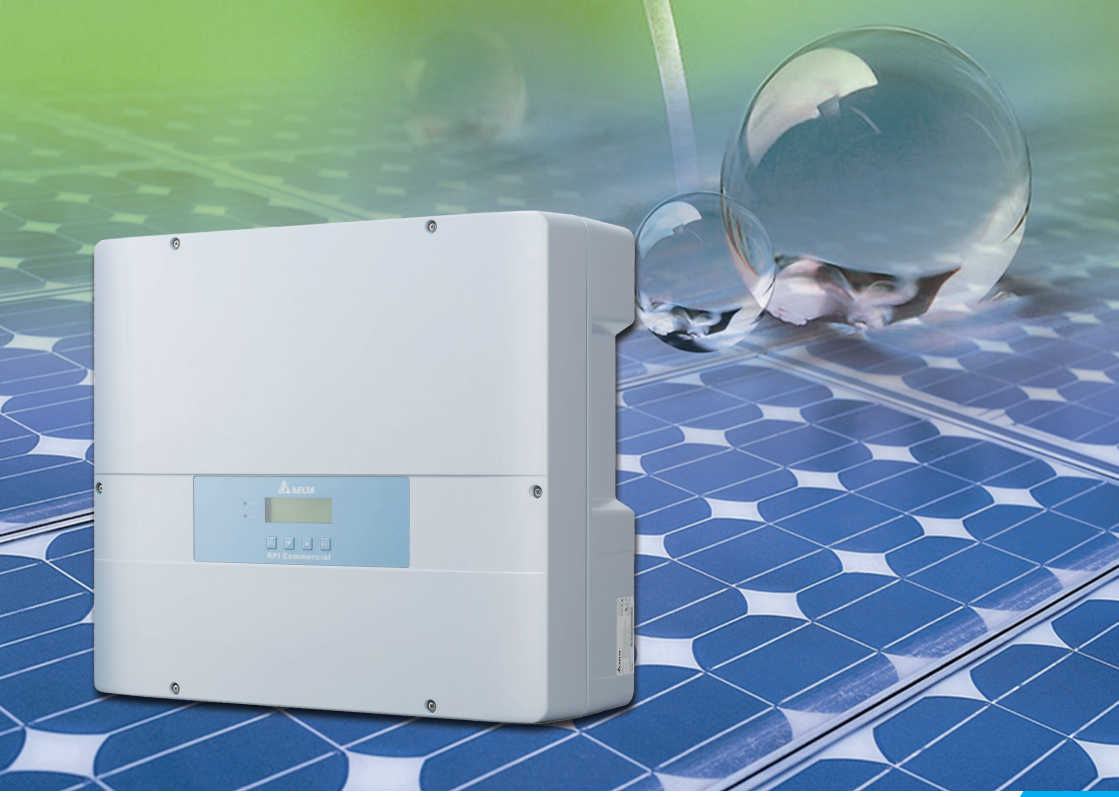


The power behind competitiveness

Grid-tie Transformerless Solar Inverter

RPI M6A/M8A/M10A

Operation and Installation Manual

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Safety Instructions

This manual uses the following instructions for conveying important safety related information.

CAUTION !



Machine and equipment damage may occur if this hazardous situation is not avoided.

WARNING !



Death and serious injury may occur if this hazardous situation is not avoided.

Repair work on the device should ONLY be carried out by the manufacturer. No user serviceable parts inside.

In Australia, installation and maintenance work shall be conducted by qualified electrician and shall comply with Australian Regulations.

DANGER !



To avoid risk of electrical shock, do not open the solar inverter. Death and serious injury will occur if this hazardous situation is not avoided.

WARNING ! BURN HAZARD



The unit may reach very high temperatures and the device surface can become hot. Sufficient cooling is necessary for optimal yield.

1.General Information

1.1. About this Manual

This manual is to provide the explanation and procedures for installing, operating, maintaining, and troubleshooting the below solar inverters:
RPI M6A/ RPI M8A/ RPI M10A

1.2. Product Description

This device is a 3-phase grid-tied solar inverter which does not support off-grid functionality.

The operation of solar inverter is shown as ***Figure 1-1***. Inverters convert the DC input power supplied from the PV Array into 3-phase AC output power to Grid.

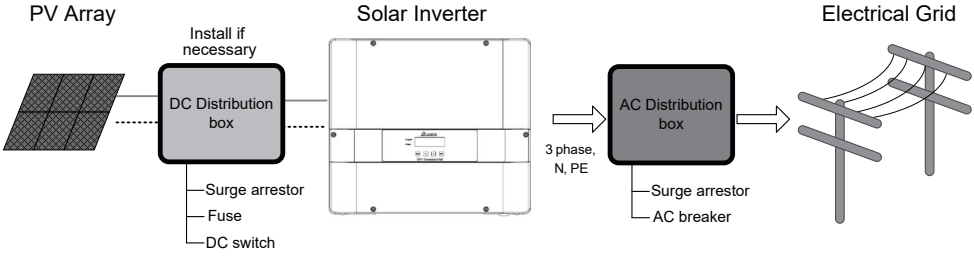


Figure 1-1 Solar system operation illustration

1.3. Additional Information

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

2.Product Overview

2.1 Checking Unit and Accessories

Unpredictable damages may occur during shipment. Check if all the accessories are in the package, the standard accessories are list as Table 2-1. If there is any visible damage to the inverter/accesories or any damage to the packaging, please contact your inverter supplier.

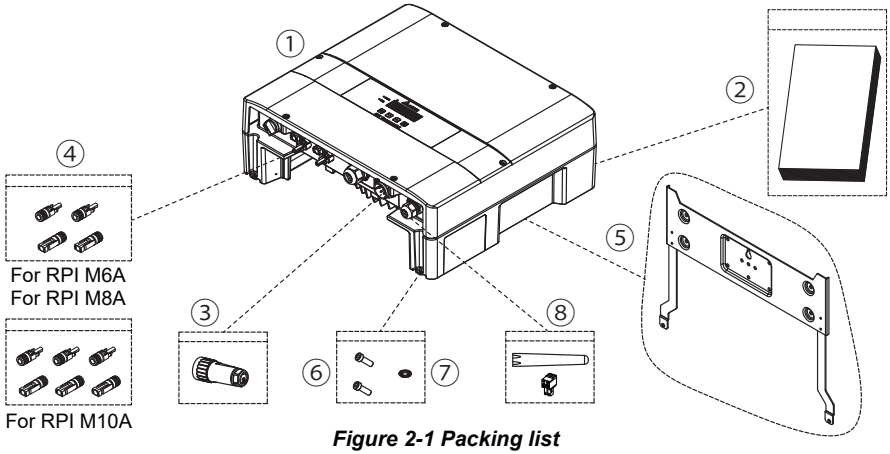


Figure 2-1 Packing list

RPI M6A/ RPI M8A/ RPI M10A			
	Object	Qty	Description
1	PV Inverter	1	RPI M6A/ RPI M8A/ RPI M10A solar inverter.
2	a. User Manual b. Quick Installation Guide (EU/AU/ EN/ DE/ FR/ NL) c. General Safety Instruction	1	The Instruction to provide the information of safety, Installation, specification, etc.
3	AC Plug	1	Connector for AC connection.
4	DC Plug	2 / 3 sets	Connector for DC connection. 2 sets for M6A / M8A 3 sets for M10A
5	Mounting Bracket	1	To mount solar inverters on the wall.
6	Screw	2	To fix solar inverter on the wall.
7	Washer	1	Use for external grounding.
8	12VDC Output Connector Wi-Fi Antenna	1 1	For CNC406 using only, DC output 12V / 0.5A max. Install antenna to Enhance Wireless Signals.

Table 2-1 Packing list

2.2. Product Label

Users can identify the model number and the specifications by the information on the product label. The location for the label please see ***Figure 2-2***.

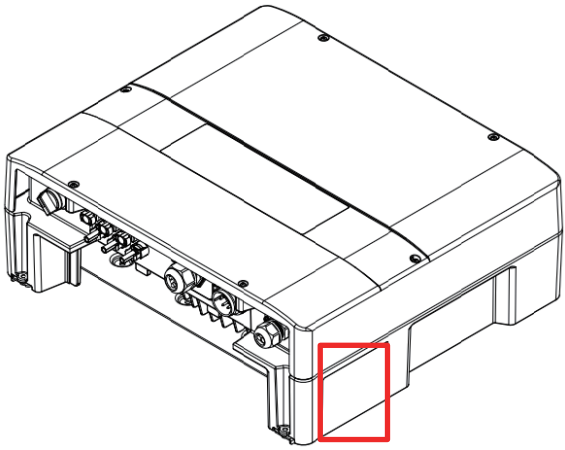


Figure 2-2 Product label

2.3. Exterior Objects

The Inverter's exterior objects are shown in ***Figure 2-3***. The detailed input/output interfaces illustration is shown in ***Figure 2-4***.

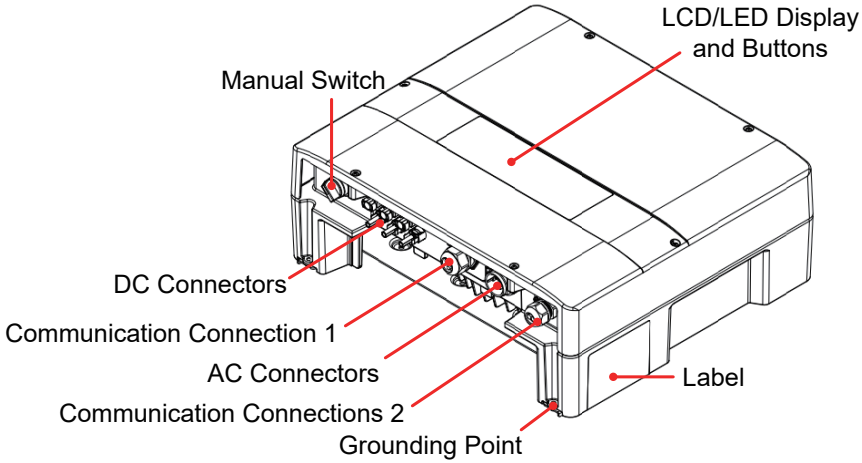


Figure 2-3 Inverter's exterior objects

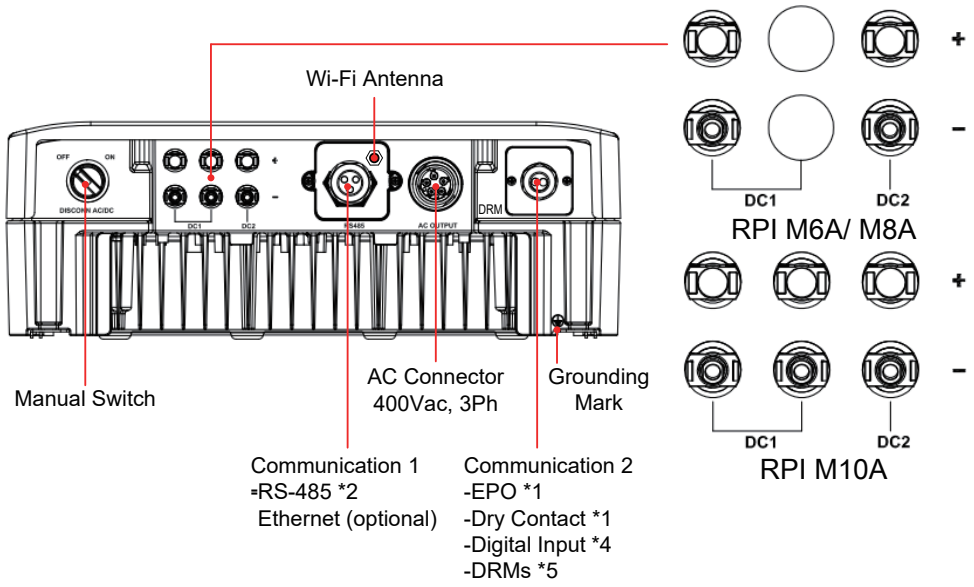
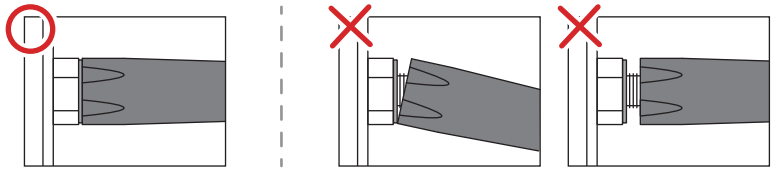


Figure 2-4 Input/output panels

CAUTION !

- Please tighten up the antenna with the correct method (refer below fig.) to avoid damage the connector and the antenna.



3.Installation

CAUTION !

The unit should not be installed in direct sunlight.

WARNING !

- Do not install the unit near or on flammable surfaces.
- Please mount the unit tightly on a solid/smooth surface.
- PV array that have an IEC 61730 Class A rating, or external insulation transformer shall be installed at grid side.

3.1. Unpack the Inverter

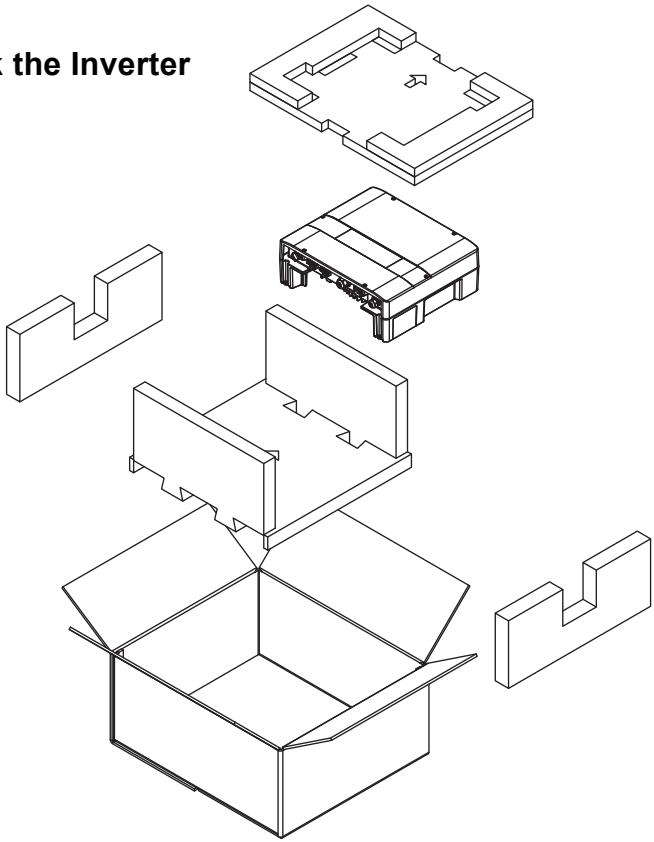


Figure 3-1 Unpacking the inverter

3.2. Mount the Inverter

This unit is designed to be wall-mounted. Please ensure the installation is perpendicular to the floor and the AC plug at the bottom. Do not install the device on a slanting wall.

To mount the inverter on the wall, please follow the procedure below:

1. Screw the mounting bracket on the wall with 8 M6 Phillips head screws. Please refert to ***figure 3-4***.
2. Attach the inverter to the mounting bracket.
3. Use Hex Wrench fixing the inverter with 2 M4 Hexagon Socket screws. Please refer to ***figure 3-5***.

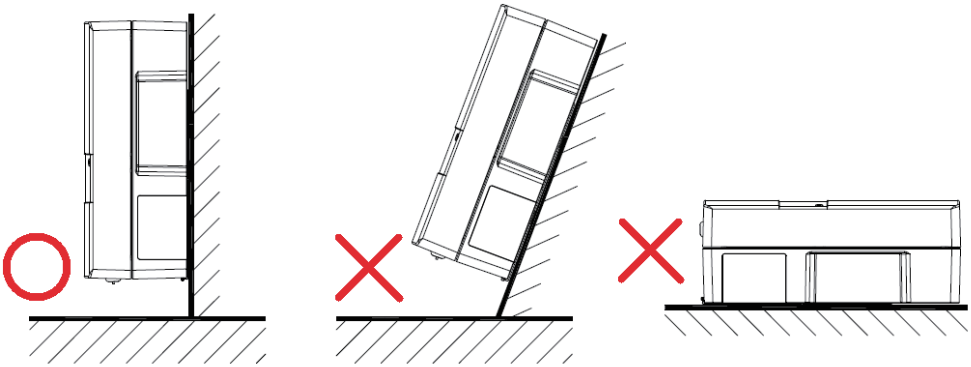
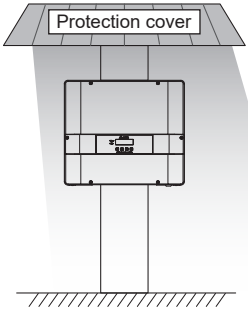


Figure 3-2 Correct and incorrect installation

CAUTION !

To avoid malfunction of inverter caused by extreme weather (ex: snow, hail…etc) or non-proper installation/ maintenance, an additional protection cover is strongly recommended to be installed by Delta.
For more details, please contact local service team.



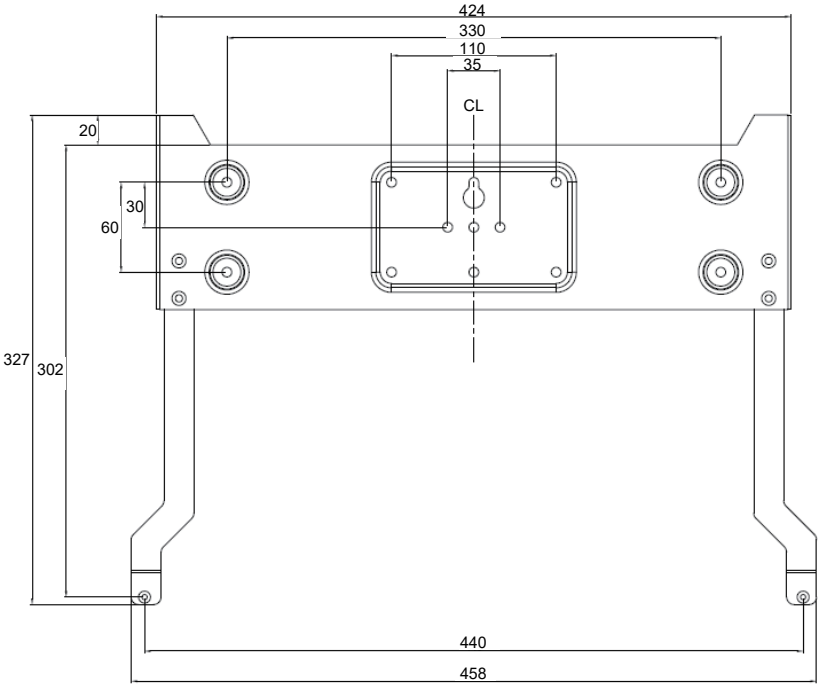


Figure 3-3 Mounting bracket dimension

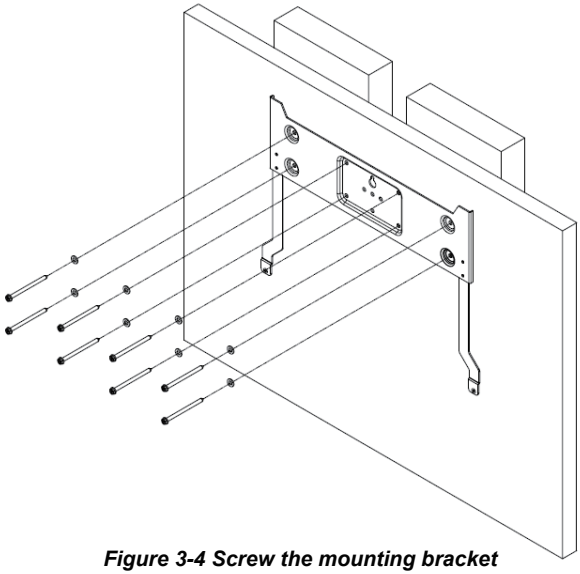


Figure 3-4 Screw the mounting bracket

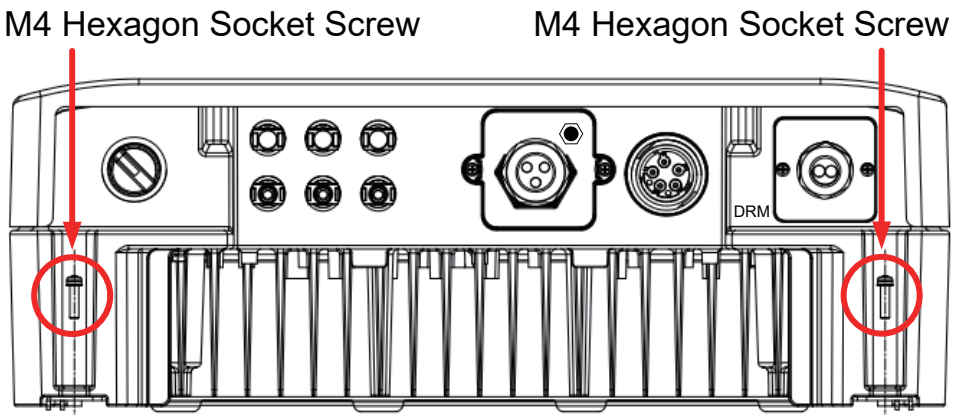


Figure 3-5 Attach inverter to the bracket and fasten with screws

CAUTION !

- The bracket supplied with the unit is specially designed and should be the only mounting device used for the unit.
- It is recommended to install the inverter in a suitable location which offers non-obscured and safe access, in turn ensuring easy access for service and maintenance.
- Please leave an appropriate gap between floor, ceiling, and unit when installing inverter as shown in ***Figure 3-6***. (There is no mandatory requirement of the gap between unit and unit.)
- Please install solar inverter at an eye level to allow easy observation for operation and parameter setting.
- Ambient temperature -25° C~60° C.(power de-rating above 40° C)

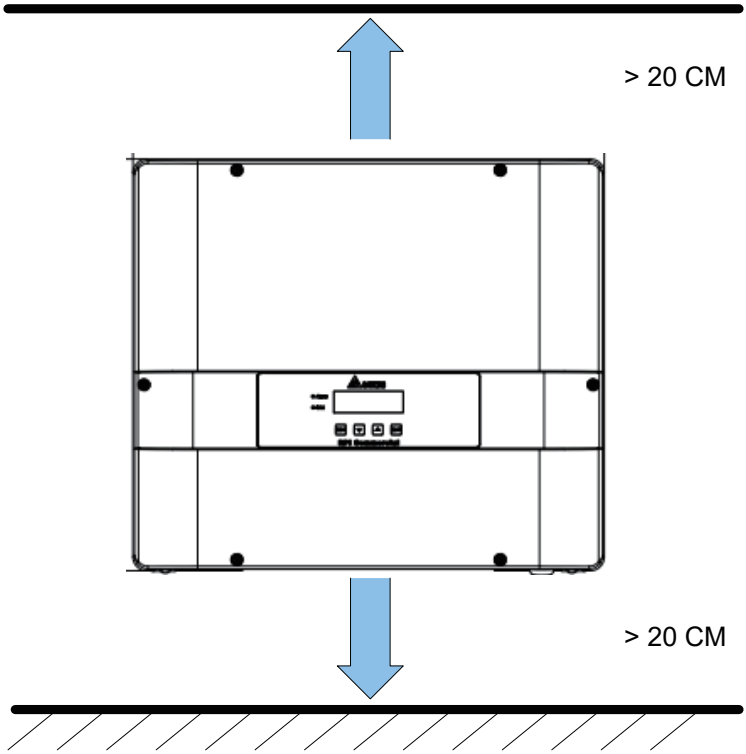


Figure 3-6 Proper installation gap

4. Wiring

4.1. Preparation before Wiring

- When grounding the solar array, an isolation transformer is required due to the RPI M6A/ M8A/ M10A not having galvanic isolation between the DC-input and AC-output. Wiring illustrations please refer to ***Figure 4-1***.
- Inverters provide DC inputs in parallel (2 MPP tracker/ 3 parallel inputs).
- Different DC connections type need different settings of insulation detection.
- It must to keep DC and AC power off when disconnected the DC connector even if turn off the manual switching that in the button cover.

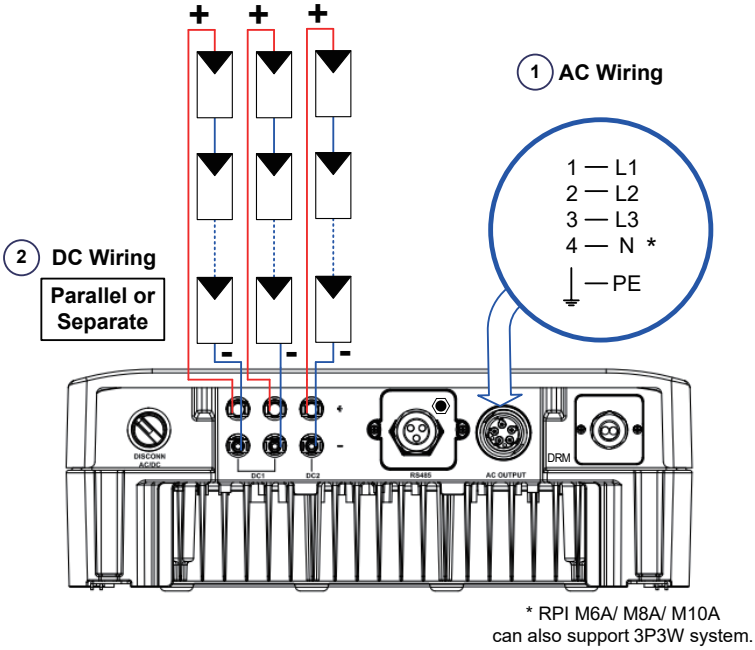


Figure 4-1 Connection of a system for floating solar array

WARNING ! 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.

4.2. AC Grid Connection: 3-Phase+PE or 3-Phase+N+PE

WARNING !

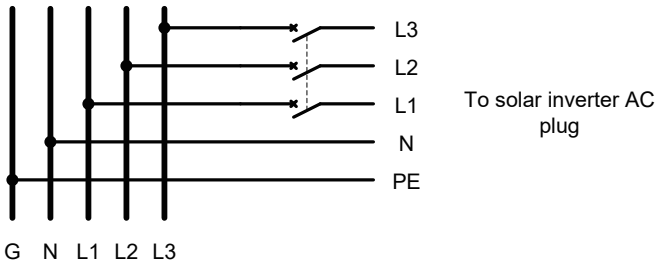
Before commencing AC wiring, please ensure AC breaker is switched off.

4.2.1. Required Protective Devices and Cable Cross-sections

It is recommended to install an upstream circuit breaker between AC side and inverter side for over current protection.

Model	Upstream circuit breaker
RPI M6A/ M8A/ M10A	20A

Table 4-1 Recommended upstream protection



The AC cable must be jacked and meet the specifications in table 4-2.

Model	Current Rating	Wire size	Recommended Torque
RPI M6A RPI M8A RPI M10A	25 A	5 - 8 mm^2	0.7 N.m

Table 4-2 AC input cable requirement

Model M6A/ M8A/ M10A supports both 3P3W (3-phase and PE) and 3P4W (3-phase, N, and PE).

CAUTION ! Machine and equipment damage may occur.

- Make sure to choose proper size for AC cable.
  Please choose the terminals as shown in ***figure 4-2*** for wires crimping.
- Failed to follow these instructions may cause AC plug damage.

