The power behind competitiveness

Single Phase Photovoltaic Multimode Inverter

RPI H7U

Operation and Installation Manual

Important Safety Instruction
Save These Instructions

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1 General Information

This manual contains important instructions for RPI H7U single phase photovoltaic multimode inverter that should be followed during installation and maintenance of the inverter. The product is designed and tested according to international safety requirements, but as with all electrical and electronic equipment, certain precautions must be observed when installing and operating the product. To reduce the risk of personal injury and to ensure the safe installation and operation of the product, you must carefully read and follow all instructions, cautions and warnings in this manual.

Before starting installation or commissioning of the RPI H7U inverter, read through the entire manual and note all. All US electrical installations must comply and be in accordance with all the state, local, utility regulations, and National Electrical Code ANSI/NFPA 70. For installations in Canada, please ensure these are done in accordance with applicable Canadian standards.

1.1 Scope of delivery

Congratulations on the purchase of your Delta RPI H7U multimode solar inverter. This manual assists you in becoming familiar with this product. Please observe all safety regulations and take into account technical connection conditions required at your local grid utility.

1.2 General Warnings / Notes on Safety

Careful handling of the product will contribute to service life durability and reliability. Both are essential to ensure maximum yield from your product. As some of the solar inverter models are heavy, two people may be required for lifting purposes. The inverter installation must be performed by an authorized electrician in accordance with the local and National Electrical Code ANSI/NFPA 70 and OSHA requirements.

DANGER!

- DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.
- ANGER indique une situation dangereuse qui, si elle n'est pasévitée, est susceptible de provoquer un décès ou des blessures graves.

CAUTION !

- CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- PRUDENCE indique une situation dangereuse qui, si elle n'est pas évitée, est susceptible de provoquer des blessures légères ou de degré moyen.

WARNING !

- WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
- AVERTISSEMENT indique une situation dangereuse qui, si elle n'est pas évitée, est susceptible de provoquer un décès ou des blessures graves.

HIGH VOLTAGE WARNING!

- HIGH VOLTAGE WARNING indicates hazardous high voltages are present, which, if not avoided, will result in death or serious injury. Thus, only authorized and trained personnel should install and maintain this product.
- AVERTISSEMENT HAUTE TENSION indique la présence de hautes tensions présentant un danger susceptibles de provoquer un décès ou des blessures graves si elles ne sont pas évitées. Par conséquent, l'installation et/ou l'entretien de ce produit doivent être entreprises uniquement par un personnel autorisé et forme.

WARNING：BURN HAZARD!

- Hot surface.
- Surface chaude

INFORMATION

- Information provided that when known and used will ensure optimal operation of the system.
- La connaissance et l'utilisation des INFORMATIONS fournies garantissent un fonctionnement optimal du système.

- Wait for a prescribed amount of time before engaging in the indicated action.
- Patientez le délai requis avant d'entreprendre l'action indiquée

- Equipment grounding conductor (PE)
- (PE) Équipement conducteur de terre

1.3 Validity

This user manual describes the installation process, maintenance, technical data and safety instructions of the following solar inverter models under the DELTA brand.

• RPI H7U

1.4 Product Description

This device is a single phase photovoltaic multimode inverter. In Utility-interactive operation, it converts direct current (DC) electricity from the PV array into single-phase alternating current (AC) to feed the excess generated power back to the local grid. In standalone operation, the inverter can now be used in standalone operation and is able to supply power to phone chargers, laptops, flashlights, and small appliances.You can find the exact procedure for the standalone operation in the user manual of your inverter.

This inverter allows for a wide voltage input range (30~500VDC) and has a high performance efficiency and user friendly design and operation. This device is also usable indoors and outdoors. AC grid monitoring is done by an independent dedicated micro controller set up to meet the requirements of UL 1741 / IEEE 1547. This enables a connection of the solar inverter to the in-house grid.
It meets the requirements of ANSI/NFPA 70, NEC690.5, UL 1741, IEEE 1547, IEEE 1547.1 and IEEE 1547.A for power generation plants on low-voltage network of regional electrical utility companies. RPI H7U is a transformer less type without galvanic isolation. Therefore, the inverter may only be operated with ungrounded PV arrays. Furthermore, the PV array must be installed in accordance with the NEC690.35 (Ungrounded Photovoltaic Power Systems) and the locally valid regulations for ungrounded PV arrays. Additionally, the PV array (PV modules and cabling) must have protective insulation and the PV modules used must be suitable for use with this inverter.

The high-quality aluminum casing corresponds to protection degree NEMA 4X and is protected by an anti-corrosion finish. Simplify and efficiently disassemble inverter without removing wiring box during fault conditions. DC arc-fault circuit interrupt (AFCI) is integrated into the RPI H7U It complies the requirement as Type 1 device in UL1699B standard, series arc faults can be detected.

Features

- Peak efficiency up to 97.5%
- Widest input voltage range 30-500Vdc
- Optional rapid shutdown box
- 4 MPP Trackers provide numerous design options.
- TYPE 4X protection level
- Integrated AFCI meets the requirements of NEC 2011
- Shade managerment with global peak MPP tracking
- Built-in DC safety switch
- Detachable wiring box
- Stand-alone supply

1.5 Ambient temperature

The inverter can be operated in ambient temperatures between -13°F to 140°F (-25°C to +60°C).The following diagram illustrates how the power of the inverter is de-rating depending on ambient temperature.

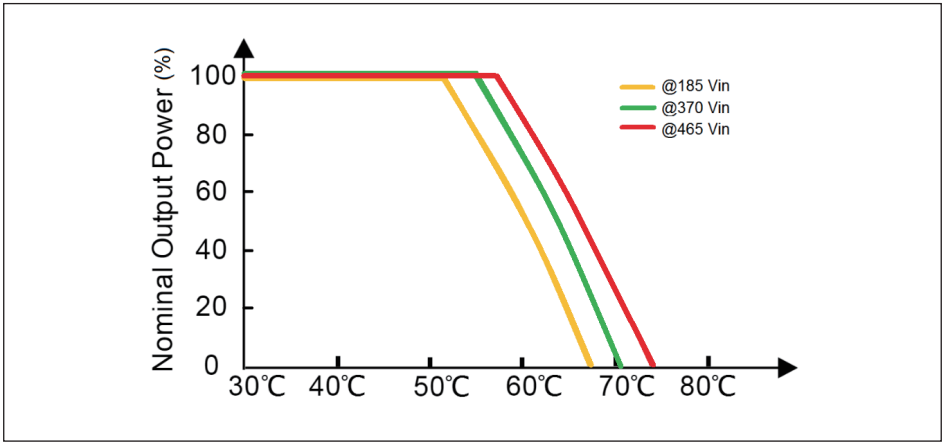


Figure 1-1 : Derated curve for H7U

1.6 Inverter DC input voltage range

Start up voltage is 30 Vdc; full power MPPT voltage is 185 Vdc;

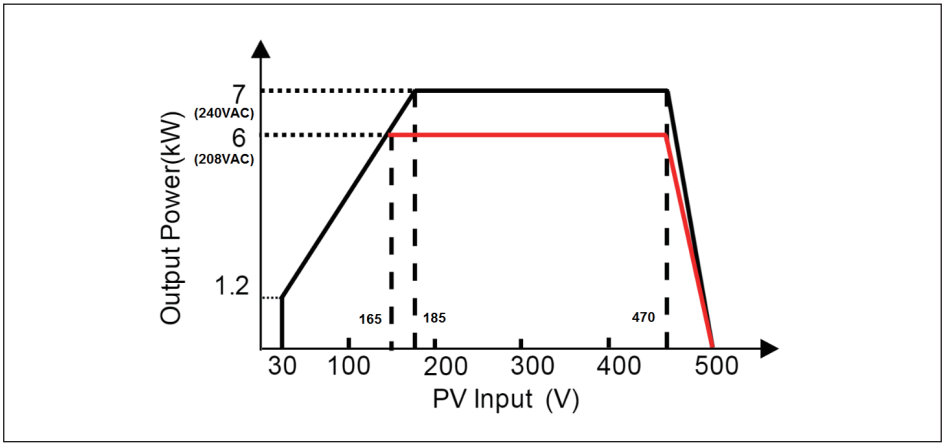


Figure 1-2 : H7U PV window

1.7 Efficiency

The best efficiency of the inverter is obtained at input voltages > 370Vdc for 240Vac grid.

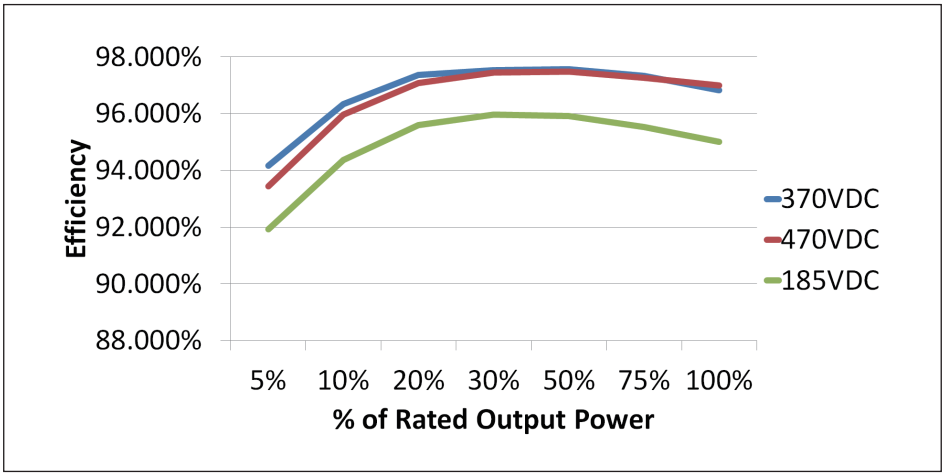


Figure 1-3 : Efficiency curve for H7U

1.8 How it Works

The operation of a solar inverter is shown in ***Figure 1-4***. In order to save energy and electricity, the solar inverter converts the DC input power supplied from the PV Array into single-phase AC output power to Grid. If there is sufficient solar irradiation during, the inverter can be used in standalone supply output mode and is able to supply power to small appliances.

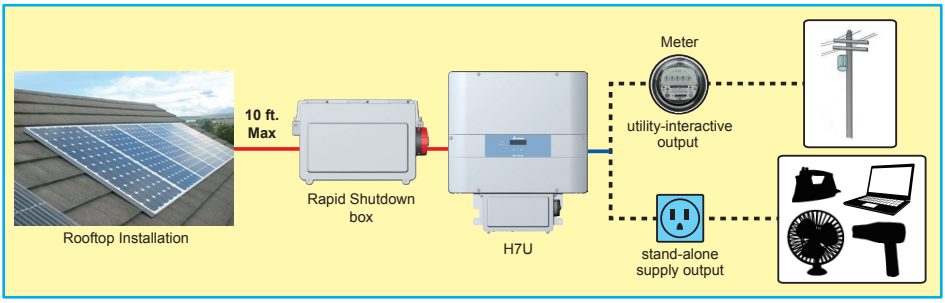


Figure 1-4 : Solar system operation illustration

1.9 Additional Information

For more detailed information for RPI H7U or other related product information, please visit : http://www.deltaww.com.

2 Installation

2.1 Installation safety

Due to the variety of users and installation environments, it is recommended to read this manual thoroughly before installation. Installation of the unit and start-up procedures must be carried out by accredited technicians.

WARNING !

- Do not install the unit near or on flammable surfaces. Please mount the unit tightly on a solid/smooth surface.
- Installation and commissioning must be performed by a licensed electrician in accordance with local, state, and National Electrical Code ANSI/NFPA 70 requirements.
- The installation and wiring methods used in the installation of this inverter in the U.S. must comply with all US National Electric Code requirements (NEC) and local Authority Having Jurisdiction (AHJ) requirements. In Canada, the installation and wiring methods used must comply with the Canadian Electric Code, parts I and II, and the local AHJ requirements. System grounding when required by the Canadian Electrical Code, Part 1, is the responsibility of the installer.
- These servicing instructions are for use by qualified personnel only. To reduce the risk of electric shock, refer all servicing to factory qualified service personnel. No user serviceable is contained inside the inverter.

CAUTION !

- The unit or system is provided with fixed trip limits and shall not be aggregated above 30KW on a single point of common connection.
- The unit should not be installed in direct sunlight.
- To reduce the risk of fire, connect only to a circuit provided with dedicated circuit over current protection in accordance with the National Electrical Code, ANSI/NFPA70.

2.2 Unpacking

Unpacking process is shown as ***Figure 2-1.***

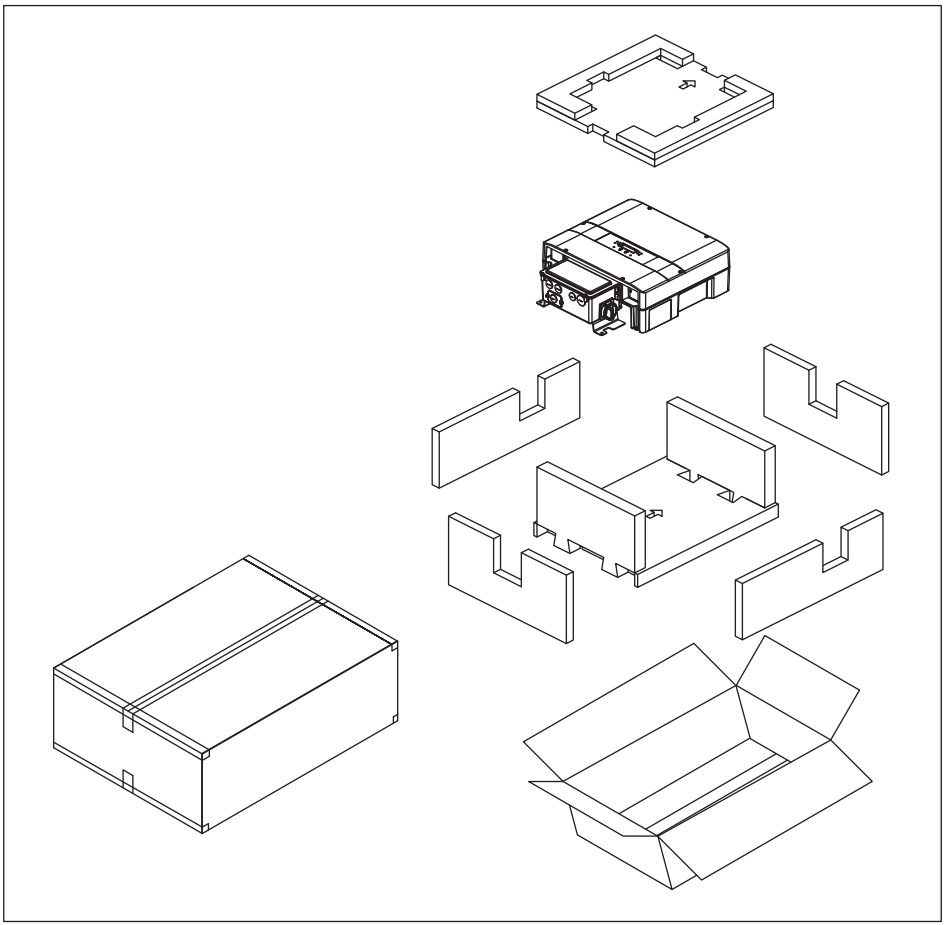


Figure 2-1 : Unpacking process for H7U

Upon receiving your brand new RPI inverter, you will be required to remove its protective packaging. This packaging consists of various materials that will need to be disposed of according to the specific recycling marking printed on them. Please note that cardboard may be recycled, whereas polystyrene foam may not. Please dispose of the packaging materials in a correct manner to ensure a better environment for us all.

2.3 Package Inspection

Unforeseeable events causing damage or movement may occur during shipment. Please check for damage on the packaging upon receiving your inverter.

Please check the model number and the serial number on the packaging is identical with the model number and serial number on the unit itself.
Check if all the accessories are in the package, the standard accessories are list as ***Table 2-1***:

RPI H7U		
Object	**Qty**	**Description**
PV Inverter	1	Solar inverter
User Manual	1	The installation manual is designed to provide information on safety, installation, technical specifications and safe operation of the inverter.
Wall-Mount Bracket	1	Wall-mount bracket to mount the solar inverter securely on the wall
M4 Screw	2	To fix solar inverter on the bracket

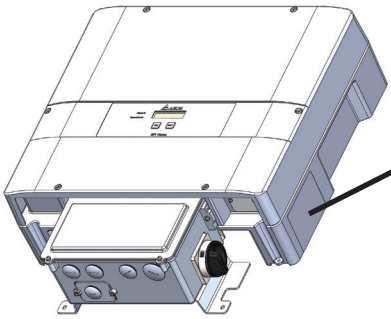
Table 2-1 : Packing list

CAUTION !

If there is any visible damage to the inverter/accesories or any damageto the packaging, please contact your inverter supplier.

2.4 Identification Label

Users can identify the model number by the information on the product label. The model number, serial number and other specifications can be located on the product label. For label location, please refer to ***Figure 2-2***.



RPI H7U DELTA

Single Phase Photovoltaic Multimode Inverter

DC Rating		
DC Max. Input Voltage		500V
DC Nominal Operation Voltage		370V
DC Operation Voltage Range		30V-500V
DC Max. Input Current		4X10A
AC Rating (Grid-tied)		
AC Nominal Output Voltage	208V	240V
AC Operation Voltage Range	183-228V	211-264V
AC Max. Continuous output power	6000VA	7000VA
AC Operation Frequency Range		59.3HZ-60.5HZ
AC Nominal Output Frequency		60Hz
AC Output Power Factor		1
AC Max. Output Current		30A
AC Rating (Stand-Alone)		
AC Nominal Output Voltage		120V
AC Max. Output Power		1500W
AC Max. Output Current		13A
Type of enclosure		Type 4X
Operating temp. range		-25 to +60℃

Conforms to UL Std.1741
Certified to CSA Std.C22.2 No.107.1

Tested To Comply With FCC Standards

Intertek 3128764

AVERTISSEMENT
Risque de choc électrique

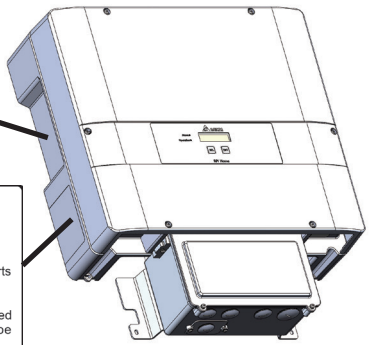
1. les plaques sont à nu. Débrancher UN' appareil avant son entretien.
2. Ne pas retirer le couvercle. Aucune pièce n'est réparable par l'utilisateur. Faire appel à un réparateur qualifié pour toute intervention de dépannage.
3. Cet appareil contient deux sources de courant, alternatif et continu. Chaque circuit doit être coupé avant toute intervention de dépannage.
4. Quand le panneau Photovoltaïque est exposé à la lumière, il fournit un courant continu à l'appareil.
5. Une charge électrique à haute tension est contenue dans le condensateur et dans le circuit associé. testez avant de toucher.
6. Des conducteurs normalement mis à terre peuvent se révéler défectueux et mis sous tension si un défaut de terre est signalé.

