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Grid-tie Transformerless Solar Inverter

M125HV_111

Operation and Installation Manual

English 1

繁體中文 103

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1 Safety

1.1 Information of the Inverter

1.1.1 Legal Provisions

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This manual accompanies our product for use by the end users. The technical instructions and illustrations contained in this manual are to be treated as confidential and no part may be reproduced without the prior written permission of DELTA ELECTRONICS, INC. Service engineers and end users may not divulge the information contained herein or use this manual for purpose other than those strictly connected with correct use of the product. All information and specifications are subject to change without notice.

DELTA ELECTRONICS, INC. shall have no obligation to either personal injury and property damage claims hereinafter with respect to any actions -- (a) the product has been installed and/or repaired improperly; (b) the product has been misused without following the instructions on this user manual; (c) the product has failed due to incorrect unpacking.

1.1.2 Target Group

This - manual – is prepared for use by a well-trained technician for installing, commissioning, operation, and maintenance. The technician must have the following basic and advanced skills:

- Knowledge of the fundamentals of electricity, wiring, electrical components and electrical schematic symbols.
- Knowledge of how a solar inverter works and is operated.
- Training in the installation and commissioning of electrical devices and installations.
- Training in how to deal with the dangers and risks associated with installing and using electrical devices and installations.
- Compliance with this manual and all safety information.

1.2 General Safety

IMPORTANT SAFETY INSTRUCTIONS : SAVE THESE INSTRUCTIONS !



- Please read these instructions carefully and save them for later use.

To prevent personal injury and/or property damage, and also to ensure long term operation of the solar inverter, it is imperative this section be read carefully and all the safety instructions understood before using this inverter.

This user manual provides important instructions for Delta grid-tie transformerless solar inverter. The product is designed, tested, verified, and certified according to international safety requirements, certifications, and standards but precautions must be observed when installing and operating the product.

This product is suitable for both indoor and outdoor use.

ATTENTION : NO GALVANIC ISOLATION



- External insulation transformer shall be installed at grid side which is following to isolating between AC and PV array.
- The design of this inverter is transformerless. There is no isolation transformer between the AC and DC sides, i.e., the product does not require galvanic isolation. In order to function properly, any PV array connected must have its PV circuits isolated from ground, i.e., do not bond either side of the array to ground! If a grounded PV array is connected to the inverter, the error message INSULATION (E34) will appear on the display.
- It is prohibited to reference the L1, L2, or L3 terminal to ground; to do so will damage the inverter and void the product warranty.

1.2.1 Condition of Use

- M125HV_111 is a transformerless solar inverter with single MPP tracking input, which converts the variable direct current generated by the solar array into a utility frequency grid-compliant balanced three-phase AC current and feeds it into the utility grid.
- The Photovoltaic modules used must be compatible with the inverter. PV modules with a high parasitic capacitance to ground may only be utilized if the capacitive coupling does not exceed 20 μ F.
- The inverter must only be operated in countries for which it is approved by Delta and the grid operator.

1.2.2 Symbols

This section describes the definition of the symbols in this manual. In order to prevent both personal injury and property damage, and to ensure long-term operation of the product, please read this section carefully and follow all the safety instructions while you use the product.

DANGER!



- This warning indicates an immediate hazard which will lead to death or serious injury.

WARNING !



- This warning indicates a hazardous condition which may lead to death or serious injury.

CAUTION !



- This warning indicates a hazardous condition which may lead to minor injury.

ATTENTION



- This warning indicates a condition of potential damage to property and/or the environment.

INFORMATION

- An exclamation mark enclosed in a double circle indicates additional important information is contained in the following section and the user should follow the instructions to prevent any hazards.

DANGER : ELECTRICAL HAZARD!!

- This warning indicates an immediate electrical hazard that unheeded can lead to death or serious injury.

CAUTION : HOT SURFACES, DO NOT TOUCH!

- This warning indicates a potential burn hazard.
- Use care when touching surfaces when operating the product.
- Do not perform any task until the product cools down sufficiently.



- This icon indicates that a prescribed time delay must elapse before engaging in an indicated action.
- Patientez le délai requis avant d'entreprendre l'action indiquée.



- This symbol indicates the location of an equipment grounding conductor (EGC) terminal.

2 Introduction

M125HV_111 transformerless 3Ø PV inverters are designed to enable the highest levels of efficiency and provide longest operating life by use of state-of-the-art high frequency and low EMI switchmode technology. It is suitable for outdoor use.

ATTENTION



- This product utilizes a transformerless design, and is not provisioned with an isolation transformer, and therefore has no galvanic isolation between the DC and AC sides.

PV array circuits connected must be floating with respect to ground, i.e., must not be referenced (bonded) to ground.

If grounded PV arrays are connected to the inverter, the inverter will not connect to the grid and the error message INSULATION (E34) will appear on the display.

- It is prohibited to connect terminals L1, L2, or L3 to ground.

2.1 Valid Model

The user manual is valid for the following device types:

- M125HV_111

This user manual must be followed during installation, operation, and maintenance.

DELTA reserves the right to make modifications to the content and technical data in this user manual without prior notice.

2.2 Product Overview

The components of M125HV_111 is shown as **Figure 2-1**.