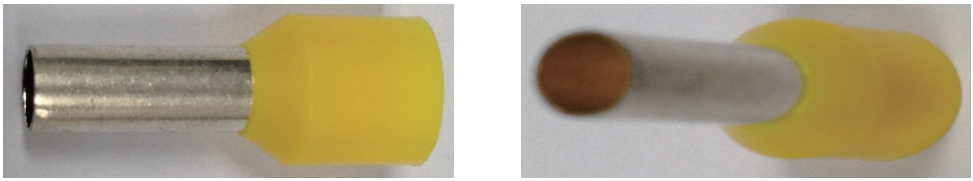


Figure 4-2 Terminal for wire crimping

Follow the steps below to strip the wires before assembling the AC plug as shown in ***Figure 4-3***:

- Remove 55 mm (2.2 inch) of AC cable outer jacket.
- Trim the L1, L2, L3, and N wire to 52.5 mm (2.0 inch).
- Strip 12 mm (0.5 inch) of insulation from all wires ends.
- Crimp terminals for all wires.

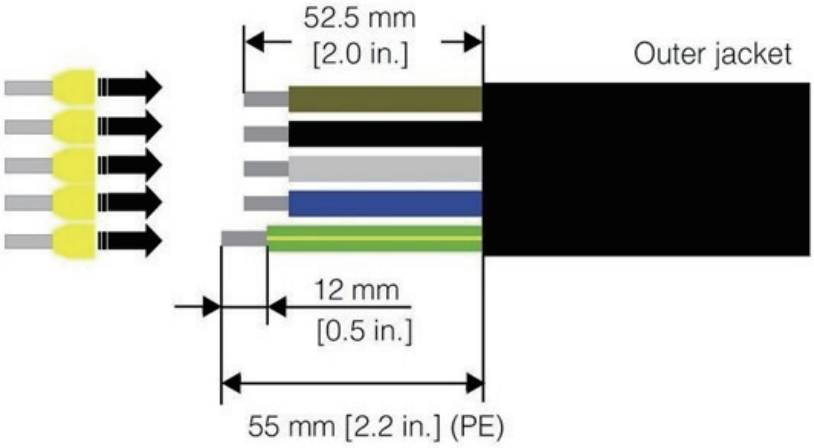


Figure 4-3 Striping the wires

RPI M6A/ M8A/ M10A use Amphenol AC connector with part number C016 20E004 800 2. Assemble the AC plug and wires as the procedures shown in ***Figure 4-4***. The sequence of L1~ L3 can be random. However, N and PE must be connected correctly.

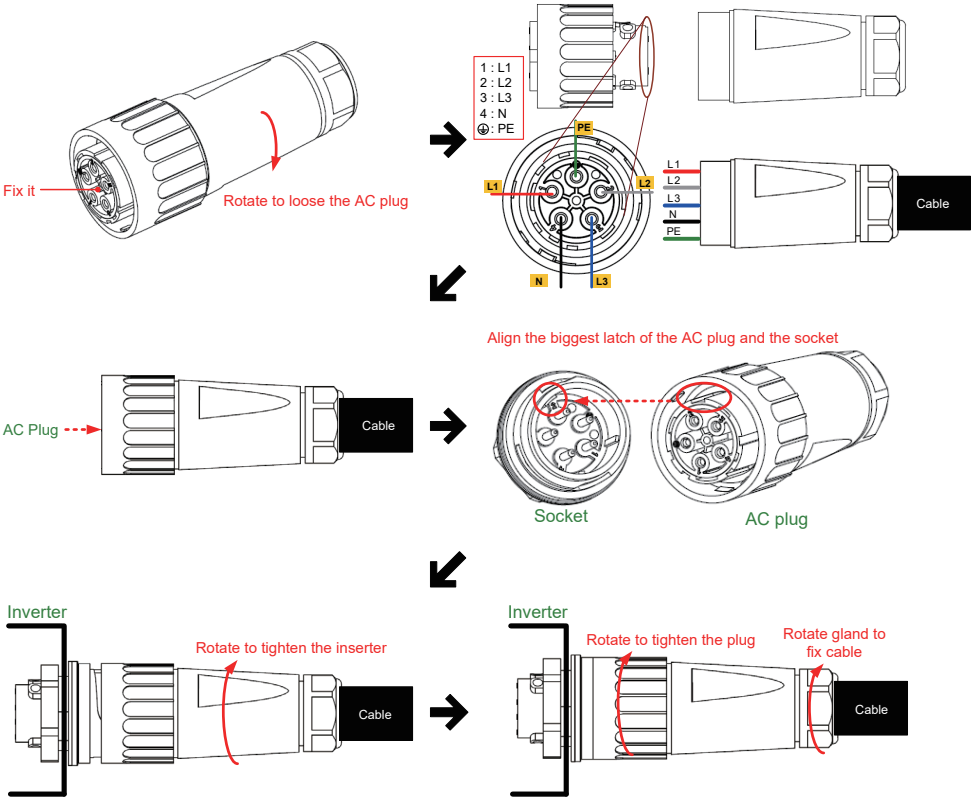


Figure 4-4 AC plug illustration for RPI M6A/ M8A/ M10A.

After wiring, installer should choose the AC connection type on the control panel. About setting, please refer to 5.3.6 Install Settings.

The AC voltage should be as followings:

3P3W	3P4W
L1-L2: 400 Vac ± 10%	L1-N: 230 Vac ± 10%
L1-L3: 400 Vac ± 10%	L2-N: 230 Vac ± 10%
L2-L3: 400 Vac ± 10%	L3-N: 230 Vac ± 10%

4.3. DC Connection (from PV Array)

WARNING !

- When undertaking DC wiring, please ensure the correct polarities are connected.
- When undertaking DC wiring please ensures that the power switch on the PV array is OFF.

CAUTION !

- The connection number of PV Array, open circuit voltage and power of all strings in DC1 must be coherent.
- The maximum open circuit voltage of PV Array cannot exceed 1000V.
- Any device installed between PV Array and inverter must meet the following specifications:
  Rated voltage > open-circuit voltage of PV Array.
  Rated current > short-circuit current of PV Array.
- The input power to the inverter should not higher than the rated power shown in table 4-3.

Type of limit	RPI M6A	RPI M8A	RPI M10A
DC1	4.25 kW @ Vdc=425V-800V	5.65 kW @ Vdc=565V-800V	7 kW
DC2			5.4 kW
Maximum input power	6.6 kW	8.8 kW	11 kW

Table 4-3 Maximum rating of input power

Model	Current Rating	Wire size
M6A	DC 10A	2 - 3mm^2 / 14 AWG
M8A	DC 10A	2 - 3mm^2 / 14 AWG
M10A	DC 15A	3 - 5mm^2 / 12 AWG

Table 4-4 Cable size

DC wiring polarities are divided into positive and negative, which is shown in Figure 4-5. The connection shall be coherent with the indication marked on inverter.



Figure 4-5 DC Plug Wiring illustration

4.4. Multiple Inverter Combinations

4.4.1. Three-Phase Parallel Combination System

RPI M6A/8A/10A can be used in three-phase parallel combination system. In this application, inverter may be parallel connected to a same AC grid. Please refer to ***Figure 4-6.***

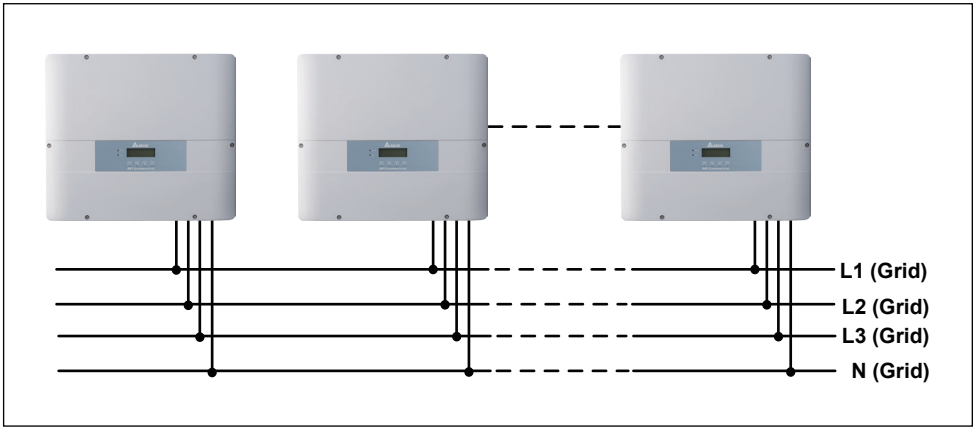


Figure 4-6 Three-phase parallel combinations

4.4.2. Communication Module Connections

The Communication 1 Module illustration please see ***Figure 4-7***, the module supports a RS-485 terminal for communication with a computer.

The Communication 2 Module illustration please see ***Figure 4-7***, the module Supports Digital Input, Demand Response Modes (DRMs), EPO, Dry Contact and DC Output : 12V / 0.5A

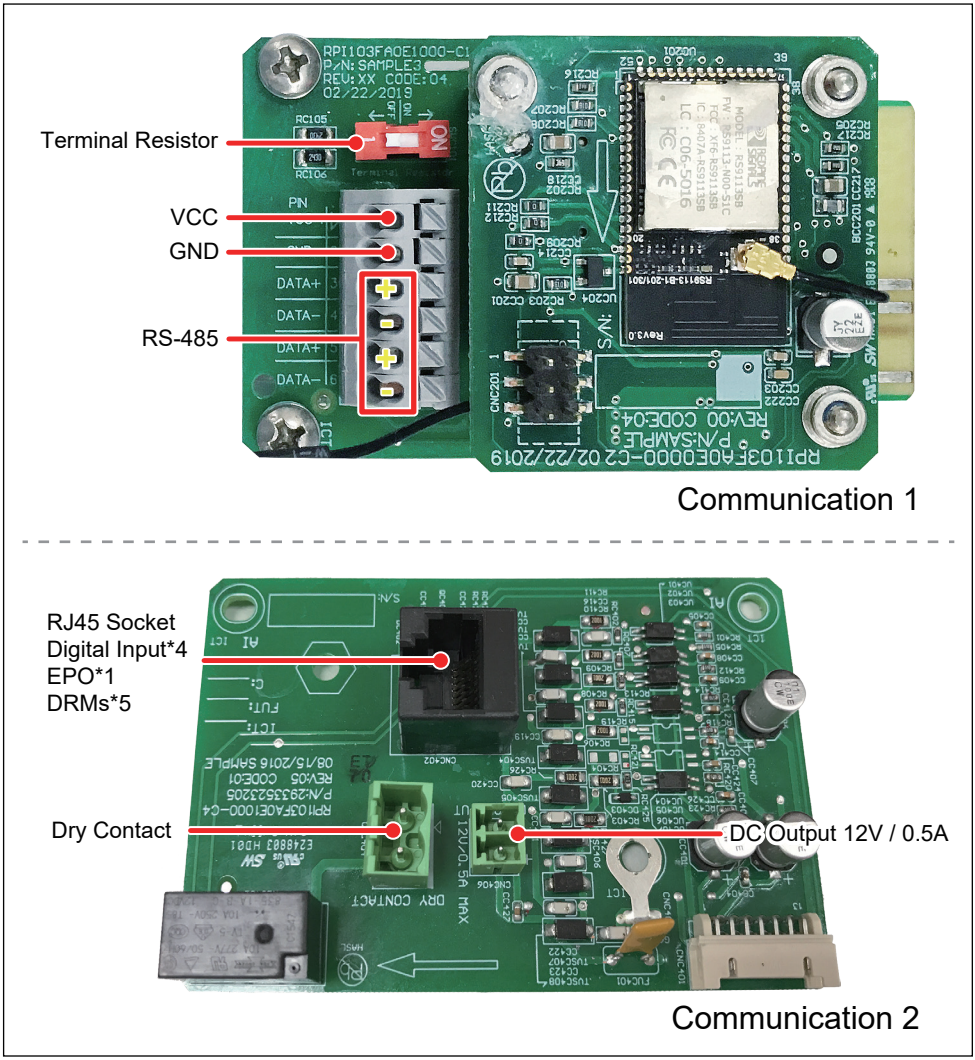
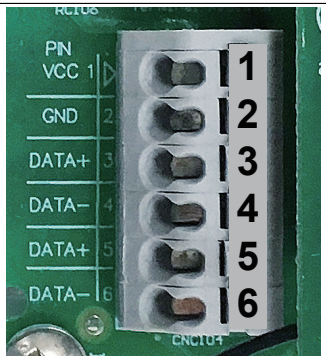


Figure 4-7 Communication module

4.4.3. RS-485 Connection

The pin definition of RS-485 is shown in ***Table 4-5***. Installers should switch ON the terminal resistor when single inverter is installed. The wiring of multi-inverters connection is shown as ***Figure 4-8***. Installers should switch ON terminal resister at the first and last devices of the RS-485 chain as shown. Other terminal resisters should be switched OFF.

Pin	Function
1	VCC (+12V)
2	GND
3	DATA+
4	DATA-
5	DATA+
6	DATA-



RPI M6A/ M8A/ M10A

Table 4-5 Definition of RS 485 pin

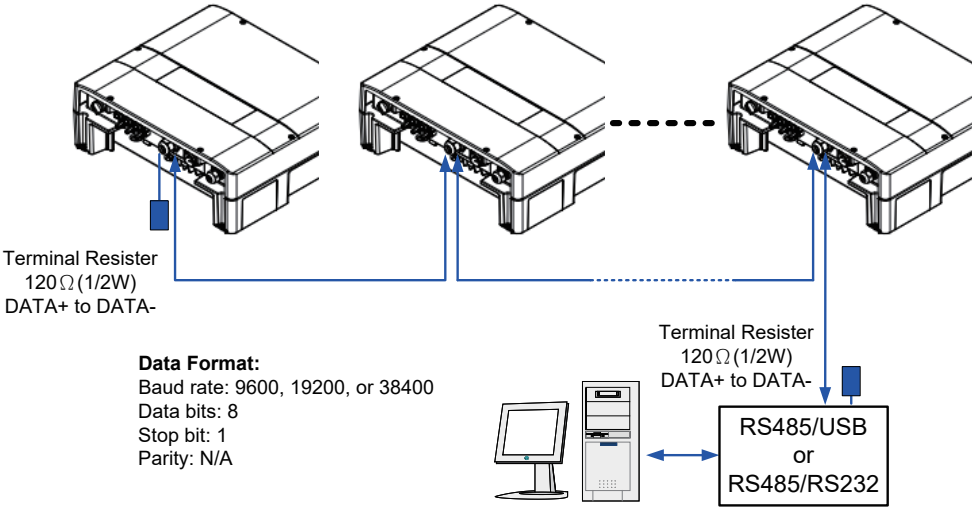


Figure 4-8 Multi-inverter connection illustration

EPO, digital input function and DRMs can be parallel connection in multi-inverter operation, refer to ***Figure 4-9*** for the connection.

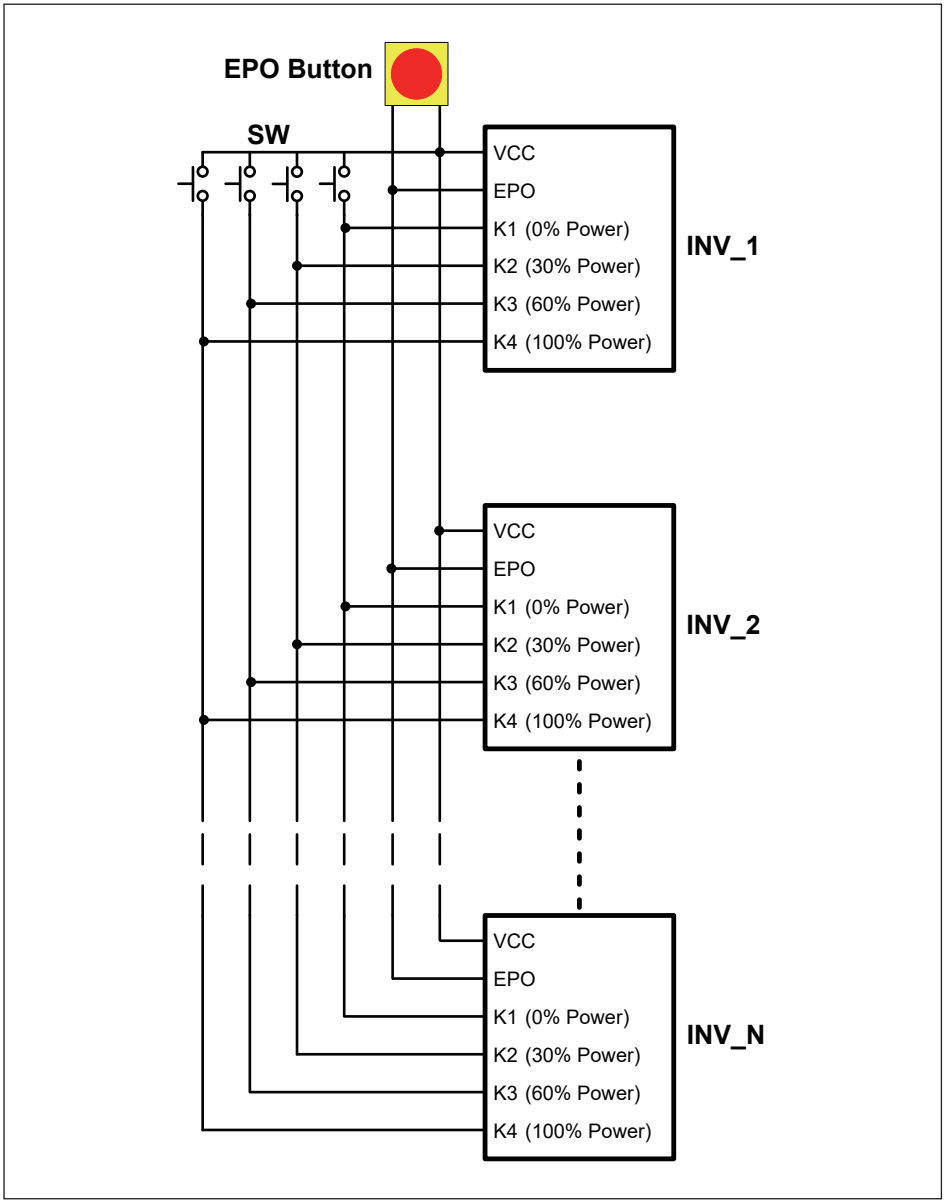


Figure 4-9 : EPO & Digital input & DRMs parallel connection

4.4.4. Digital Input & EPO Function & DRMs

Communication 2 Module has 1 set of emergency power off function (EPO). Users can customize EPO function in Install Settings page. Please refer to section 5.3.6.6 EPO. also provides 4 sets of digital input function (K1~K4). Please refer to ***Table 4-7*** In Australia (AU 2015) and New Zealand (NZ 2015), the DRMs are also use digital input function to assert. The definition is different from normal digital input function; please refer to ***Table 4-8*** for the DRMs pin definitions.

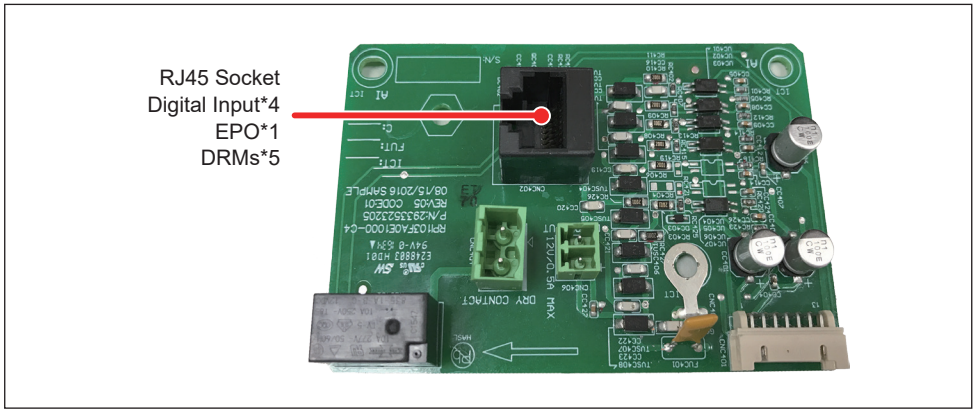


Figure 4-10 Digital function & EPO & DRMs

Pin	Define
1	K1
2	K2
3	K3
4	K4
5	VCC*
6	EPO*
7	EPO
8	VCC

Tabel 4-6
Definition of RJ45 Socket Pin

Short	Inverter's action
VCC & K1	0% active power
VCC & K2	Maximum 30% active power
VCC & K3	Maximum 60% active power
VCC & K4	Maximum 100% active power
VCC & EPO	Emergency power off (EPO)

Table 4-7 Definition of digital input & EPO function

Short	Inverter's action
VCC* & K1	DRM5 (0% active power)
VCC* & K2	DRM6 (Maximum 50% active power)
VCC* & K3	DRM7 (Maximum 75% active power and sink reactive power)
VCC* & K4	DRM8 (Maximum 100% active power and sink reactive power)
VCC* & EPO*	DRM0 (Emergency power off)

Tabel 4-8 Definition of DRMs for Australia (AU 2015) and New Zealand (NZ 2015)

4.4.5. Dry Contact Connection

RPI M6A/ M8A/ M10A provide 1 set of Dry Contact function and its triggering condtion can be customized by users. When dry contact function is triggered, the output two ports will be short-circuted. For more information about triggering condtion settings, please refer to section 5.3.6.5 Dry Contact.

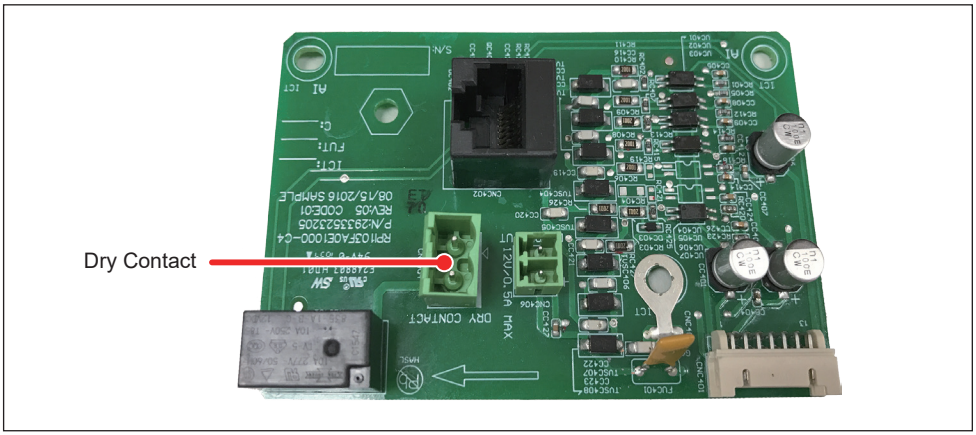


Figure 4-11 Dry contact port

4.4.6. DC Output Connection

RPI M6A/ M8A/ M10A provide 1 set of DC Output and it can be used by external device (EX: Alarm light or Buzzer).
The output spec is 12V / 0.5A max and its connector in packing, please refer to ***Table 2-1*** Packing list.

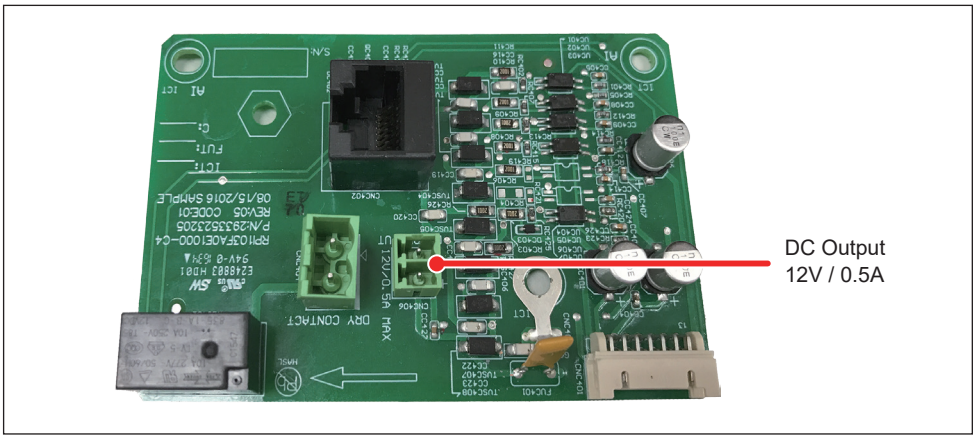


Figure 4-12 DC Output port

4.4.7. Wi-Fi Connection

The Communication Module supports the inverter to communicate with the device (e.g., smart phone, tablet ect.) by using Wi-Fi.

1. Turn on Wi-Fi of the device.
2. Select the Wi-Fi SSID of inverter : Delta-[serial number]
   (e.g. Delta-O1M19500001W0 ; please refer rating label on the inverter)
3. Enter the Wi-Fi password: DELTASOL

Please use “MyDeltaSolar” App connect to inverter (Available on both google Play store and iOS App store or you can scan below QR code to download the app)

NOTE

- The inverter can only connect one device at the same time.
- If the Wi-Fi password is forgotten, please refer following step to return the passwoord to default ("DELTASOL")
- If Wi-Fi connection is missing or crash , please refer following step to reboot Wi-Fi module.

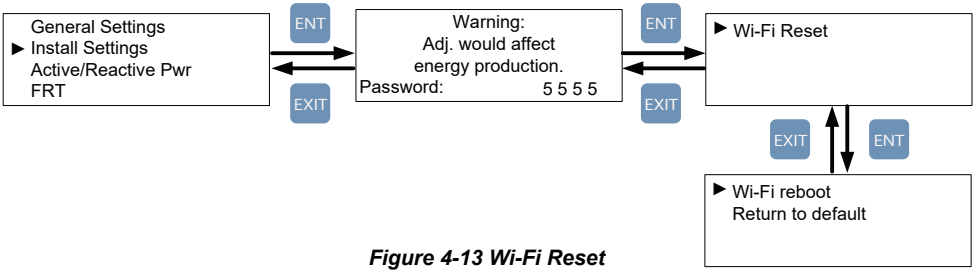


Figure 4-13 Wi-Fi Reset

MyDeltaSolar

1. This APP should collocate with Delta Inverter.
2. If inverter is not connected to cloud, you still can monitor inverter operation by APP.

QR Code

Download on the App Store

IOS

ANDROID APP ON Google play

Android

5.Turn on / off PV inverter

WARNING ! BURN HAZARD

The enclosure temperature may exceed 70°C while inverter is operation.
A dangerous burn hazard is present in this situation.

5.1. First startup

At first startup, users have to feed in AC power and switch on the Manual Switch. Inverter will start up on AC power and LCD display panel will come live. When the LCD display lighting up, please set Language and Country according to your needs. After these two items set correctly, LCD display will enter home page ***(Figure 5-3)***. Please make sure “status:” showing no any error, fault or warning on home page before you feed in DC power. After DC and AC power are ready, inverter will initially self-test which may take about 2 minutes and start to feed in power to grid.