AVERTISSEMENT

1. Cet appareil renferme plusieurs circuits sous tension. Voir le schéma
2. L'alimentation provient de plus d'une source
3. Raccordé au service public

AVERTISSEMENT
Surfaces chaudes

1. Ne pas toucher , risque de brûlures.



CAUTION
Risk of Electric Shock

1. Plates are live. Disconnect unit before servicing.
2. Do not remove cover. No user serviceable parts inside. Refer servicing to qualified service personnel.
3. Both ac and dc voltage sources are terminated inside this equipment. Each circuit must be individually disconnected before servicing.
4. When the photovoltaic array is exposed to light, it supplies a dc voltage to this equipment.
5. High-energy electric charge is stored in the capacitor and associated circuitry Test before touching.
6. Normally grounded conductors may be ungrounded and energized when a ground-fault is indicated.

WARNING

1. More than one live circuit. See diagram.
2. Power fed from more than one source
3. Utility-interconnected

CAUTION
Hot surfaces

1. To reduce the risk of burns. Do not touch.

Wiring Box

This is the compartment where all the wiring for the inverter inputs and outputs plus the RS-485 communication is done.

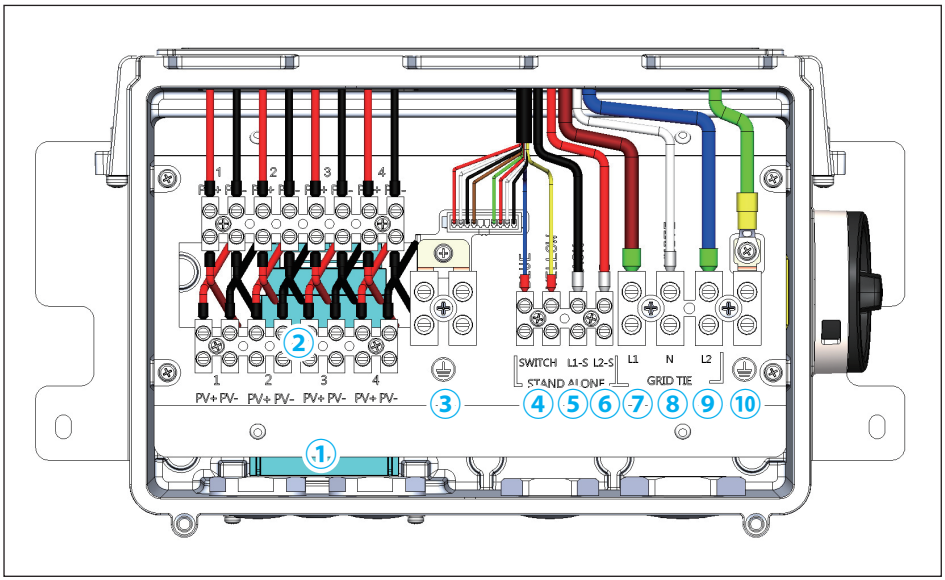


Figure 2-2 : Location of wiring box conneciton option

The warning label located in the wiring box enclosure as shown above indicates that there are multiple live DC and AC wire.

Wiring Box - This is the compartment where all the wiring for the inverter inputs and outputs plus the RS-485 communication is done.

Required torques for wiring box terminals

① RS-485 communication ports (22 AWG / 1 Nm = 8.85 lbs-in)
② PV Negative Terminals (12 AWG / 0.5 Nm = 4.43 lbs-in)
③ Grounding Terminals (10 - 8 AWG / 1.2 Nm = 10.62 lbs-in)
④ Stand alone switch (12 AWG / 0.5 Nm = 4.43 lbs-in)
⑤ AC Stand alone L1 (12 AWG / 0.5 Nm = 4.43 lbs-in)
⑥ AC Stand alone L2 (12 AWG / 0.5 Nm = 4.43 lbs-in)
⑦ AC Grid side L1 (10 - 8 AWG / 1.2 Nm = 10.62 lbs-in)
⑧ AC Grid side Neutral (10 - 8 AWG / 1.2 Nm = 10.62 lbs-in)
⑨ AC Grid side L2 (10 - 8 AWG / 1.2 Nm = 10.62 lbs-in)
⑩ Equipment Grounding Terminals (10 - 8 AWG / 1.2 Nm = 10.62 lbs-in)

3 Product Overview

3.1 Dimensions

Due to the variety of users and installation environments, it is recommended to read this manual thoroughly before installation. Installation of the unit and start-up procedures must be carried out by accredited technicians.

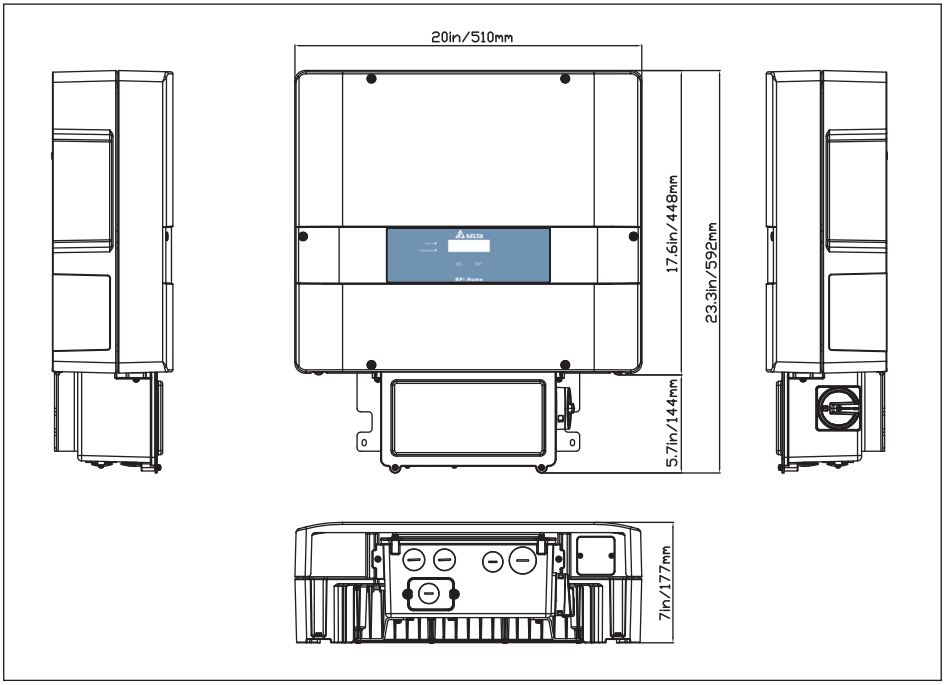


Figure 3-1 : Dimensions of RPI H7U

3.2 Function Introduction

The Inverter's exterior is shown in ***Figure 3-2***. The description for individual objects can be found in sections 3.2.1 and 3.2.2.

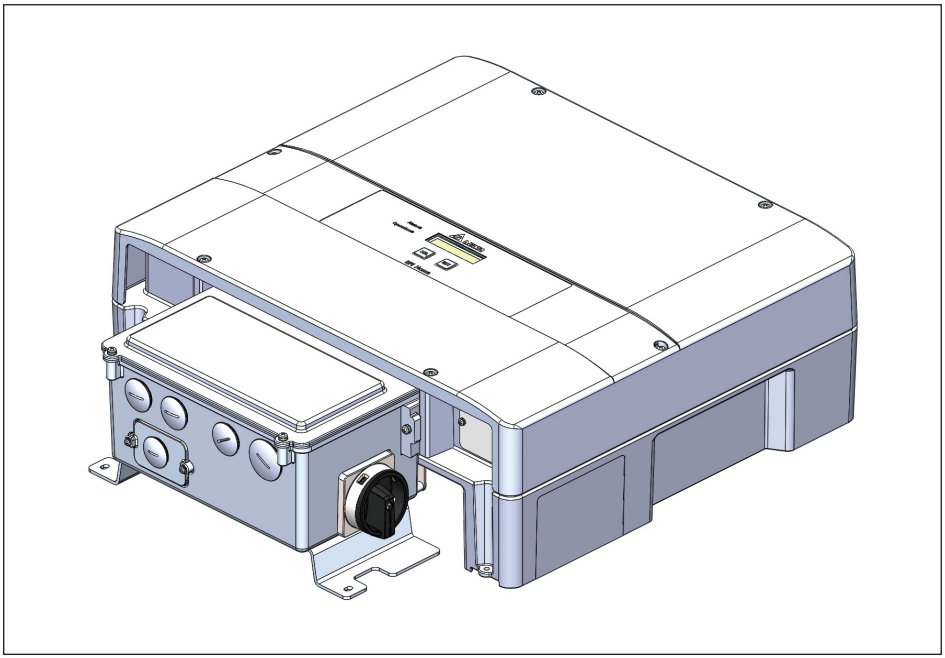


Figure 3-2 : Inverter exterior objects

1. Wiring Box Cover - This is the cover for the wiring compartment.
   Please note the DC disconnect must be in the OFF position before this cover can be removed.

2. Wiring Box - This is the compartment where all the wiring for the inverter inputs and outputs plus the RS-485 communication is done.

3. Conduit Opening - There are one - 1" conduit openings, and one - 1/2" conduit openings and three – 3/4" conduit openings . Each conduit opening comes fitted with a conduit plug that should be removed before installing conduit fittings. Conduit fittings need to be water tight with a type 4, 4X, 6, or 6X rating.

3.2.1 LCD Display and Buttons

The Inverter's exterior is shown in ***Figure 3-2***. The description for individual objects can be found in sections 3.2.1 and 3.2.2.

Figure 3-3 : LCD display and buttons

A further description features

1. LED Indicators - The two LED indicators show errors or status as described in Section 7.
2. LCD - The 16 character, 2 lines LCD shows important messages regarding the inverter status and performance.
3. Display Control Keys - These 2 keys allow the user to access status and performance information and to change settings via the display.

3.2.2 Inverter Input/Output Interface

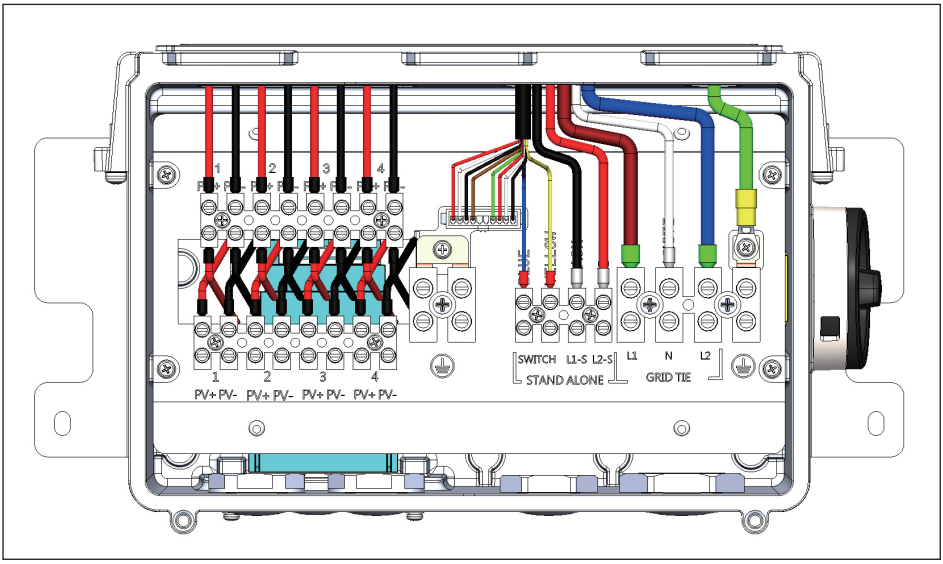


Figure 3-4 : Input/output interface

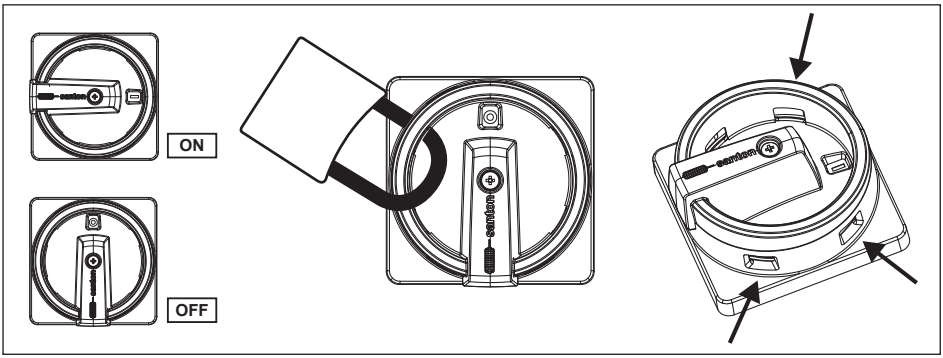


Figure 3-5 : Lockable DC Switch

Note: Lockable DC Disconnect

DC Disconnect shown with lock in off position.
There are three openings on the disconnect where a lockout padlock can be attached as shown above.

3.3 Mounting

This unit is designed to be wall-mounted. Please ensure the installation is perpendicular to the floor and the AC plug located at the base of the unit.
Do not install the device on a slanting wall. The dimensions of the mounting bracket are shown in the figure below. 8 ofφ5.5mm screws are required for the mounting plate(hole size: φ6.5mm). Fix the supplied wall-mount plate securely on the wall before attaching the inverter onto the mounting plate.

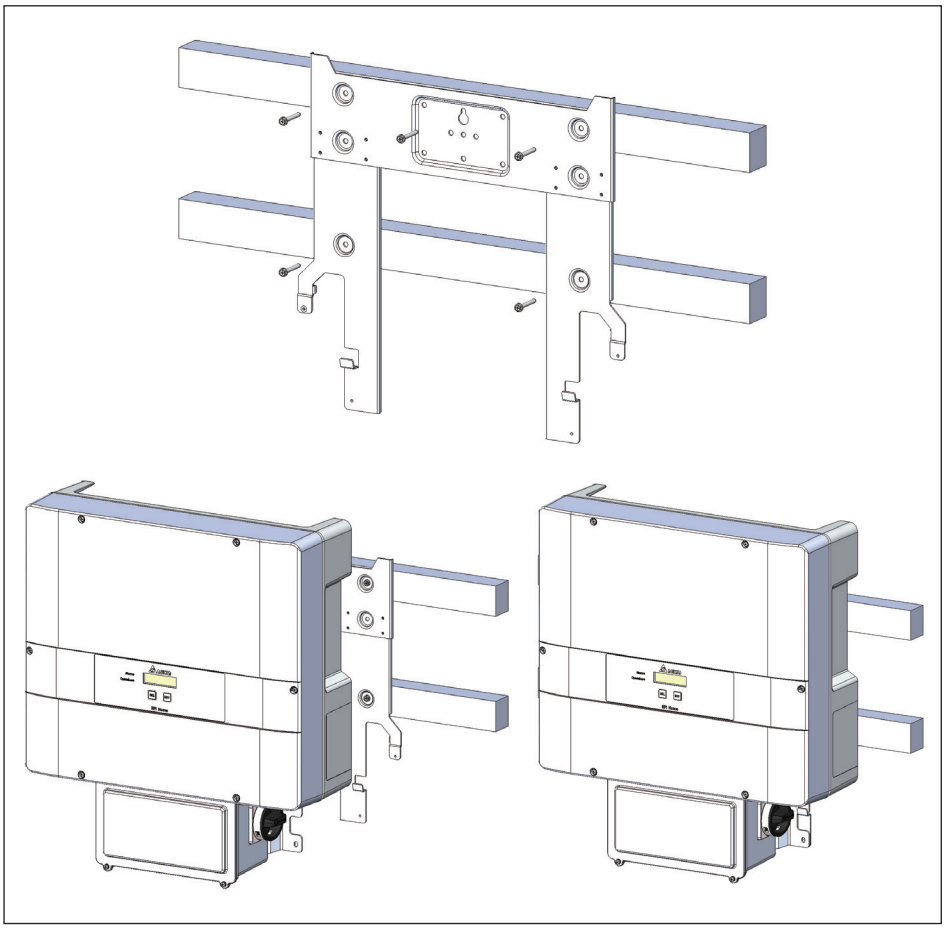


Figure 3-6 : Attaching the mounting bracket for RPI H7U

Please make sure the inverter is installed vertically.

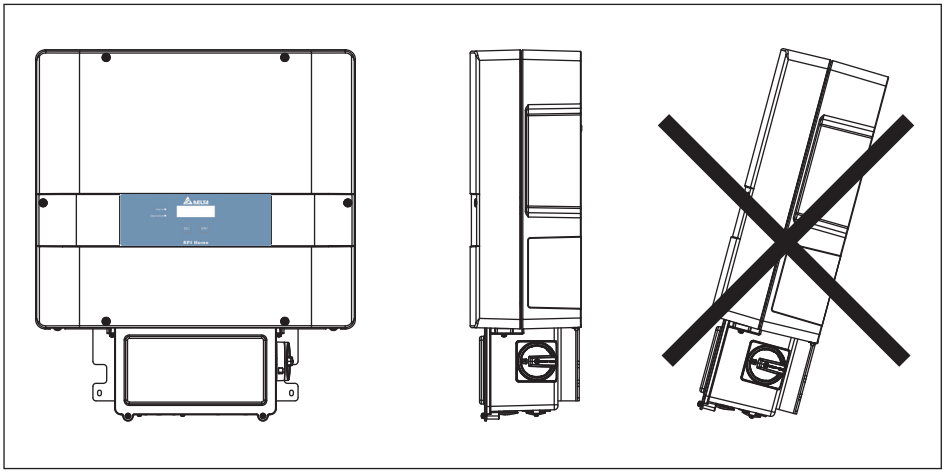


Figure 3-7 : Correct and incorrect installation illustration

Installation location:

1. The bracket supplied with the unit is specially designed and should be the only mounting device used for the unit.
2. It is recommended to install the inverter in a suitable location which offers easy and safe access for service and maintenance.
3. Please leave an appropriate gap in between units when installing multiple solar inverter systems.
4. Please install solar inverter at eye level to allow easy observation for operation and parameter setting.
5. Chose a mounting height that allows easy access viewing of the display.
6. Ensure inverter ambient temperature is within -13°F to +104°F (-25°C to +40°C) for optimal efficiency of the PV system.
7. Ensure the mounting hardware meets the appropriate building code.
8. Avoid installation on resonating surfaces (light construction walls etc.).
9. Despite having a NEMA 4X enclosure with a soiling category III certification, the inverter must not be exposed to heavy soiling.
10. Ensure the mounting hardware and structure can support the weight of the inverter.