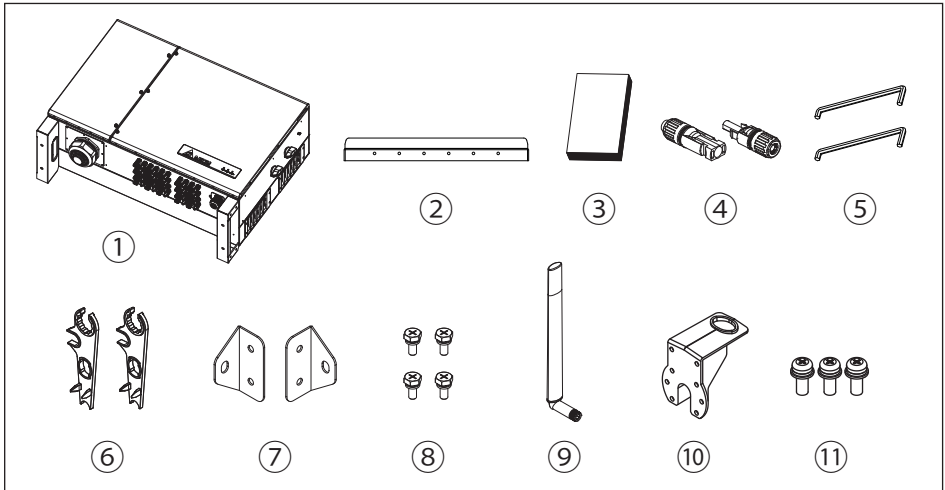


Figure 2-1: Components

Table 2-1: Packing list

M125HV_111			
	Object	Qty	Description
1	Delta Solar Inverter	1 pc	Solar inverter
2	Mounting Bracket	1 pc	Wall mounting bracket (Material: Aluminum/Thickness: 3mm)
3	User Manual	1 pc	Important instructions for solar inverter. Safety instructions should be followed during installation and maintenance
4	H4 Plus Connector	20 pairs	DC String inputs
5	Hexagon Driver	2 pcs	Fixture for both front doors Prevent it from closing
6	H4 Wrench	2 pcs	For disconnecting H4 connector
7	Reinforce Bracket	2 pcs	Wall mount brackets for stands on each side
8	Screw M8x16L	4 pcs	To lock reinforce bracket with foot
9	SUB_1G Antenna	1 pc	Antenna for SUB_1G
10	Antenna Bracket	1 pc	For fixing antenna
11	Screw M4x12L	3 pcs	For assembling antenna bracket

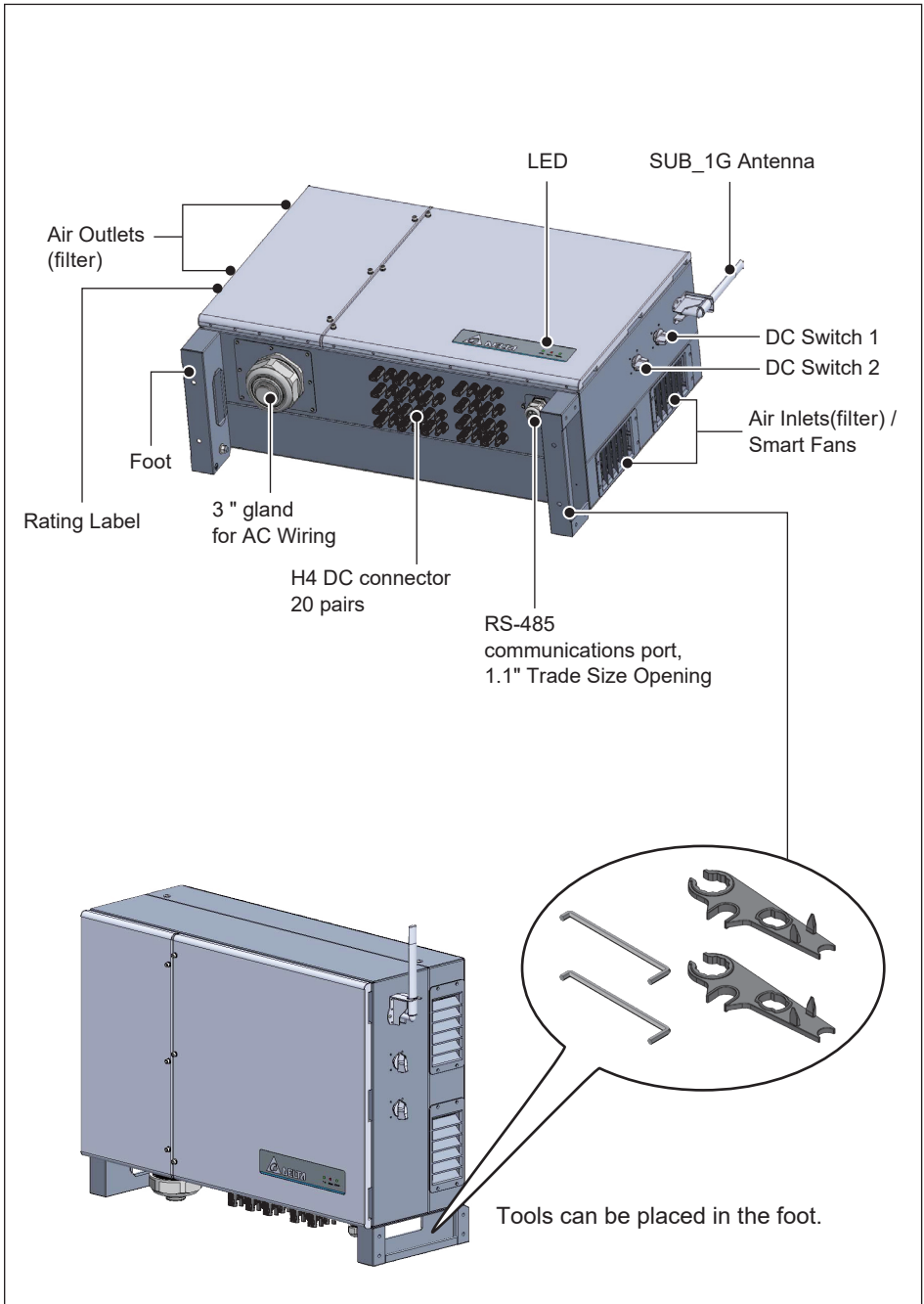


Figure 2-2: Overview

Figure 2-3 shows the rating label of M125HV_111, and **Table 2-2**, defines the symbol markings on this label.