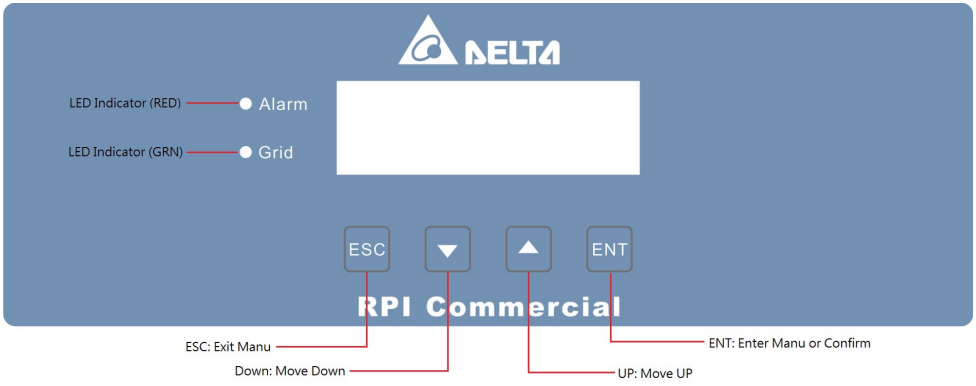


Figure 5-1 panel indicator

Condition	Green LED	Red LED
Countdown	FLASH *1	OFF
Power ON	ON	OFF
Error or Fault	OFF	ON
Standby or Night time (No DC)	OFF	OFF
Bootloader mode	FLASH *2	

*1 ON 1s / OFF 1s
*2 ON 1s / OFF 1s, Green and Red are interleaving

Table 5-1 LED indicator

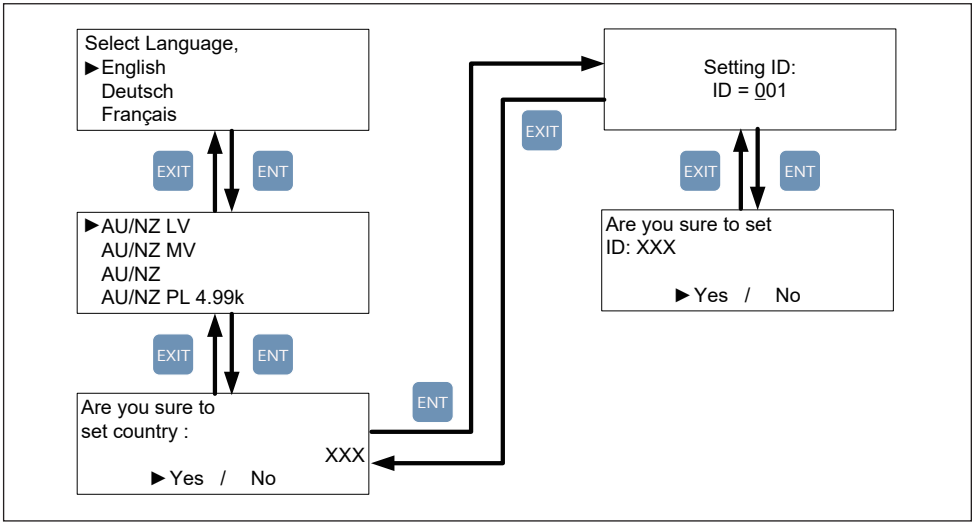


Figure 5-2 Country and language settings for first startup

5.2. Home Page

When inverter is operating normally, the LCD will display homepage as shown in ***Figure 5-3***, user can get the information of output power, inverter status, E-today, date and time.

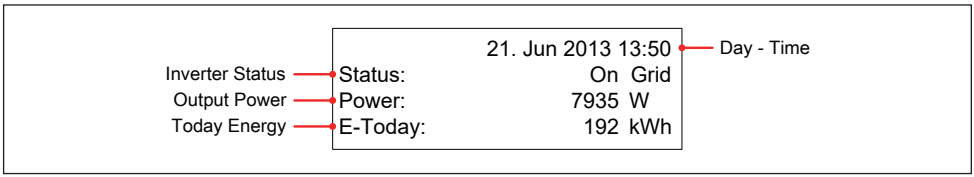


Figure 5-3 Home page for M6A/ M8A and M10A

5.3. LCD Flow Chart

Press any key at home page can users enter main menu page (shown as ***Figure 5-4***). Press Esc key at main menu can go back to homepage. When users adjust settings, the cursor on display will change from "►" to "➔"

Meter	5.3.1
Energy Log	5.3.2
Event Log	5.3.3
Inverter Information	5.3.4
General Setting	5.3.5
Install Setting	5.3.6
Active/Reactive Power	5.3.7
FRT	5.3.8

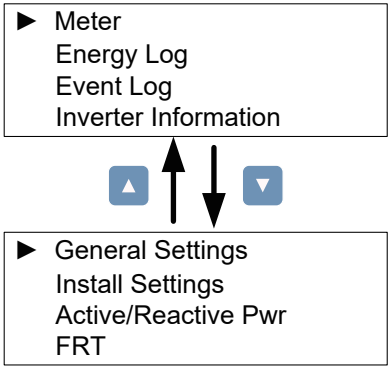


Figure 5-4 Menu page

5.3.1. Power Meter

This page displays voltage, current and power from both AC and DC side.

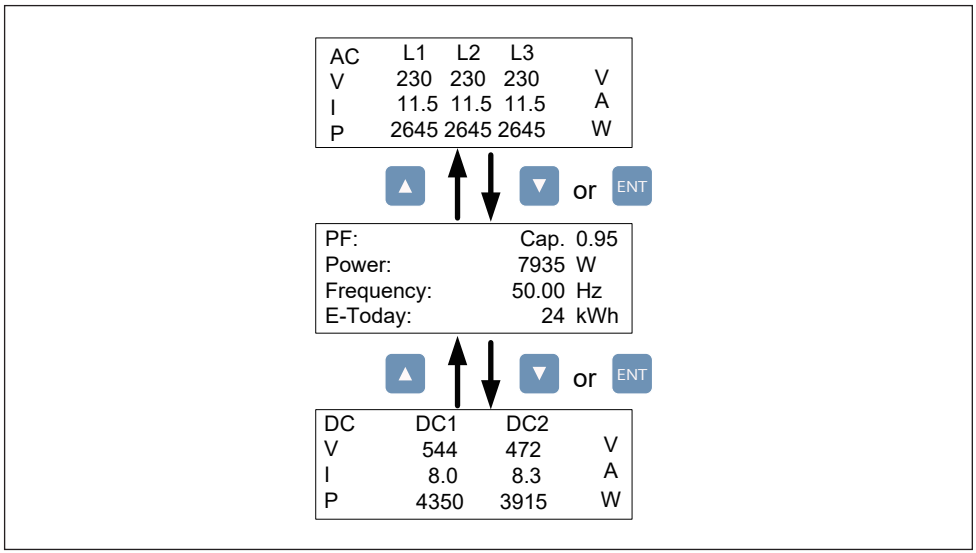


Figure 5-5 Power meter page

5.3.2. Energy Log

User can view the inverter's life energy and life runtime via Energy Log page.

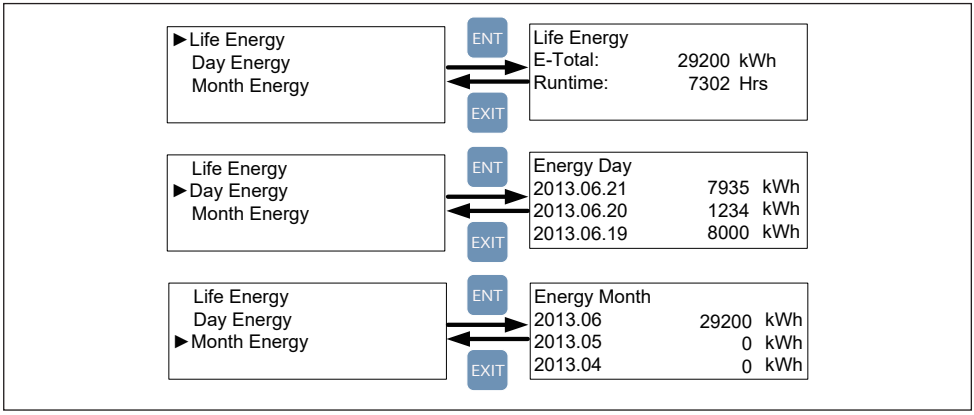


Figure 5-6 Energy log flow chart

5.3.3. Event Log

Event Log has two subpages: Error Events page and Grid Report page. Error Events page displays all the events (Error and Fault) and it can show 30 records at a time. Grid Report page only displays the error that occurred at grid side, and it can show 5 records at a time.

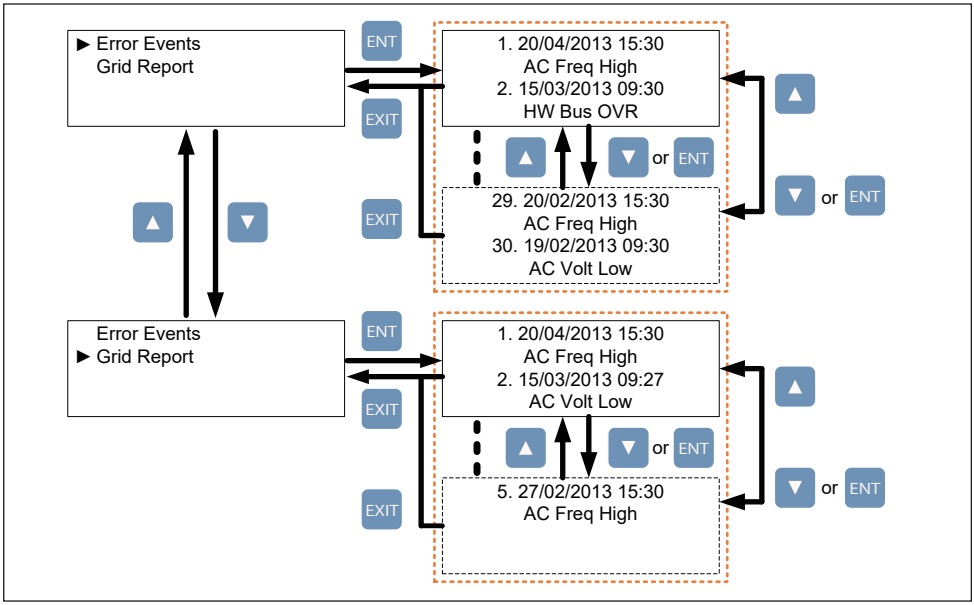


Figure 5-7 Event log flow chart

5.3.4. Inverter Information

This page can helps user to recognize the inverter. First section displays serial number, installation date, ID, and firmware version. Another 3 sections displays the settings of inverter functions. For more infromation about these settings, please refer to 5.3.6 Install Settings, 5.3.7 Active/Reactive power, and 5.3.8 FRT (Fault ride through).

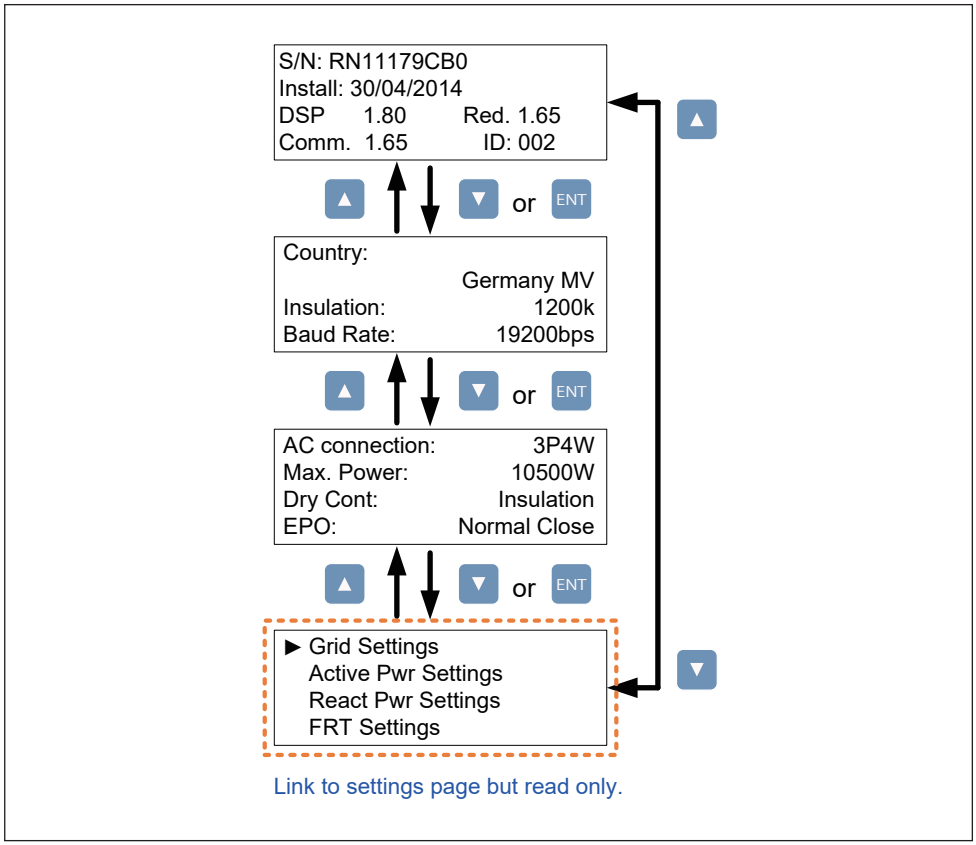


Figure 5-8 Inverter information page

5.3.5. General Settings

Users can set Language, Date and Time, and RS-485 communication baud rate in this page.

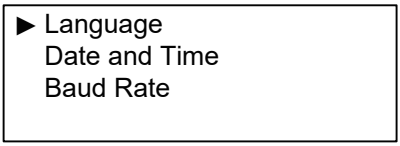


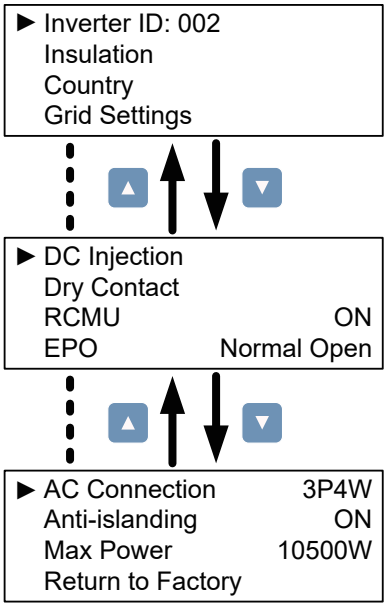
Figure 5-9 General Settings page

5.3.6. Install Settings

CAUTION !

The settings in Install Settings page can only be adjusted by qualified installers or engineers. Changing these settings may result in damage to the inverter and other equipment.

To enter Install Settings page, users have to enter correct password.
There are 3 sets of password with different permissions: user level, installer level, and manufacturer level. The following sub-sections will introduce the setting items in Install Settings page of user level and installer level.



User Level:
- Inverter ID
- Insulation
- Country
- Dry Contact
- EPO
- AC Connection
- Max. Power

Installer Level:
- Inverter ID
- Insulation
- Country
- Grid Settings
- Dry Contact
- EPO
- AC Connection
- Max. Power

Manufacturer Level:
- All Settings

Figure 5-10 Install settings page and password permissions

5.3.6.1. Inverter ID

Inverter ID is used in RS-485 communication, for PC recognizing the inverter. If users connect several inverters together via RS-485, each inverter must have different ID.

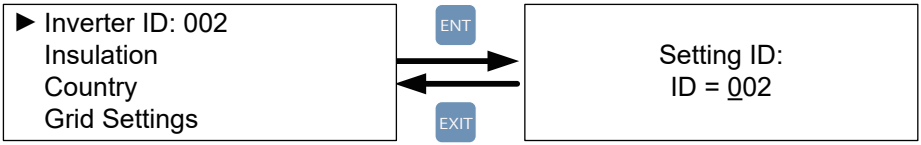


Figure 5-11 Inverter ID page

5.3.6.2. Insulation

Before connecting to grid, inverter will measure the impedance between the PV array and PE first. RPI M6A/ M8A/ M10A models provide 6 types of impedance measurement methods (ON, DC1 only, DC2 only, Plus Grounded, Minus Grounded, and OFF) and 3 impedance limits. Installer must select the appropriate method based on PV array's wiring.

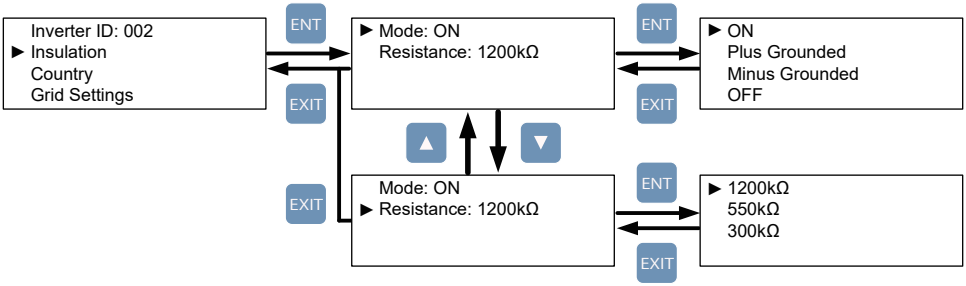


Figure 5-12 Insulation page

5.3.6.3. Country

Each country has its own electricity regulations. Installer must select the country correctly.

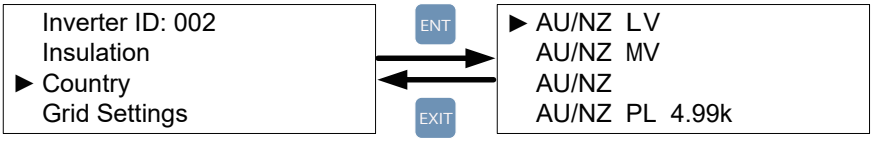


Figure 5-13 Country page

5.3.6.4. Grid Settings

Grid settings page includes the voltage and frequency protection points. These protection points are linked to electricity regulations. If there is no any special requirement, please do not change any grid settings.

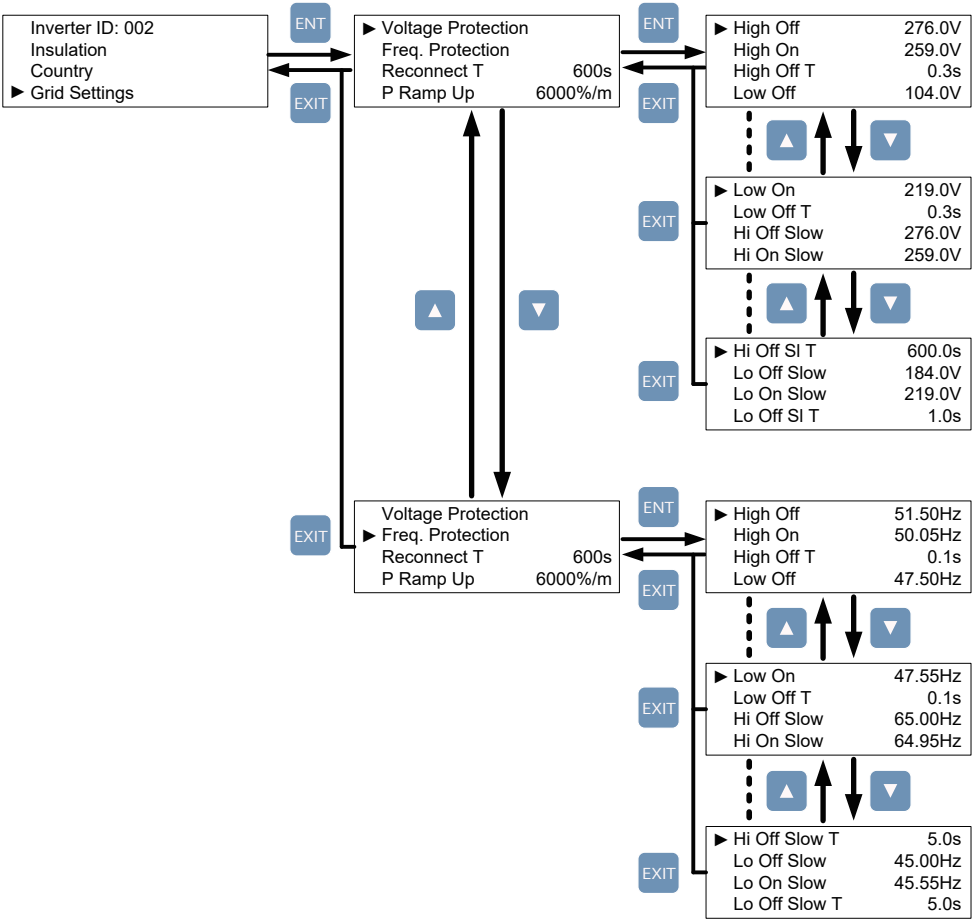


Figure 5-14 Grid Settings page

5.3.6.5. Dry Contact

Users can choose the trigger condition of dry contact. There are 8 options in the setting page: Disable, On Grid, Fan Fail, Insulation, Alarm, Error, Fault, and Warning. Please refer to Table 5-2 for more details about these options.

Setting	Dry Contact Trigger Timing
Disable	No action.
On Grid	Inverter is connecting to grid.
Fan Fail	Fan Fail occurs.
Insulation	Insulation test fail.
Alarm	Any error, fault, or warning occurs.
Error	Any Error occurs.
Fault	Any Fault occurs.
Warning	Any Warning occurs.

Table 5-2 Dry Contact Trigger Setting

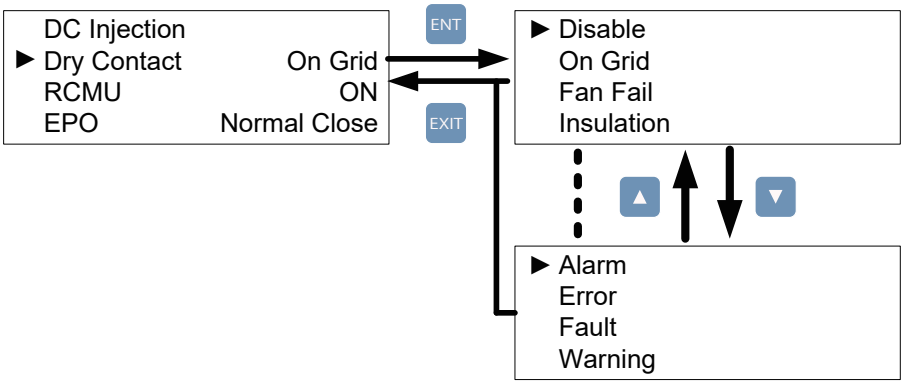


Figure 5-15 Dry Contact page

5.3.6.6. EPO

EPO function has 2 detection methods: Normal Open and Normal Close. Normal Open means EPO pins are usually open-circuited. When these two pins are short-circuited, inverter will shut down immediately. Normal Close is contrary to Normal Open. Please choose an appropriate detection method according to your needs.

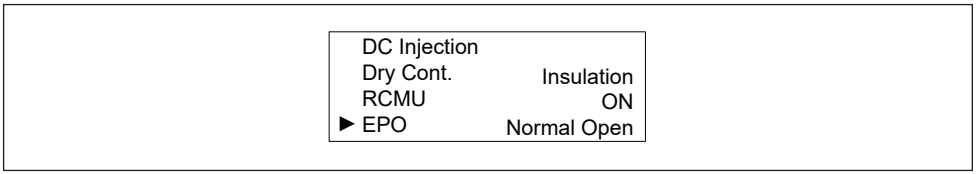


Figure 5-16 EPO page

5.3.6.7. AC connection

RPI M6A/ M8A/ M10A models can support 3P3W and 3P4W system. Please select the correct AC wiring type.

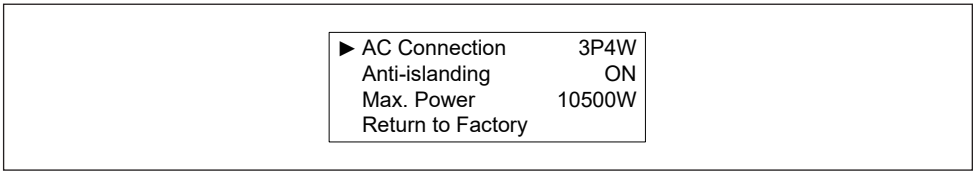


Figure 5-17 AC connection page

5.3.6.8. Max Power

Electricity regulation in some area requests that inverter must have power limit function. In these areas, users can adjust Max Power to limit the maximum output power of the inverter.

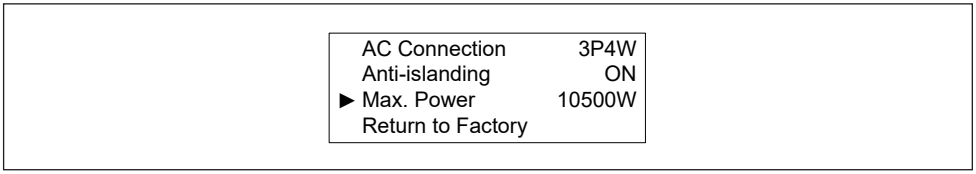


Figure 5-18 Max Power page

5.3.7. Active/Reactive power

A password is required to enter Active/Reactive Power page. This page includes two kinds of function: active power control and reactive power control. In active power control function, there are 3 control modes: Power Limit, Power vs. Frequency, and P(V). In reactive power control function, there are 4 control modes: Constant cosphi, cosphi(P), Constant Q, and q(V). These modes will be introduced in next section.

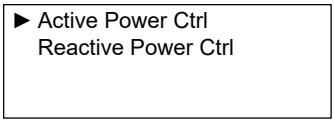


Figure 5-19 Active/Reactive power page

5.3.7.1. Power Limit

This control mode can reduce the output power to a percentage of inverter's rated power. Users can limit the output power by set the Set Point in Power Limit page.

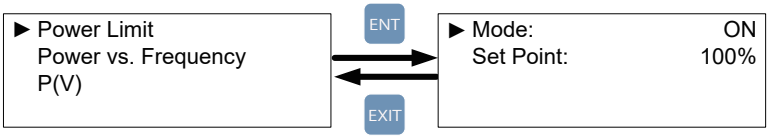


Figure 5-20 Power Limit page

5.3.7.2. Power vs. Frequency

Inverter will reduce output power when grid frequency rises up if this mode enabled. Users can tune the parameters in Power vs. Frequency page to change the inverter's behavior.

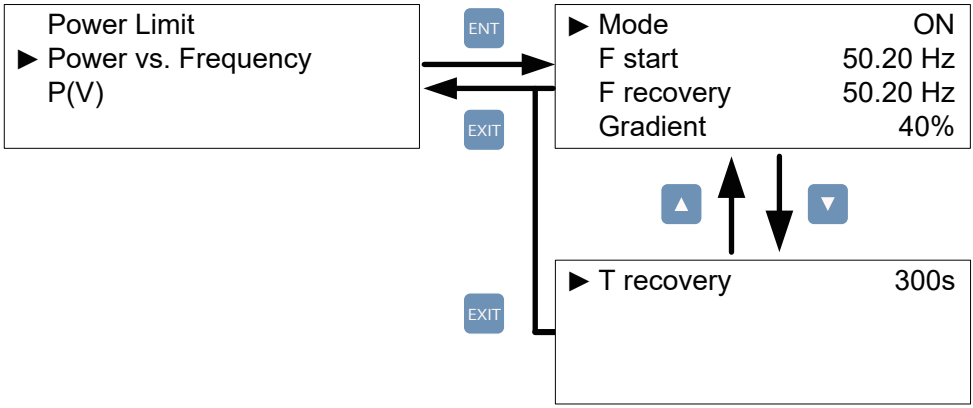


Figure 5-21 Power vs Frequency page

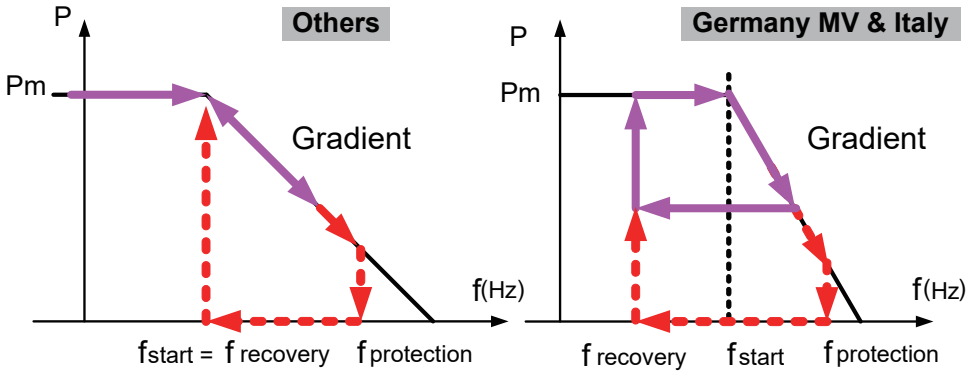


Figure 5-22 Power vs Frequency parameters

5.3.7.3. P(V)

When grid voltage rises up to a lock-in voltage(V lock-in) and inverter's present output power is greater than lock-in power(P lock-in), inverter will reduce the output power and keep it at a certain value(P lock-out) until grid voltage drop back to lock-out voltage(V lock-out) and passing a certen time(T revcovery).