Please ensure the spacing requirement to allow for sufficient convective cooling. It is essential to ensure sufficient space for product operation as shown in ***Figure 4-3***. The National Electric Code may require significantly larger working clearances (see NEC Section 110.26)

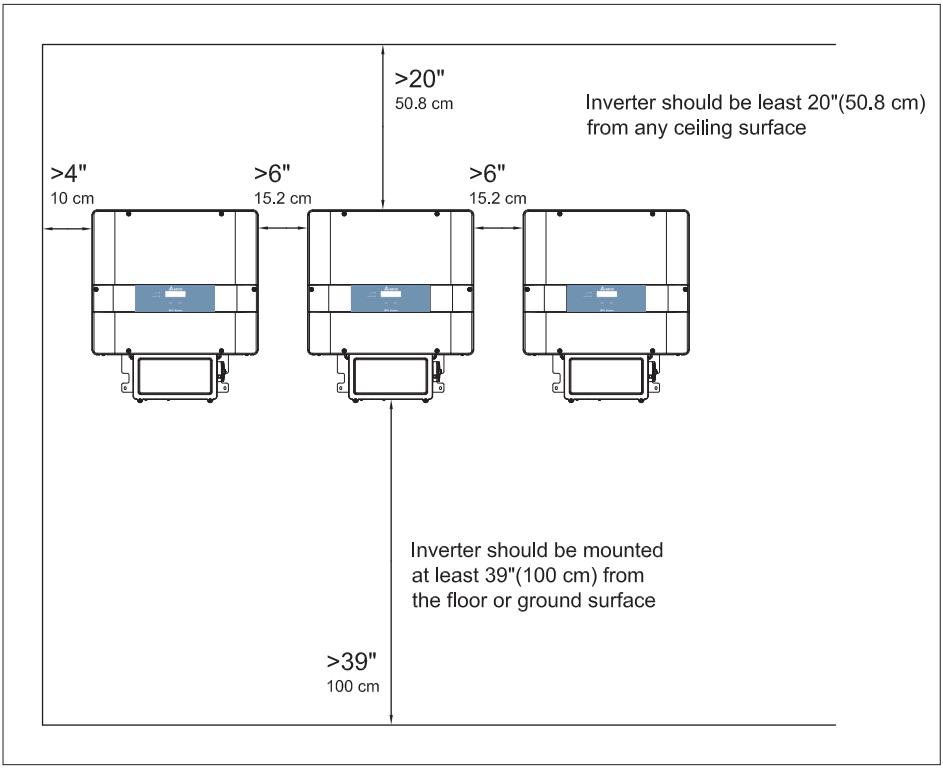


Figure 3-8 : Adequate installation gap

4 Electrical connections

4.1 General safety

WARNING !

- Installation and commissioning must be performed by a licensed electrician in accordance with local, state, and National Electrical Code ANSI/NFPA 70 requirements. Use 90°C (194 °F) copper solid or stranded wire only for all DC and AC wiring to the PVI inverter to optimize system efficiency.
  Size conductors per NEC requirements.
- Before connecting the inverter to the AC distribution grid, approval must be received by the appropriate local utility as required by national and state interconnection regulations, and must be connected only by qualified personnel.

DANGER!

- PV solar arrays produce hazardous voltages and currents when exposed to light which can create an electrical shock hazard. Use dark opaque sheets to cover the PV solar array before wiring or connecting cable terminations.

CAUTION !

- Do not attempt to open or repair the inverter. The inverter is factory sealed to maintain its NEMA 4X rating. Breaking the seal will void the inverter warranty.
- The AC output circuits are isolated from the enclosure. When required, providing PV system grounding electrode conductor (GEC) is the responsibility of the installer. See NEC 690.41. 690.42 and 690.43.

4.2 Preparation before Wiring

WARNING !

- Installation and commissioning must be performed by a licensed electrician in accordance with local, state, and National Electrical Code ANSI/NFPA 70 requirements.
- Input and output circuits of this unit are isolated from the enclosure System grounding must be done in accordance with the National Electrical Code (NEC). Compliance is the responsibility of the installer
- Establish electrically safe work conditions by ensuring there are no live voltages present on PV input and AC output circuits and that all dedicated DC and AC disconnects/breakers are locked out and tagged. Verify that the inverter‘s DC disconnect and AC disconnect are in the “OFF” position, before inverter installation.
- Inverter warranty is void if the DC input voltage exceeds the inverter‘s 500 Vdc maximum

DANGER! SHOCK HAZARD

- Whenever a PV array is exposed to sunlight, a shock hazard may exist due to output wires or exposed terminals. To reduce the risk of shock during installation, cover the array with an opaque (dark) material and ensure that the Disconnect Device in the inverter is set to OFF before commencing any wiring.

CAUTION !

- Before any electrical wiring can be connected to the inverter, the inverter must be permanently mounted.
- Ensure voltage values and polarities are correct.

Whole system wiring can be seen as below.
Please refer to ***Figure 4-1*** for Inverter electrical diagram.

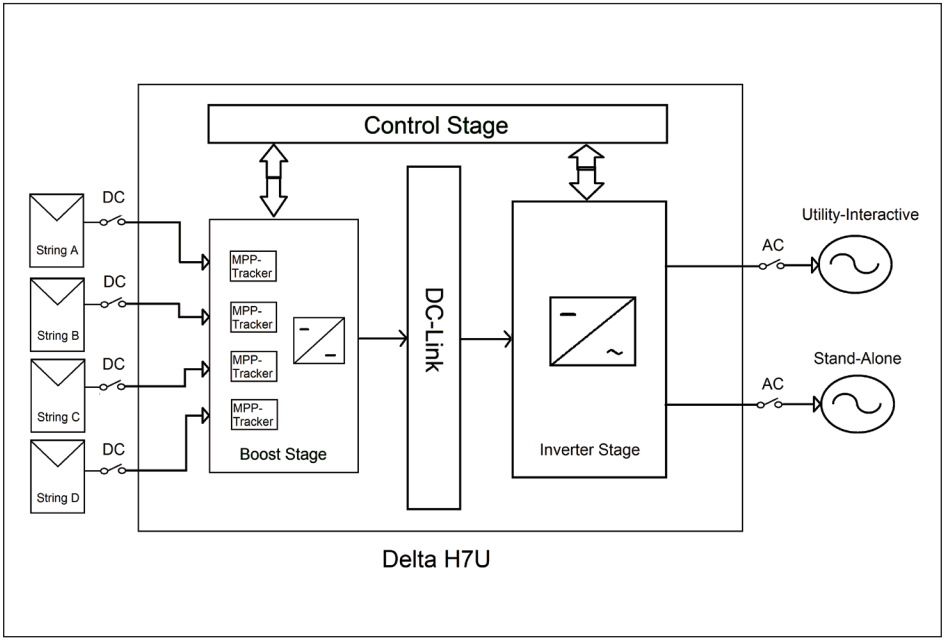


Figure 4-1 : Connection of a system for floating solar array

4.3 AC Grid Connection

WARNING !

- Before commencing AC wiring, please ensure AC breaker is switched off.

CAUTION !

- The RPI H7U solar Inverters must never be connected to a 120 Vac utility service. NEC 690.64(b)(1) requires that the inverter be connected to a dedicated circuit with no other outlets or devices connected to the same circuit.

The RPI H7U solar inverters operate grid-tied to the utility voltage.
PVI inverters are software configurable via the user display panel for various 208 Vac or 240 Vac 60 Hz service.

Voltage – 1547.1 USA 208V

	Voltage range
Under voltage range 2	V < 104 V
Under voltage range 1	104 V < V < 184V
Over voltage range 1	228 V < V < 250 V
Over voltage range 2	V > 250 V

Voltage – 1547.A USA 208V

	Voltage range
Under voltage range 3	V < 94 V
Under voltage range 2	94V < V < 125V
Under voltage range 1	125V< V < 184V
Over voltage range 1	228 V < V < 250 V
Over voltage range 2	V > 250 V

Table 4-1 : Voltage protection Range (208)

Voltage – 1547.1 USA 240V

	Voltage range
Under voltage range 2	V < 120 V
Under voltage range 1	120 V < V < 212 V
Over voltage range 1	264 V < V < 288 V
Over voltage range 2	V > 288 V

Voltage – 1547.A USA 240V

	Voltage range
Under voltage range 3	V < 108 V
Under voltage range 2	108 V < V < 144 V
Over voltage range 1	144 V < V < 212 V
Over voltage range 1	264 V < V < 288 V
Over voltage range 2	V > 288 V

Table 4-2 : Voltage protection Range (240)

Frequency – 1547.1 USA

	Solar system size	Frequency range
Over frequency range 1	≤ 30 kW	60.0 Hz < f < 60.5 Hz
Under frequency range 1	≤ 30 kW	59.3 Hz * < f < 60.0 Hz

Frequency – 1547.A USA

	Solar system size	Frequency range
Over frequency range 2	≤ 300W	f > 62 Hz
Over frequency range 1	≤ 300 W	60.5 Hz< f < 62 Hz
Under frequency range 1	≤ 300 W	f < 57 Hz
Under frequency range 2	≤ 300 W	57 Hz< f < 59.5 Hz

Table 4-3 : Frequency protection Range

Grid configurations allowed:

The Figure below illustrates commonly used transformer types.
Remember, when connecting to the utility, the phase relationship is not important.
But the voltage must be compatible.

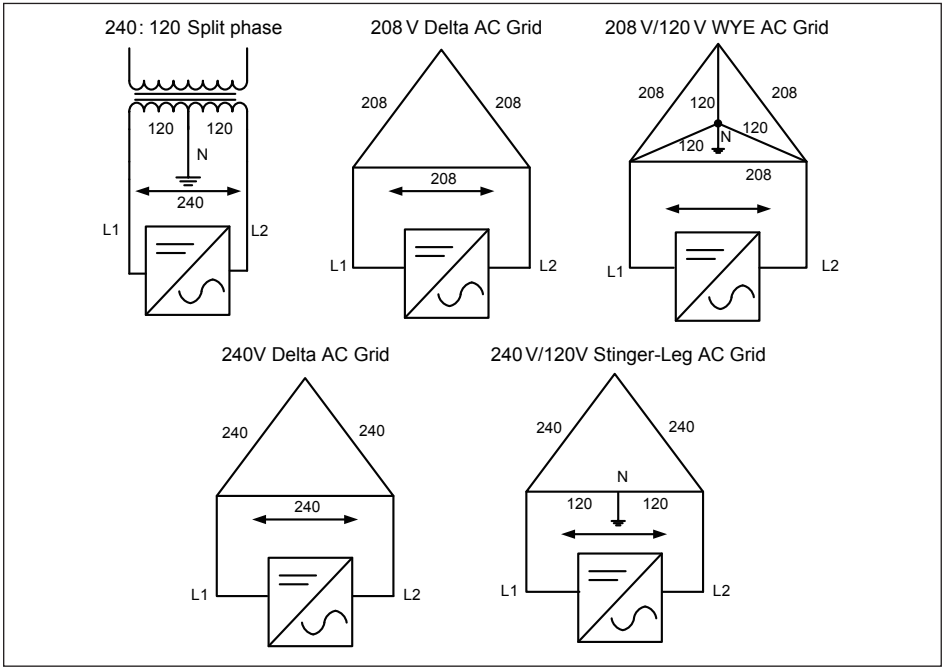


Figure 4-2 : Grid configurations allowed of UL market

WARNING !

- Do not connect the inverter to the 480 V Delta or 480 V / 277 V WYE power grids.

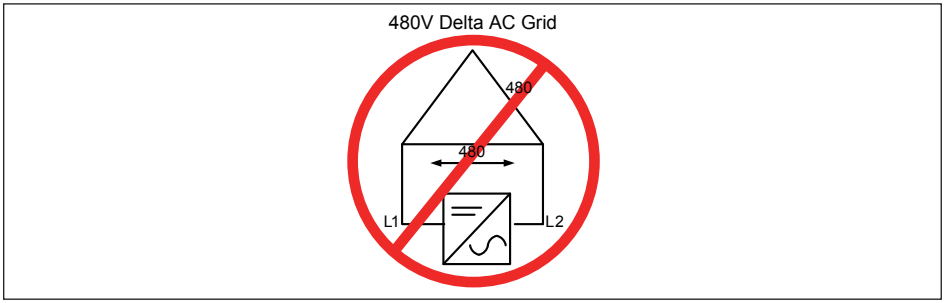


Figure 4-3 : 480 Delta AC grid of UL market

4.3.1 Required protective devices and cable cross-sections

AC circuit breaker

There must be a circuit breaker or fuse to protect each AC phase, L1 and L2. The over current protection device should be able to handle the rated maximum output voltage and current of the inverter. Please refer to the table below to determine the appropriate circuit breaker size to avoid potential fire hazards. The National Electrical Code (NEC), ANSI/NFPA 70 or applicable local electrical codes must be followed when determining maximum branch-circuit over-current protection requirements.

	Power rating	Upstream circuit breaker
RPI H7U	7 kVA	2-pole, 40 A 208/240 V_{ac}

Table 4-4 : Recommended upstream protection

Current Rating	Wire size	Torque
>30 A (RPI H7U)	3-4mm^2 / 8 AWG	1.2 Nm

Table 4-5 : AC wire requirement

Grounding Electrode Conductor (GEC)

NEC 690.47, a GEC must be installed, and the Grounding Electrode Terminal (GET) conductor must be sized in accordance with NEC article 250.166.
The GET conductor should be terminated at the GET screw terminal inside the wiring box compartment.

Lightning and surge protection

RPI H7U inverters are designed and certified to meet stringent UL 1741 / IEEE 1547 and ANSI/ IEEE 62.41/62.42 AC lighting and surge requirements; however, every PV installation is unique, thus additional external UL/NEC AC and DC surge protection and solid grounding practice are recommended.
The inverter comes equipped with class II AC and DC surge arrestors.

4.4 Stand alone power supply

The inverter is equipped with an integrated stand alone power supply module to which an external socket-outlet can be connected.

If there is sufficient solar irradiation, you can use the inverter as an energy source via the connected socket-outlet. The inverter can now be used in standalone power supply operation and is able to supply power to phone chargers, laptops, flashlights, small appliances, and televisions. You can find the exact procedure for the stand alone power supply operation in the user manual of your inverter.

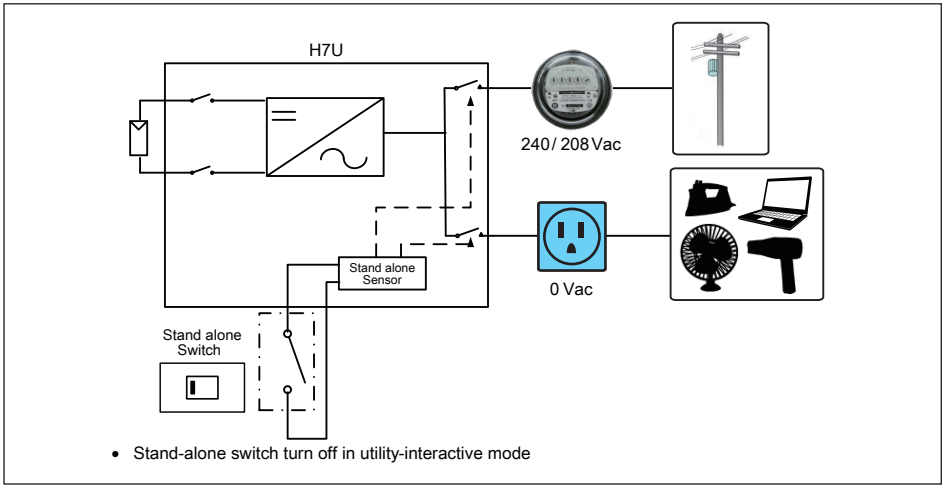


Figure 4-4 : Inverter in utility-interactive operation

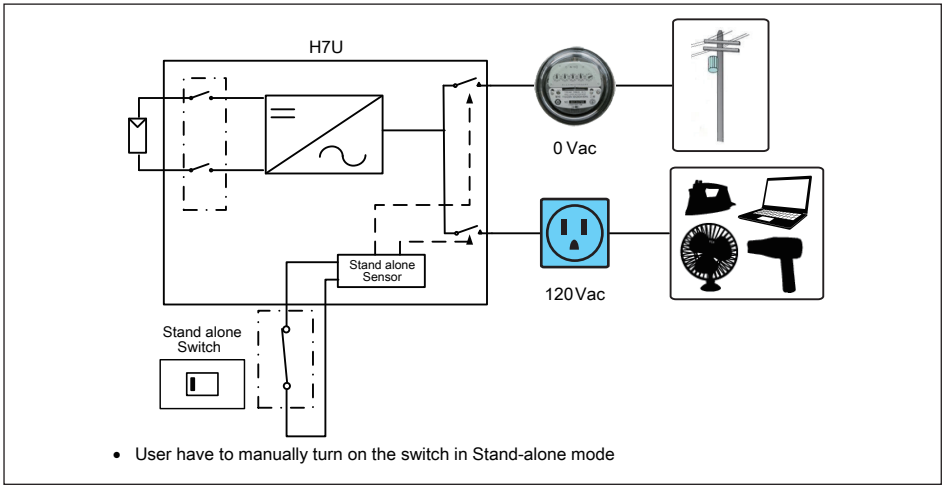


Figure 4-5 : Inverter in standalone operation

CAUTION !

Inverter is not possible power distribution gird in standalone operation.

Standalone power supply Operation

In order to use the inverter in standalone power supply operation, there must be sufficient solar irradiation. However, standalone power supply operation is not possible as long as the inverter is in feed-in operation. The inverter activates the standalone operation If the switch of the socket-outlet is set to "ON", the electrical power can be used. Hence, the inverter regulates the stand alone power supply automatically at the socket-outlet as long as there is sufficient solar irradiation.