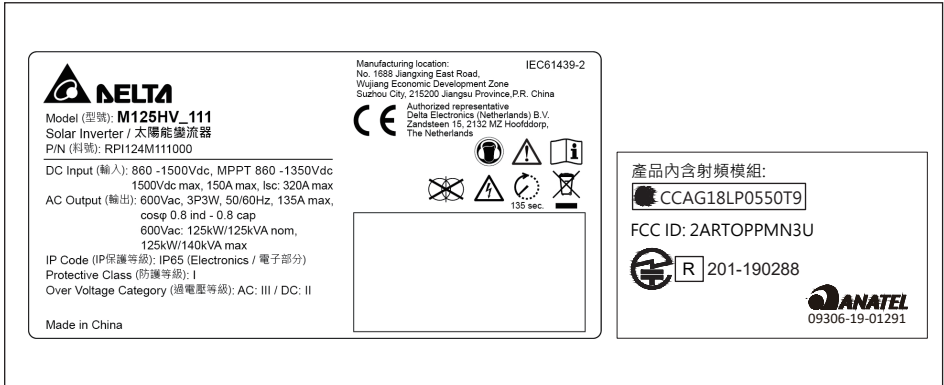









Figure 2-3: Rating label

Table 2-2: Rating label explanation

Symbol	Definition	
	<p>Danger to life through electric shock Potentially fatal voltage is applied to the inverter during operation. This voltage persists even 135 seconds after disconnection of the power supply. Never open the inverter. The inverter contains no components that must be maintained or repaired by the operator or installer. Opening the housing will void the warranty.</p>	
	<p>Before working with the inverter, you must read the supplied manual and follow the instructions contained therein.</p>	
	<p>This inverter is not separated from the grid with a transformer.</p>	
	<p>The housing of the inverter must be grounded if this is required by local regulations.</p>	
	<p>M125HV_111 model complies with Anatel certification standards.</p>	

In the following pages, **Figures 2-4** illustrate the general layout of and wiring area. **Figure 2-5** and **Table 2-3** provides detailed description of each wiring area option. The wiring area includes terminals for connection of the output (AC) wiring, AC surge protection devices (SPD).