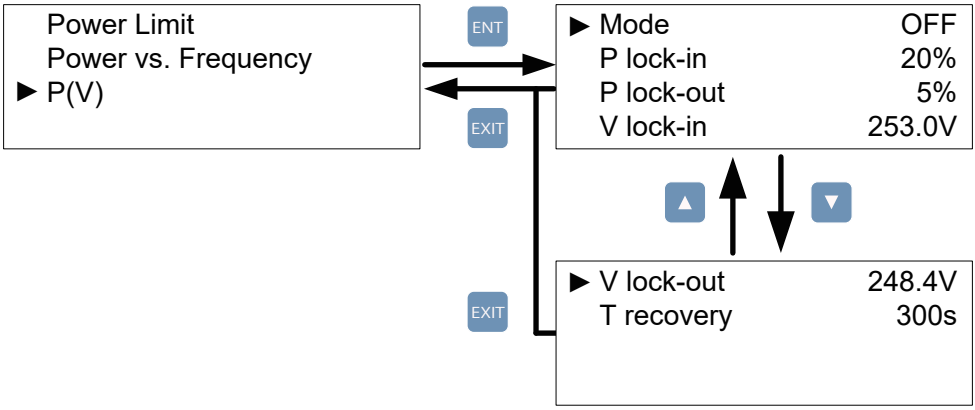


Figure 5-23 P(V) page

5.3.7.4. Constant cosphi

Inverter can feed in a fixed reactive power to grid. Users can set the power factor(cosphi) in Constant cosphi page.

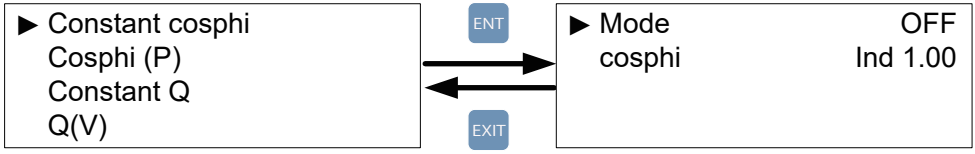


Figure 5-24 Constant cosphi page

5.3.7.5. Cosphi (P)

Cosphi (P) is a function that inverter will feed in reactive power when its output active power reach the setting values. For country Italy MV and Italy LV, users can set lock-in voltage and lock-out voltage to assign the operation interval. When grid voltage reach the lock-in voltage(V lock-in), inverter will enable cosphi (P) function automatically and disabled it when grid voltage reach lock-out voltage(V lock-out).

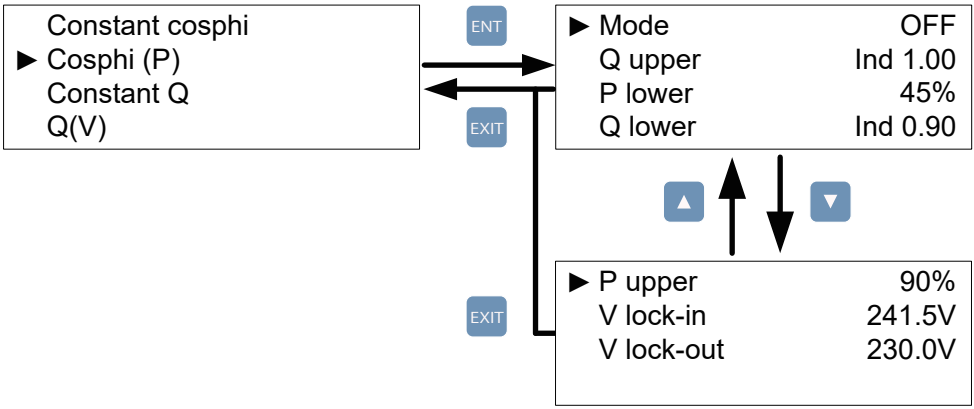


Figure 5-25 Cosphi (P) page

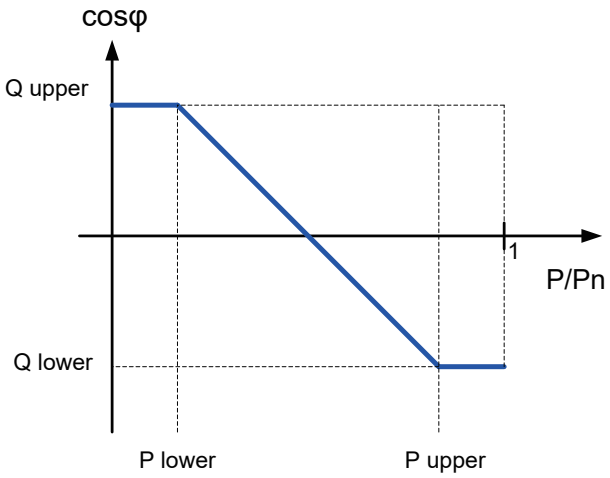


Figure 5-26 Cosphi (P) parameters

5.3.7.6. Constant Q

Like Constant cosphi function, users can assign a percentage of reactive power in Constant Q page.

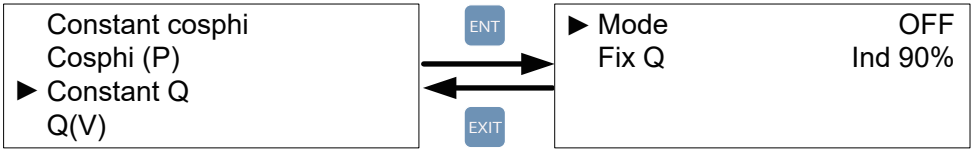


Figure 5-27 Cosphi (P) parameters

5.3.7.7. Q(V)

Q(V) is a control mode that inverter will provide reactive power accroding to grid voltage. For country Italy MV and Italy LV, users can set lock-in power and lock-out power to assign Q(V) function operation interval.

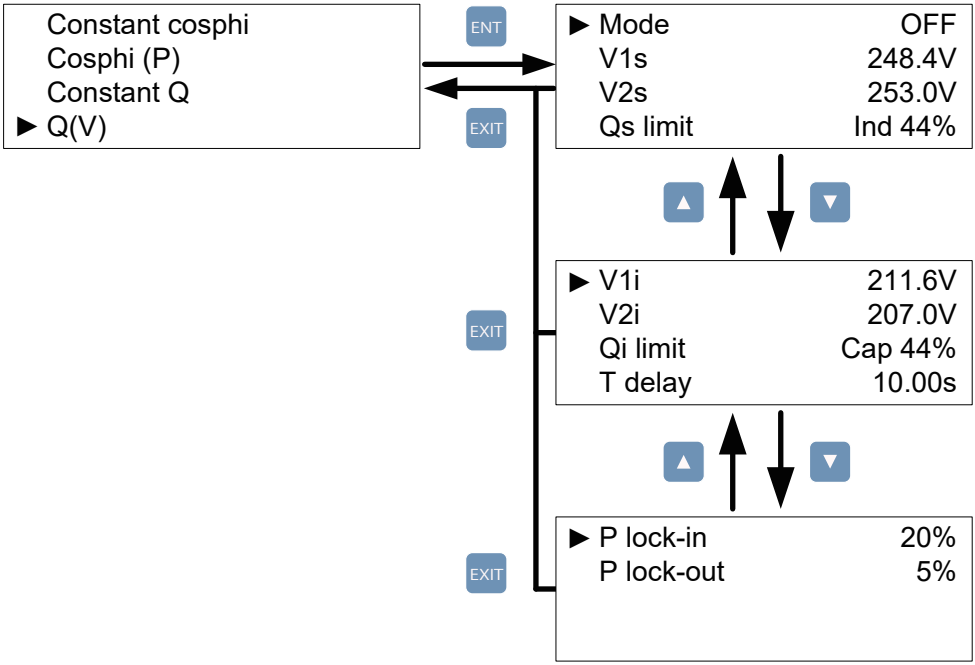


Figure 5-28 Q(V) page

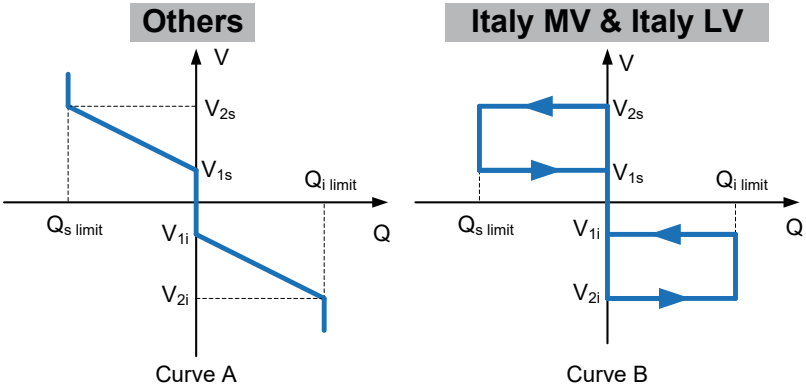


Figure 5-29 Q(V) parameters

5.3.8. FRT (Fault ride through)

Some area requests that inverter should keep connected to grid when grid voltage drops suddenly in few seconds. In these areas, users can enable FRT function and adjust the parameters to meet the requirement.

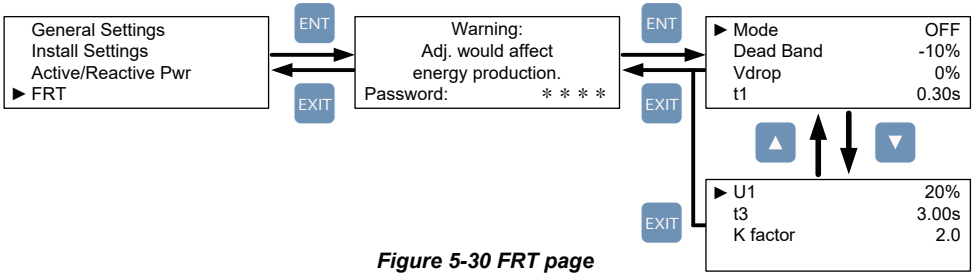


Figure 5-30 FRT page

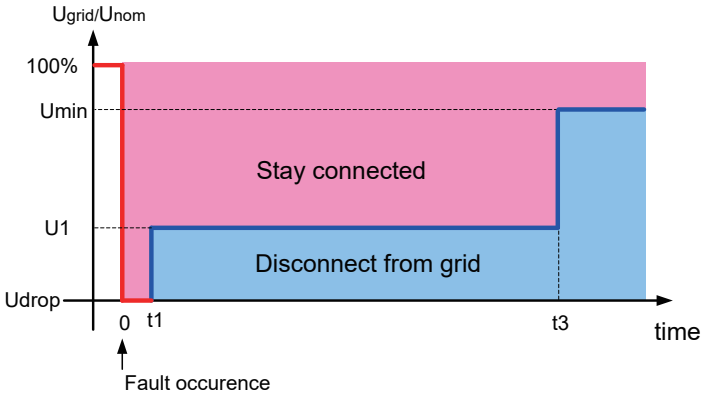


Figure 5-31 FRT Parameters

6.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 ! Electric Shock



Before any maintenance, please switch AC and DC power off to avoid risk of electric shock even if manual switching turn off.

7.Error message and Trouble Shooting

ERROR		
Message	**Possible cause**	**Action**
AC Freq High (E01)	1. Actual utility frequency is over 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
AC Freq Low (E02)	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
Grid Quality (E07)	Non-linear load in Grid and near to inverter	Grid connection of inverter need to be far away from non-linear load if necessary
HW Con. Fail (E08)	1. Wrong connection in AC plug 2. Detection circuit malfunction	1. Check the AC connection, must accords to manual 2. Check the detection circuit inside the inverter
No Grid (E09)	1. AC breaker is OFF 2. Disconnect in AC plug	1. Switch on AC breaker 2. Check the connection in AC plug and make sure it connects to inverter
AC Volt Low (E10, E15, E20)	1. Actual utility voltage is under the UVR setting 2. Incorrect country or Grid setting 3. Wrong connections in AC plug 4. Detection circuit malfunction	1. Check the utility voltage connection to the inverter terminal 2. Check country & Grid setting 3. Check the connection in AC plug 4. Check the detection circuit inside the inverter
AC Volt High (E11, E13, E16, E18, E21, E23)	1. Actual utility voltage is over the OVR setting 2. Utility voltage is over the Slow OVR setting during operation 3. Incorrect country or Grid setting 4. Detection circuit malfunction	1. Check the utility voltage on the inverter terminal 2. Check the utility voltage on the inverter terminal 3. Check country & Grid setting 4. Check the detection circuit inside the inverter

ERROR		
Message	**Possible cause**	**Action**
Solar1 High (E30)	1. Actual Solar1 voltage is over 1000Vdc 2. Detection circuit malfunction	1. Modify the solar array setting, and make the Voc less than 1000Vdc 2. Check the detection circuit inside the inverter
Solar2 High (E31)	1. Actual Solar2 voltage is over 1000Vdc 2. Detection circuit malfunction	1. Modify the solar array setting, and make the Voc less than 1000Vdc 2. Check the detection circuit inside the inverter
Insulation (E34)	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

Table 7-1 Error Message

Warning		
Message	**Possible cause**	**Action**
Solar1 Low (W01)	1. Actual Solar1 voltage is under the limit 2. Some devices were damaged inside the inverter if the actual Solar1 voltage is close to "0" 3. Detection circuit malfunction	1. Check the Solar1 voltage connection to the inverter terminal 2. Check all switching devices in boost1 3. Check the detection circuit inside the inverter
Solar2 Low (W02)	1. Actual Solar2 voltage is under the limit 2. Some devices were damaged inside the inverter if the actual Solar2 voltage is close to "0" 3. Detection circuit malfunction	1. Check the Solar2 voltage connection to the inverter terminal 2. Check all switching devices in boost2 3. Check the detection circuit inside the inverter

Table 7-2 Warning Message

FAULT		
Message	**Possible cause**	**Action**
DC Injection (F01, F02, F03)	1. Utility waveform is abnormal 2. Detection circuit malfunction	1. Check the utility waveform. Grid connection of inverter need to be far away from non-linear load if necessary 2. Check the detection circuit inside the inverter
Temperature (F05)	1. The ambient is over 60℃ (The installation is abnormal) 2. Detection circuit malfunction	1. Check the installation ambient and environment 2. Check the detection circuit inside the inverter
Temperature (F07)	1. Ambient temperature is <-30℃ 2. Detection circuit malfunction	1. Check the installation ambient and environment 2. Check the detection circuit inside the inverter
HW NTC1 Fail (F06)	1. Ambient temperature >90℃ or <-30℃ 2. Detection circuit malfunction	1. Check the installation ambient and environment 2. Check the detection circuit inside the inverter
HW NTC2 Fail (F08)	1. Ambient temperature >90℃ or <-30℃ 2. Detection circuit malfunction	1. Check the installation ambient and environment 2. Check the detection circuit inside the inverter
HW NTC3 Fail (F09)	1. Ambient temperature >90℃ or <-30℃ 2. Detection circuit malfunction	1. Check the installation ambient and environment 2. Check the detection circuit inside the inverter
HW NTC4 Fail (F10)	1. Ambient temperature >90℃ or <-30℃ 2. Detection circuit malfunction	1. Check the installation ambient and environment 2. Check the detection circuit inside the inverter
DC RLY Fail (F13)	1. Driver circuit for relay is defective 2. Relay(s) is defective 3. Detection circuit malfunction (Inverter voltage)	1. Check the input voltage, must >150Vdc 2. Check the auxiliary circuitry inside the inverter 3. Check the detection circuit inside the inverter
HW DSP ADC1 (F15)	1. Insufficient input power 2. Auxiliary power circuitry malfunction 3. Detection circuit malfunction	1. Check the input voltage, must >150Vdc 2. Check the auxiliary circuitry inside the inverter 3. Check the detection circuit inside the inverter

FAULT		
Message	**Possible cause**	**Action**
HW DSP ADC2 (F16)	1. Insufficient input power 2. Auxiliary power circuitry malfunction 3. Detection circuit malfunction	1. Check the input voltage, must >150Vdc 2. Check the auxiliary circuitry inside the inverter 3. Check the detection circuit inside the inverter
HW DSP ADC3 (F17)	1. Insufficient input power 2. Auxiliary power circuitry malfunction 3. Detection circuit malfunction	1. Check the input voltage, must >150Vdc 2. Check the auxiliary circuitry inside the inverter 3. Check the detection circuit inside the inverter
HW Red ADC1 (F18)	1. Insufficient input power 2. Auxiliary power circuitry malfunction 3. Detection circuit malfunction	1. Check the input voltage, must >150Vdc 2. Check the auxiliary circuitry inside the inverter 3. Check the detection circuit inside the inverter
HW Red ADC2 (F19)	1. Insufficient input power 2. Auxiliary power circuitry malfunction 3. Detection circuit malfunction	1. Check the input voltage, must >150Vdc 2. Check the auxiliary circuitry inside the inverter 3. Check the detection circuit inside the inverter
HW Eff. (F20)	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
HW COMM1 (F23)	1. DSP is idling 2. The communication connection is disconnected 3. The communication circuit malfunction	1. Check reset and crystal in DSP 2. Check the connection between DSP and COMM 3. Check the communication circuit
HW COMM2 (F22)	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
Ground Cur. (F24)	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 a external transformer if necessary 3. Check boost driver & boost choke 4. Check the detection circuit inside the inverter

FAULT		
Message	**Possible cause**	**Action**
HW Con. Fail (F26)	1. Power line is disconnected inside the inverter 2. Current feedback circuit is defective	1. Check the power lines inside the inverter 2. Check the current feedback circuit inside the inverter
RCMU Fail (F27)	1. RCMU is disconnected 2. Detection circuit malfunction	1. Check the RCMU connection inside the inverter 2. Check the detection circuit inside the inverter
RLY Short (F28)	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
RLY Open (F13, F29)	1. One or more relays are abnormal 2. The driver circuit for the relay malfunction 3. The detection accuracy is not correct for Vgrid and Vout	1. Replace the defective relay(s) 2. Check the driver circuit inside the inverter 3. Check the Vgrid and Vout voltage detect on accuracy
Bus Unbal. (F30)	1. Not totally independent or parallel between inputs 2. PV Array short to Ground 3. Driver for boost is defective or disconnected 4. Detection circuit malfunction	1. Check the inputs connections 2. Check the PV Array insulation 3. Check the driver circuit for boost inside the inverter 4. Check the detection circuit inside the inverter
HW Bus OVR (F31, F33, F35)	1. Driver for boost is defective 2. Voc of PV array is over 1000Vdc 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 Voc less than 1000Vdc 3. N/A 4. Check the detection circuit inside the inverter
AC Cur. High (F36, F37, F38, F39, F40, F41)	1. Surge occurs during operation 2. Driver for inverter stage is defective 3. Switching device is defective 4. Detection circuit malfunction	1. N/A 2. Check the driver circuit in inverter stage 3. Check all switching devices in inverter stage 4. Check the detect circuit inside the inverter
HW CT A Fail (F42)	1. Test current loop is broken 2. CTP3 is defective 3. Detection circuit malfunction	1. Check the connection of CNP4 to CNM4 2. Replay CTP3 with new one 3. Check the detection circuit inside the inverter

FAULT		
Message	**Possible cause**	**Action**
HW CT B Fail (F43)	1. Test current loop is broken 2. CTP4 is defective 3. Detection circuit malfunction	1. Check the connection of CNP4 to CNM4 2. Replace CTP4 with new one 3. Check the detection circuit inside the inverter
HW CT C Fail (F44)	1. Test current loop is broken 2. CTP5 is defective 3. Detection circuit malfunction	1. Check the connection of CNP4 to CNM4 2. Replace CTP5 with new one 3. Check the detection circuit inside the inverter
HW AC OCR (F45)	1. Large Grid harmonics 2. Switching device is defective 3. Detection circuit malfunction	1. Check the utility waveform. Grid connection of inverter need to be far away from non-linear load if necessary 2. Check all switching devices in inverter stage 3. Check the detection circuit inside the inverter
HW ZC Fail (F50)	The detection circuit for synchronal signal malfunction	Check the detection circuit for synchronal signal inside the inverter
DC Cur. High (F60, F61, F70, F71)	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 curcuit for boost inside the inverter 3. Check input current detection circuit

Table 7-3 Fault Message

8.De-Commissioning

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

WARNING !



To avoid injuries, please follow the procedures:

- Switch off AC circuit breaker to disconnect with electricity grid.
- Switch off DC switch to disconnect with DC source.
- Switch off the PV array switch to disconnect from the PV array.
- Use proper voltmeter 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.

Now you may unload the inverter.

9.Technical Data

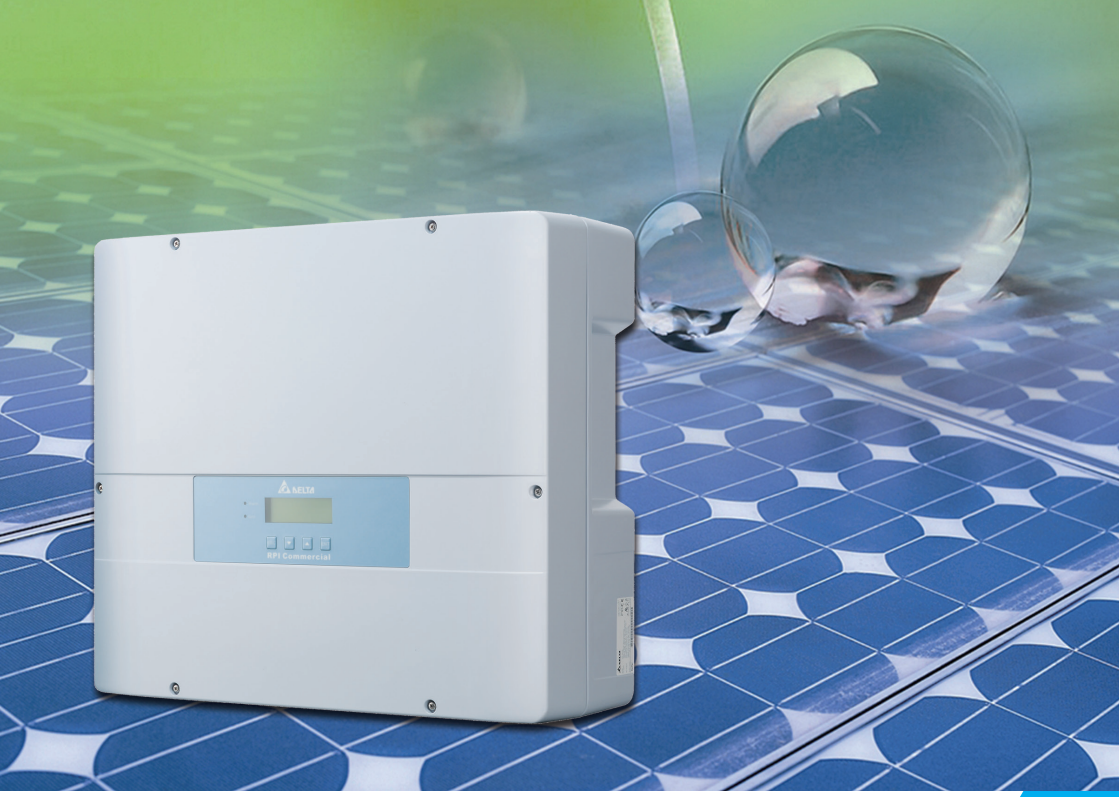
	RPI M6A	RPI M8A	RPI M10A
GENERAL			
Enclosure	Powder coated aluminum		
Operating temperature	-25~60℃ , full power up to 40℃		
Operating Altitude	2000m		
Relative humidity	0 – 100% non-condensing.		
Environmental category	Outdoor, wet locations		
Protection degree	IP65 (Electronics)		
Pollution degree	Internal : II, External : III		
Overvoltage category	AC output :III, DC Input :II		
Maximum backfeed current to the array	0		
Galvanic isolation	NO		
Safety class	Class I metal enclosure with protective earth		
Weight	25kg	25kg	26kg
Dimensions(W*H*D)	510 × 445 × 177mm		
Connectors	Weather resistant connectors		
DC INPUT (Solar side)			
Maximum input power	6.6kW	8.8kW	11kW
Recommended PV power range	5.7kW–7.5kW	7.6kW–10kW	9.5kW– 12.5kW
Nominal voltage	600Vdc		
Operating voltage	200Vdc – 1000Vdc		
Startup voltage	> 250 Vdc		
Start up power	40W		
MPP tracker	Parallel inputs: 1 MPP tracker Separate inputs: 2 MPP trackers		
Absolute maximum voltage	1000Vdc		

	RPI M6A	RPI M8A	RPI M10A
MPPT range at Nominal Power			
Balanced inputs	315~800Vdc	415~800Vdc	415~800Vdc
Unbalanced inputs	425~800Vdc	565~800Vdc	415~800Vdc
DC INPUT (Solar side)			
Number of inputs	MPPT1 (1pair MC4) MPPT2 (1pair MC4)		MPPT1 (2pair MC4) MPPT2 (1pair MC4)
Rated current	MPPT1 (10A) MPPT2 (10A)	MPPT1 (10A) MPPT2 (10A)	MPPT1 (15A) MPPT2 (10A)
Maximum short circuit current per MPPT (Isc)	13A / 13A		26A / 13A
AC OUTPUT (GRID SIDE)			
Nominal power	6kVA	8kVA	10kVA
Maximum power	6.3kVA(1)(2)	8.4kVA	10.5kVA
Voltage	3Ph, 230/400Vac (3phase / N / PE)		
Nominal current	8.7A	11.6A	14.5A
Maximum current	9.7A	13A	16A
Inrush current	31A / 100us	31A / 100us	31A / 100us
Maximum output fault current (rms)	13.6A	18.2A	22.4A
Maximum output overcurrent protection	11.6A	15.6A	19.2A
Frequency	Rated 50/60Hz (Programmable 45Hz - 65Hz)		
Active anti-islanding method	Reactive power injection		
Total harmonic distortion	< 3 %		
Power factor	> 0.99 @ full power Adjustable: 0.80 leading – 0.80 lagging		
DC current injection	<0.5% rated current		
Tare loss	< 2W		
Maximum efficiency	98.3%	98.3%	98.3%
EU efficiency	97.6%	97.9%	98.0%
AC connector	3 Ph + N + PE; 3-phase AC plug that meets IP67		
Fuse	N/A. Please connect to an external protection device (1.25 rated current)		

		RPI M6A	RPI M8A	RPI M10A
SYSTEM INFORMATION / COMMUNICATION				
User interface		Black-on-white character type LCD display		
		365 days data logger and real time clock		
		30 event record		
External communication		2 RS-485/Wi-Fi connections		
REGULATIONS & DIRECTIVES				
CE conformity		Yes		
Grid interface		VDE0126-1-1, VDE-AR-N 4105, AS4777		
Emission		EN 61000-6-3		
Harmonics		EN 61000-3-2		EN 61000-3-12
Variations and flicker		EN 61000-3-3		EN 61000-3-11
Immunity		EN 61000-6-2		
Immunity	ESD	IEC 61000-4-2		
	RS	IEC 61000-4-3		
	EFT	IEC 61000-4-4		
	Surge	IEC 61000-4-5		
	CS	IEC 61000-4-6		
	PFMF	IEC 61000-4-8		
Electrical safety		IEC 62109-1/ -2		
MISCELLANEOUS				
Enclosure		Mounting bracket		
		Aluminum with powder coating		

(1) 4.99kW max. for Australia (AU / NZ PL 4.99kW).
(2) 6.3kW max. for Australia (AU / NZ).