Stand alone power supply operation only stops when the switch of the socket-outlet has been turned "OFF". The inverter returns to utility-interactive operation.
It feeds power into the utility grid again.

Restrictions for the Standalone Supply Operation

Power Fluctuation

The power available during standalone supply operation depends on the solar irradiation on the PV modules. The power can fluctuate considerably depending on the weather or may not be available at all. Therefore, please do not supply loads with the standalone supply operation that rely on a stable voltage supply, such as medical devices.

Low Solar Irradiation

The inverter interrupts the standalone supply operation when solar irradiation is too low, inverter will alarm standalone overload, but it tries to continue the standalone supply operation automatically after 60 seconds.

Behavior at Night

Since there is no solar irradiation present, standalone supply operation is not possible at night. Inverter will be shown night mode information.

Overload of the Socket-Outlet

The inverter will interrupt standalone supply operation in the case of an overload of the socket-outlet; however, it will try to continue standalone supply operation automatically every 60 seconds. This can lead to the inadvertent starting of a connected load.

Only connect loads that have a power consumption of 1,500 watts or less.

If inverter connect a power strip, the sum of the input power of all loads connected to the power strip, may not exceed 1,500 watts as well.

Technical Data

Maximum AC voltage	125 V
Maximum AC current	13 A
Maximum power	1,500 W

Table 4-6 : Stand alone technical data

Installation and Wiring

The installer is responsible for supplying and installing a switch and outlet to enable the standalone feature. The figure below illustrates the wiring of a typical combination switch and outlet to the standalone module in the inverter.

Note that the switch and socket-outlet are wired to operate independently and it is not necessary that the switch and outlet are part of a single device.

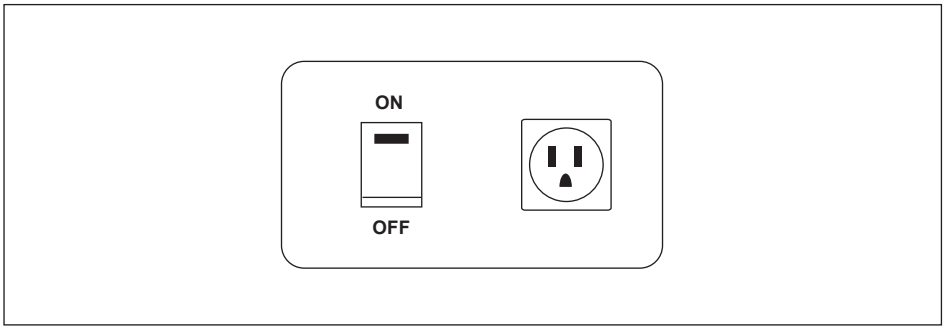


Figure 4-6 : Sample wiring of combination switch and socket-outlet

National Electrical Code Compliance

Section 690.61 of ANSI/NFPA 70, National Electrical Code (NEC), permits a normally interactive system to operate as a standalone system when disconnected from the utility electrical power system. RPI H7Uinverters equipped with the standalone comply with National Electrical Code (NEC) 690.61 for interactive and standalone operation.

Section 690.10(B) of ANSI/NFPA 70, National Electrical Code (NEC) requires over current protection for conductors “between the inverter output and the building or structure disconnecting means” in a standalone system. When installed and wired according to the installation manual, the standalone outlet conductors form a dedicated circuit that is isolated from other premises wiring of the building or structure. Power to the standalone outlet can only be supplied from the inverter and the inverter operates as a current limited device. Therefore, the conductors between the inverter and the standalone outlet should not require additional over current protection.

4.5 Opening the wiring box cover

WARNING !

- Ensure no live voltages are present on PV input and AC output circuits, and verify that the DC disconnect is in the “OFF” position, and that are dedicated AC and DC disconnects/breakers locked out before inverter installation.

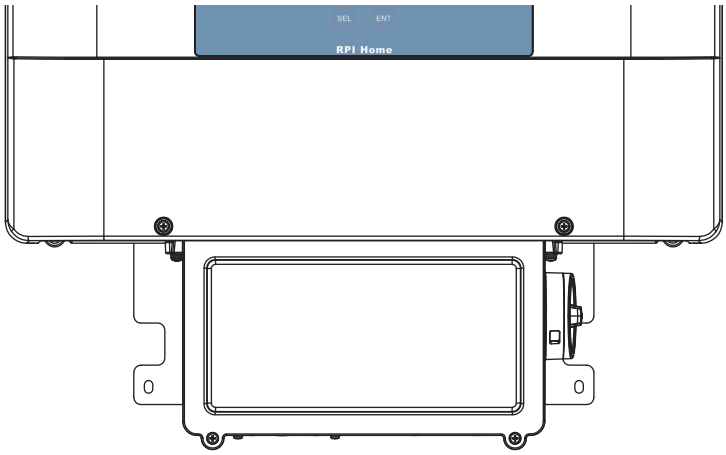


Figure 4-7 : Removing the wiring box cover

1. Place DC Disconnect switches in “OFF” position. Please note the cover cannot be removed when the DC Disconnect switch is in the “ON” position.

2. Remove the 2 cover screws (torques1.6 Nm = 14.16 lbs-in) indicated above.

3. Lift the cover upward and place it off to the side.

Wiring box conduit openings

Conduit openings are provided for 1“ inch,3/4” inch and ½” inch conduit fittings. If the conduit fitting used is between 1“ inch, 3/4” inch and ½” (2.54 cm,1.90cm and 1.27 cm), an appropriate conduit reducer should be used.

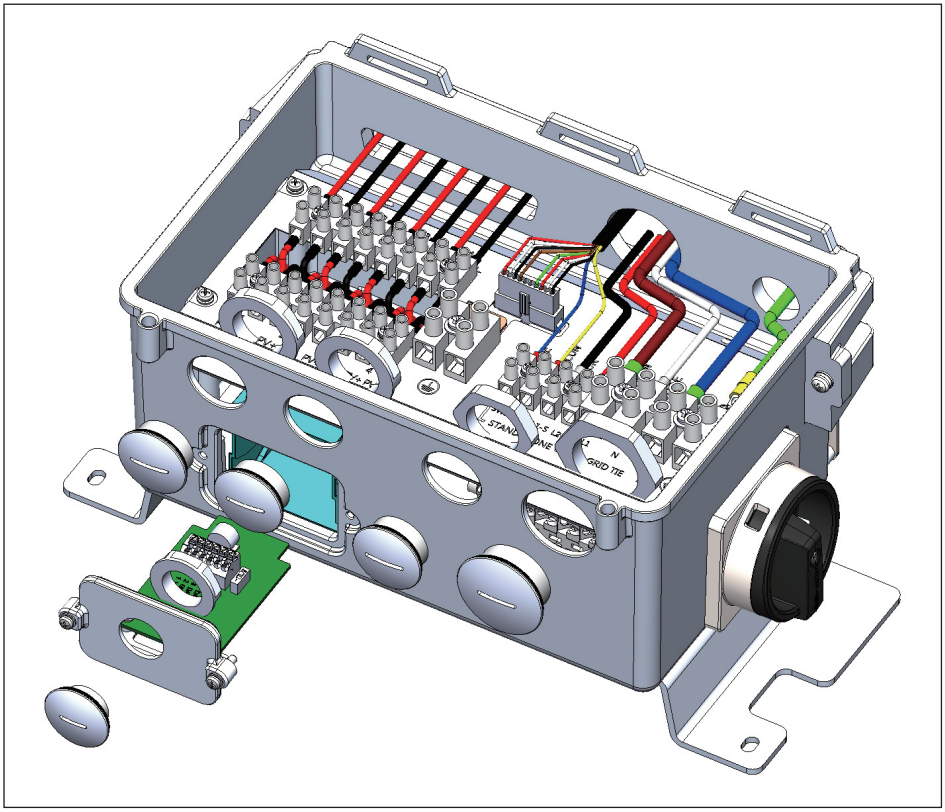


Figure 4-8 : Wiring box conduit opening locations

The conduit plugs are removed by placing a flat head screwdriver in the slot on the conduit plug face and turning it while gripping the nut on the inside of the enclosure. Unscrew the nut from the conduit plug and slip the conduit plug out of the conduit opening.

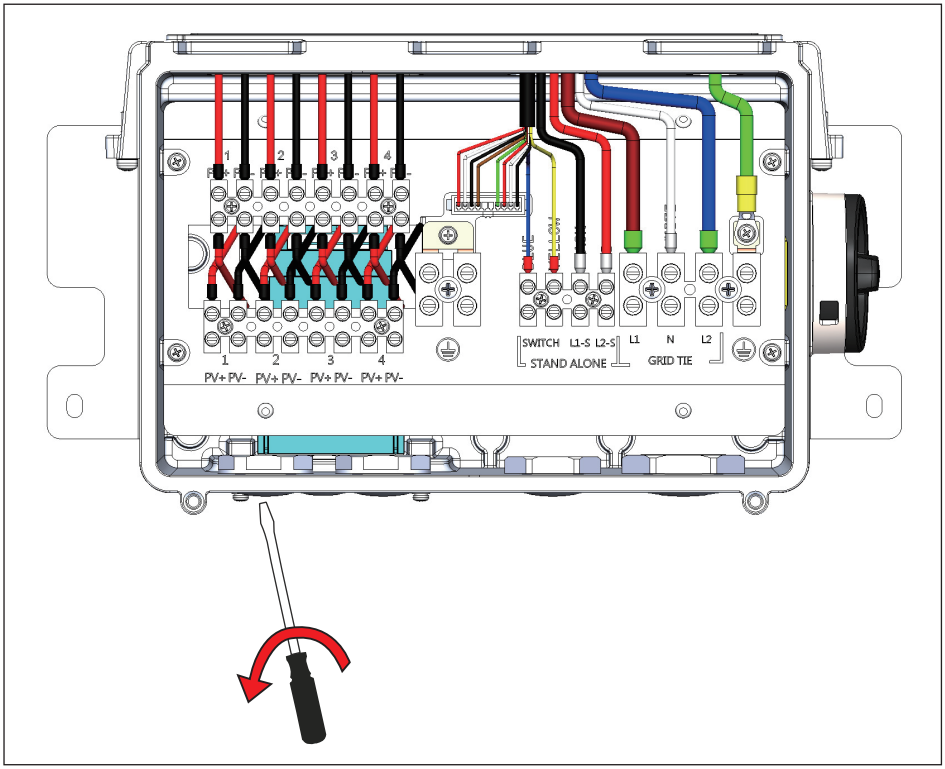


Figure 4-9 : Wiring box conduit plug removal

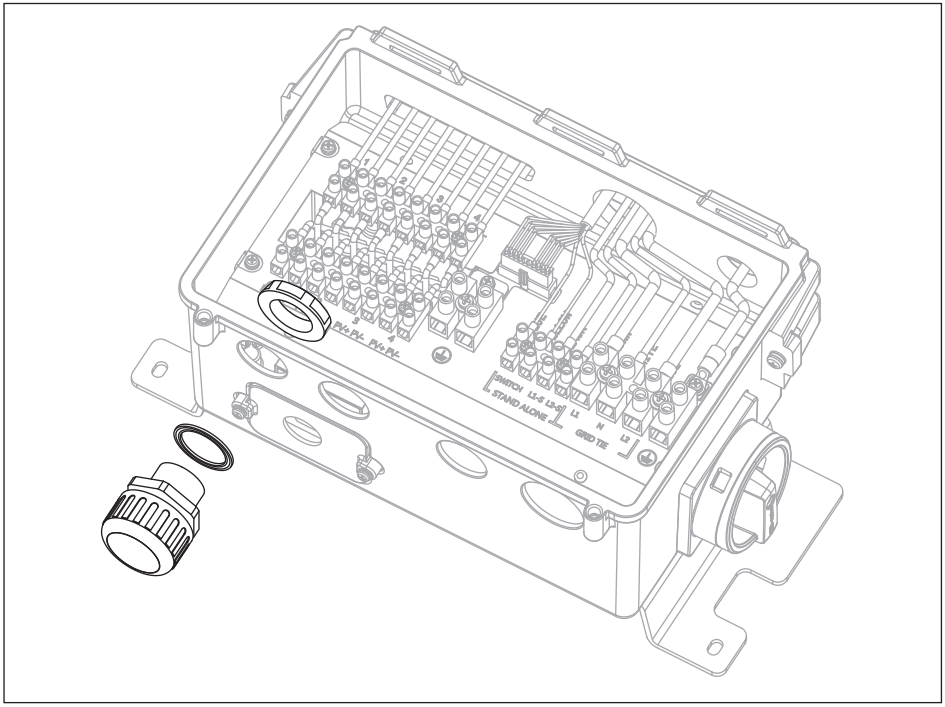


Figure 4-10 : Conduit installation and wiring routing

Conduit fittings need to be water tight with a NEMA 4, 4X, 6, or 6X rating. Once conduit and fittings are installed, route wiring through the conduit and fitting and allow a 6 inch strain relief service loop within the wiring box compartment.

4.6 DC Connection (from PV Array)

DANGER! Electric shock hazard.

- The DC conductors of this photovoltaic system are ungrounded and may be energized.
- The DC conductors of this photovoltaic system are ungrounded but will become temporarily grounded without indication when the inverter measures the PV array isolation.

WARNING !

- Risk of electric shock and fire. Uses only with PV modules tha are listed for use with system voltage of 500V.
- When undertaking DC wiring please ensures that the DC isolator switch on the PV array is OFF.
- When undertaking DC wiring, please ensure the correct polarities are connected.

INFORMATION

- The PV Array positive or negative leads must not be connected to ground.
- All screw terminals accept solid or stranded copper 12 AWG wire only.
  A torque wrench with a flat head screw driver is recommended for tightening screw terminals to a 4.43 in-lbs. (0.5 Nm) torque.

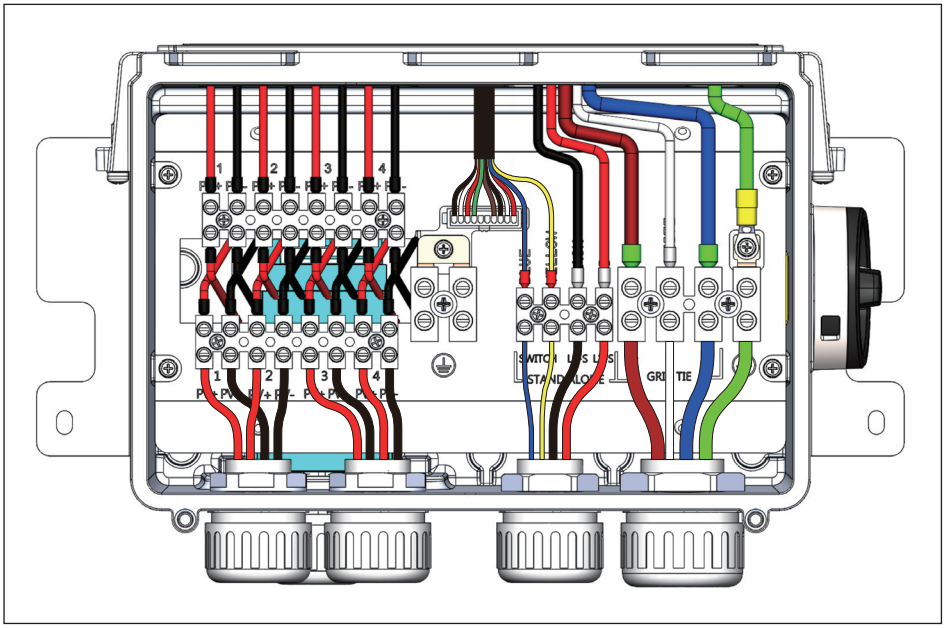


Figure 4-11 : Wiring box diagram

PV input connections:

1. Verify that the exposed wires are at least 6 inches in length to provide adequate strain relief and wire end strip length. Secure the conduit into both fittings then tighten conduit fit tings to manufacturer's recommended torque.

2. Connect the positive lead from each PV array string to 1 of the PV Positive Terminals (A) in the wiring box compartment. Using a torque wrench, tighten the screw terminal to 4.43 in-lbs (0.5 Nm) of torque.

3. Connect the negative lead from each PV array string to 1 of the PV Negative Terminals (B) in the wiring box compartment using a torque wrench; tighten the screw terminal to 4.43 in-lbs (0.5 Nm) of torque.

4.7 AC Connection

WARNING !

- Installation and commissioning must be performed by a licensed electrician in accordance with local, state, and National Electrical Code ANSI/NFPA 70 requirements.
- Verify that the dedicated 2-pole 240 V_{ac} / 208 V_{ac} circuit breaker in the building electrical service panel is turned-off and locked out.
- Ensure no live voltages are present on PV input and AC output circuits, and verify that the DC disconnect, AC disconnect, are in the “OFF” position, before inverter installation.

INFORMATION

- All screw terminals accept solid or stranded copper 10 - 8 AWG wire only. A torque wrench is recommended for tightening screw terminals to a 10.62 in-lbs (1.2 Nm) torque.

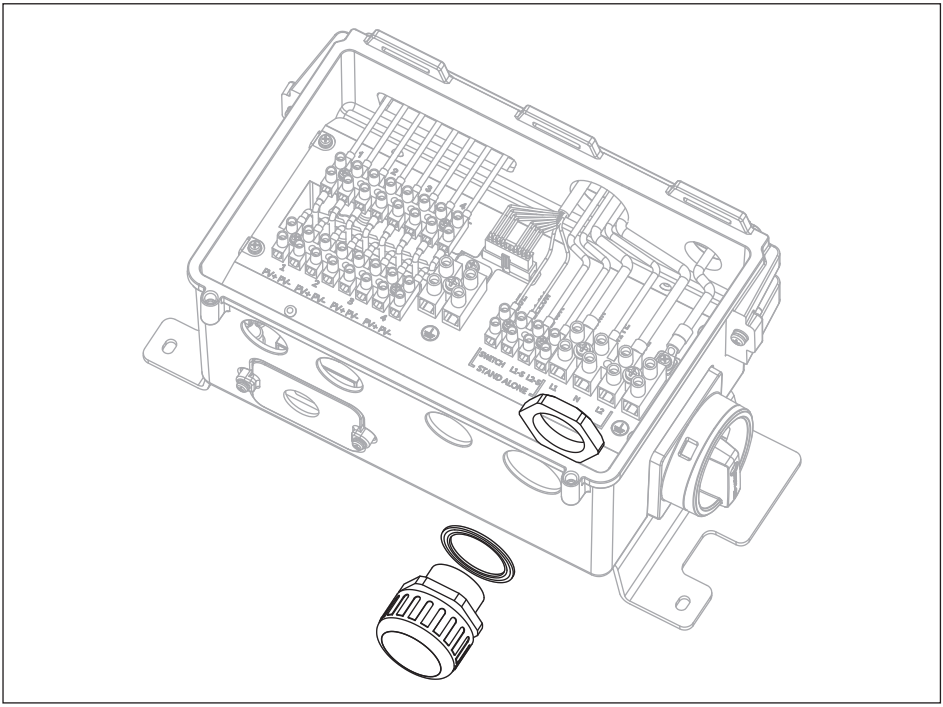


Figure 4-12 : Conduit installation and AC wiring routing

Conduit fittings need to be water tight with a NEMA 4, 4X, 6, or 6X rating once conduit and fittings are installed, route wiring through the conduit and fitting and allowing a 6 inch strain relief loop within the wiring box compartment.
The conductor size shall not be smaller than the 75°C wire size based on the amp cities given in table 310.16 of the NEC, ANSI/ NFPA 70 and an additional de-rating factor of 125% as indicated by UL1741.