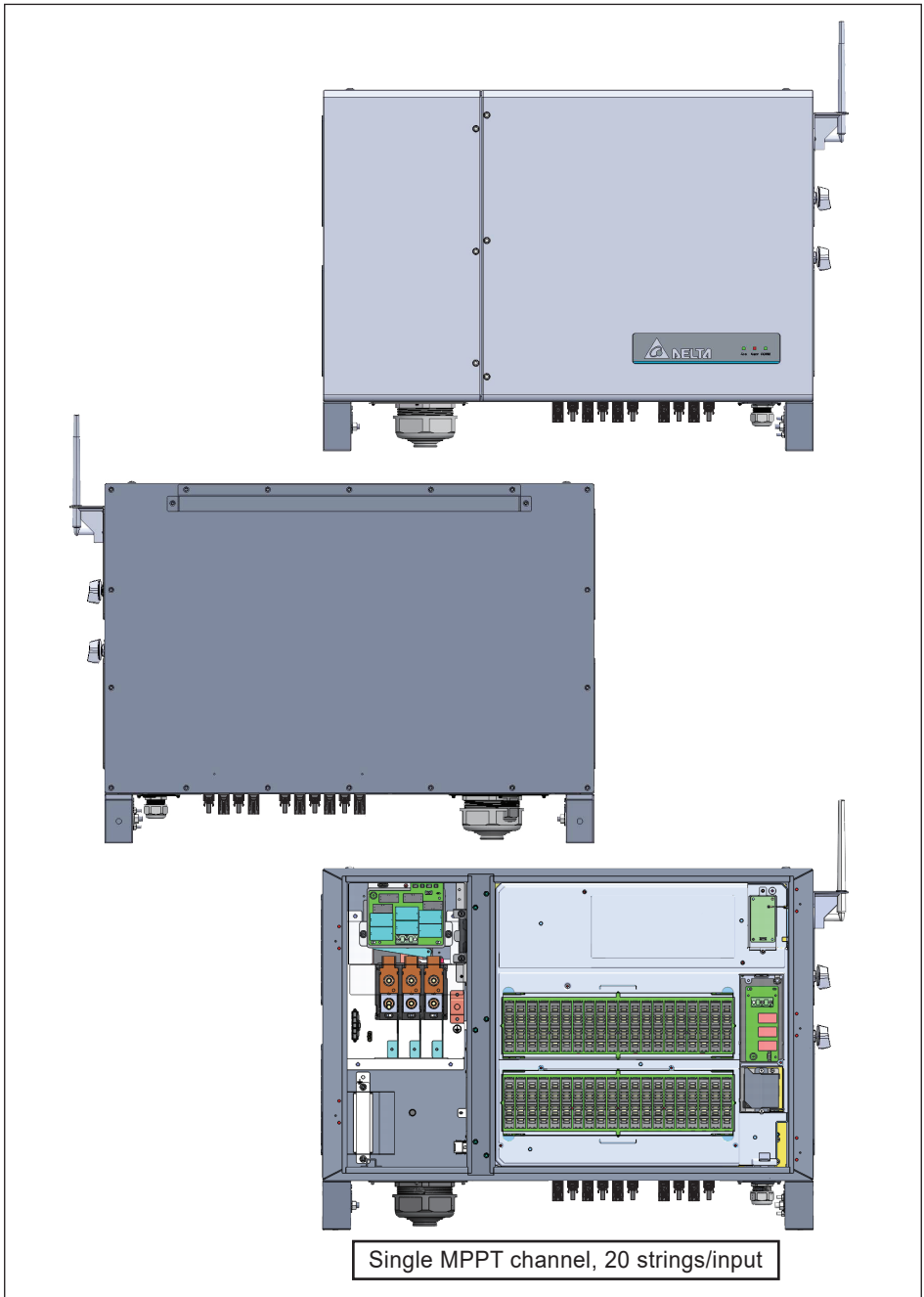


Figure 2-4: External/ internal view

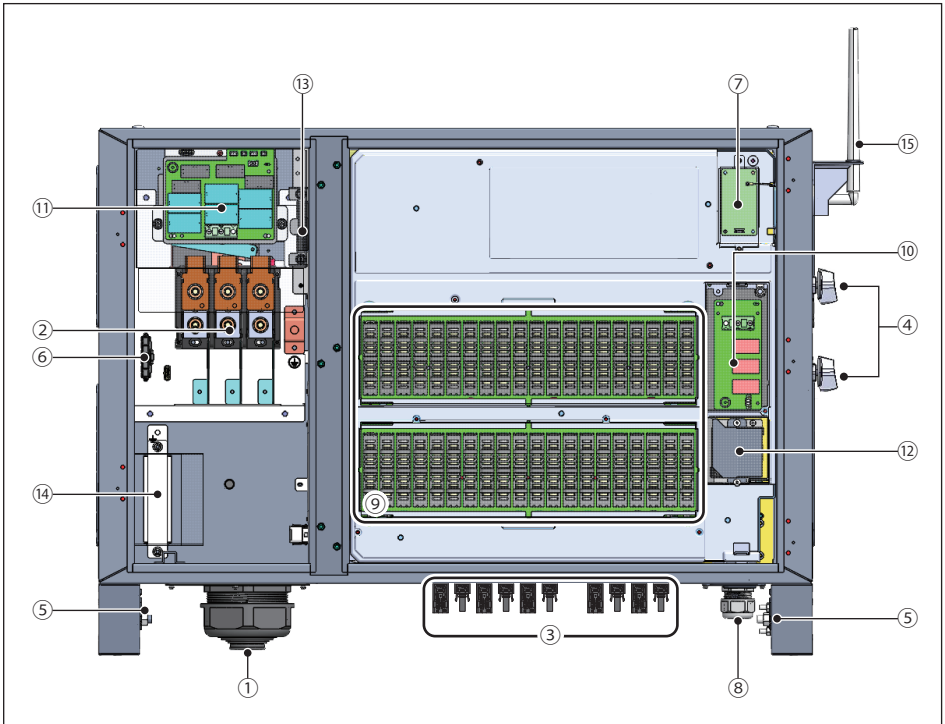


Figure 2-5: Layout

Table 2-3: Layout description

NO.	Component	NO.	Component	NO.	Component
1	3" cable opening for AC	6	Power connect of Din Rail SPD	11	Type II AC SPD
2	AC terminal	7	N3U_SB1	12	Internal fan 1
3	H4 connectors (20 pairs)	8	Communication port	13	Internal fan 2
4	DC switches	9	Fuse holder	14	Din rail for AC SPD (optional)
5	Grounding (M6/10 threaded stud)	10	Type II DC SPD	15	SUB_1G Antenna & bracket

3 Installation

CAUTION !



- In some locations, mounting the inverter in direct sunlight may cause the inverter to enter a thermal derating mode. To eliminate this concern, a shade structure over the inverter chassis may be necessary.

WARNING !



- Do not install the unit near or on flammable surfaces.
- Inverter must be mounted securely to a solid / smooth surface.
- M125HV_111 is not intended for use in a residential environment, it may cause radio interference, in which case the user may be required to take additional mitigation measures against electromagnetic interference.

The chapter contains instructions for

- (1) Mechanical installation
- (2) Electrical Installation
- (3) Communication setup

Figure 3-4 provides the mechanical dimensions of the inverter.

3.1 Unboxing & Review

Unpacking the M125HV_111, please follow the order of **Figure 3-1**. It could be transported by 2 people (**Figure 3-2**) or crane (**Figure 3-3**).