Table 9-1 Specifications for RPI M6A/ M8A/ M10A



The power behind competitiveness

三相併網型變流器

RPI M6A/M8A/M10A
操作手冊

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繁體中文 ····· 53

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Smarter. Greener. Together.

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安全規範

本手冊提供使用者以下幾種常見安全規範:

注 意 !



- 如若不遵守此規範則可能導致機器設備的損毀。

警 告 !



- 如若不遵守此規範則可能會導致人員的傷亡，
  本機任何維修動作只能由製造商進行。

危 險 !



- 如若不遵守此規範則將會導致人員的傷亡,
  為了避免觸電, 請勿私自打開本變流器外殼。

高溫危險 !



- 機器正常操作時表面溫度可能會有燙傷的危險請勿碰觸。

1.信息

1.1. 關於此手冊

本手冊將提供產品之電器規格、安裝步驟以及相關設定等資訊，本手冊適用機型為RPI M6A/ RPI M8A/ RPI M10A。

1.2. 產品說明

本產品為三相非隔離、市電並聯型之太陽能變流器(solar inverter)。
太陽光能量經由太陽能板(PV array)轉換成可運用之直流電後，再由變流器轉換成三相電流輸出與市電併聯，不支援獨立運轉(stand alone)。

太陽能變流器工作方式如**圖1-1**，將太陽能板的直流電源轉換成三相交流電源輸出至市電，達到節能省電的目的。

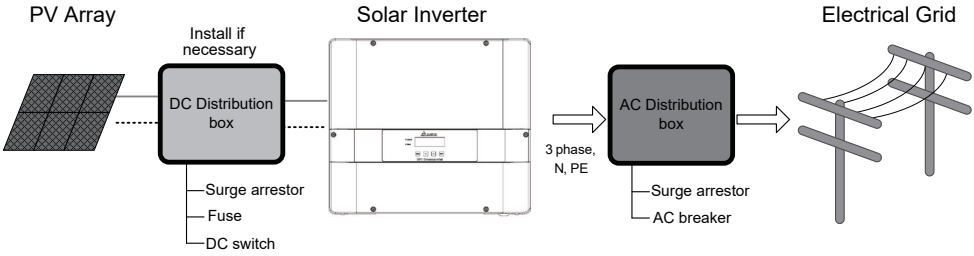


圖1-1: 太陽能變流器使用說明

1.3. 其他資訊

如果想獲得更詳細之資訊或其它相關產品資訊，
可連結至以下網站：http://www.deltaww.com

2.產品概觀

2.1 檢查內容物

運輸過程中可能會發生不可預測的損壞。 檢查所有內容物是否在包裝箱中，標準內容物如**表2-1**所示。如果變流器/內容物有明顯損壞或包裝箱有任何損壞，請聯繫您的變流器供應商。

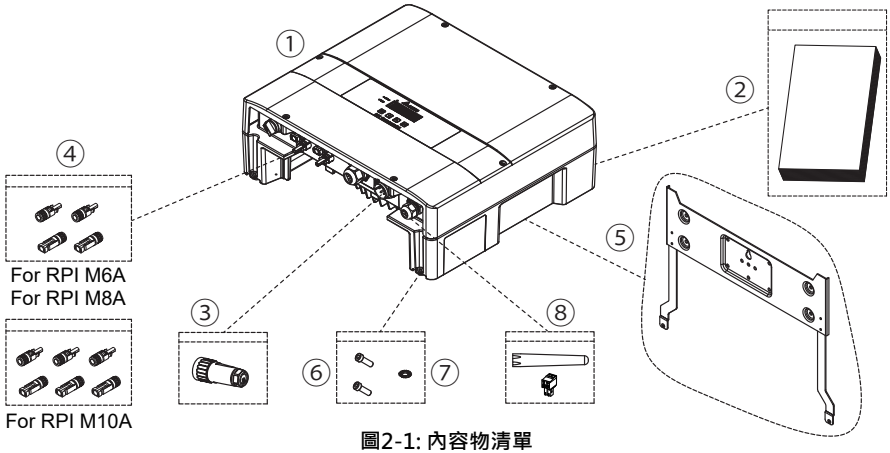


圖2-1: 內容物清單

RPI M6A/ RPI M8A/ RPI M10A			
	物品	數量	說明
1	太陽能變流器	1	RPI M6A/ RPI M8A/ RPI M10A 太陽能變流器
2	a. 使用說明書 b. 快速安裝導覽 (EU/AU/ EN/ DE/ FR/ NL) c. 安全說明	1	安全規範、安裝步驟、產品規格...等
3	AC接頭	1	連接接頭
4	DC接頭	2 / 3 sets	DC連接接頭 M6A / M8A: 2組 M10A: 3組
5	壁掛板	1	將太陽能變流器掛於牆上之掛壁板
6	螺絲	2	將太陽能變流器固定於牆上
7	墊圈	1	用於外部接地
8	12VDC 輸出連接器 Wi-Fi 天線	1 1	僅適用於CNC406，最大直流輸出12V / 0.5A 安裝天線以增強無線信號

表2-1: 內容物清單

2.2. 產品標籤

使用者可透過產品標籤上的資訊得知變流器之型號，變流器之型號、規格及序號皆標示於產品標籤上，關於標籤的位置請參考**圖 2-2**。

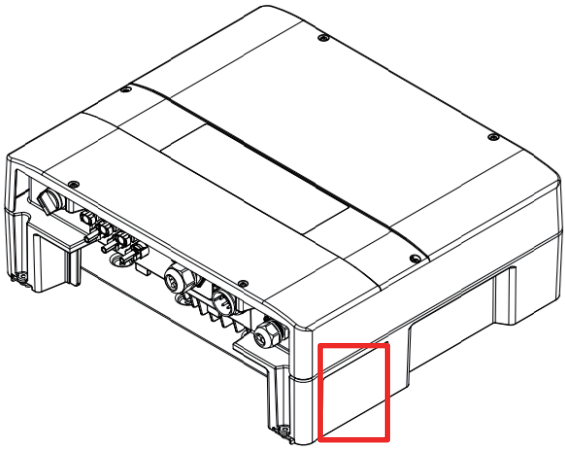


圖2-2: 產品標籤

2.3. 外觀介紹

變流器外部元件如**圖2-3**所示。詳細的輸出與輸入介面請參考**圖 2-4**。

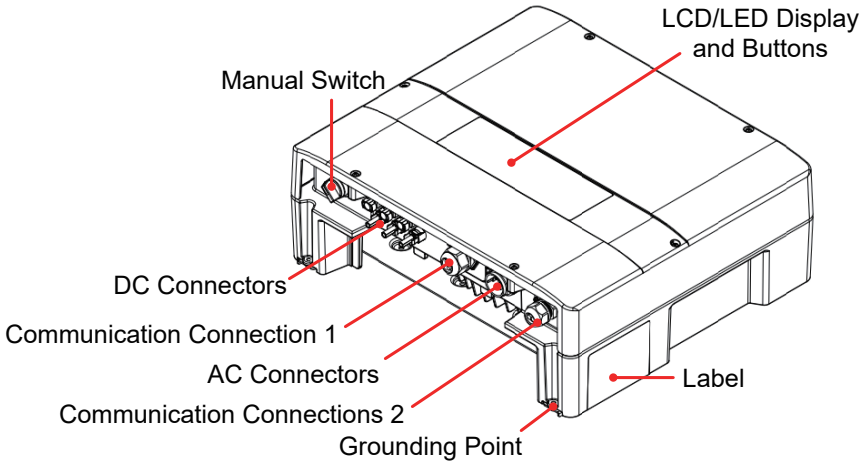


圖2-3: 外觀介紹

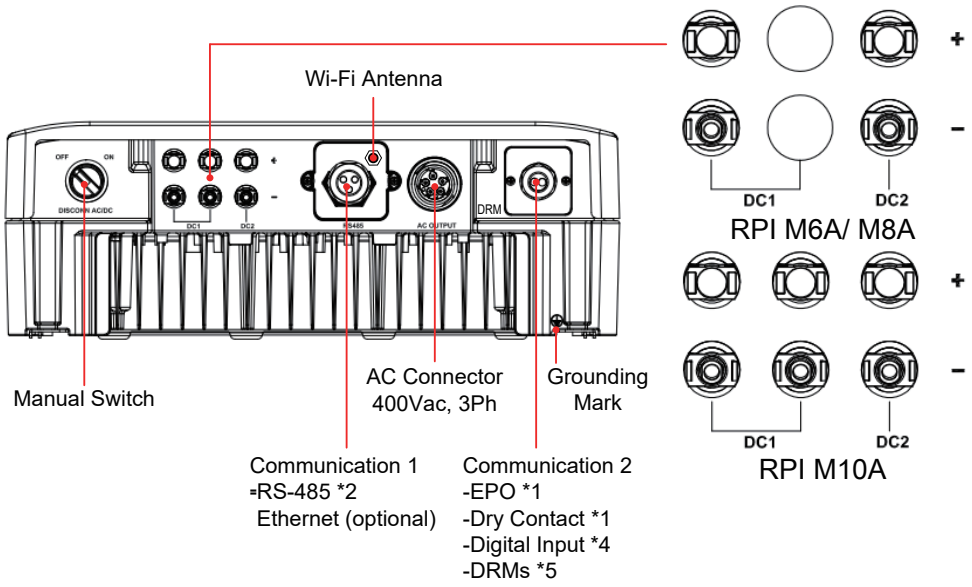
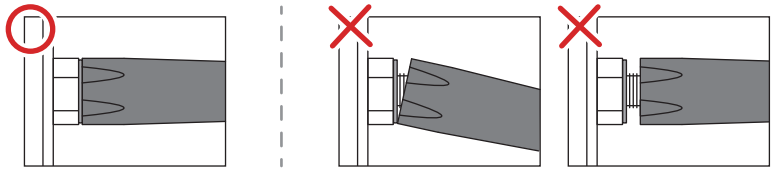


圖2-4: 輸出入介面介紹

注 意!

- 請用正確的方式鎖緊天線 (參考下圖) 以避免接頭以及天線損壞。



3.安裝

注 意 !

- 變流器不可安裝在陽光可直射的地方。

警 告!

- 請勿將變流器安裝於易燃性物質附近。
- 請將變流器安裝於穩固之牆上。
- 太陽能板(PV array)絕緣等級須具有IEC 61730 Class A，或者在市電側額外安裝隔離變壓器。

3.1. 變流器開箱

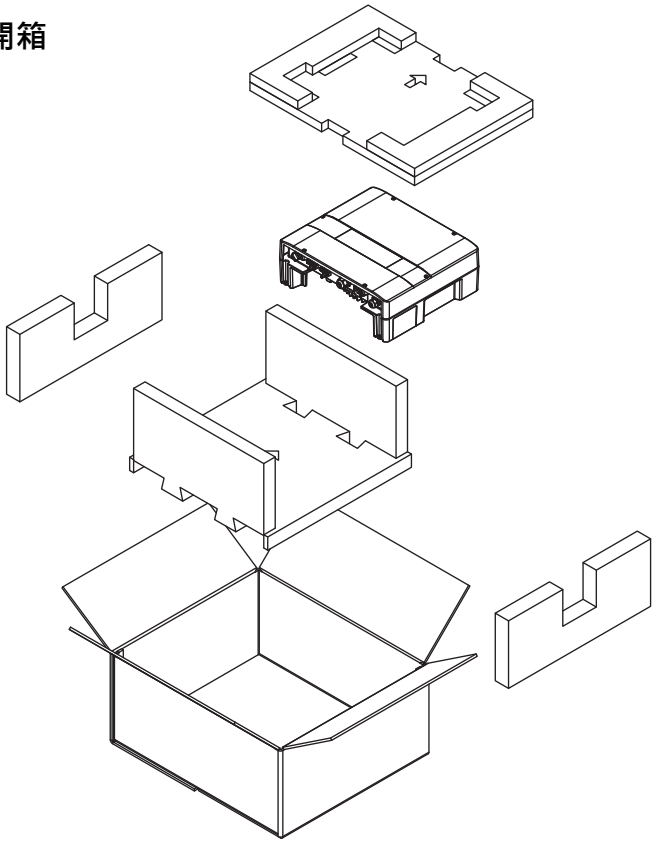


圖3-1: 開箱

3.2. 安裝變流器

本變流器屬於壁掛式機種，安裝時請以機身垂直地面，AC/DC接頭位於機子正下方之方式壁掛於牆上。勿將機子安裝於傾斜之處。

請依照以下步驟將變流器安裝於牆上：

1. 使用8顆M6螺絲將壁掛板鎖附於牆上。請參考**圖3-4**。
2. 將變流器附掛於壁掛板上。
3. 使用六角扳手且用2顆M4內六角螺釘固定變流器。 請參考**圖3-5**。

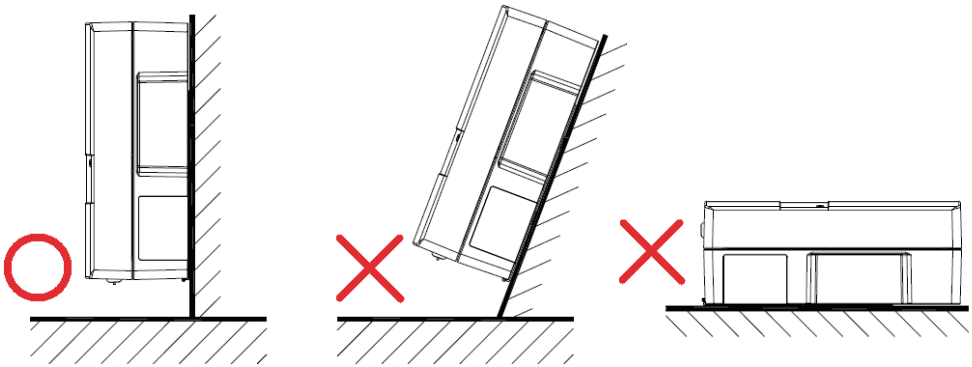
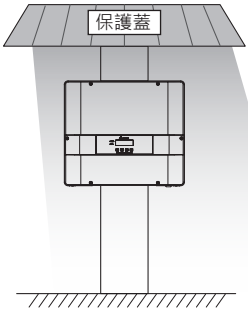


圖3-2: 正確及不正確的安裝

注 意 !

為避免由於極端氣候(大雪, 冰雹...等)或不恰當的安裝/維運所導致的變流器故障, 台達強烈建議安裝額外的保護蓋, 詳細細節請洽當地服務團隊。



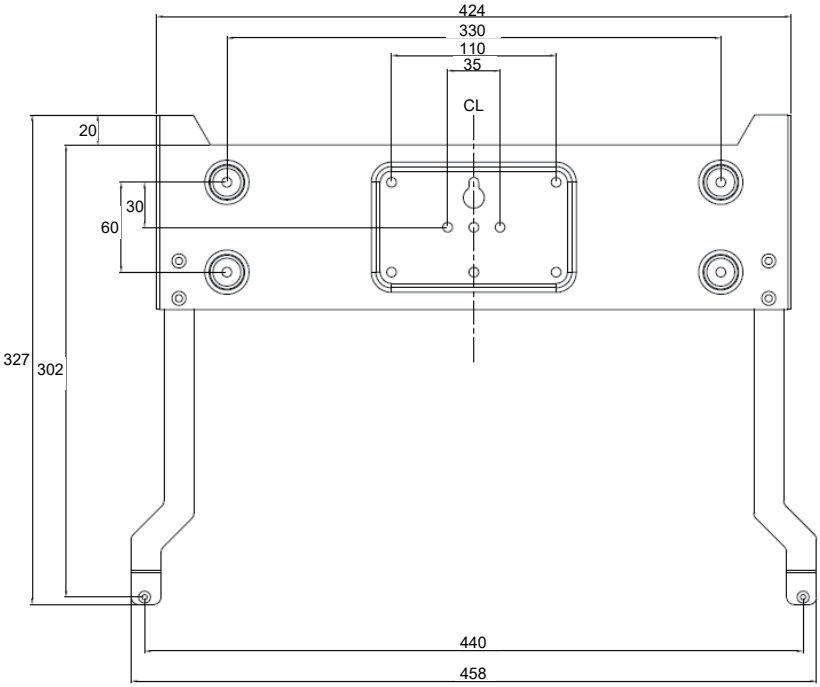


圖3-3: 壁掛板尺寸

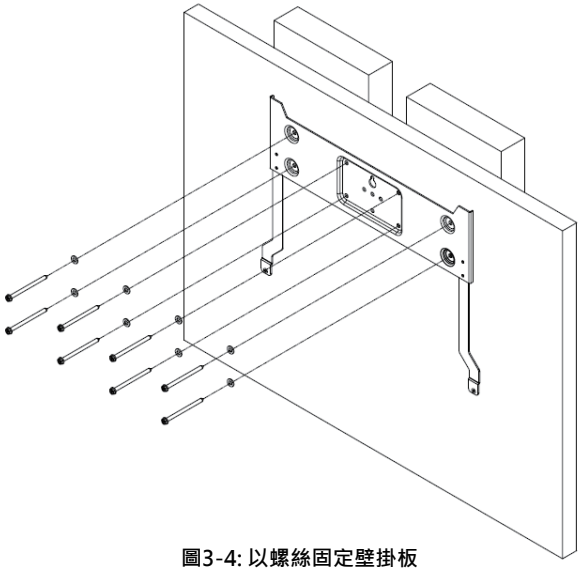


圖3-4: 以螺絲固定壁掛板

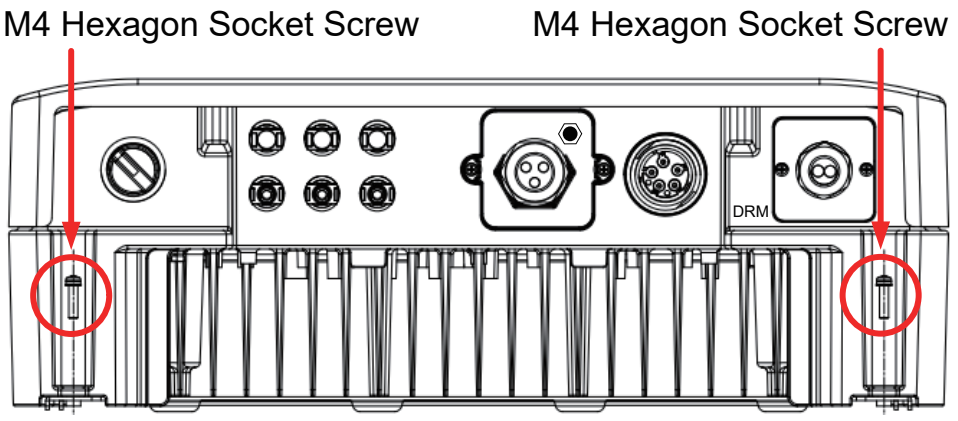


圖3-5: 附掛和固定變流器

注意！

- 壁掛板是專為變流器設計，而且是變流器唯一的安裝方式。
- 請安裝於安全且空曠之場所，方便保養與檢修。
- 安裝變流器時，請在地板，天花板和設備之間留出適當的間距，如**圖3-6**所示。 (沒有強制要求單位和單位之間的差距。)
- 請安裝於視線可及之高度，以便觀察其運轉狀態與參數設定。
- 請安裝於溫度介於-25℃~60℃的場所。

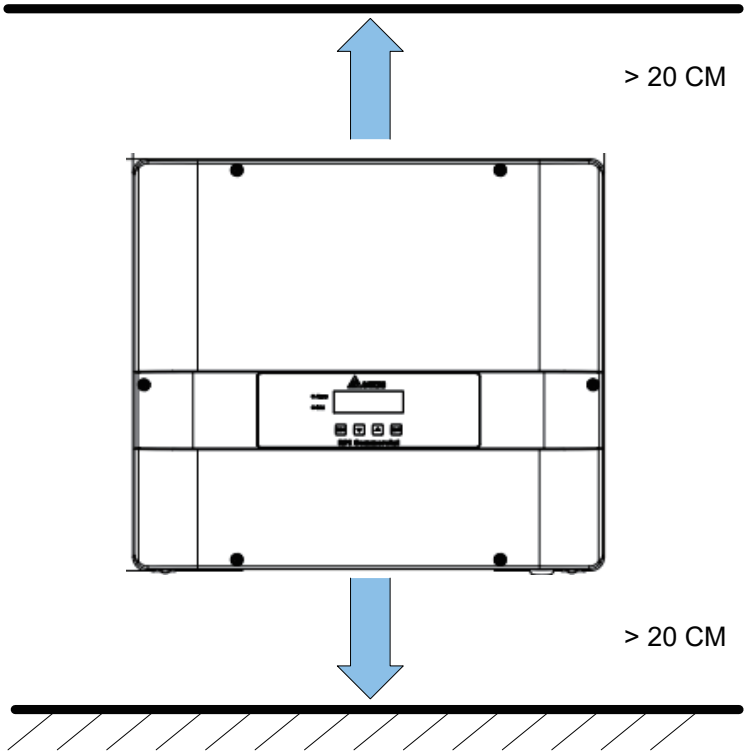


圖3-6: 適當安裝間距

4.配線

4.1. 配線前準備事項

- RPI M6A/ M8A/ M10A機種內部並未附帶隔離變壓器。若太陽能板為正端接地或負端接地時，使用者須於AC 端加裝外部隔離變壓器。詳細的接線方式請參考**圖 4 -1**。
- 變流器提供並聯直流輸入（2 組MPP追蹤 / 3組並聯輸入）。
- 不同的DC配線方式需於變流器控制面板上設定不同的對地阻抗(insulation)偵測方式。
- 即使切斷機殼底部的手動開關，在移除DC端子前仍需將AC與 DC電源確實切離，避免觸電。

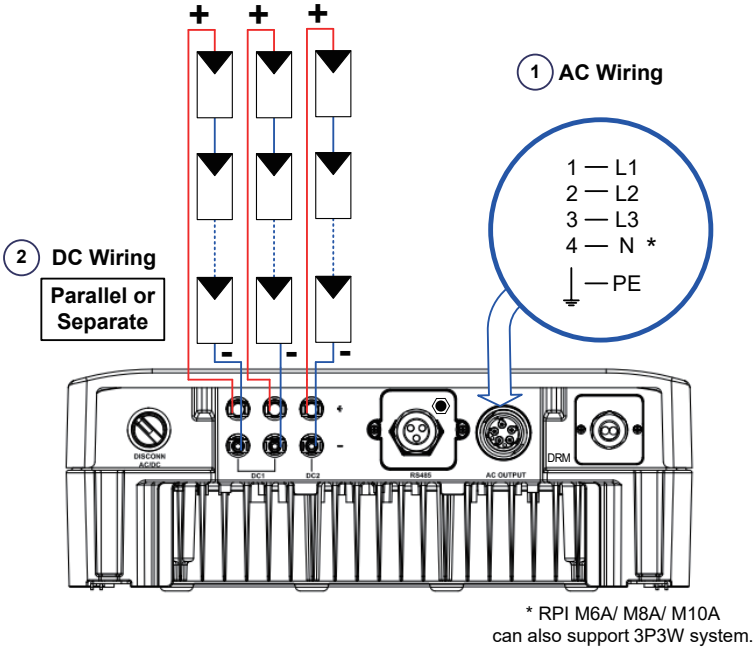


圖4-1: 系統配線圖

警告！電擊危險

每當太陽能板暴露在陽光下時，由於輸出線或裸露的端子，可能存在電擊危險。為降低安裝過程中的衝擊風險，請使用不透明（深色）材料覆蓋太陽能板，並確保在開始任何接線之前將變流器中的斷開設備設置為OFF。

4.2. AC(市電端)之連接: 三相三線(3P+PE)或三相四線(3P+N+PE)

警告！

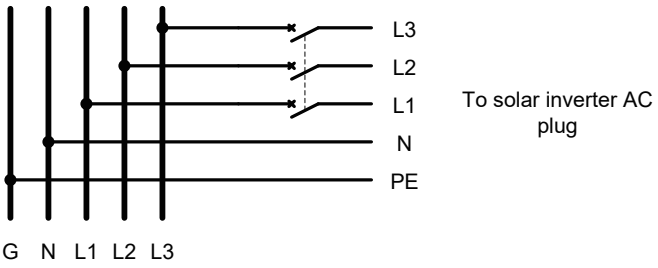
- 執行配線作業時, 必須確認市電電源開關已經關閉。

4.2.1. 保護裝置與AC配線圖

建議在市電與變流器之間加裝斷路器以達到過電流保護的效果。
請參考下表的規格選擇適當的斷路器。

Model	Upstream circuit breaker
RPI M6A/ M8A/ M10A	20A

表4-1: 斷路器建議規格



AC端之配線必須妥善包覆以確保安全並符合**表4-2**中之規格。

機種名稱	額定電流	單一線徑	建議扭力值
RPI M6A RPI M8A RPI M10A	25 A	5 - 8 mm^2	0.7 N.m

表4-2: AC接頭線徑尺寸

Model M6A/ M8A/ M10A 機型皆支持三相三線(3-phase and PE)與三相四線(3- phase,N and PE)兩種配線方式。

注意! 可能造成機器設備損毀

- 確保為AC電纜選擇合適的尺寸:
  請選擇如**圖4-2**所示的端子進行電線壓接。
- 未遵循這些說明可能會導致AC接頭損壞。

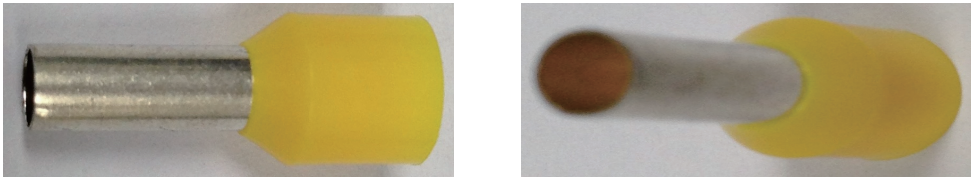


圖4-2: 電線壓接端子

在組裝AC plug前請先按照以下步驟剝除線皮，如**圖4-3**所示：

- 剝除電纜外部膠皮55mm (2.2inch)。
- 將內部L1、L2、L3、N線材修剪至52.5mm (2.0 inch)。
- 剝除內部所有線材之膠皮12mm (0.5 inch) 。
- 所有電線的壓接端子。