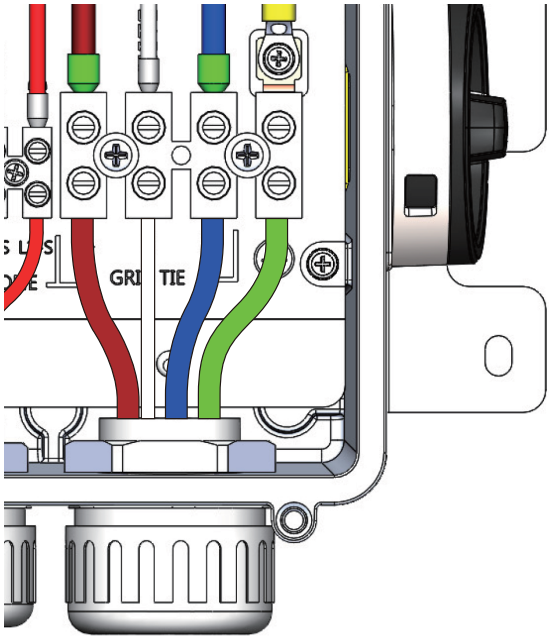


Figure 4-13 : Wiring box AC assembly - terminal labelling

WARNING !

- An additional external AC disconnect may be required by your local AHJ. Please check local regulations to determine if the AC disconnect is required for your installation.

AC output wire connections:

a. Utility-interactive operation wiring.

1. Mount the external AC disconnect (if required by local AHJ) near the inverter.
2. Install conduit fitting and conduit into the wiring box compartment from AC disconnect or utility service panel.
3. Route AC wiring through conduit and verify that the exposed wires are at least 6 inches in length to provide adequate strain relief and wire end strip length. Secure the conduit into both fittings then tighten conduit fittings to manufacturer's recommended torque.
4. Terminate inverter's AC output wires inside the AC disconnect or junction box.
5. Connect the AC system GND ⏚ wire to the screw terminal (A) and using a 3/16"(4mm) flat blade cabinet screw driver tighten the screw terminal to 10.62 in-lbs (1.2 Nm) of torque.
6. Connect the Neutral wire to the [N] screw terminal (B), L1 wire to the [L1] terminal (D),L2 wire to the [L2] terminal (C),using a torque wrench, tighten the screw terminal to 10.62 in-lbs (1.2 Nm) of torque.

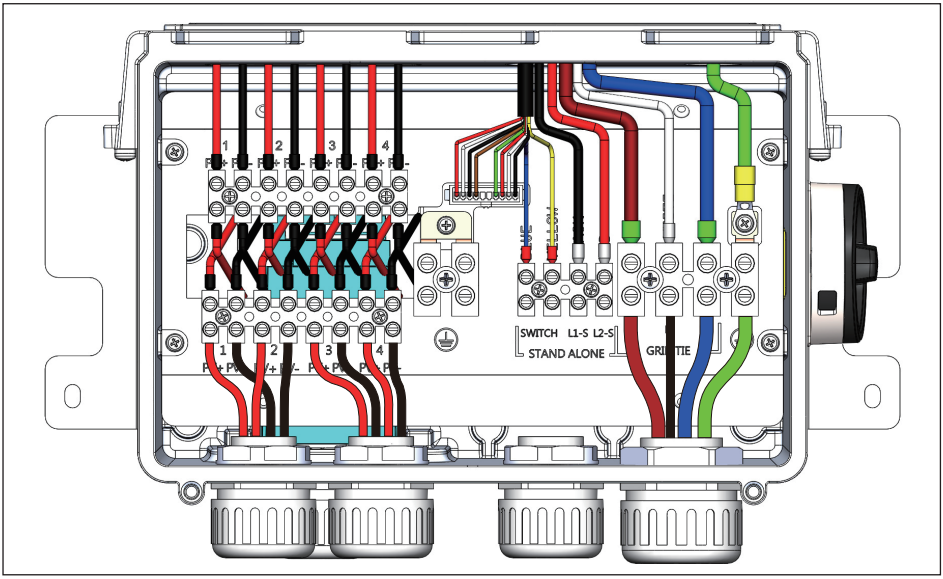


Figure 4-14 : Utility-interactive operation wiring diagram

CAUTION !

Inverter is not possible power distribution gird in standalone operation.

b. Standalone operation wiring

1. If the inverter is in Utility-interactive operation, disconnect it.
2. Install the conduit with conduit fitting in the enclosure opening.
3. Feed the cable through the conduit to the terminals.
4. Strip off the conductor insulation.
5. Insert the insulated conductors for connecting the switch into the [Switch] terminals.
6. Insert the insulated conductors for connecting the outlet into the [L1-S] and [L2-S] terminals.
7. Ensure that the grounding cable of the module is connected to the ground ⏚ connection in the inverter.
8. Connect the insulated conductors that are connected to the [L1-S] and [L2-S] terminals to the outlet.
9. Connect the insulated conductors that are connected to the [Switch] terminals to the switch.
10. Label the switch using the supplied label. Label the closed switch position with "ON" and the opened switch position with "OFF".

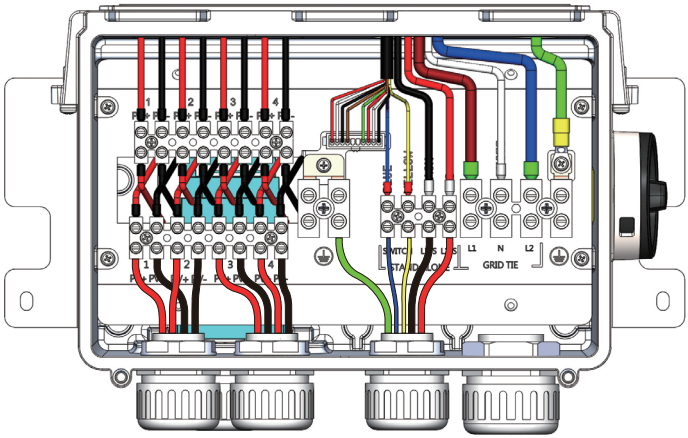


Figure 4-15 : Stand-alone operation wiring diagram

WARNING !

- Danger of fire due to short circuit a short circuit can occur in the standalone supply operation if the insulated conductors of the outlet and the switch have been swapped. The short circuit can cause a fire in the switch.

4.8 Communication Module

The Communication Module enables communication between the unit and a computer and provides 2 RS-485 ports. When using this module, the first step is to take off the cover located at the bottom right of inverter and pull out the RS-485 socket as shown in ***Figure 4-16***.

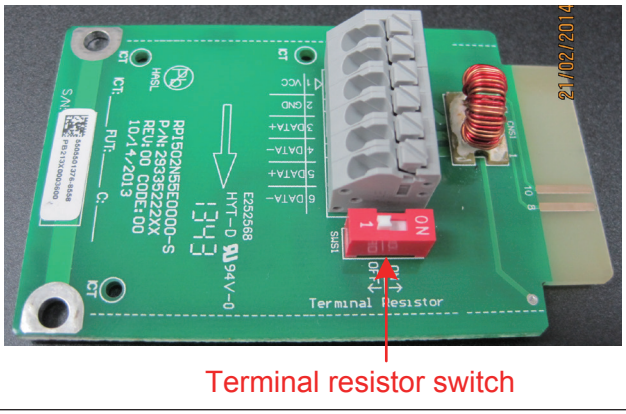


Figure 4-16 : Communication module

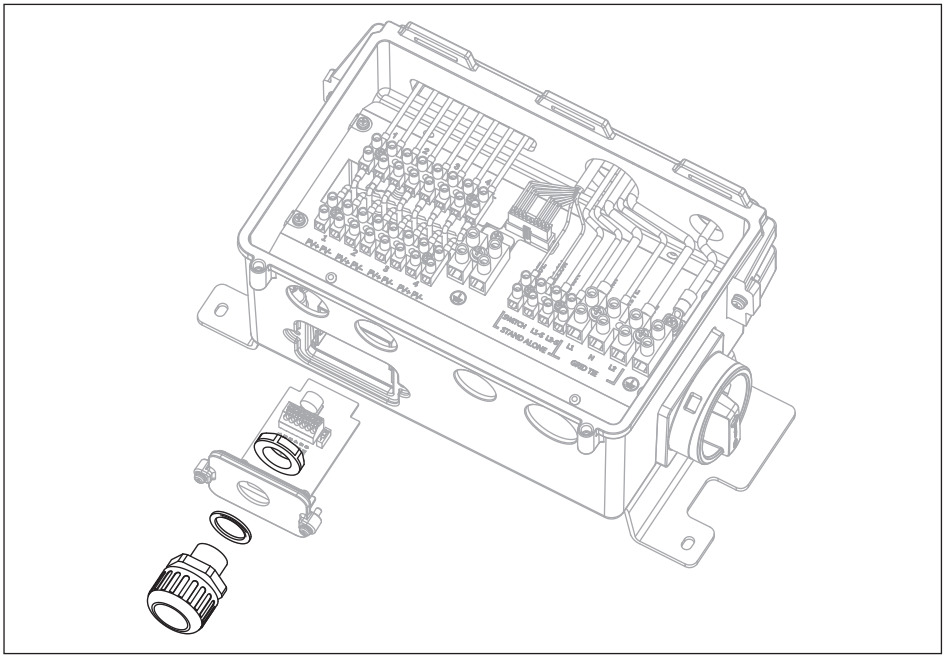


Figure 4-17 : Conduit installation and Communication wiring routing

4.8.1 RS-485 Connection

The pin definition of RS-485 shown in ***Table 4-7*** and protocol settings are listed in ***Table 4-8***. Installer must switch the terminal resistor switch to ON when only a single inverter is installed. The wiring of multi-inverter is shown in ***Figure 4-14***. The terminal resistor switch of the first and last inverters should be switched ON, and the others OFF.

PIN	FUNCTION
1	VCC
2	GND
3	DATA+
4	DATA-
5	DATA+
6	DATA-

Table 4-7 : Definition of RS-485

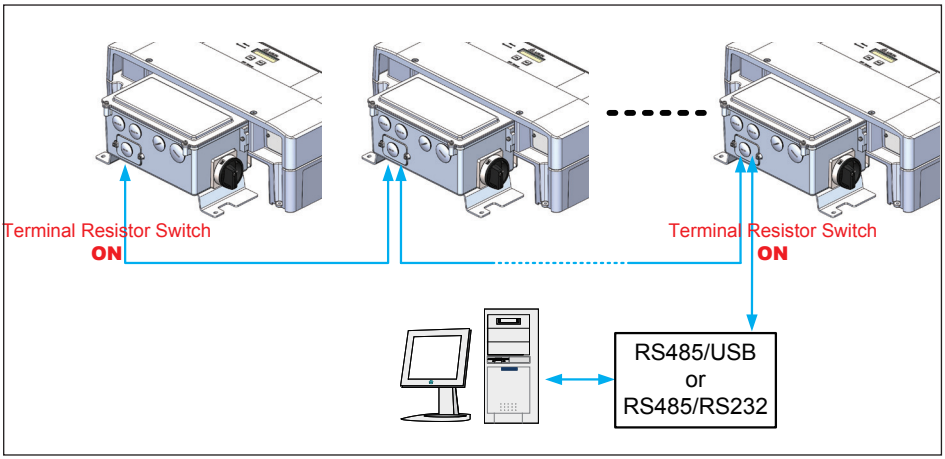


Figure 4-18 : Multi-inverter connection illustration

RS-485 Data format	
Baud rate	9600 / 19200(default)
Data bit	8
Stop bit	1
Parity	N/A

Table 4-8 : RS-485 data format

5 PV Commissioning

WARNING !

- Installation and commissioning must be performed by a licensed electrician in accordance with local, state, and National Electrical Code ANSI/NFPA 70 requirements.
- Verify that the dedicated 2-pole 240 Vac / 208 Vac circuit breaker in the building electrical service panel is turned-off and locked out.

INFORMATION

- Wearing full PPE, with the disconnect in the “OFF” position, verify the PV input polarity once more simply by carefully using a 500 Vdc rated digital volt meter and probing the positive (+) and negative (-) PV array connections.

5.1 Status LEDs

LED Indicators

- Alarm: RED
- Operation :Green

LED	Normal	Count down	FW update	Error/Fault	No or low DC input	Thermal derating
Green	ON	Blink(on/off 1s)	Blink(on/off 1s)	OFF	OFF	Blink(on 1.4s, off 0.2s)
Red	OFF	OFF	Blink(on/off 1s)	ON	OFF	OFF

Information on the LED messages is provided in section 8. Diagnosis and maintenance

5.2 Display and Keypad

Component

5.2.1 Display layout

The display has 2 rows of 16 characters each. The first row contains the name of the currently displayed menu. The second row shows the menu elements.

5.2.2 Keypad

Symbol	Use
SEL	• Move forward in a menu • Set a value
ENT	• Select a menu entry • Open a configurable value for editing • Finish editing (adopt the set value)

5.3 Inverter turn-on procedure

Firstly, uncover the PV arrays and expose them to full sunlight. Please note, the sunlight must be intense enough to produce the required output voltage for the inverter to start up Measure the PV array open circuit DC voltage across the DC positive (+) and negative (-) terminals.

Unlock and turn on the dedicated 2-pole 240 Vac / 208 Vac circuit breaker in the building electrical service panel. Switch the DC and AC disconnection switches (breakers) to “ON”. Check the inverter LCD display. The start-up screen should appear in several seconds.

5.4 Inverter turn-off procedure

1. Turn off the AC disconnect.
2. Turn off the dedicated 2-pole 240 Vac / 208 Vac circuit breaker in the building electrical service panel and lock it out.
3. Turn off the DC disconnect.

5.5 Standard initial commissioning

Brief overview of the commissioning steps

- Select the grid voltage configuration
- Set up the RS-485 communication

Detailed description of the commissioning steps

1. Check all connections and cables for damage and correct seating. Correct the installation if necessary.
2. Switch on the DC disconnect, the start-up process of the inverter begins. After the start-up process and the automatic self-test, the initial commissioning procedure of the inverter starts and the Installation menu is displayed.
3. Select a country setting.

Country Setting:

Upon first start-up of the device, Country selection is required.

1. In the country setting page, press “SEL” button (NEXT) to select your country, press “ENT” button to confirm this page.
2. Press “Enter” button to confirm your country setting.

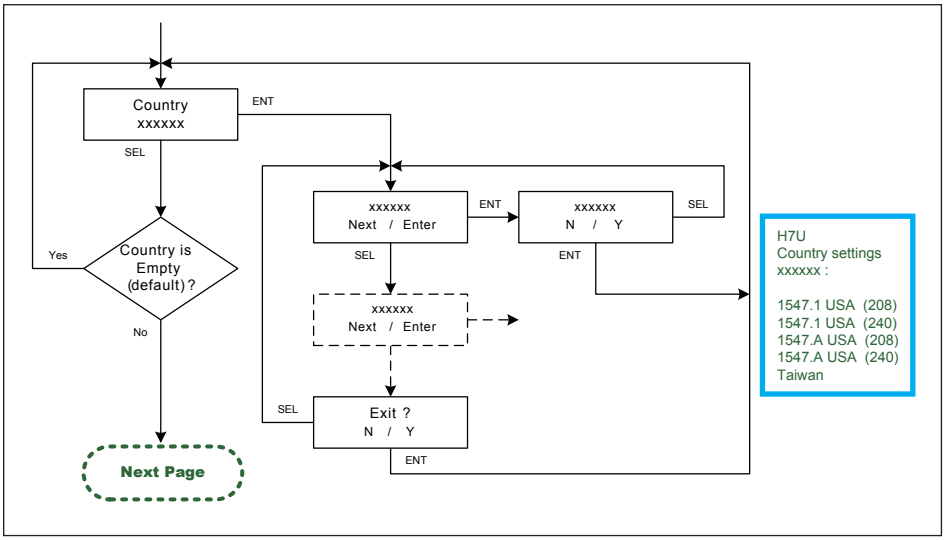


Figure 5-1 : Country Setting

Grids available for standard commissioning

Display text Description	
1547.1 USA 208Vac 1547.A USA 208Vac (Automatically Neutral detection)	USA 208V DELTA 3 PHASE SYSTEM
	USA 208V/120V WYE 3 PHASE SYSTEM
1547.1 USA 240Vac 1547.A USA 240Vac (Automatically Neutral detection)	USA 240 DELTA 3 PHASE SYSTEM
	USA 240/120 STINGER LEG 3 PHASE SYSTEM
	USA 240/120 SPLIT PHASE SYSTEM

Table 5-1 : Grids available for country setting

Inverter ID Setting

1. Press “Select” button until “Inverter ID: XX" is shown in the LCD.
2. Press and hold both buttons (“Enter” first, then “Select”) entering setting ID screen, then release both buttons and set ID by pressing “Select” button, then press “Enter” button if the ID is correct (ID = 1 ~ 254).
3. Inverter ID is changed and saved.