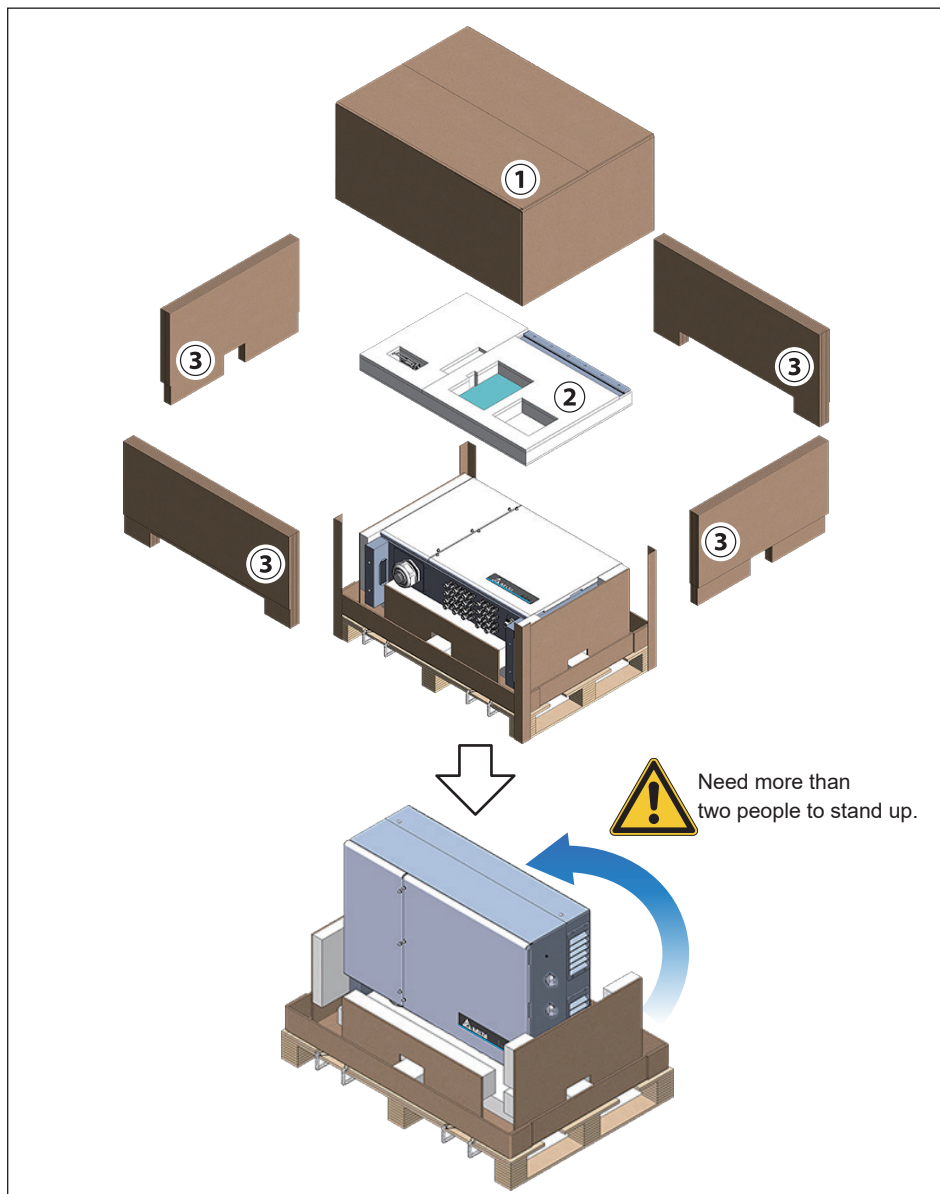


Figure 3-1: The step to unpacking the inverter

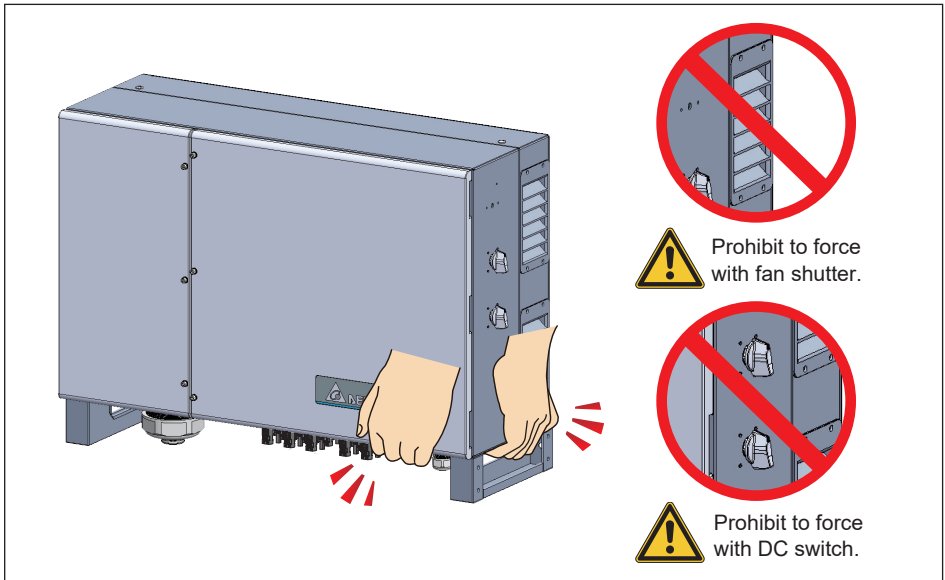


Figure 3-2: Handle position for handling

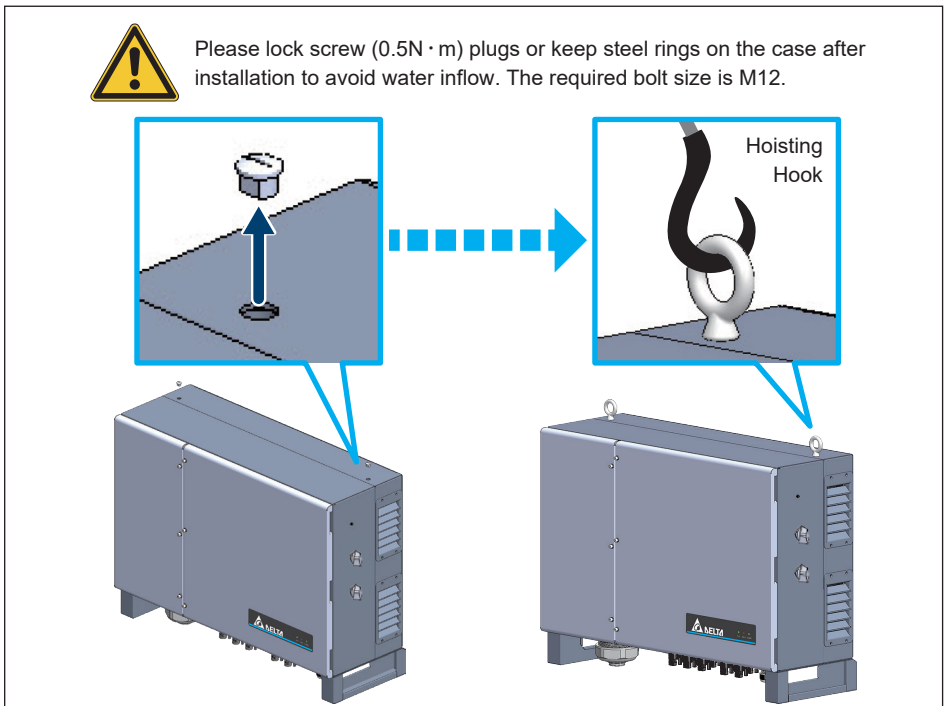


Figure 3-3: Attaching the Hoisting hooks

3.2 Mechanical Installation

This unit is designed to be wall-mounted per **Section 3.2.1** or ground mounted **Section 3.2.2**.

3.2.1 Vertical Wall Mount

Refer to **Figures 3-5** through **Figures 3-9**.

1. Ensure the surface to which the unit is to be mounted is sufficiently strong enough to carry the weight.
2. Orient the wall bracket horizontally (perpendicular to the floor), with the large plate at the bottom, and mark required mounting hole locations per **Figure 3-5**.
3. Secure the mounting bracket on the wall with 6 M10 screws.
4. Hang the inverter on the wall mounting bracket.
5. Secure the inverter by inserting and tightening 2 M10 screws per **Figure 3-9**.

CAUTION !



- The mounting bracket shipped with the unit is specially designed and is the only certified mounting device for mounting the inverter.
- Secure the mounting bracket on the wall with 6 M10 screws. (5 screws at least)