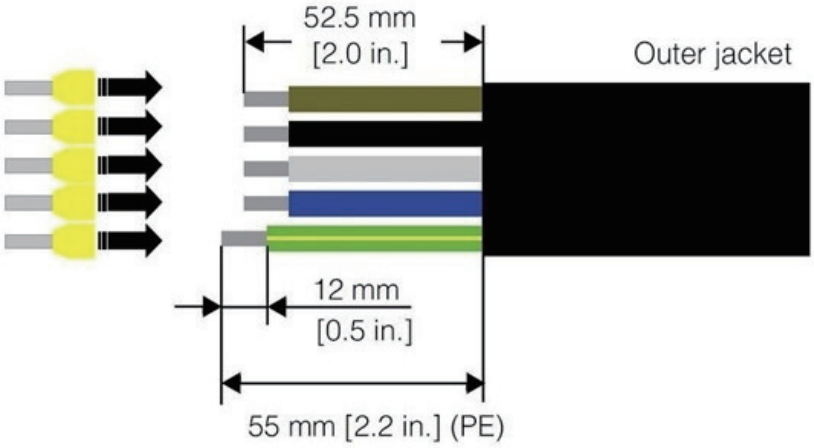


圖4-3: AC線材撥線

RPI M6A / M8A / M10A使用帶部件號的Amphenol AC連接器C016 20E004 800 2。線材壓接完成後請按照**圖 4-4**組裝AC接頭。變流器可接受正相序或負相序連接，意即L1~L3 連接順序可調整，但N與PE則必須正確的連接。

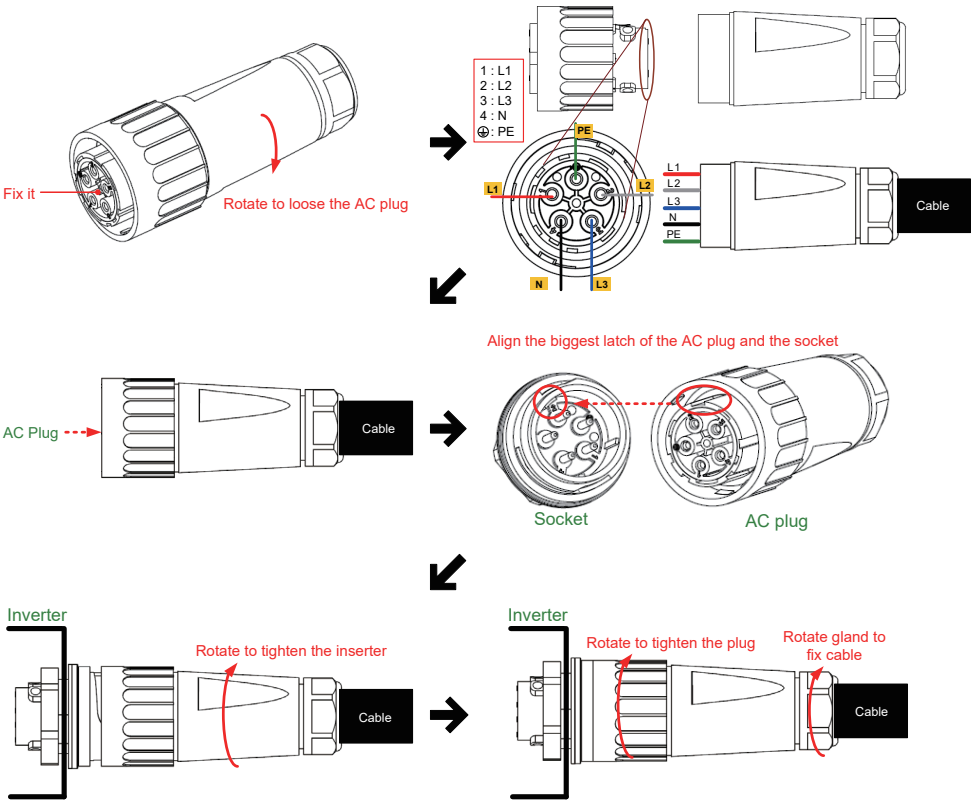


圖4-4: RPI M6A/ M8A/ M10A之AC接頭配線圖

配線後，安裝人員應選擇控制面板上的AC連接類型。 關於設置，請參閱**5.3.6安裝設置**。

連接至AC之電壓必須符合下列規範：

三相三線:
L1-L2: 400 Vac ± 10%
L1-L3: 400 Vac ± 10%
L2-L3: 400 Vac ± 10%

三相四線:
L1-N: 230 Vac ± 10%
L2-N: 230 Vac ± 10%
L3-N: 230 Vac ± 10%

4.3. 直流輸入端(太陽能板電源端)之連接

警告！

- 配線時, 請選用適當之線徑, 並依正確極性連接。
- 配線時, 確認太陽能板(PV Array)電源之開關已關閉。

注意！

- DC1所有的string串接後之太陽能板數量、開路電壓與功率大小須為一致。
- 太陽能板串接後的最大開路電壓(Voc)不可超過1000Vdc。
- 安裝至太陽能板端之裝置，額定電壓>太陽能板之開路電壓，額定電流>太陽能板之短路電流。
- 輸入至變流器之最大功率不可超過**表4-3**之規範。

限制條件	RPI M6A	RPI M8A	RPI M10A
DC1	4.25 kW @ Vdc=425V-800V	5.65 kW @ Vdc=565V-800V	7 kW
DC2			5.4 kW
最大輸入功率	6.6 kW	8.8 kW	11 kW

表4-3: 最大容許輸入功率限制

型號	額定電流	線徑
M6A	DC 10A	2 - 3mm^2 / 14 AWG
M8A	DC 10A	2 - 3mm^2 / 14 AWG
M10A	DC 15A	3 - 5mm^2 / 12 AWG

表4-4: 線徑大小

DC配線端子可分為正極和負極兩種，如**圖4-5**所示。配接時請務必確認極性與變流器上的標示一致。



圖4-5: DC配線端子

4.4. 多台變流器組合

4.4.1. 多台變流器在三相系統並聯配置方式

RPI M6A/8A/10A 可配置在三相電壓的系統，也可將多台RPI M6A/8A/10A的AC側併聯在相同的市電電網。請參考**圖4-6**。

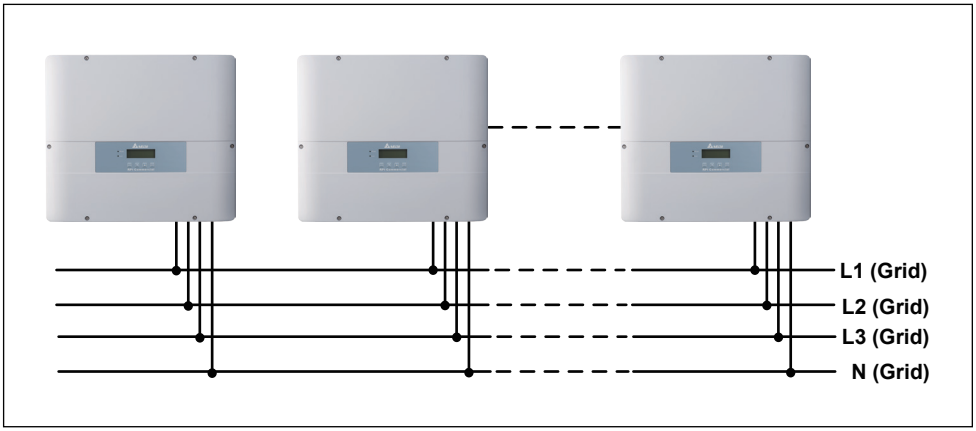


圖4-6: 多台變流器在三相系統併聯配置方式

4.4.2. 通訊介面之連接

通訊1模組請參考**圖4-7**，該模組支援RS-485與電腦進行通訊。
通訊2模組請參考**圖4-7**，該模組支援數位輸入、DRMs、EPO、乾接點以及DC輸出: 12V/0.5A。

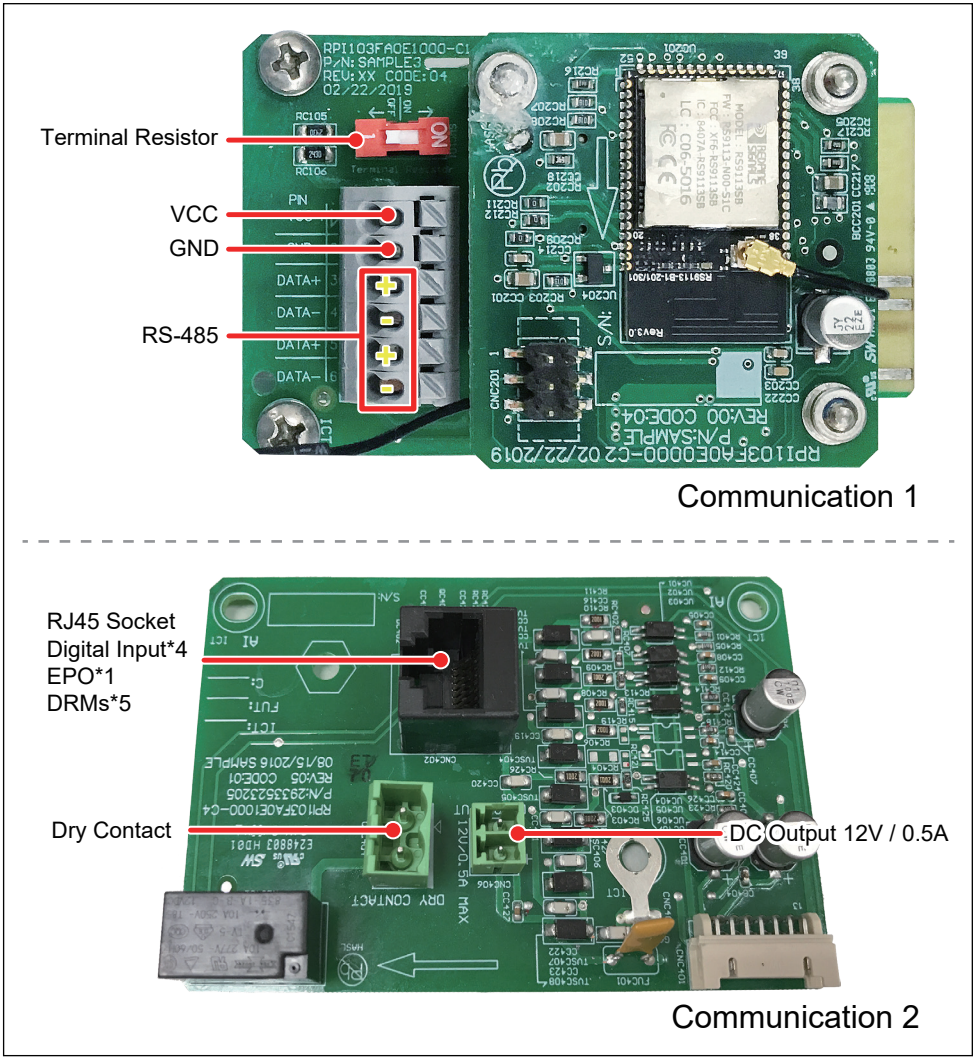
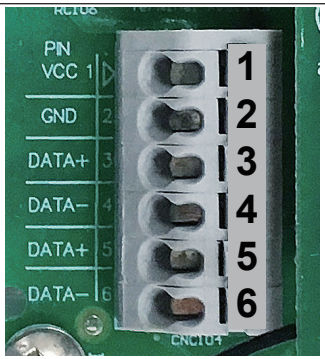


圖4-7: 通訊模組示意圖

4.4.3. RS-485之連接

RS-485端子的定義如**表4-5**。當變流器為單台安裝時，安裝者需將該台之終端電阻設置為ON。當變流器為多台串聯時，請參考**圖4-8**。安裝者需將第一台及最後一台變流器之終端電阻設置為ON，其餘機子則為OFF。

Pin	Function
1	VCC (+12V)
2	GND
3	DATA+
4	DATA-
5	DATA+
6	DATA-



RPI M6A/ M8A/ M10A

表4-5: RS-485端子定義

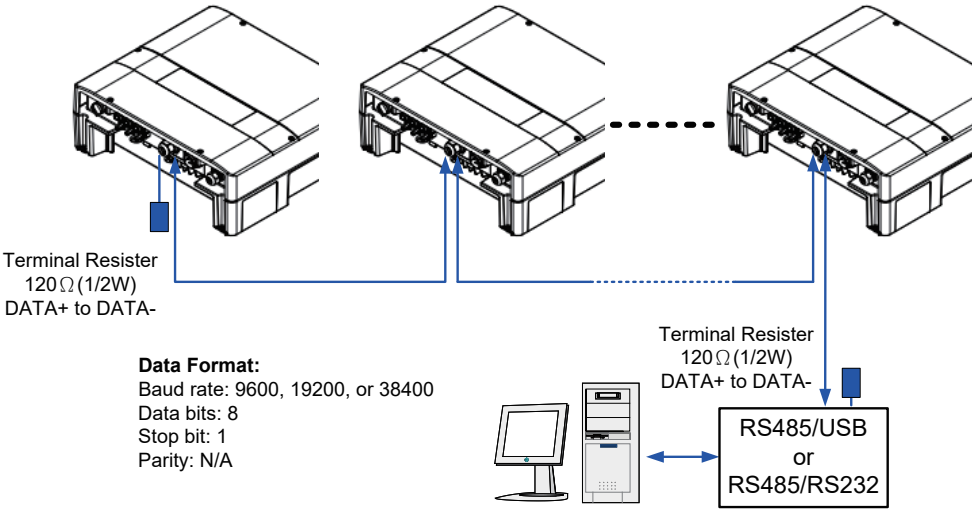


圖4-8: 多台變流器串接通訊

緊急停止開關與數位輸入功能可以在變流器多台併聯下使用，接線方式請參考**圖4-9**。

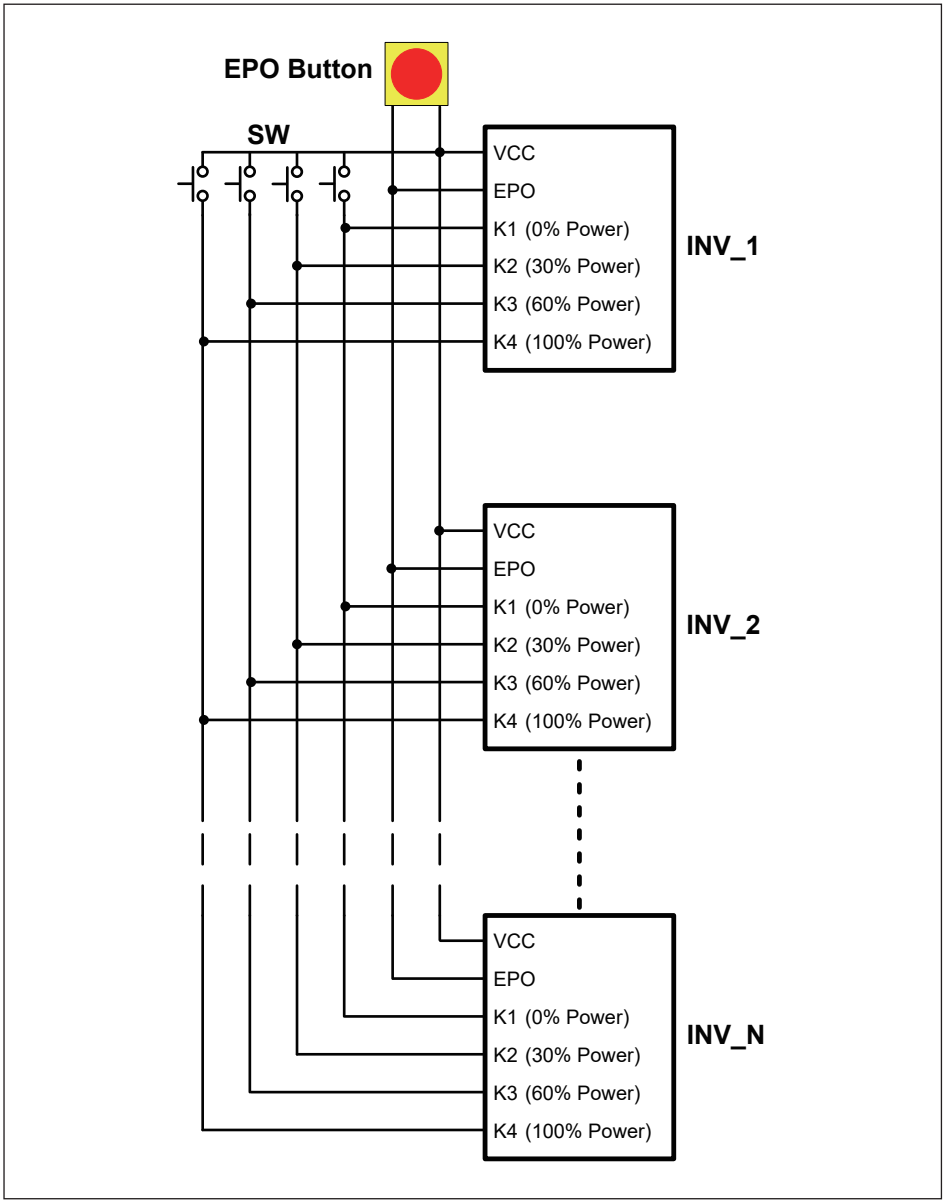


圖4-9 : 緊急停止開關與數位輸入功能的多台併聯

4.4.4. 緊急關機裝置與數位輸入之連接

通訊2模組有一組緊急關機裝置(EPO)。使用者可以在安裝設定頁中自定義EPO功能。請參閱**第5.3.6.6節**，EPO也提供四組數位輸入功能(K1~K4)。
在澳洲(AU 2015)及紐西蘭(NZ 2015)，DRMs也使用數位輸入功能來判斷，請參考**表4-7**，其定義方式與一般的數位輸入功能不同；有關DRMs的接腳定義，請參考**表4-8**。

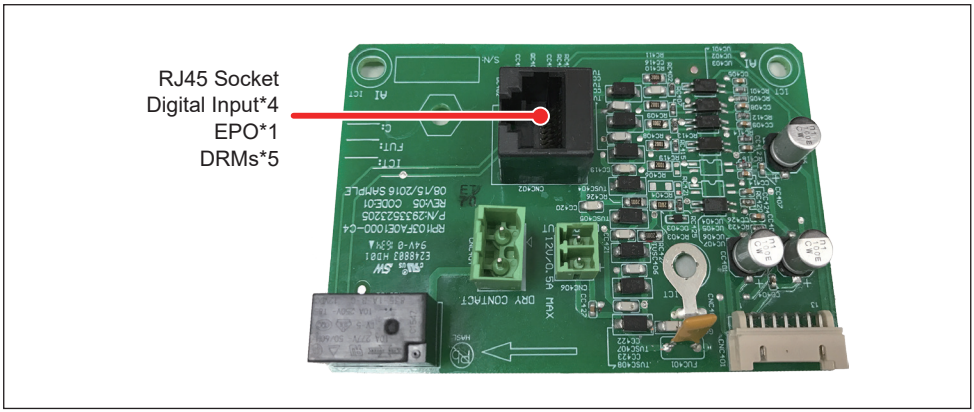


圖4-10: 緊急關機裝置與數位輸入功能

接腳	定義
1	K1
2	K2
3	K3
4	K4
5	VCC*
6	EPO*
7	EPO
8	VCC

表4-6:
RJ45插座接腳的定義

短路以下腳位	變流器的動作
VCC & K1	停止輸出任何功率
VCC & K2	降低功率輸出至30%額定功率
VCC & K3	降低功率輸出至60%額定功率
VCC & K4	恢復功率輸出至100%額定功率
VCC & EPO	緊急關機

表4-7: 數位輸入與緊急關機裝置的定義

短路以下腳位	變流器的動作
VCC* & K1	DRM5 (0% active power)
VCC* & K2	DRM6 (Maximum 50% active power)
VCC* & K3	DRM7 (Maximum 75% active power and sink reactive power)
VCC* & K4	DRM8 (Maximum 100% active power and sink reactive power)
VCC* & EPO*	DRM0 (Emergency power off)

表4-8: 澳洲(AU 2015)和紐西蘭(NZ 2015)的DRMs定義

4.4.5. 乾接點之連接

RPI M6A/ M8A/ M10A機種提供1組連動的乾接點，其觸發條件可由使用者自訂。當乾接點被觸發，輸出兩個端口將被短路。有關觸發條件設置的更多信息，請參閱**第5.3.6.5節Dry Contact**。

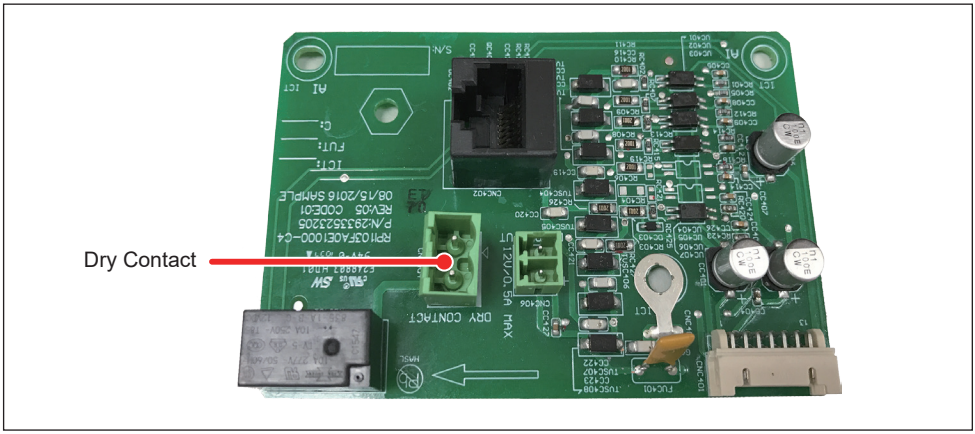


圖4-11: 乾接點端口

4.4.6. 直流輸出端之連接

RPI M6A / M8A / M10A提供1組直流輸出端，可供外部設備使用（EX：警報燈或蜂鳴器）。

輸出規格最大為12V/0.5A，其包裝連接器請參考**表2-1**包裝清單。

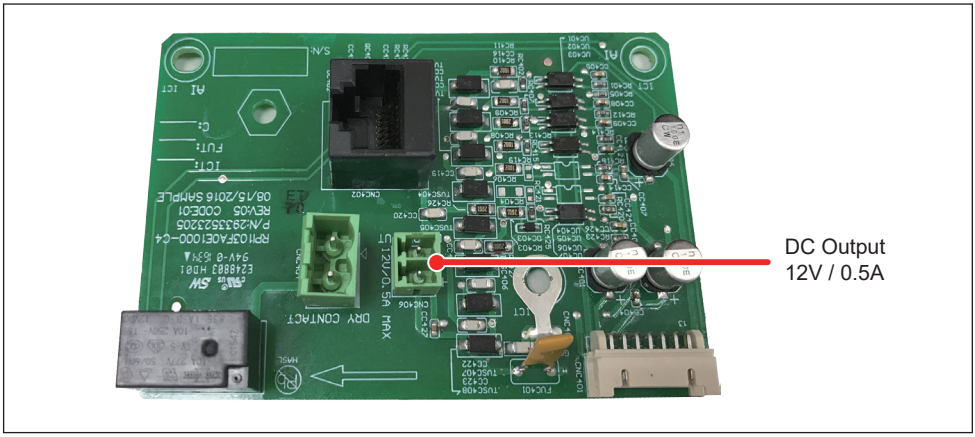


圖4-12: 直流輸出端口

4.4.7. Wi-Fi Connection

通訊模組提供本變流器與擁有Wi-Fi功能的上網設備(例如：智慧型手機、平板裝置...等)之間的通訊功能，使用本功能時需經由Wi-Fi連線。

(1)開啟連線裝置的Wi-Fi功能

(2)選擇您所購買產品的SSID: Delta-[serial number]

(例如：Delta-O1M19500001W0；請參考產品”規格標籤”)

(3)輸入安全Wi-Fi網路的密碼：DELTASOL

利用 "MyDeltaSolar" APP 連接變流器(可以於Google play或是APP store下載)或者掃描下方QR CODE

NOTE

- 本產品同時間僅提供單一上網設備連接
- 連線密碼忘記請用下圖Wi-Fi return to default即回復為初始密碼 (”DELTASOL”)
- 若需要重新啟動Wi-Fi 請選擇Wi-Fi reboot

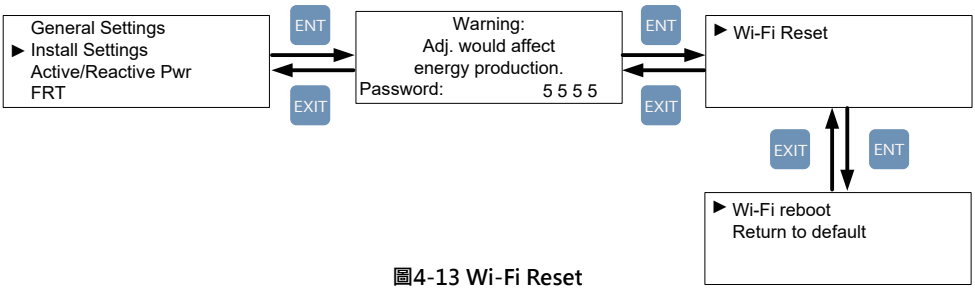


圖4-13 Wi-Fi Reset

MyDeltaSolar

1. 這個APP應用於台達變流器
2. 即使變流器沒有連接到雲端，仍可以使用APP點對點連線監控變流器

QR Code

Download on the App Store

IOS

ANDROID APP ON Google play

Android

5.變流器開/關機

警告！燙傷危險

- 在變流器運轉期間, 外殼溫度可能超過70℃, 請勿觸摸以免燙傷。

5.1. 首次開機

首次開機時，請先將AC電源送入變流器，並將手動開關(Manual Switch)轉至ON，變流器將啟動交流電源，LCD顯示面板將啟動。當LCD顯示面板亮起時，請設置語言和所在國家。LCD顯示面板將進入主頁（**圖5-3**）。
在送入直流電源之前，請觀察主畫面中的“Status”是否有顯示任何錯誤訊息，若無則可送入DC電源並等待變流器自我測試，約莫2分鐘後機子將會進行併網前倒數而後併網。

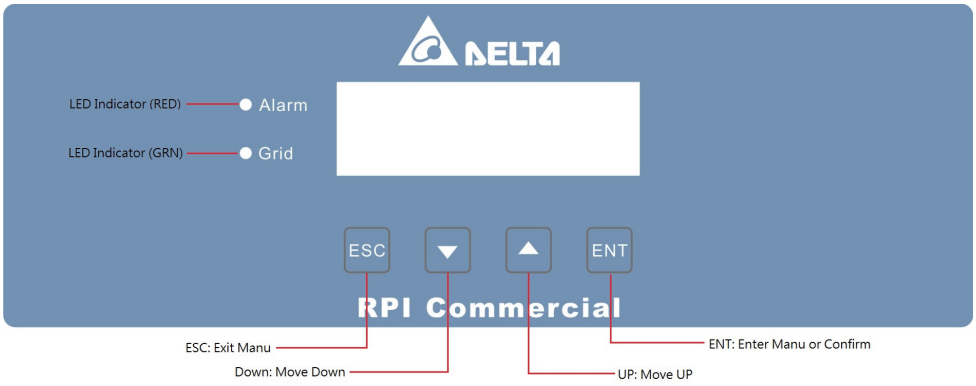


圖5-1: 控制面板

狀態	綠色 LED	紅色 LED
併網前倒數	閃爍 *1	OFF
成功併網	ON	OFF
發生Error或Fault	OFF	ON
待機、夜間模式(無DC時)	OFF	OFF
燒錄模式	閃爍 *2	