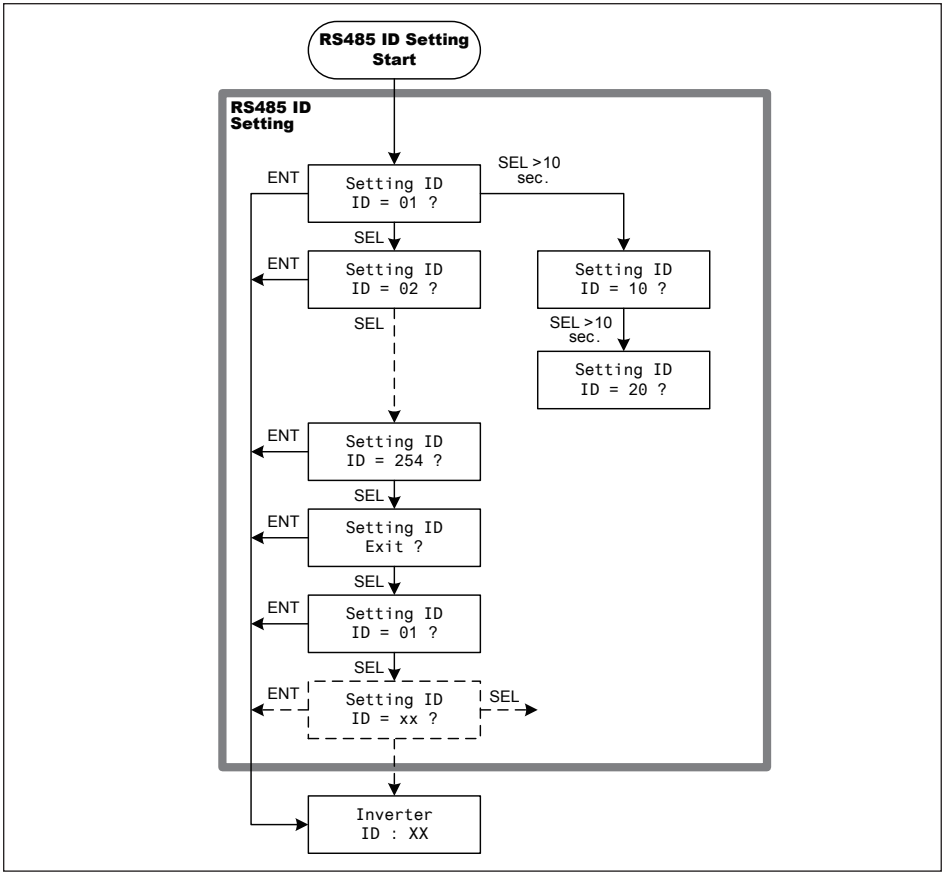


Figure 5-2 : Inverter ID flowchart.

Multiple inverters can be monitored via the inverter’s RS-485 connection, but each inverter’s ID must be assigned a unique value.

INFORMATION

- Make sure the inverter ID is different from each other in the same RS485 chain.
- 220 ohm termination resistor must be connected to the last inverter in the series.

5.6 Setting values

You can set parameters in several menus.
The **SEL** key increases the value of the parameter.
Pressing the **ENT** key causes the new parameter value to be adopted.
The example on the next page illustrates the procedure for changing the value of a parameter. This procedure is the same for all configurable parameters.

Example: Time Setting

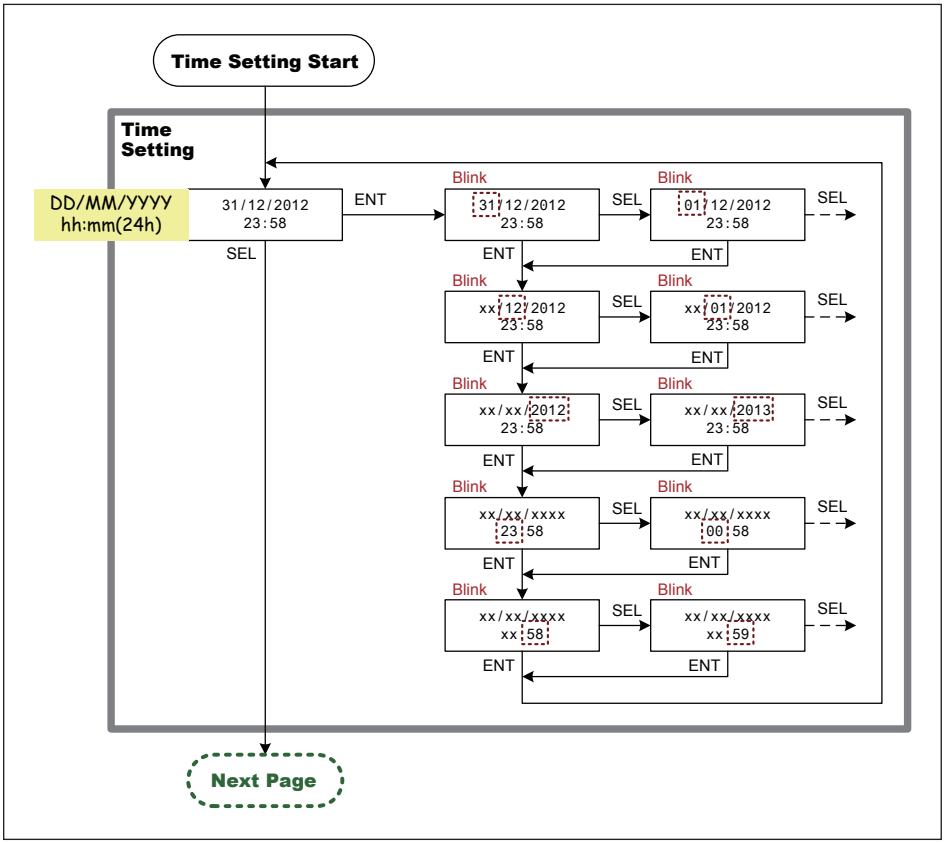


Figure 5-3 : RTC time setting

6 Inverter information

6.1 Starting up the Inverter

Switch the DC and AC disconnection switches (breakers) to “ON”.
Check the inverter LCD display. The start-up screen should appear in several seconds (for the first time start up, select proper country, language and set correct date and time, see “6.1.2 Language Selection & 6.1.3 Country Selection).

6.1.1 Inverter Install Setting

Figure 6-1 shows display flowchart overview.
It helps installers know more about overall flowchart, and get easy and fast to set all items.

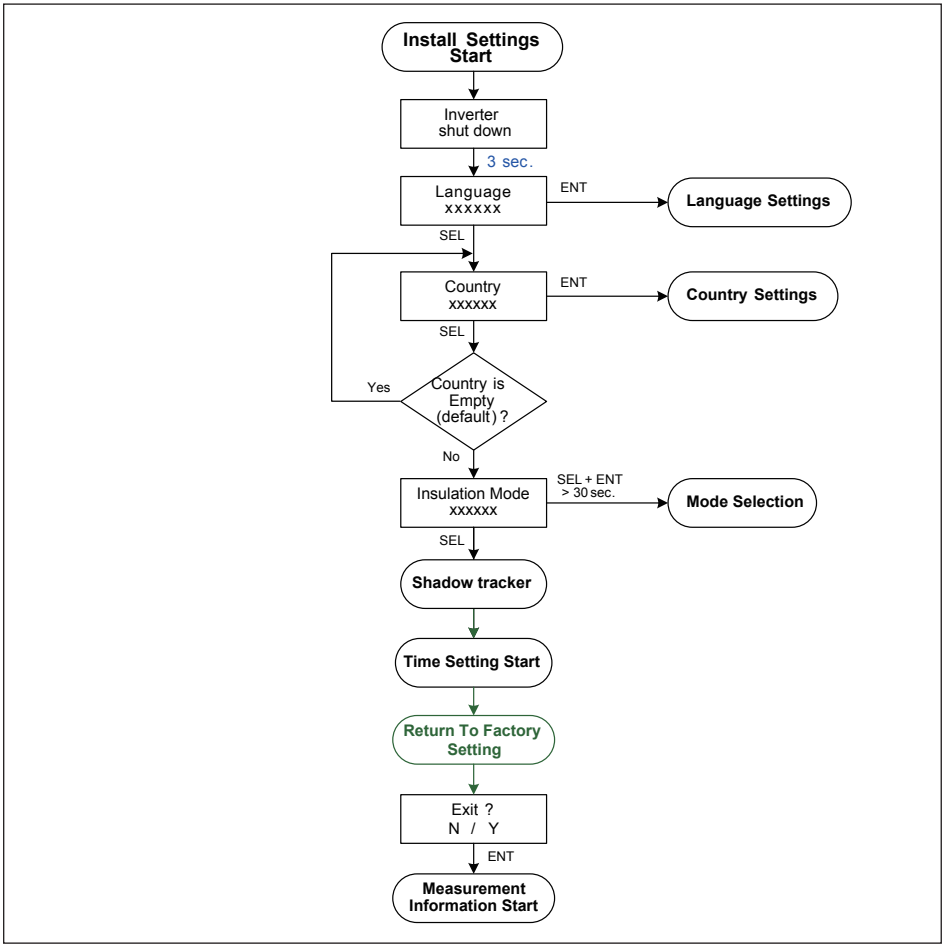


Figure 6-1 : Install setting flowchart overview

6.1.2 Language Selection

When entering this menu, user can set one of two different languages.

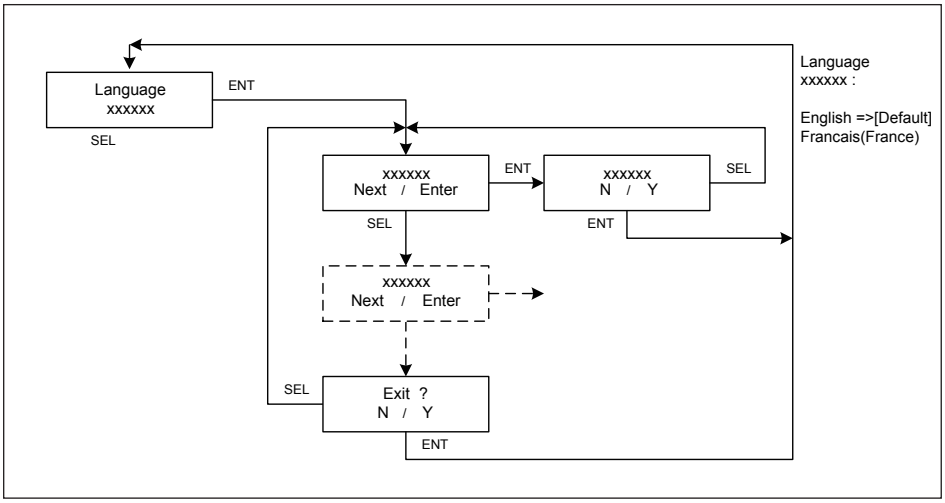


Figure 6-2 : Language selection

RPI H7U
English
Français

Table 6-1 : Language list

6.1.3 Country Selection

Users can select different countries in this menu.

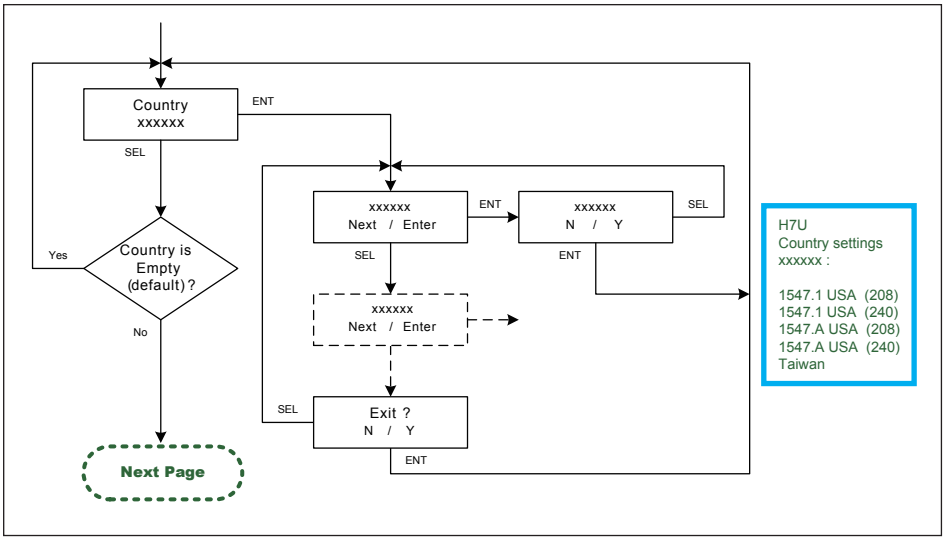


Figure 6-3 : Country Setting

RPI H7U
IEEE 1547.A USA (240)
IEEE 1547.A USA (208)
IEEE 1547.1 USA (240)
IEEE 1547.1 USA (208)
TAIWAN

Table 6-2 : Country list

6.1.4 Insulation Mode

Users can select different countries in this menu.

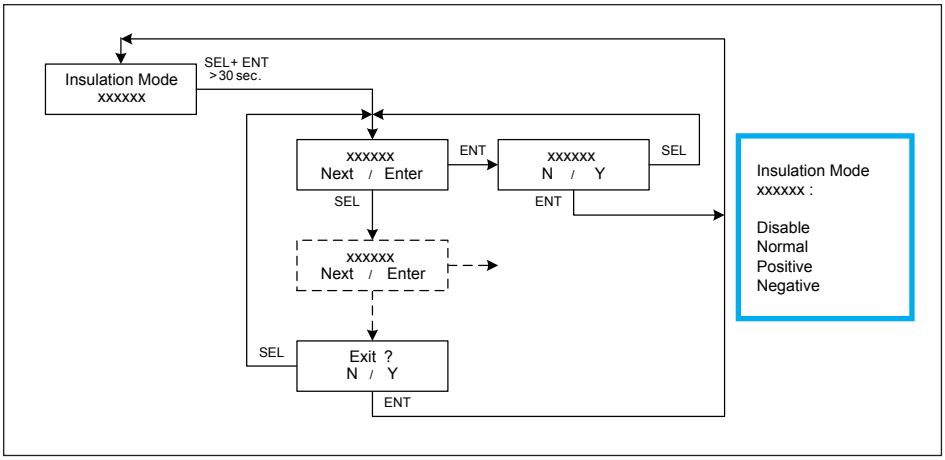


Figure 6-4 : Insulation mode

6.1.5 Shadow Tracker

The “Shadow tracker” option is an extended MPP tracker. When the option is switched on, the MPP tracker performs an additional search at regular intervals. The MPP tracker then searches for the maximum power over a wider voltage range. This option should be switched on if shadows regularly pass slowly over the PV modules in the course of a day. These types of moving shadows can be caused by chimneys or trees, for example. Do NOT use this option for normal fast-moving shadows, e.g., from passing clouds. The option is set depending on the intervals that PV panel modules may be shaded.

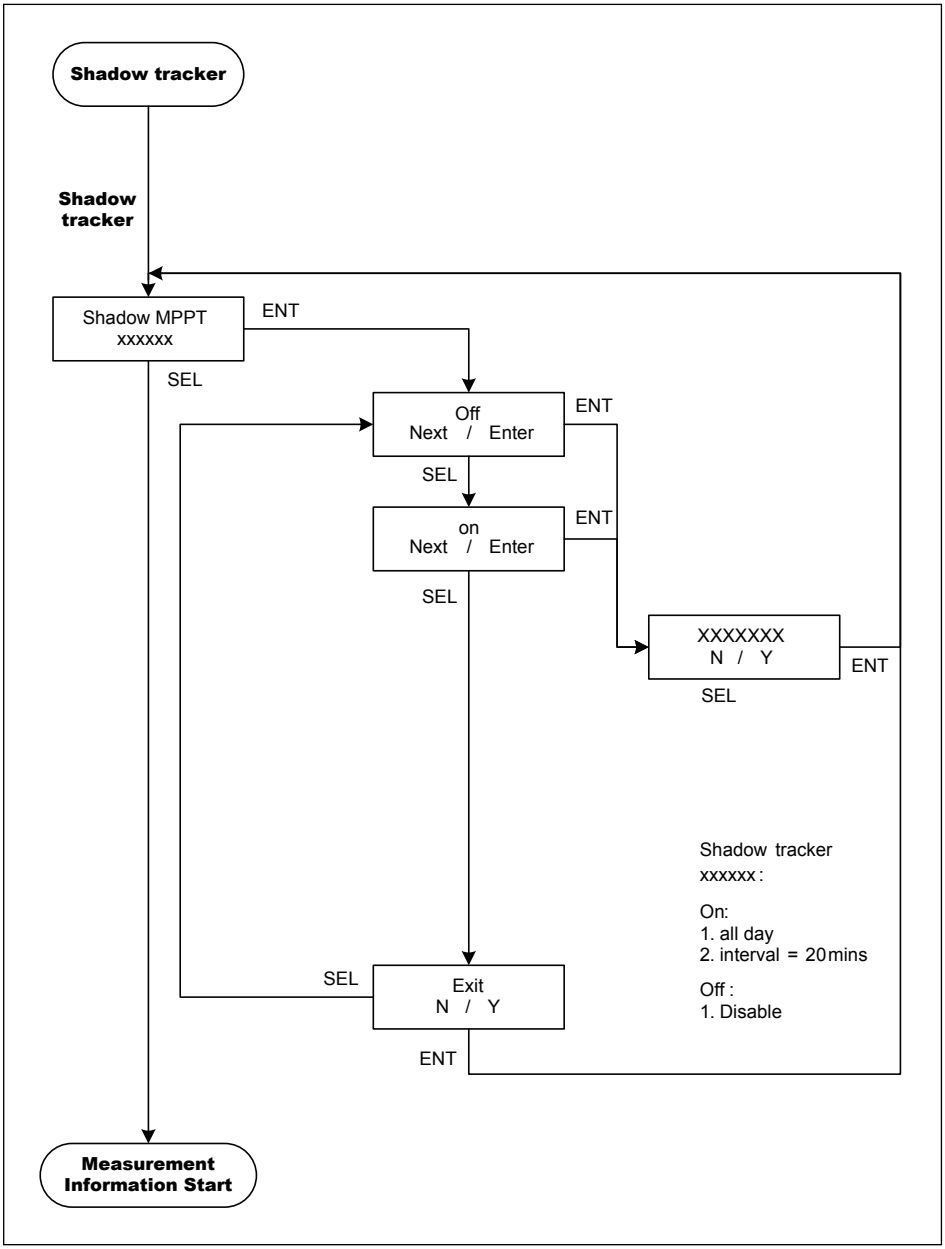


Figure 6-5 : Shadow tracker setting

6.1.6 Time Setting

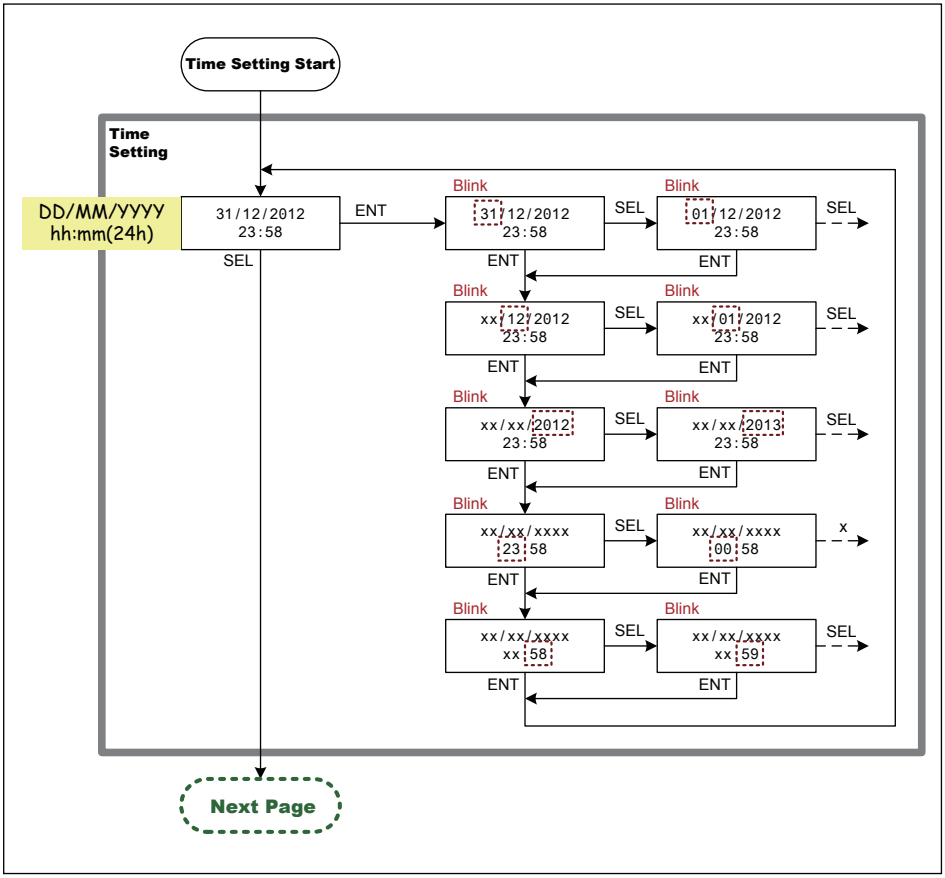


Figure 6-6 : Time setting

6.2 System and Measurement Information

Pressing any button will enter main menu (***Figure 6-7,6-8***), “Output Energy (today)” is the first option on the main menu with several other items below as seen in section 6.2.1 ~ 6.2.4.