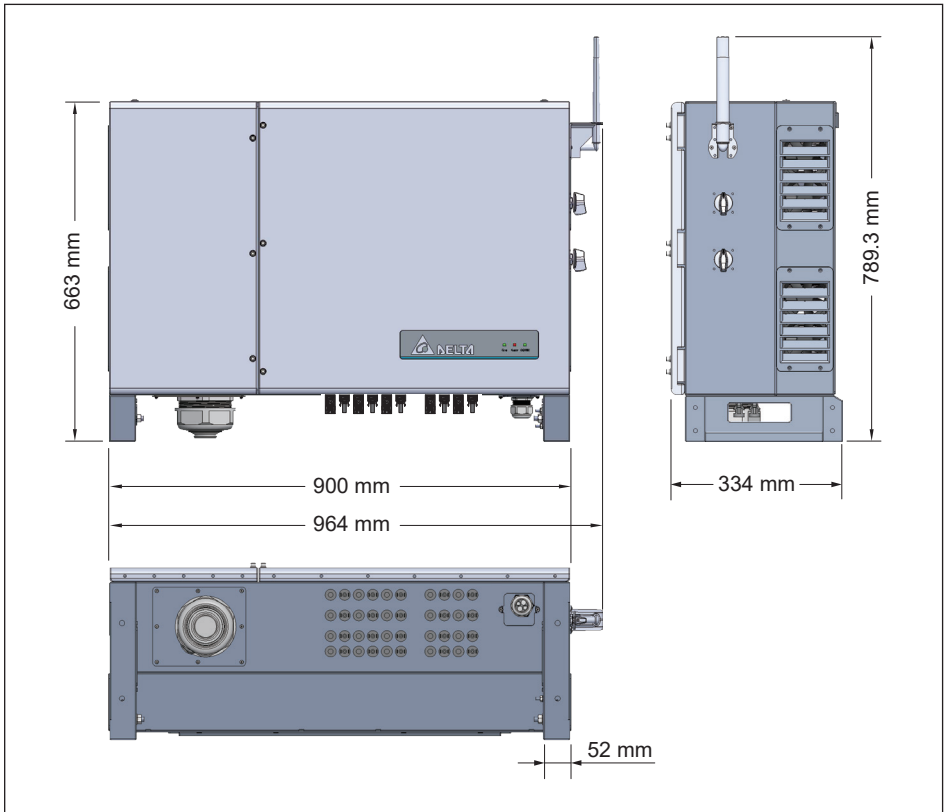


Figure 3-4: Inverter dimensions

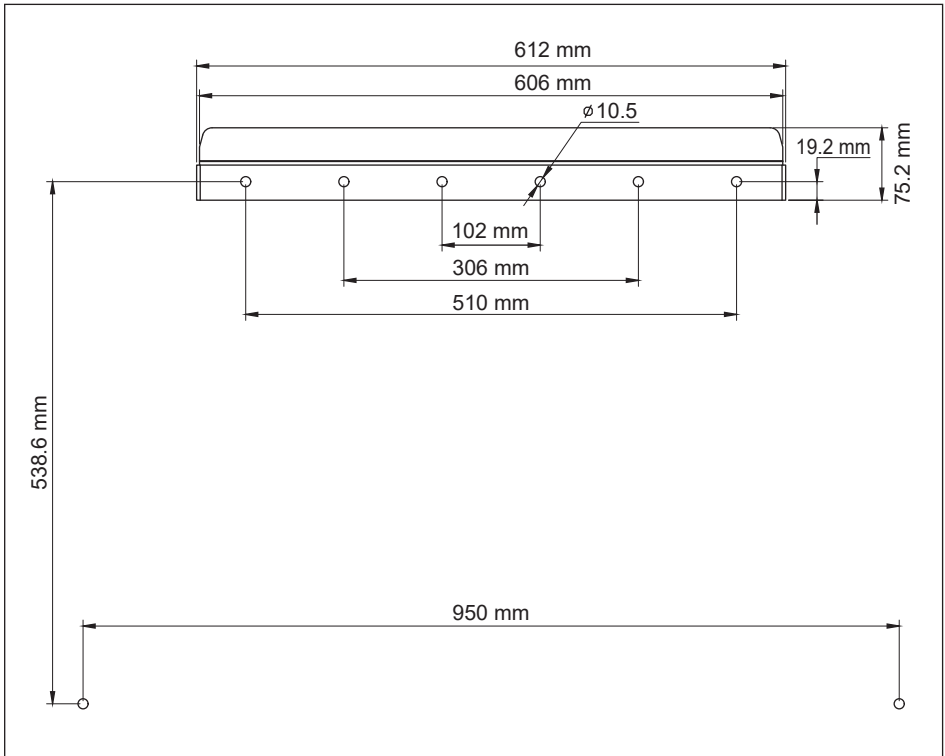


Figure 3-5: Mounting bracket dimensions

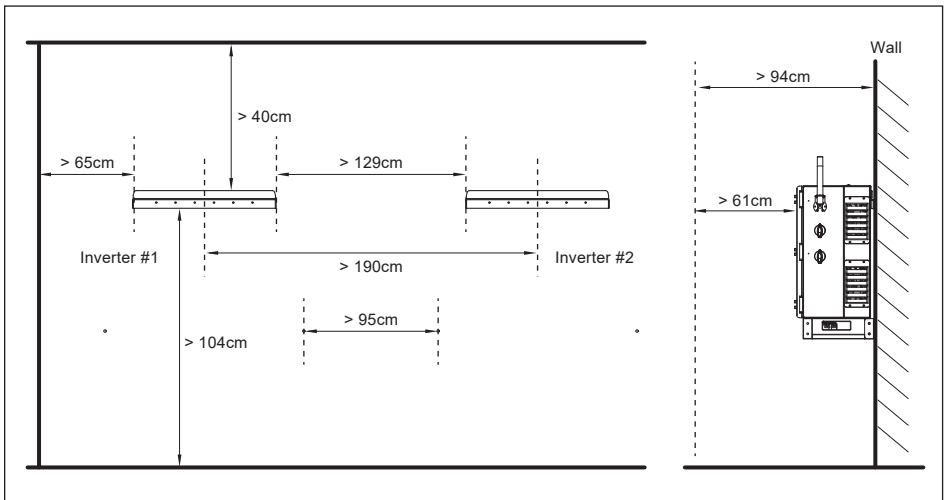


Figure 3-6: Required mounting clearances

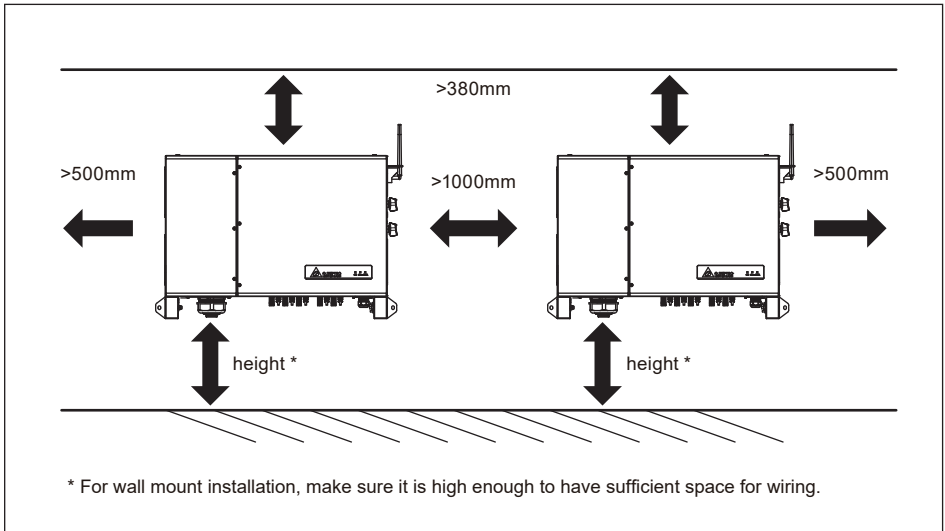


Figure 3-7: Separation distance of plural inverters

CAUTION !



- Failure to comply with above mounting instructions including permitted orientations and designated clearances may result in derated power output and may void the warranty. To avoid these issues follow the instructions above!

After installing the reinforce brackets on the feet (**Figure 3-8**), secure the reinforce brackets to the wall with two screws per **Figure 3-9**.