*1 ON 1s / OFF 1s
*2 ON 1s / OFF 1s, 綠色和紅色交錯閃爍

表5-1: LED指示燈狀態

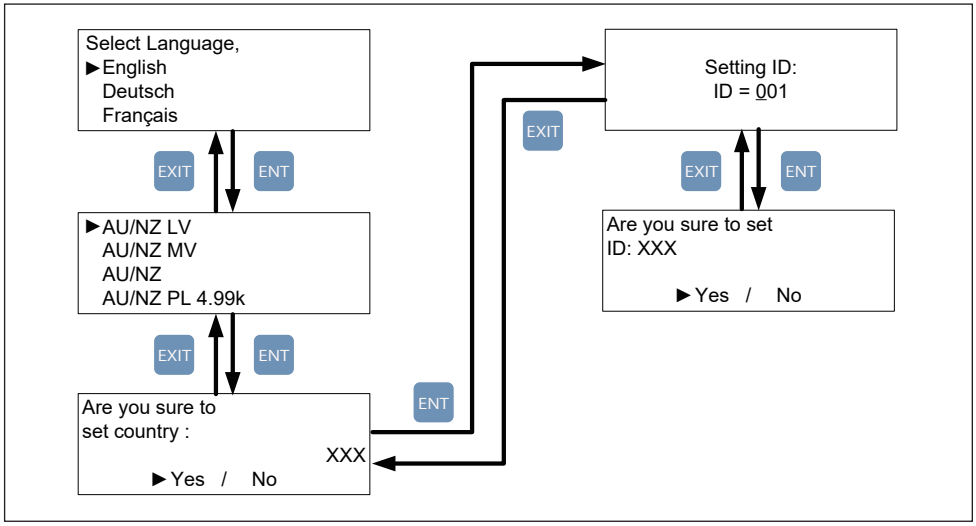


圖5-2: 首次開機出現語言和國別設定

5.2. 主畫面

當變流器正常工作畫面會顯示如**圖5-3**，使用者可從畫面上得知今日的累計發電量、目前Power、變流器工作狀態、以及日期時間等資訊。

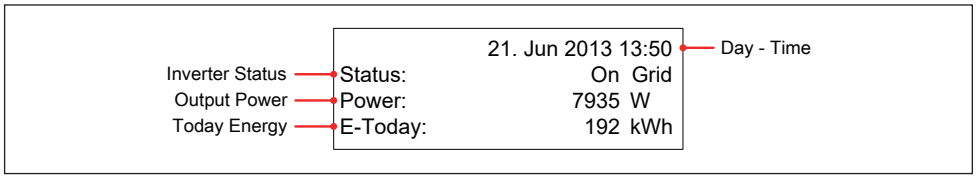


圖5-3: 主畫面

5.3. LCD操作流程

在主畫面按任意鍵，使用者可以進入主選單頁面（如**圖5-4**所示）。 按主選單上的Esc鍵可以返回主畫面。
當使用者調整設置時，顯示面板上的游標將從 “▶” 變為 “➔” 。

Meter	5.3.1
Energy Log	5.3.2
Event Log	5.3.3
Inverter Information	5.3.4
General Setting	5.3.5
Install Setting	5.3.6
Active/Reactive Power	5.3.7
FRT	5.3.8

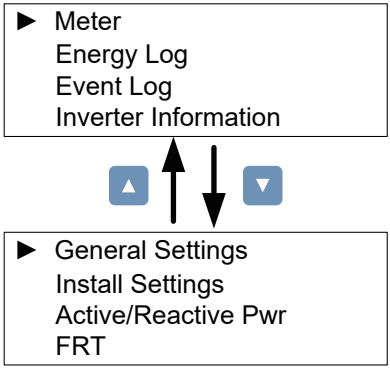


圖5-4: 選單頁面

5.3.1. Power Meter

此頁面顯示AC與DC端之電壓、電流、功率等資訊。

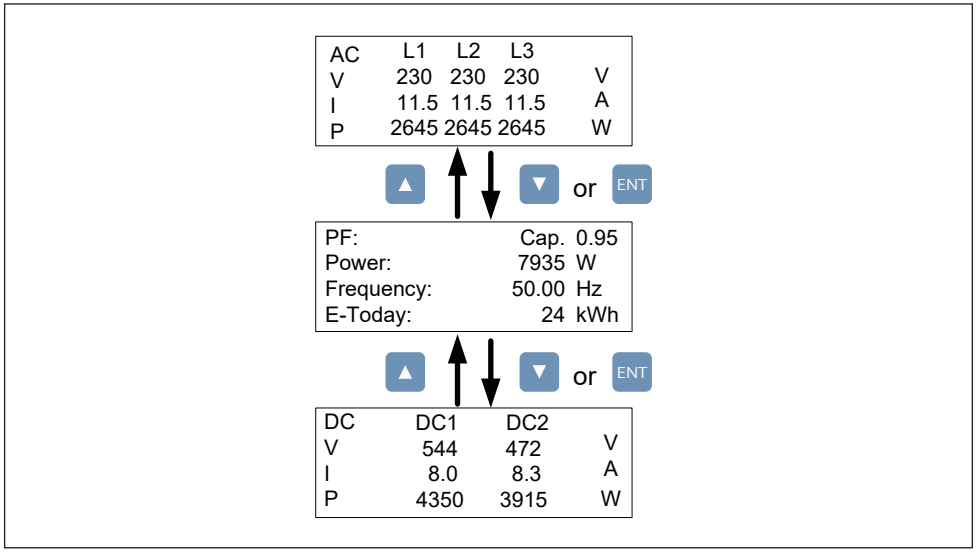


圖5-5 : Power meter頁面

5.3.2. Energy Log

此頁面可觀看變流器安裝至今的總發電瓦時與總運作時間。

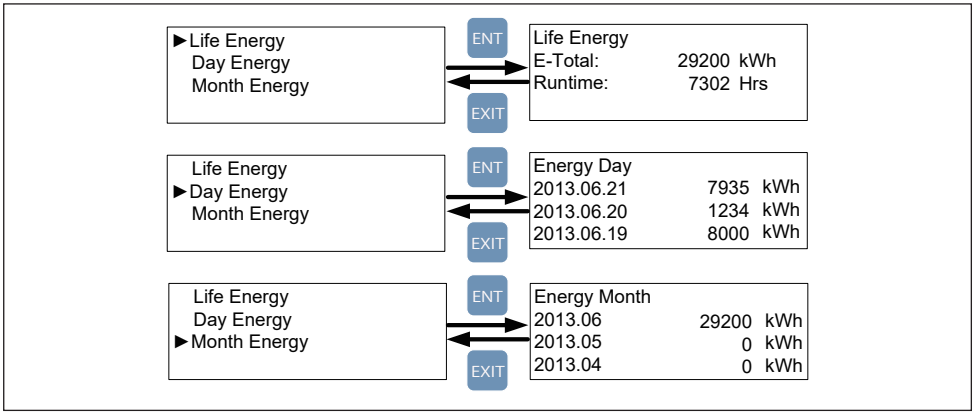


圖5-6: Energy log流程

5.3.3. Event Log

Event Log可分為Error Events與Grid Report兩個分頁。Error Events分頁可記錄30筆變流器所偵測到的錯誤訊息，包含Internal Error與Grid Fault；而Grid Report分頁則可單獨記錄五筆與市電端有關之錯誤訊息(Grid Fault)。

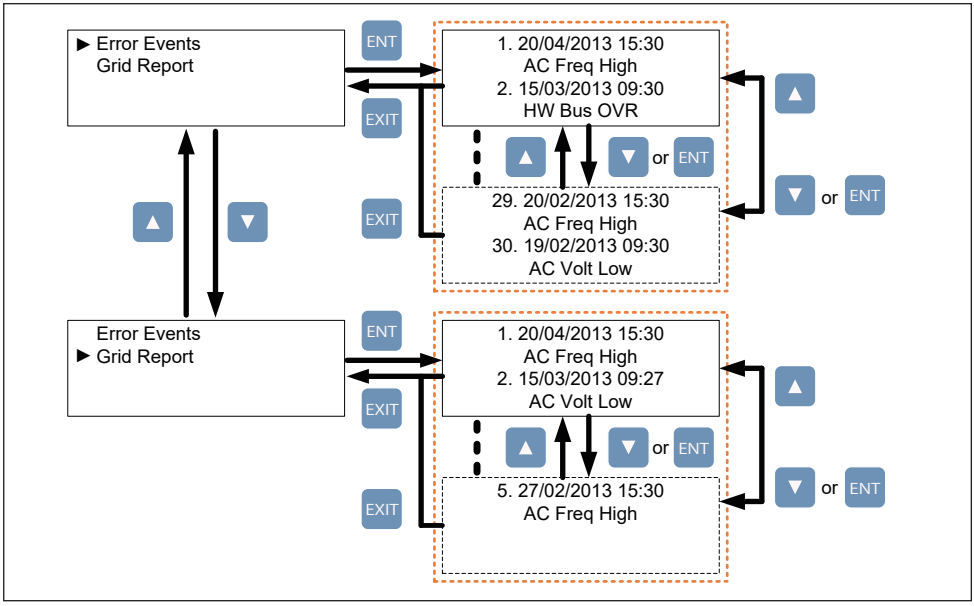


圖5-7: Event log流程

5.3.4. Inverter Information

此頁面可顯示產品序號、安裝日期、韌體版本與變流器內部各項設定值之資訊。若有修改這些設定值的需求，請參閱**章節5.3.6 Install Settings**、**章節5.3.7 Active/Reactive power**以及**章節5.3.8 FRT (Fault ride through)**。

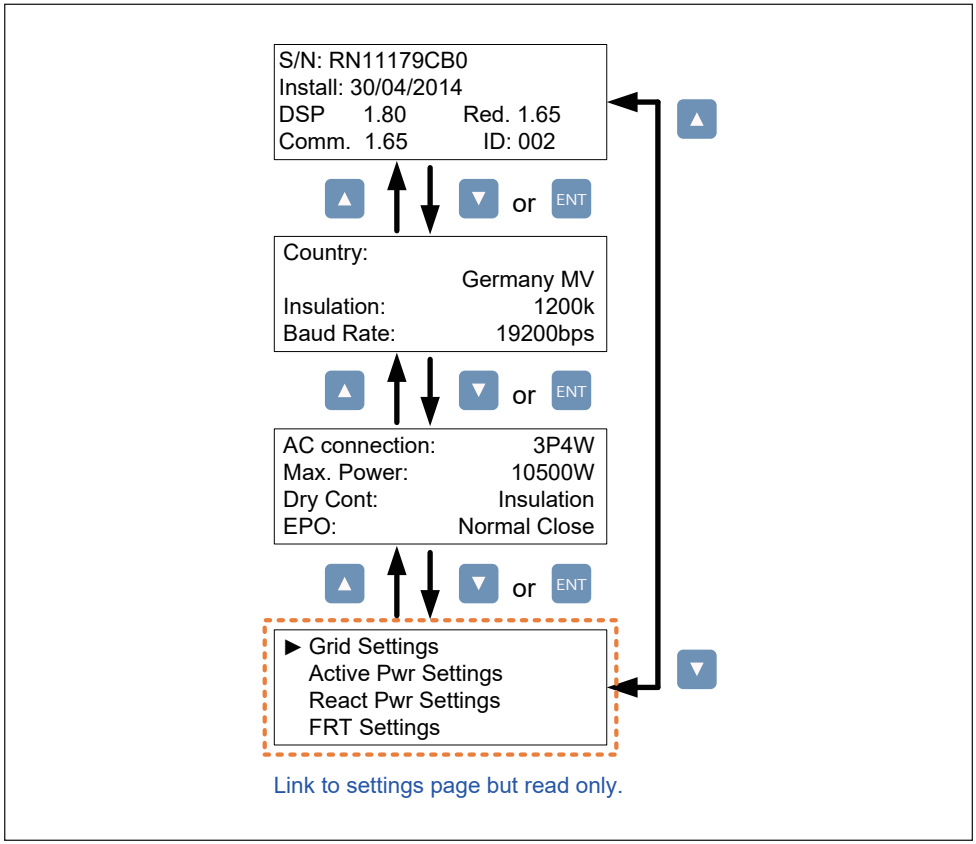


圖5-8: Inverter information頁面

5.3.5. General Settings

此頁面可設定語言、日期和時間以及RS-485通訊baud rate。

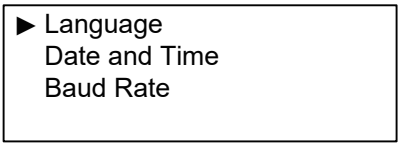


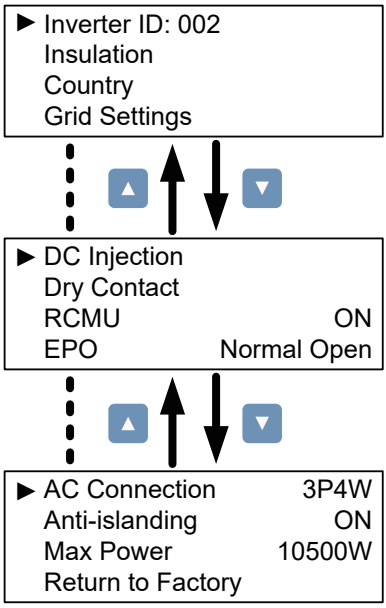
圖5-9: General Settings頁面

5.3.6. Install Settings

注意！

- 此頁面僅允許專業安裝人員或有專業人員在旁指導時方可調整，任意更改這些設定有可能造成變流器損壞。

進入Install Settings頁面前需要輸入密碼，密碼分為三種權限：使用者權限、安裝者權限以及製造商權限。以下章節僅會介紹使用者權限與安裝者權限所需之各項設定值。



User Level:
- Inverter ID
- Insulation
- Country
- Dry Contact
- EPO
- AC Connection
- Max. Power

Installer Level:
- Inverter ID
- Insulation
- Country
- Grid Settings
- Dry Contact
- EPO
- AC Connection
- Max. Power

Manufacturer Level:
- All Settings

圖5-10: Install settings頁面

5.3.6.1. Inverter ID

變流器的ID使用於RS-485通訊時，使Master(主)端能順利辨認各個Slave(僕)端之變流器。當使用者將多台變流器透過RS-485串聯時，各變流器必須要有不同的ID。

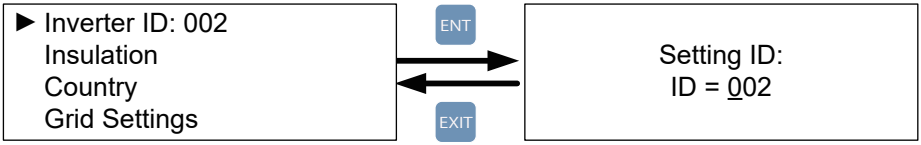


圖5-11: Inverter ID頁面

5.3.6.2. Insulation

變流器於併網前將會進行太陽能板之對地組抗偵測，使用者可自訂偵測方式與對地阻抗限制值。RPI M6A/ M8A/ M10A機種提供六種對地組抗偵測方式(ON、DC1 only、DC2 only、Plus Grounded、Minus Grounded、OFF)與三種對地阻抗限制值可設定。

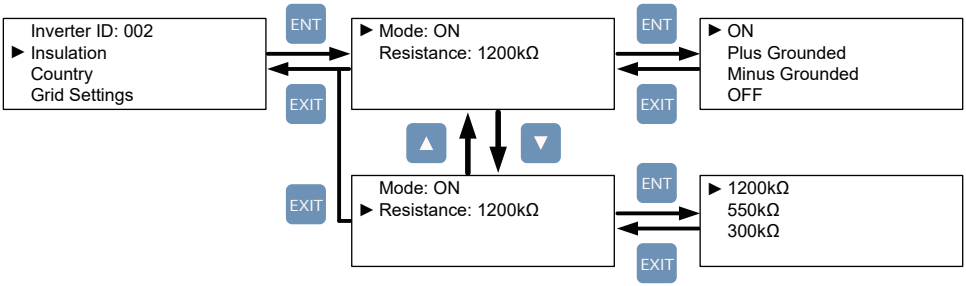


圖5-12: Insulation頁面

5.3.6.3. Country

選單中的每一個國家選項即代表一種電力法規，安裝者於安裝變流器後必須選擇正確的國家選項，以符合當地電力法規的要求。

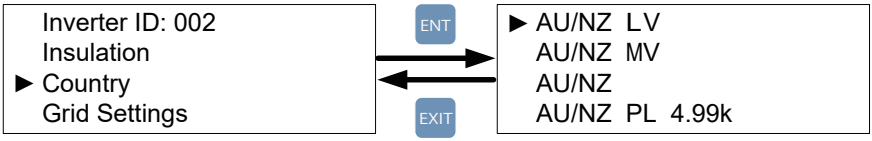


圖5-13: Country頁面

5.3.6.4. Grid Settings

Grid Settings頁面包含各種電壓與頻率保護值，這些保護值乃依據各電力法規所建立，若無特殊需求請勿修改任何保護值。

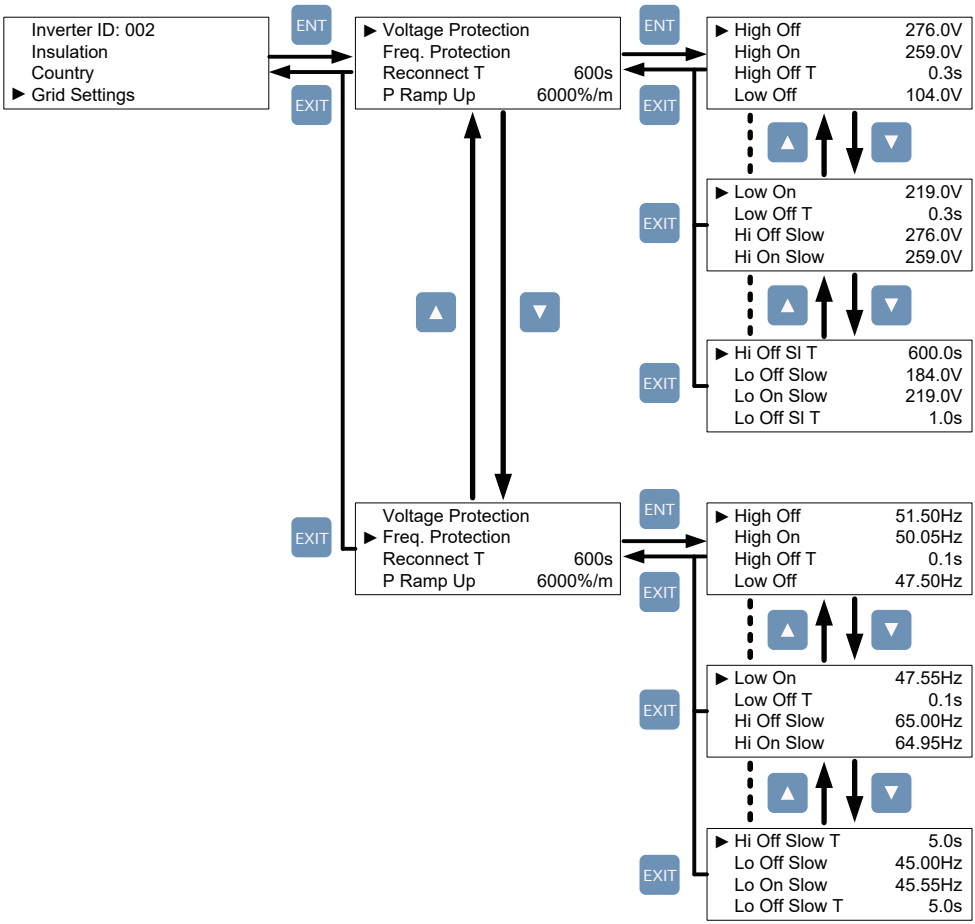


圖5-14: Grid Settings頁面

5.3.6.5. Dry Contact

使用者可透過此頁面自訂乾接點之觸發條件。RPI M6A/ M8A/ M10A機種提供8種觸發條件可選擇，Disable、On Grid、Fan Fail、Insulation、Alarm、Error、Fault以及Warning。各選項與觸發條件的詳細資訊請參考**表5-2**。

設定值	乾接點觸發時機
Disable	不動作。
On Grid	當變流器成功併網時。
Fan Fail	當Fan Fail發生時。
Insulation	當對地阻抗測試失敗時。
Alarm	任何 Error、Fault、Warning發生時。
Error	任何 Error發生時。
Fault	任何 Fault發生時。
Warning	任何 Warning發生時。

表5-2: 乾接點觸發條件設定

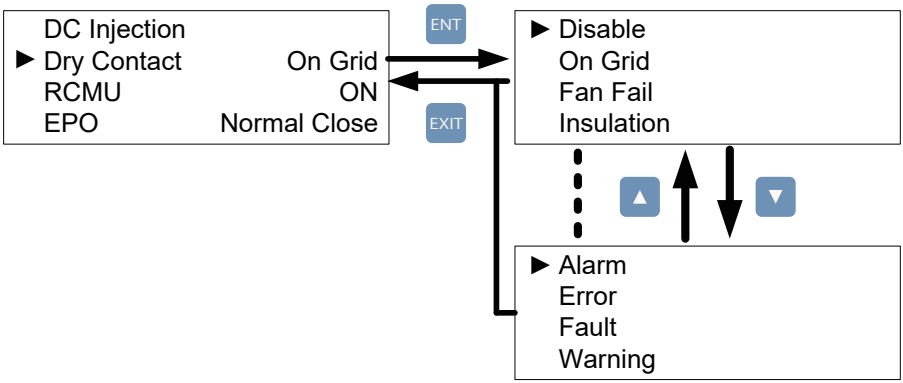


圖5-15: Dry Contact頁面

5.3.6.6. EPO

EPO有兩種偵測模式：Normal Open與Normal Close。Normal Open代表EPO常態為開路，短路時則觸發緊急關機功能。Normal Close則代表常態為短路，開路時則觸發緊機關機功能。請依據您的需求選擇適合的偵測模式。

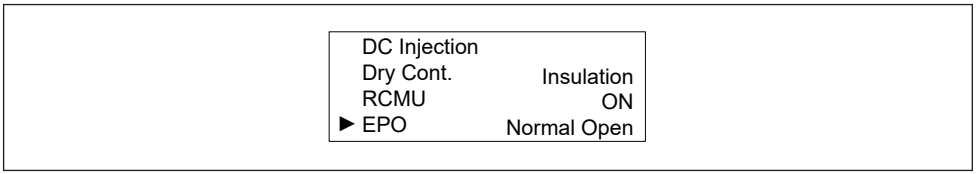


圖5-16: EPO頁面

5.3.6.7. AC connection

RPI M6A/ M8A/ M10A支援3P3W與3P4W配線方式，請依照實際配線方式選擇對應的設定，確保機子能正常運作。

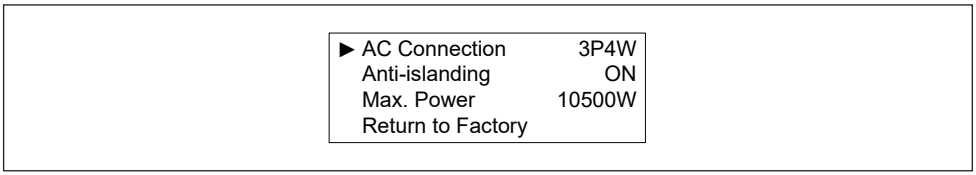


圖5-17: AC配線方式

5.3.6.8. Max Power

某些電力法規有調整最大功率輸出之要求，參照此類電力法規之使用者可透過此功能更改變流器的最大功率輸出額度。

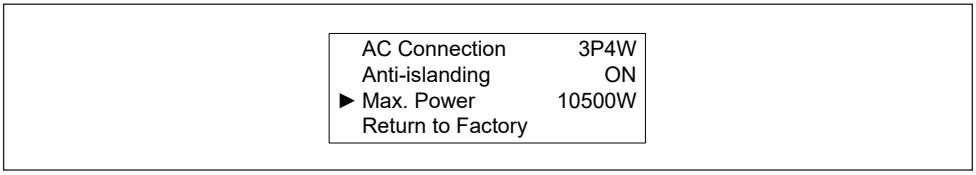


圖5-18: Max Power頁面

5.3.7. Active/Reactive power

進入實功/虛功控制頁面前必須輸入密碼。此頁面包含實功功率控制與虛功功率控制兩個主要功能。

實功功率控制有三種模式：
Power Limit, Power vs. Frequency, and P(V)；
虛功功率控制有四種模式：
Constant cosphi, cosphi(P), Constant Q, and Q(V)。
這些模式將會在下面的章節中詳細的介紹。

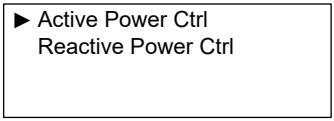


圖5-19: Active/Reactive power頁面

5.3.7.1. Power Limit

此控制模式可限制變流器之輸出功率。使用者可透過設定Set Point來指定變流器所能輸出的最大功率。

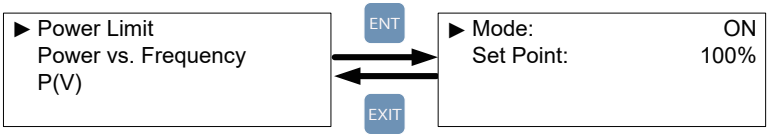


圖5-20: Power Limit頁面

5.3.7.2. Power vs. Frequency

此模式開啟後，變流器可隨著市電頻率升高而自動降低其輸出功率。
使用者可以調整Power vs. Frequency頁面中的參數以更改變流器的行為。

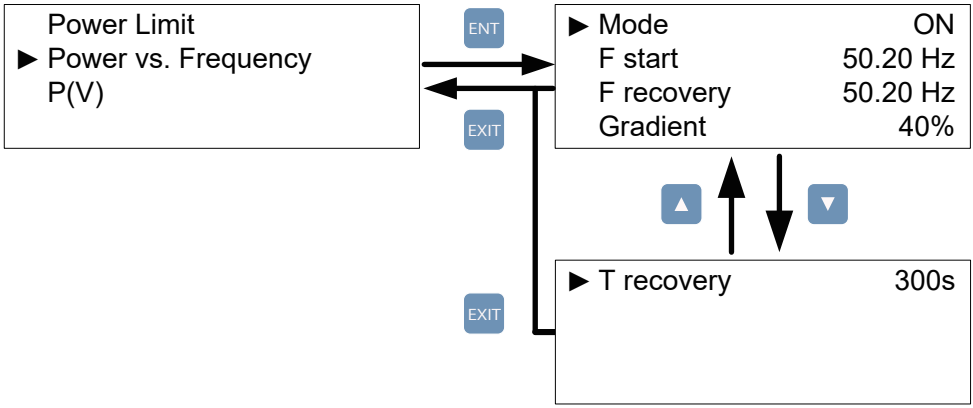


圖5-21: Power vs Frequency頁面

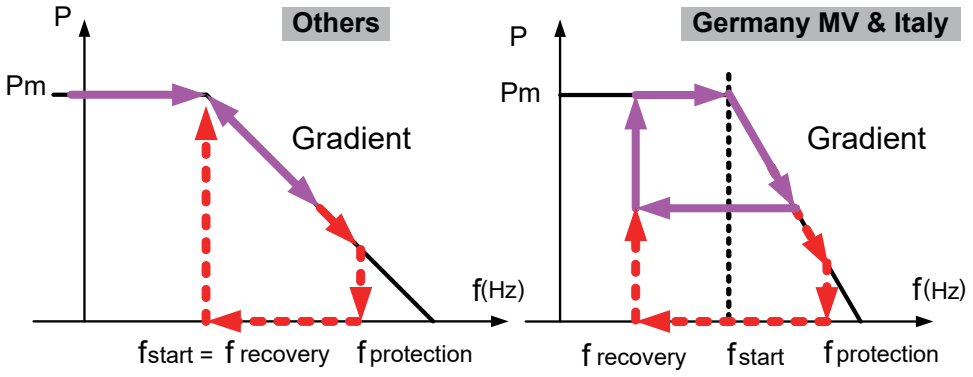


圖5-22: Power vs Frequency參數對照

5.3.7.3. P(V)

此模式啟動後，當市電電壓大於V lock-in且此時變流器之輸出功率大於P lock-in時，變流器將會自動將輸出功率降低至P lock-out，直到市電電壓低於V lock-out且經過T recovery秒後方回復正常功率輸出。