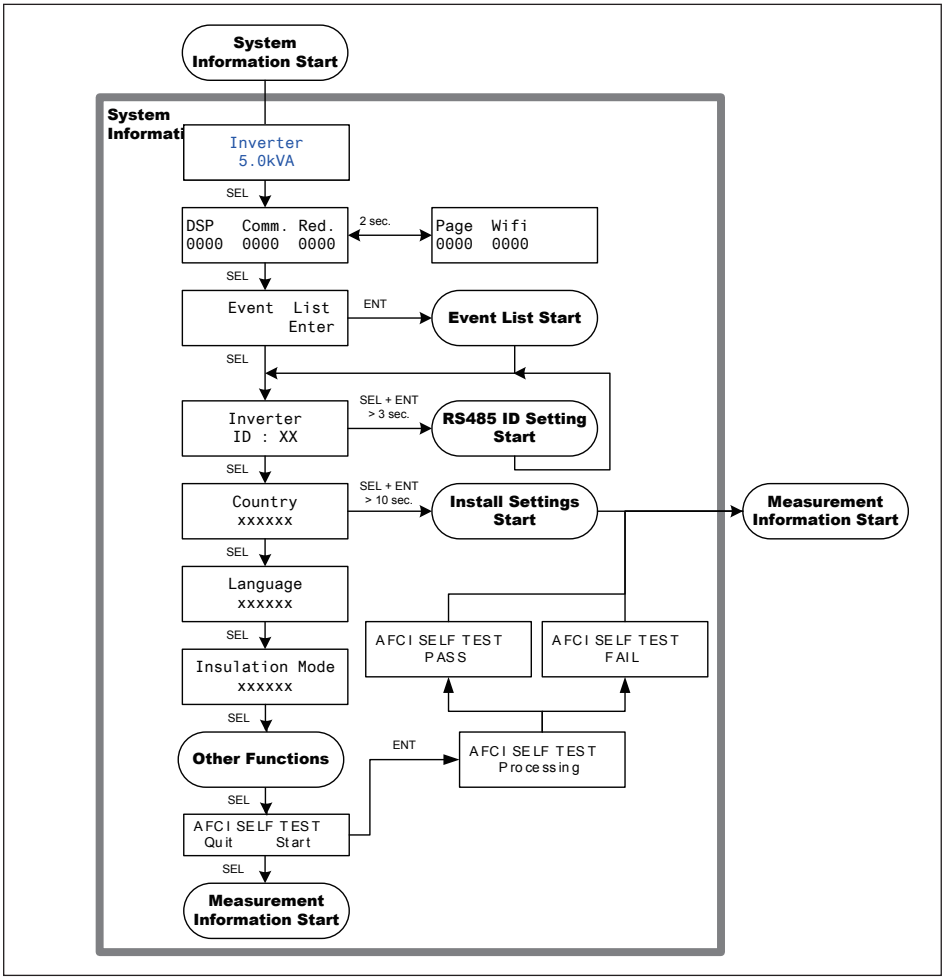


Figure 6-7: System information

System page:

Page1	Inverter model	Page5	Country page
Page2	Firmwave version	Page6	Language page
Page3	Event list	Page7	Insulation mode
Page4	Inverter ID	Page8	AFCI self test

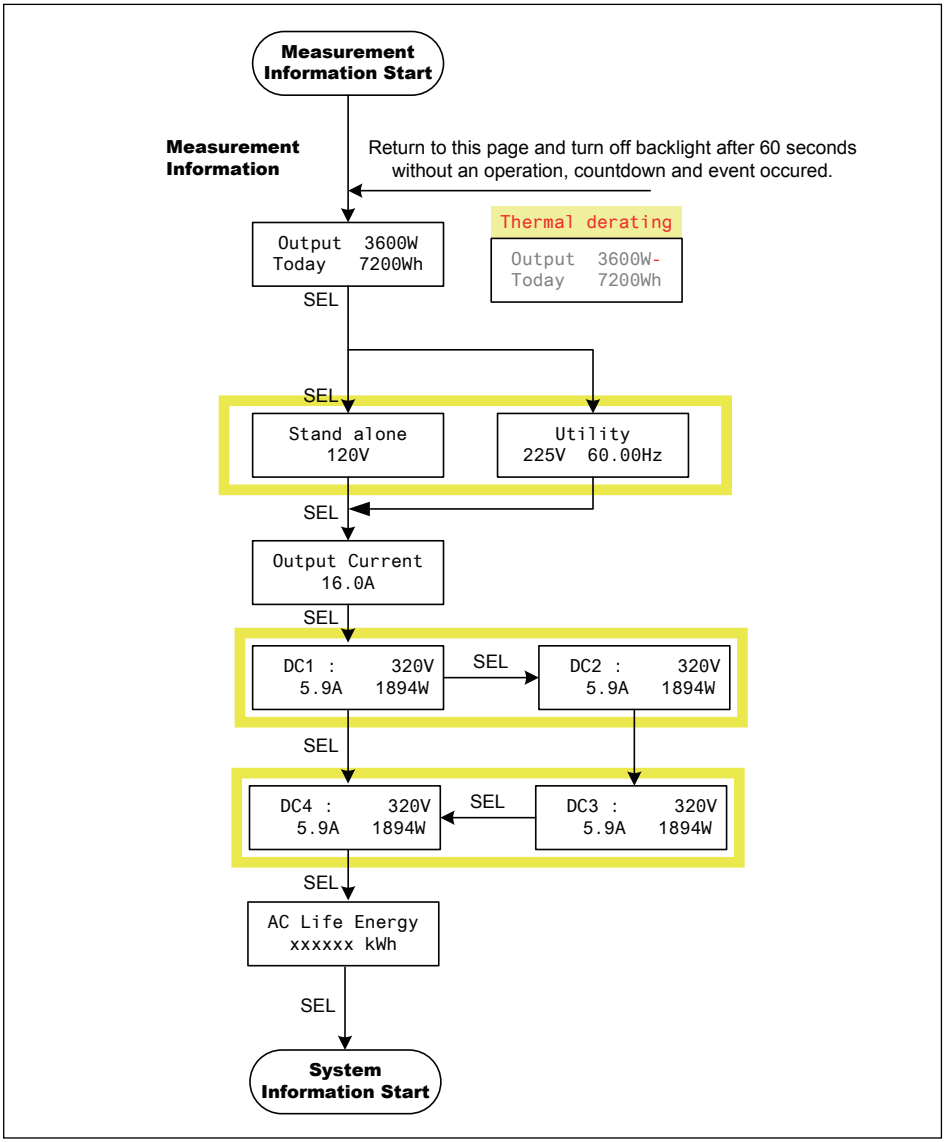


Figure 6-8: Measurement information

Measurement page:

Page1 Today output energy
Page2 AC voltage and frequency
Page3 AC Output current
Page4 DC1 Input voltage, current and power
Page5 DC2 Input voltage, current and power
Page6 DC3 Input voltage, current and power
Page7 DC4 Input voltage, current and power
Page8 Total output energy

6.2.1 Event List

When entering this menu, the display will show all the events (error or fault) and it can show up to 16 records at most with the latest one on the top.

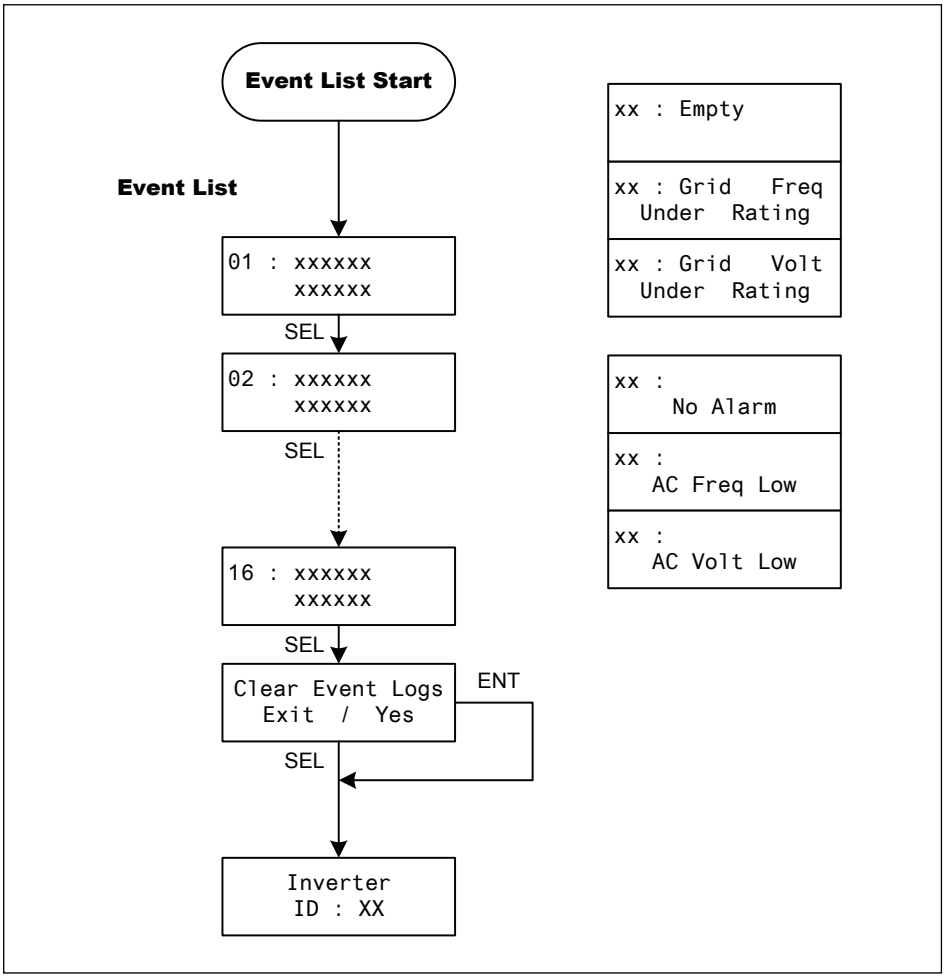


Figure 6-9: Event log flowchart

6.2.2 AFCI self test

The “AFCI self test” is a manual test function.
When enable the “self test” function, the arc detection function will be carried out. If the internal circuit is OK, the inverter will show “AFCI SELF TEST PASS” on the display. The inverter operating in Utility-interactive and/or Standalone mode will show “Arc fault”, while users enable self test function. The error code must be cleared manually. Section 6.2.2 shows how to clear the error code.

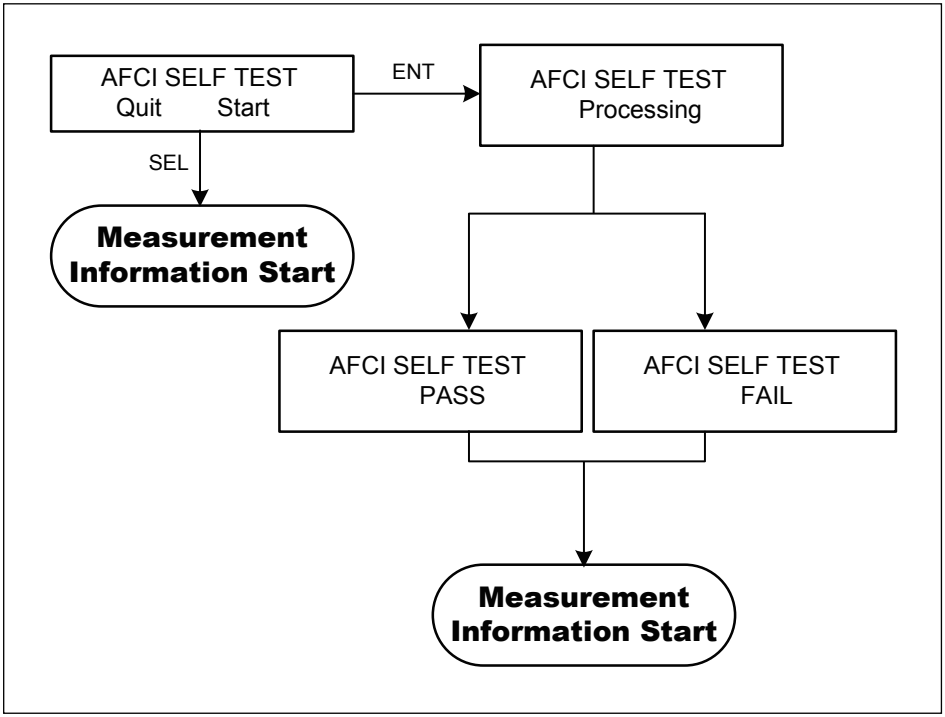


Figure 6-10: AFCI SELF TEST flowchart

6.2.3 Arc fault clear

When an arc fault occurs, the inverter will shut down and the “ARC FAULT” message will be displayed. The inverter will remain off until the arc fault is cleared manually. Users can clear “ARC FAULT” message according to ***Figure 6-11.***

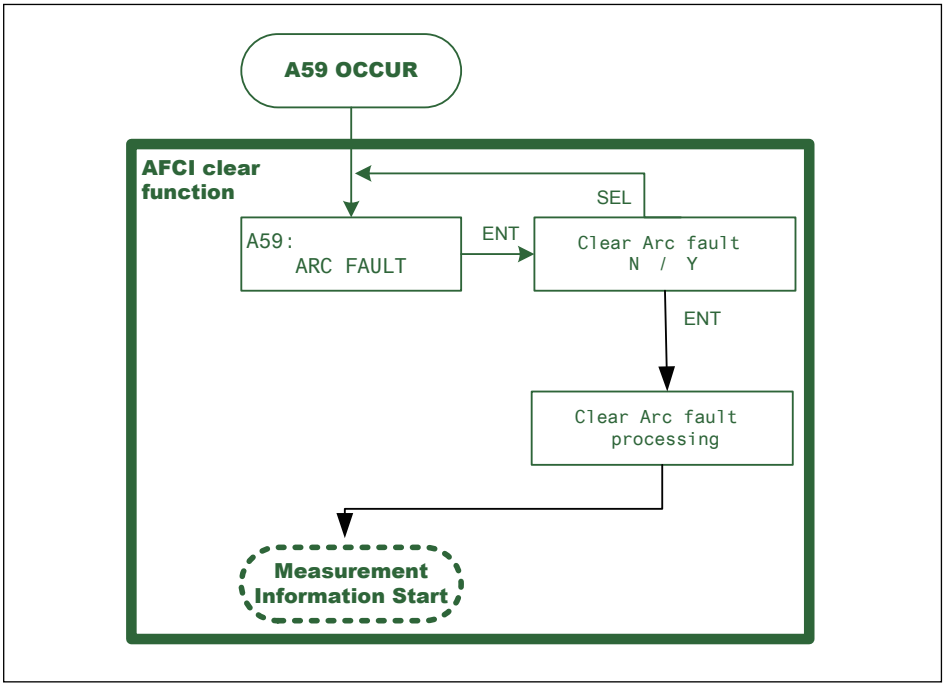


Figure 6-11: ARC fault flowchart

6.2.4 WiFi Settings Page

Settings include WiFi, Ethernet IP address and WiFi IP address.

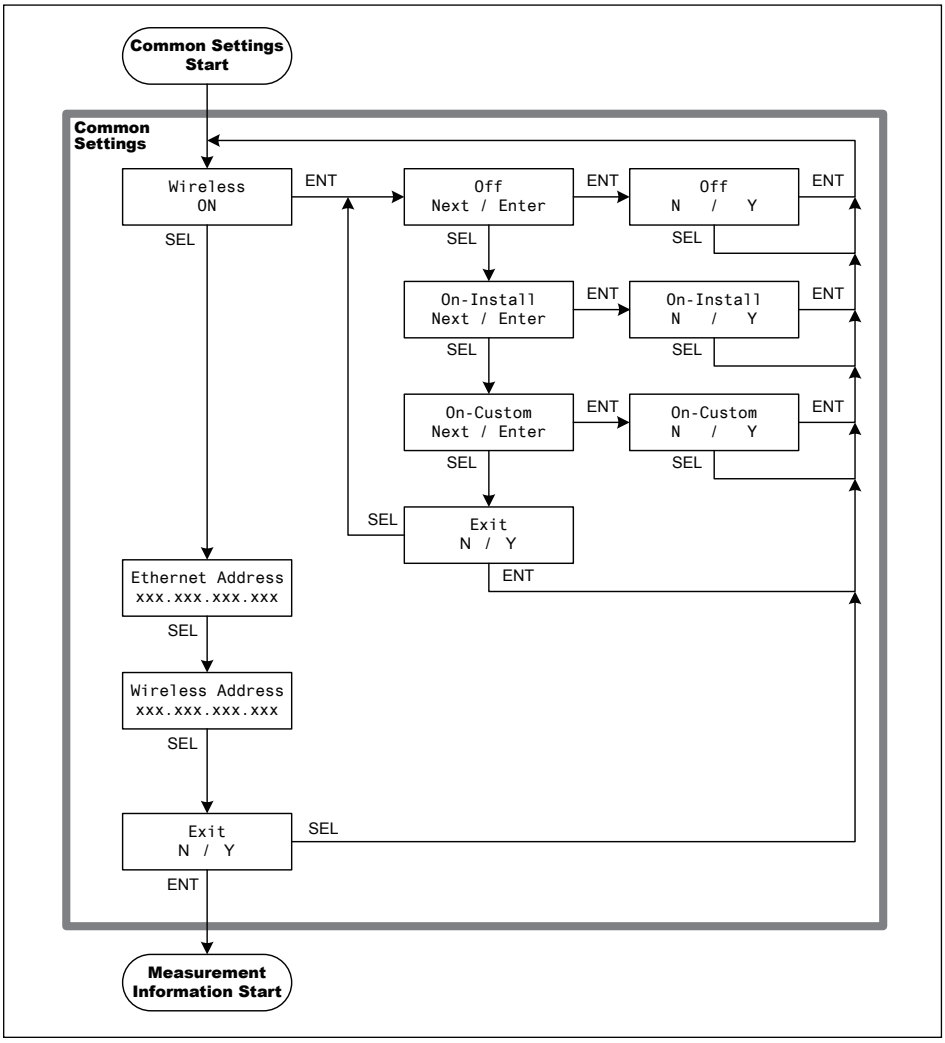


Figure 6-12: Event log flowchart

INFORMATION

- Communication card should be use Delta Ethernet module .

7 Maintenance

In order to ensure normal operation of the inverter, please check the unit regularly. Check that all terminals, screws and cables are connected and appeared as they did upon installation. If there are any impaired or loose parts, please contact your solar installer.

Ensure that there are no foreign objects in the path of the heat outlet and keep the unit and its surroundings clean and tidy.

WARNING !

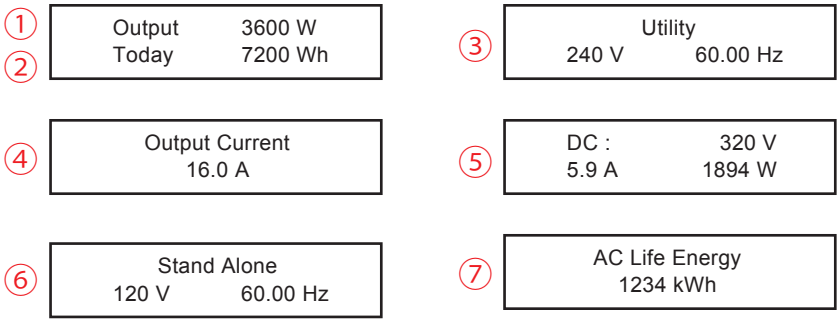
- Before any maintenance, please switch AC and DC power off to avoid risk of electronic shock.

DANGER! HIGH VOLTAGE WARNING!

- Hazardous voltage exists while the inverter is operating. Hazardous voltage may still be present 5 minutes after all power sources have been disconnected. Never open the inverter. The inverter contains no components that are user serviceable.
  Opening the cover will void the warranty.

8 Measurement Error Message and Trouble Shooting

8.1 Measurement



No.	Measurement	Meaning	Unit
1	Output	Actual power inverter is exporting	W
2	Today	Energy generated today	Wh
3	Utility	Grid Voltage and Frequency	Vac / Hz
4	Output Current	Actual Output AC current	A
5	DC	DC input Voltage, Current, Watt	Vdc, A, W
6	Stand alone	Voltage and Frequency	Vac / Hz
7	AC Life Energy	Total Energy generated, cumulative	kWh

Table 8-1: Measurement and message

8.2 Error Message & Trouble Shooting

ERROR		
Message	**Possible cause**	**Action**
E01: Grid Freq. Over Rating	1. Actual utility frequency is higher than the OFR setting 2. Incorrect country setting 3. Detection circuit malfunction	1. Check the utility frequency on the inverter terminal 2. Check country setting 3. Check the detection circuit inside the inverter
E02: Grid Freq. Under Rating	1. Actual utility frequency is lower than the UFR setting 2. Incorrect country or Grid setting 3. Detection circuit malfunction	1. Check the utility frequency on the inverter terminal 2. Check country & Grid setting 3. Check the detection circuit inside the inverter
E09: No Grid	1. AC breaker is OFF 2. AC plug Disconnected	1. Switch on AC breaker 2. Check the connection in AC plug and make sure it connects to inverter 3. Replace fuses and check all switching devices in boost & inverter stages
E10: Grid Volt Under Rating	1. Actual utility voltage is under the UVR setting 2. Utility voltage is under the Slow UVR setting during operation 3. Incorrect country or Grid setting 4. Detection circuit malfunction	1. Measure the utility AC voltage to the inverter terminal. 2. Check the utility AC voltage connection to the inverter terminal. 3. Check country & Grid setting 4. Check the detection circuit inside the inverter
E11: Grid Volt Over Rating	1. Actual utility voltage is under the OVR setting 2. Utility voltage is under the Slow OVR setting during operation 3. Incorrect country or Grid setting 4. Detection circuit malfunction	1. Measure the utility AC voltage to the inverter terminal. 2. Check the utility AC voltage connection to the inverter terminal. 3. Check country & Grid setting 4. Check the detection circuit inside the inverter
E13: Slow Over Voltage Range	1. Actual utility voltage is over the OVR setting 2. Incorrect country or Grid setting 3. Detection circuit malfunction	1. Check the utility voltage on the inverter terminal 2. Check country & Grid setting 3. Check the detection circuit inside the inverter
E14: VLN Over Voltage	1. Actual utility voltage is over the half of OVR setting 2. Incorrect country or Grid setting 3. Detection circuit malfunction	1. Check the utility voltage on the inverter terminal 2. Check country 3. Check the detection circuit inside the inverter
E26:Slow Over Frequency Range	1. Actual utility frequency is over the OFR setting 2. Incorrect country or grid setting 3. Detection circuit malfunction	1. Check the utility frequency on the inverter terminal 2. Check country setting 3. Check the detection circuit inside the inverter

ERROR		
Message	**Possible cause**	**Action**
E27:Slow Under Frequency Range	1. Actual utility frequency is under the UFR setting 2. Incorrect country or Grid setting 3. Detection circuit malfunction	1. Check the utility frequency on the inverter terminal 2. Check country & Grid setting 3. Check the detection circuit inside the inverter
E28: Slow Under Voltage Range	1. Actual utility voltage is under the UVR setting 2. Incorrect country or Grid setting 3. Detection circuit malfunction	1. Check the utility voltage on the inverter terminal 2. Check country & Grid setting 3. Check the detection circuit inside the inverter
E29: VLN Under Voltage	1. Actual utility voltage is under the half of UVR setting 2. Incorrect country or Grid setting 3. Detection circuit malfunction	1. Check the utility voltage on the inverter terminal 2. Check country 3. Check the detection circuit inside the inverter
E30: DC Volt Over Rating	1. Actual Solar1 voltage is higher than 500Vdc 2. Detection circuit malfunction	1. Modify the solar array string layout and reduce the Voc below 500Vdc 2. Check the detection circuit inside the inverter
E34: Ground Fault	1. PV array insulation fault 2. Large PV array capacitance between Plus to Ground or Minus to Ground or both. 3. Detection circuit malfunction	1. Check the insulation of Solar inputs 2. Check the capacitance, dry PV panel if necessary 3. Check the detection circuit inside the inverter
F05: NTC Over Temp	1. The ambient temp. is above 60°C 2. Detection circuit malfunction	1. Check the installation ambient temp. and environment 2. Check the detection circuit inside the inverter
F06: Inside NTC Circuit Fail	1. Ambient temp. >100°C or <-24°C 2. Detection circuit malfunction	1. Check the installation ambient and environment 2. Check the detection circuit inside the inverter
F07:NTC Low Temperature	1.Temperature of ambient <= -25 degree 2. Detection circuit malfunction	1. Check the installation ambient and environment 2. Check the detection circuit inside the inverter
F08: Heat Sink NTC1 Fail	1. Boost 1 heat sink temp. >100°C or <-24°C 2. Detection circuit malfunction	1. Check the installation ambient and environment 2. Check the detection circuit inside the inverter.
F09: Heat Sink NTC2 Fail	1. Inverter heat sink temp. >100°C or <-24°C 2. Detection circuit malfunction	1. Check the installation ambient and environment 2. Check the detection circuit inside the inverter

ERROR		
Message	**Possible cause**	**Action**
F10:Heat Sink NTC3 Fail	1. Boost 2 heat sink temp. >100°C or <-24°C 2. Detection circuit malfunction	1. Check the installation ambient and environment 2. Check the detection circuit inside the inverter
F15:DSP ADC V_{grid} / I_{out} Fail	1. Auxiliary power circuitry malfunction 2. Detection circuit malfunction	1. Check the auxiliary circuitry inside the inverter 2. Check the detection circuit inside the inverter
F16:DSP ADC V_{in} / V_{bus} Fail	1. Auxiliary power circuitry malfunction 2. Detection circuit malfunction	1. Check the auxiliary circuitry inside the inverter 2. Check the detection circuit inside the inverter
F17:DSP ADC I_{in} / I_{boost} Fail	1. Auxiliary power circuitry malfunction 2. Detection circuit malfunction	1. Check the auxiliary circuitry inside the inverter 2. Check the detection circuit inside the inverter
F18:RED. ADC V_{grid} Fail	1. Auxiliary power circuitry malfunction 2. Detection circuit malfunction	1. Check the auxiliary circuitry inside the inverter 2. Check the detection circuit inside the inverter
F19:DSP ADC I_{out_dc} Fail	1. Auxiliary power circuitry malfunction 2. Detection circuit malfunction	1. Check the auxiliary circuitry inside the inverter 2. Check the detection circuit inside the inverter
F20: Efficiency Inconsistent	1. The calibration is incorrect 2. Current feedback circuit is defective	1. Check the accuracy of current and power 2. Check the current feedback circuit inside the inverter
F22: Internal Comm Fault_R	1. Red. CPU is idling 2. The communication connection is disconnected	1. Check reset and crystal in Red. CPU 2. Check the connection between Red. CPU and DSP
F24: Residual Curr Over Rating	1. PV array insulation fault 2. Large PV array capacitance between Plus to Ground or Minus to Ground 3. Either side of boost driver or boost choke malfunction 4. Detection circuit malfunction	1. Check the insulation of Solar inputs 2. Check the capacitance (+ <-> GND & - <-> GND), must < 2.5uF. Install an external transformer if necessary 3. Check boost driver & boost choke 4. Check the detection circuit inside the inverter

ERROR		
Message	**Possible cause**	**Action**
F27: RCMU Circuit Fail	1. RCMU is disconnected 2. Detection circuit malfunction	1. Check the RCMU connection inside the inverter 2. Check the detection circuit inside the inverter
F28: Relay Short	1. One or more relays are sticking 2. The driver circuit for the relay malfunction	1. Replace the defective relay(s) 2. Check the driver circuit inside the inverter
F29: Relay Open	1. One or more relays are abnormal 2. The driver circuit for the relay malfunction 3. The detection accuracy is not correct for V_{grid} and V_{out}	1. Replace the defective relay(s) 2. Check the driver circuit inside the inverter 3. Check the V_{grid} and V_{out} voltage detection accuracy
F35: Bus Volt Over Rating	1. Driver for boost is defective 2. V_{oc} of PV array is over550Vdc 3. Surge occurs during operation 4. Detection circuit malfunction	1. Check the driver circuit for boost inside the inverter 2. Modify the solar array setting, and make the V_{oc} less than 550Vdc 3. N/A 4. Check the detection circuit inside the inverter
F37: AC Curr Over Rating	Detection circuit malfunction	Check the detect circuit inside the inverter
F42: CT Current Sensor Fail	1. Inverter choke Fail 2. Output Filter Fail 3. Detection circuit malfunction	1. Check Inverter choke inductance. 2. Check output filter capacitance. 3. Check the detection circuit inside the inverter
F48:Over Load(Stand alone)	1. Over Load (Standalone), Output power>1500W 2. Input power < output power 3. Output voltage >125Vac or 115 Vac.	1. Check PV power 2. Check Output Load. 3. Check detection circuit for stand alone Voltage
F50:Zero Cross Circuit Fail	The detection circuit for synchronous signal malfunction	Check the detection circuit for synchronous signal inside the inverter
F58: Arc Circuit Fail	Arc Circuit Fail	1. Check Arc board power 2. Check Arc detect signal 3. Check Arc life pulse signal

ERROR		
Message	**Possible cause**	**Action**
F59: Arc Fault	Arc Fault occur	1. Check PV input wiring, no parallel setting 2. Check switches, plugs, brushed motor and/or electrical wiring have a broken conductor in the cord.
F60: DC1 Curr Over Rating	1. Switching device in boost is defective 2. Driver for boost is defective 3. Input current detection circuit malfunction	1. Check all switching device in boost 2. Check the driver circuit for boost inside the inverter 3. Check input current detection circuit
F61: DC2 Curr Over Rating	1. Switching device in boost is defective 2. Driver for boost is defective 3. Input current detection circuit malfunction	1. Check all switching device in boost 2. Check the driver circuit for boost inside the inverter 3. Check input current detection circuit
F62: DC3 Curr Over Rating	1. Switching device in boost is defective 2. Driver for boost is defective 3. Input current detection circuit malfunction	1. Check all switching device in boost 2. Check the driver circuit for boost inside the inverter 3. Check input current detection circuit
F63: DC4 Curr Over Rating	1. Switching device in boost is defective 2. Driver for boost is defective 3. Input current detection circuit malfunction	1. Check all switching device in boost 2. Check the driver circuit for boost inside the inverter 3. Check input current detection circuit

9 De-Commissioning

De-Commissioning Procedure:

If necessary to put the device out of operation for maintenance and/or storage, please follow the instructions below.

WARNING !

To avoid injuries, please follow the procedures

- Switch off AC circuit breaker to disconnect from electricity grid.
- Switch off the PV Array switch to disconnect from PV Array.
- Use proper voltage meter to confirm that the AC and DC power are disconnected from the unit.
- Remove the AC wiring immediately to completely disconnect from electricity grid.
- Remove the DC wiring to disconnect from PV Array.
- Remove the communication module RS-485 connection from the computer connection.
- After completing the above steps, the inverter can be removed.

DANGER! HIGH VOLTAGE WARNING!

- Danger of death or severe injuries from dangerous voltage Disconnect the inverter from the AC grid before removing the AC conductors.
- Verify absence of AC voltage before removing conductors.
- Dangerous voltages can be present at the DC connections of the inverter.
- Never disconnect the PV modules when the inverter is connected to AC grid or DC disconnect is on. First switch off the AC conductors grid so that the inverter cannot feed energy into the grid. Then, open the DC disconnect.
- Verify absence of DC voltage before removing conductors.

WARNING !

- The inverter is heavy (see Technical Data). Incorrect handling can lead to injuries. The inverter must be lifted and carried by two people.

10 Technical Data

10.1 Specifications

Model	RPI H7U
GENERAL	
Enclosure	Powder-coated aluminium
Operating temperature	-25~60°C, full power up to 40°C
Relative humidity	0% – 100% non-condensing.
Galvanic isolation	Transformer less
Safety class	Class I metal enclosure with protective earth
DC INPUT (Solar side)	
Max. recommended input power	3000W Per string.
Max. input voltage	500 Vdc
Operating voltage range	30~500 Vdc
MPP range (rated power)	185~470 Vdc (240 Vac system) 160~470 Vdc (208 Vac system)
Nominal voltage	370 Vdc (240 Vac system) 320 Vdc (208 Vac system)
MPP Tracker	4
Max. input current (each MPPT)	10 A
Max. short circuit current per MPPT	13.9 A
Max. inverter backfeed current to the array	0 A
Start-up voltage	35 Vdc
AC OUTPUT (Grid side)	
Nominal output power	7000 VA
Maximum power	6000 W @ 208 Vac / 7000 W @ 240 Vac
Voltage Range	-12% ~ +10%
Nominal output current	28.8 A @ 208 V 29.1 A @ 240 V

Model	RPI H7U
Max. output current	30 A
Maximum output fault current	43 A
Maximum output over current protection	45 A
AC OUTPUT (Grid side)	
Frequency	60 Hz
Frequency range	59.3~60.5 Hz
Total harmonic distortion	<3% @ Rated power(#1)
Power factor	>0.99@Rated power(#1)
Peak efficiency	97.53%
CEC efficiency	97.10%
output fault current (A, peak and duration)	130A peak, 1ms.
AC OUTPUT (stand alone)	
Maximum output power	1500 W
Maximum output Voltage	125 Vac
Maximum output Current	13 A
Nominal Frequency	60 Hz
MECHANICAL	
Housing	Die cast
Cooling	convection cooling
IP rating	NEMA 4X
External communication	RS-485 connection Wi-Fi, Ethernet (optional)
Weight	27 kg
Dimensions	510 × 592 × 177 mm

(#1)
- Max. output power at ≦40°C, de-rating power at 40°C
- Night time consumption with standby communication & display
- All specifications are subject to change without prior notice.

Model	RPI H7U
REGULATIONS & DIRECTIVES	
Electronics protection rating	NEMA 4X
Safety	UL 1741, CSA 22.2 No. 107-01
SW Approval	UL 1998
Isolation Monitor Interrupt (IMI)	NEC 690.35, UL1741 CRD
Unintentional Islanding protection	IEEE 1547, IEEE 1547.1
EMC	FCC part 15 A & B, ICES-003
AFCI	UL1699B (Type 1), NEC 690 2014

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