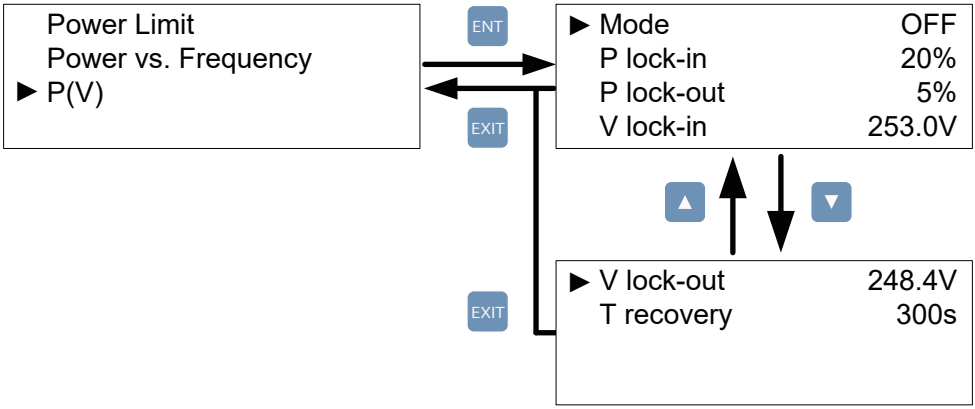


圖5-23: P(V)頁面

5.3.7.4. Constant cosphi

此模式啟動後，變流器可饋入固定功率因子(cosphi)之虛功功率至市電，使用者可透過設定頁面指定欲饋入之功率因子。

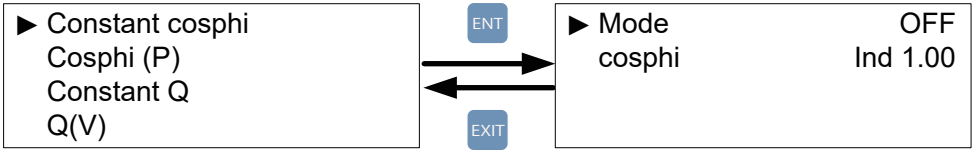


圖5-24: Constant cosphi頁面

5.3.7.5. Cosphi (P)

此功能啟動後，變流器可隨著輸出之實功功率高低而饋入一定比例之虛功功率。當國家設定為Italy LV或Italy MV時，使用者可進一步指定當市電電壓高於V lock-in時方饋入虛功，電壓低於V lock-out後，無論此時輸出實功功率為何，皆不饋入虛功。

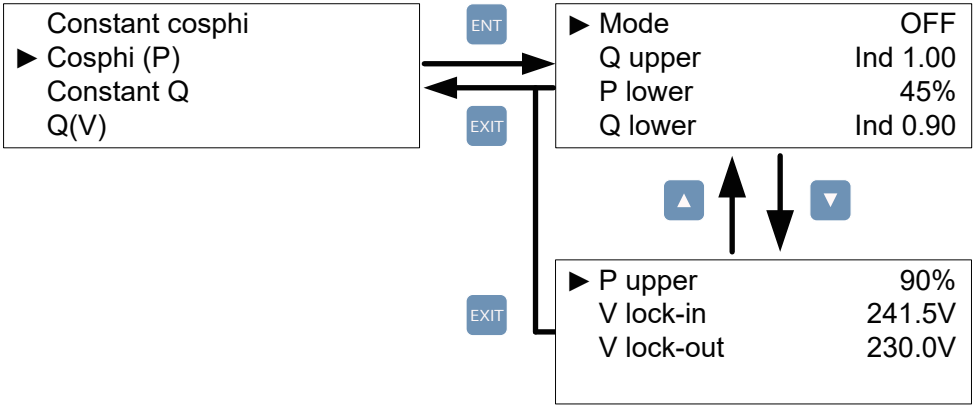


圖5-25: Cosphi (P)頁面

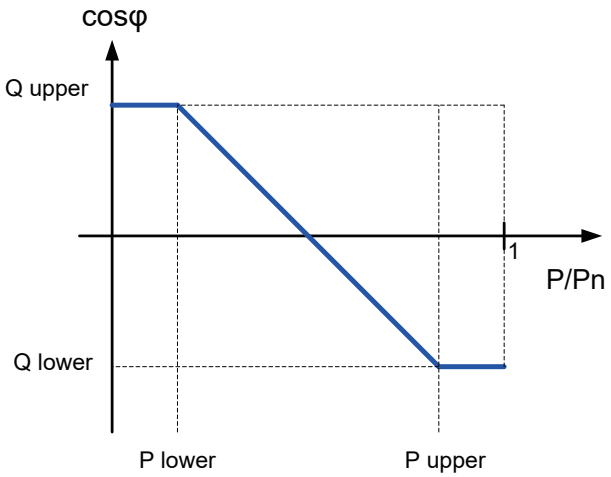


圖5-26: Cosphi (P)參數對照

5.3.7.6. Constant Q

此模式啟動後，變流器可饋入固定比例之虛功功率至市電，使用者可透過設定頁面指定欲饋入之虛功功率量。

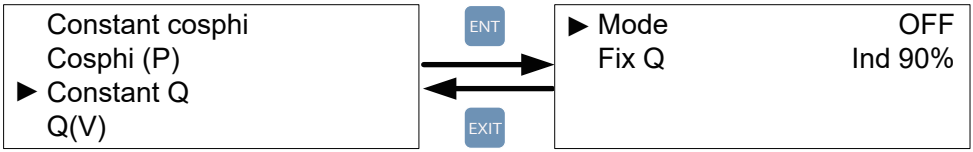


圖5-27: Constant Q頁面

5.3.7.7. Q(V)

此模式啟動後，變流器會隨著市電電壓變化而饋入不同性質的虛功功率。當國家設定為Italy LV或Italy MV時，使用者可進一步指定輸出功率達到P lock-in時方饋入虛功，輸入功率小於P lock-out時則無論市電電壓為何，皆不饋入任何虛功。

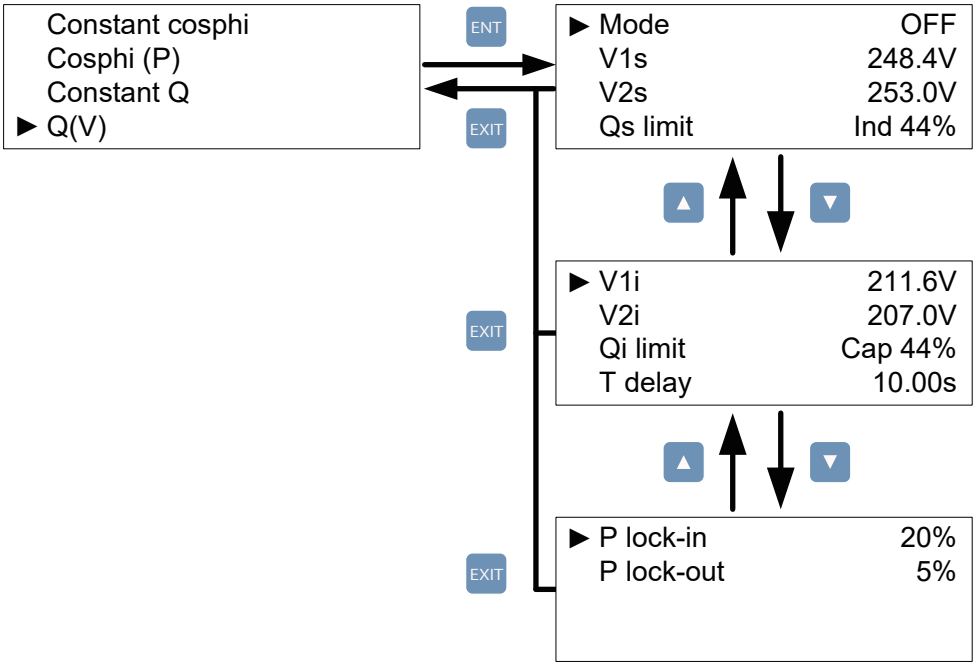


圖5-28: Q(V)頁面

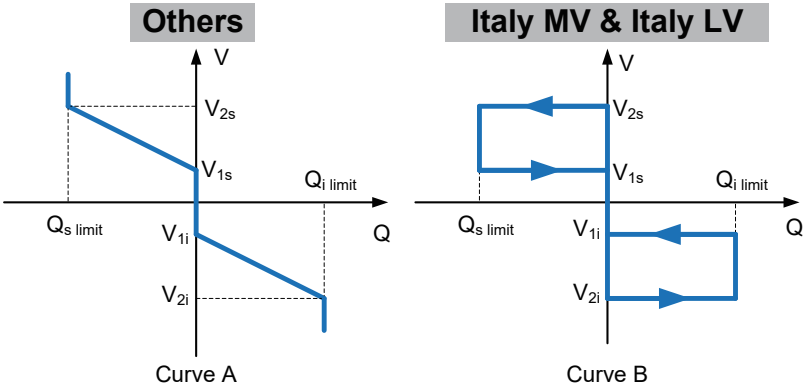


圖5-29: Q(V)參數對照

5.3.8. FRT (Fault ride through)

根據某些特定地區之電力法規規範，當市電電壓發生驟降時，在一定的時間內變流器必須維持併網狀態。使用者可透過啟動FRT功能並設定所需的參數來達到這項要求。

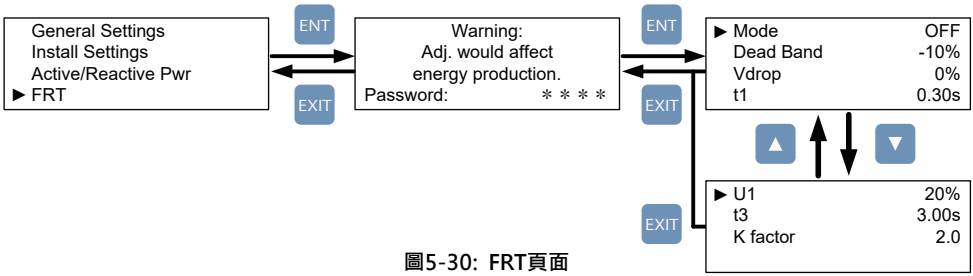


圖5-30: FRT頁面

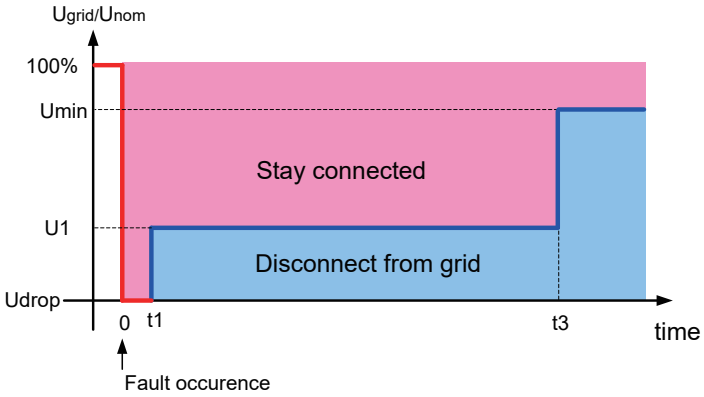


圖5-31: FRT參數對照

6.設備維護

為確保PV Inverter正常運轉，請至少每半年確認一次變流器所有端子與螺絲是否鬆脫、電纜線是否毀損。如有上述情形，請聯絡合格之技術人員進行維修或更換。

警告！電擊危險



- 在進行維護工作前, 即使切斷機殼底部的手動開關,仍需將AC 與 DC 電源確實切離, 避免觸電。

7.錯誤訊息與簡易故障排除

錯誤資訊		
資訊顯示	**可能原因**	**故障排除**
AC Freq High (E01)	1. 實際的市電頻率高過過頻率保護設定 2. 國家設定不正確 3. 偵測到電路功能異常	1. 檢查變流器端的市電頻率 2. 檢查國家設定 3. 檢查變流器端的偵測電路
AC Freq Low (E02)	1. 實際的市電頻率低於欠頻率保護設定 2. 國家或電網設定不正確 3. 偵測到電路功能異常	1. 檢查變流器端的市電頻率 2. 檢查國家與電網設定 3. 檢查變流器端的偵測電路
Grid Quality (E07)	在電網或靠近變流器附近非線性的負載	必要時變流器與電網連接處必須遠離非線性的負載
HW Con. Fail (E08)	1. 在AC介面連接錯誤 2. 偵測到電路功能異常	1. 檢查AC連接，必須和使用手冊一致 2. 檢查變流器內部的偵測電路
No Grid (E09)	1. AC 斷路器跳開 2. 中斷AC介面	1. 斷開AC 斷路器 2. 檢查連接AC介面並確認其連接至變流器
AC Volt Low (E10, E15, E20)	1. 實際市電的電壓低於低電壓保護設定 2. 國家或電網設定不正確 3. AC介面連接錯誤 4. 偵測到電路功能異常	1. 檢查市電與變流器端的連接 2. 檢查國家或電網設定 3. 檢查AC介面連接 4. 檢查變流器內部的偵測電路
AC Volt High (E11, E13, E16, E18, E21, E23)	1. 實際市電的電壓高於過電壓保護設定 2. 操作期間，市電的電壓高於慢速電壓保護設定 3. 國家或電網設定不正確 4. 偵測到電路功能異常	1. 檢查變流器端的市電電壓 2. 檢查變流器端的市電電壓 3. 檢查國家或電網設定 4. 檢查變流器內部的偵測電路
Solar1 High (E30)	1. 實際Solar1電壓超過1000Vdc 2. 偵測到電路功能異常	1. 修正 solar array 設定並使得 Voc 小於 1000Vdc 2. 檢查變流器內部的偵測電路

錯誤資訊		
資訊顯示	可能原因	故障排除
Solar2 High (E31)	1. 實際Solar2電壓超過1000Vdc 2. 偵測到電路功能異常	1. 修正 solar array 設定並使得 Voc 小於 1000Vdc 2. 檢查變流器內部的偵測電路
Insulation (E34)	1. 太陽能板絕緣測試未通過 2. 太陽能板電容值介於正到接地端或負到接地端太大或者兩者皆有之 3. 偵測到電路功能異常	1. 檢查輸入端絕緣 2. 檢查電容值, 必要時擦乾太陽能板 3. 檢查變流器內部的偵測電路

表 7-1: 錯誤資訊

警 告		
資訊顯示	可能原因	故障排除
Solar1 Low (W01)	1. 實際Solar1電壓低於下限值 2. 若實際Solar1電壓接近0，變流器內部可能有裝置損壞 3. 偵測到電路功能異常	1. 檢查Solar1電壓至變流器端的連接 2. 檢查boost1的所有開關裝置 3. 檢查變流器內部的偵測電路
Solar2 Low (W02)	1. 實際Solar2電壓低於下限值 2. 若實際Solar1電壓接近0，變流器內部可能有裝置損壞 3. 偵測到電路功能異常	1. 檢查Solar2 voltage至變流器端的連接 2. 檢查boost2的所有開關裝置 3. 檢查變流器內部的偵測電路

表7-2: 警告資訊

故障		
資訊顯示	可能原因	故障排除
DC Injection (F01, F02, F03)	1. 市電波形異常 2. 偵測到電路功能異常	1. 檢查市電波形. 必要時變流器與電網連接處必須遠離非線性的負載 2. 檢查變流器內部的偵測電路
Temperature (F05)	1. 環境溫度超過60℃ (裝置異常) 2. 偵測到電路功能異常	1. 檢查設備的周遭和環境 2. 檢查變流器內部的偵測電路
Temperature (F07)	1. 環境溫度<-30℃ 2. 偵測到電路功能異常	1. 檢查設備的周遭和環境 2. 檢查變流器內部的偵測電路
HW NTC1 Fail (F06)	1. 環境溫度>90℃或<-30℃ 2. 偵測到電路功能異常	1. 檢查設備的周遭和環境 2. 檢查變流器內部的偵測電路
HW NTC2 Fail (F08)	1. 環境溫度>90℃或<-30℃ 2. 偵測到電路功能異常	1. 檢查設備的周遭和環境 2. 檢查變流器內部的偵測電路
HW NTC3 Fail (F09)	1. 環境溫度>90℃或<-30℃ 2. 偵測到電路功能異常	1. 檢查設備的周遭和環境 2. 檢查變流器內部的偵測電路
HW NTC4 Fail (F10)	1. 環境溫度>90℃或<-30℃ 2. 偵測到電路功能異常	1. 檢查設備的周遭和環境 2. 檢查變流器內部的偵測電路
DC RLY Fail (F13)	1. 繼電器的驅動電路故障 2. 一個或多個繼電器本體故障 3. 偵測到電路功能異常	1. 檢查輸入電壓必須> 150Vdc 2. 更換故障之繼電器 3. 檢查變流器內部的偵測電路
HW DSP ADC1 (F15)	1. 輸入功率不足 2. 輔助電源電路功能異常 3. 偵測到電路功能異常	1. 檢查輸入電壓必須> 150Vdc 2. 檢查變流器內部的輔助電源電路 3. 檢查變流器內部的偵測電路

故障		
資訊顯示	**可能原因**	**故障排除**
HW DSP ADC2 (F16)	1. 輸入功率不足 2. 輔助電源電路功能異常 3. 偵測到電路功能異常	1. 檢查輸入電壓必須> 150Vdc 2. 檢查變流器內部的輔助電源電路 3. 檢查變流器內部的偵測電路
HW DSP ADC3 (F17)	1. 輸入功率不足 2. 輔助電源電路功能異常 3. 偵測到電路功能異常	1. 檢查輸入電壓必須> 150Vdc 2. 檢查變流器內部的輔助電源電路 3. 檢查變流器內部的偵測電路
HW Red ADC1 (F18)	1. 輸入功率不足 2. 輔助電源電路功能異常 3. 偵測到電路功能異常	1. 檢查輸入電壓必須> 150Vdc 2. 檢查變流器內部的輔助電源電路 3. 檢查變流器內部的偵測電路
HW Red ADC2 (F19)	1. 輸入功率不足 2. 輔助電源電路功能異常 3. 偵測到電路功能異常	1. 檢查輸入電壓必須> 150Vdc 2. 檢查變流器內部的輔助電源電路 3. 檢查變流器內部的偵測電路
HW Eff. (F20)	1. 校正不正確 2. 電流回授電路無效	1. 檢查電流和功率的精度 2. 檢查變流器內部電流回授電路
HW COMM1 (F23)	1. DSP 閒置中 2. 通訊連接中斷 3. 通訊電路功能異常	1. 檢查DSP中reset和crystal 2. 檢查DSP和COMM通訊連接 3. 檢查通訊電路
HW COMM2 (F22)	1. Red. CPU閒置中 2. 通訊連接中斷	1. 檢查Red. CPU中reset和crystal 2. 檢查Red. CPU和DSP通訊連接
Ground Cur. (F24)	1. 太陽能板絕緣測試未通過 2. 太陽能板電容值介於正到接地端或負到接地端太大 3. Boost 驅動電路或Boost電感其中之一功能異常 4. 偵測到電路功能異常	1. 檢查輸入端的絕緣 2. 檢查電容值 (+ <-> GND & - <-> GND) , 必須< 2.5uF. 必要時安裝外部的變壓器 3. 檢查boost驅動電路和boost電感 4. 檢查變流器內部的偵測電路

故障		
資訊顯示	**可能原因**	**故障排除**
HW Con. Fail (F26)	1. 變流器內部的電源線未連接 2. 電流回授電路無效	1. 檢查變流器內部電源線 2. 檢查變流器內部電流回授電路
RCMU Fail (F27)	1. RCMU連接中斷 2. 偵測到電路功能異常	1. 檢查變流器內部RCMU連接 2. 檢查變流器內部的偵測電路
RLY Short (F28)	1. 一個或多個繼電器是閉合的 2. 繼電器driver電路功能異常	1. 替換無效的繼電器 2. 檢查變流器內部的驅動電路
RLY Open (F13, F29)	1.一個或多個繼電器異常 2. 繼電器驅動電路功能異常 3. Vgrid與Vout偵測精度不正確	1. 替換無效的繼電器 2. 檢查變流器內部的驅動電路 3. 檢查Vgrid與 Vout電壓偵測精度
Bus Unbal. (F30)	1. 輸入端並未完全獨立或併聯 2. 太陽能板短路到地 3. Boost驅動電路無效或連接中斷 4. 偵測到電路功能異常	1. 檢查輸入連接 2. 檢查太陽能板絕緣設定 3. 檢查變流器內部boost的驅動電路 4. 檢查變流器內部的偵測電路
HW Bus OVR (F31, F33, F35)	1. Boost驅動電路無效或連接中斷 2. 太陽能板Voc超過1000Vdc 3. 操作期間突波發生 4. 偵測到電路功能異常	1. 檢查變流器內部boost的驅動電路 2. 修正太陽能板設定, 並使得Voc 小於1000Vdc 3. N/A 4. 檢查變流器內部的偵測電路
AC Cur. High (F36, F37, F38, F39, F40, F41)	1. 操作期間突波發生 2. Inverter stage驅動電路無效 3. 開關裝置無效 4. 偵測到電路功能異常	1. N/A 2. 檢查inverter stage驅動電路 3. 檢查inverter stage全部開關裝置 4. 檢查變流器內部的偵測電路
HW CT A Fail (F42)	1. 測試電流回路損壞 2. CTP3無效 3. 偵測到電路功能異常	1. 檢查CNP4至CNM4的連接 2. 替換新的CTP3 3. 檢查變流器內部的偵測電路

故障		
資訊顯示	**可能原因**	**故障排除**
HW CT B Fail (F43)	1. 測試電流回路損壞 2. CTP4無效 3. 偵測到電路功能異常	1. 檢查CNP4至CNM4的連接 2. 替換新的 CTP4 3. 檢查變流器內部的偵測電路
HW CT C Fail (F44)	1. 測試電流回路損壞 2. CTP5無效 3. 偵測到電路功能異常	1. 檢查CNP4至CNM4的連接 2. 替換新的 CTP5 3. 檢查變流器內部的偵測電路
HW AC OCR (F45)	1. 電網諧波太大 2. 開關裝置無效 3. 偵測到電路功能異常	1. 檢查市電波形. 必要時變流器與電網連接處必須遠離非線性的負載 2. 檢查inverter stage開關裝置 3. 檢查變流器內部的偵測電路
HW ZC Fail (F50)	同步訊號偵測電路功能異常	檢查變流器內部同步訊號的偵測電路
DC Cur. High (F60, F61, F70, F71)	1. Boost開關裝置無效 2. Boost驅動電路無效 3. 輸入電流偵測電路功能異常	1. 檢查boost全部開關裝置 2. 檢查變流器內部的boost驅動電路 3. 檢查輸入電流偵測電路

表7-3: 故障資訊

8.卸載

如需要將變流器卸載，請務必遵守以下規範與程序。

警告！



為了避免人員受傷, 請遵守以下程序：

- 切斷AC斷路器, 解除與市電端之連接。
- 切斷DC開關, 解除與直流端電源之連接。
- 切斷太陽能板斷路器, 解除變流器和太陽能板之連接。
- 使用適合之電壓量測儀錶 (voltmeter), 確認AC電源與DC電源已完全斷除。
- 拔除與市電連接之AC端纜線。
- 拔除與太陽能板連接之DC端纜線。
- 拔除所有通訊連接RS-485模塊。

現在您可以卸下變流器 。

9.技術資料

	RPI M6A	RPI M8A	RPI M10A
一般規格			
外殼	Powder coated aluminum		
操作溫度	-25~60℃ , full power up to 40℃		
操作高度	2000m		
相對濕度	0 – 100% non-condensing.		
環境類別	Outdoor, wet locations		
防護等級	IP65 (Electronics)		
汙染等級	Internal : II, External : III		
過電壓類別	AC output :III, DC Input :II		
反饋至太陽能板電流最大值	0		
電器隔離	NO		
安全性等級	Class I metal enclosure with protective earth		
重量	25kg	25kg	26kg
尺寸(W*H*D)	510 × 445 × 177mm		
連接器	Weather resistant connectors		
直流側 (Solar side)			
最大輸入功率	6.6kW	8.8kW	11kW
建議PV功率	5.7kW–7.5kW	7.6kW–10kW	9.5kW– 12.5kW
標稱電壓	600Vdc		
操作電壓	200Vdc – 1000Vdc		
啟動電壓	> 250 Vdc		
啟動功率	40W		
MPP追蹤	Parallel inputs: 1 MPP tracker Separate inputs: 2 MPP trackers		
絕對最大電壓	1000Vdc		

	RPI M6A	RPI M8A	RPI M10A
最大功率追蹤電壓範圍 (額定功率)			
平衡輸入	315~800Vdc	415~800Vdc	415~800Vdc
非平衡輸入	425~800Vdc	565~800Vdc	415~800Vdc
直流側 (Solar side)			
輸入數目	MPPT1 (1pair MC4) MPPT2 (1pair MC4)		MPPT1 (2pair MC4) MPPT2 (1pair MC4)
額定電流	MPPT1 (10A) MPPT2 (10A)	MPPT1 (10A) MPPT2 (10A)	MPPT1 (15A) MPPT2 (10A)
各MPPT最大短路電流(Isc)	13A / 13A		26A / 13A
市電側 (GRID SIDE)			
標稱功率	6kVA	8kVA	10kVA
最大功率	6.3kVA(1)(2)	8.4kVA	10.5kVA
電壓	3Ph, 230/400Vac (3phase / N / PE)		
標稱電流	8.7A	11.6A	14.5A
最大電流	9.7A	13A	16A
湧浪電流	31A / 100us	31A / 100us	31A / 100us
最大輸出故障電流(rms)	13.6A	18.2A	22.4A
最大輸出過流保護	11.6A	15.6A	19.2A
頻率	Rated 50/60Hz (Programmable 45Hz - 65Hz)		
主動式孤島效應偵測	無效功率注入		
總諧波失真	< 3 %		
功率因子	> 0.99 @ full power Adjustable: 0.80 leading – 0.80 lagging		
DC電流注入	<0.5% rated current		
夜間功率損耗	< 2W		
最大效率	98.3%	98.3%	98.3%
歐洲效率	97.6%	97.9%	98.0%
AC介面	3 Ph + N + PE; 3-phase AC plug that meets IP67		
保險絲	N/A. Please connect to an external protection device (1.25 rated current)		

		RPI M6A	RPI M8A	RPI M10A
介面與通訊				
使用者介面		Black-on-white character type LCD display		
		365 days data logger and real time clock		
		30 event record		
外部通訊		2 RS-485/Wi-Fi connections		
認證				
CE conformity		Yes		
Grid interface		VDE0126-1-1, VDE-AR-N 4105, AS4777		
Emission		EN 61000-6-3		
Harmonics		EN 61000-3-2		EN 61000-3-12
Variations and flicker		EN 61000-3-3		EN 61000-3-11
Immunity		EN 61000-6-2		
Immunity	ESD	IEC 61000-4-2		
	RS	IEC 61000-4-3		
	EFT	IEC 61000-4-4		
	Surge	IEC 61000-4-5		
	CS	IEC 61000-4-6		
	PFMF	IEC 61000-4-8		
Electrical safety		IEC 62109-1/ -2		
MISCELLANEOUS				
附件		Mounting bracket		
		Aluminum with powder coating		

(1) 4.99kW max. for Australia (AU / NZ PL 4.99kW).
(2) 6.3kW max. for Australia (AU / NZ).

表9-1: RPI M6A/ M8A/ M10A規格



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