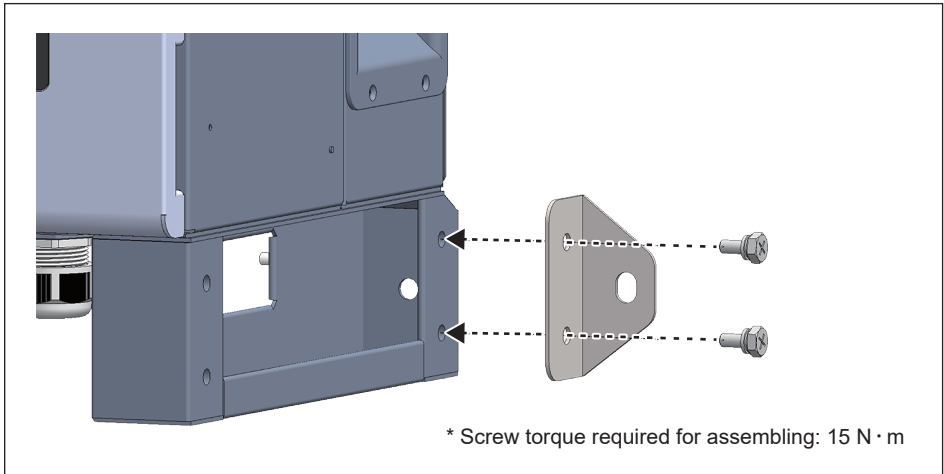
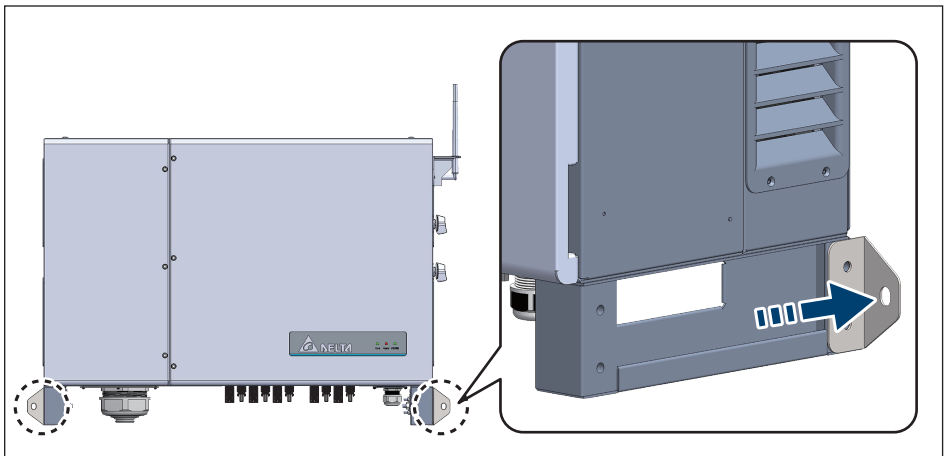


Figure 3-8: Install the unit on the feet



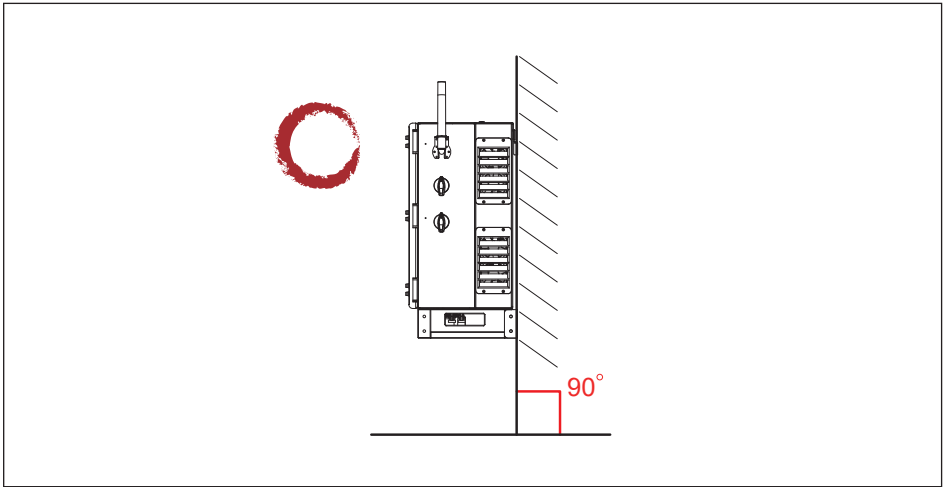


Figure 3-10: Permitted mounting positions

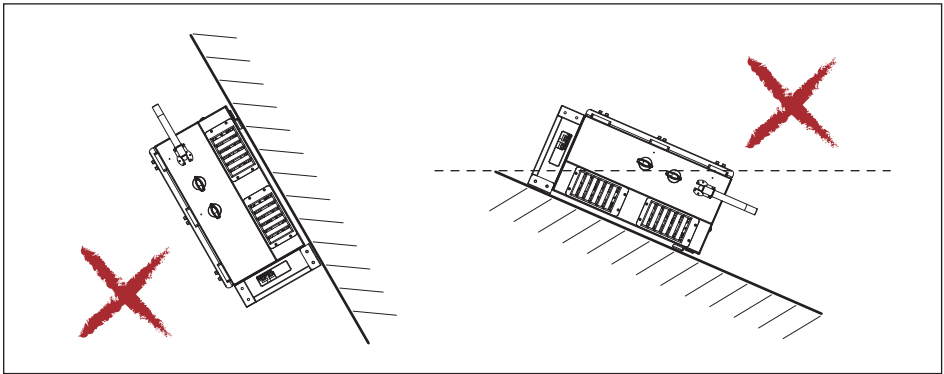


Figure 3-11: Prohibited mounting positions

O : Permitted / X : Prohibited

3.2.2 Ground Mount (Optional)

Grounded Bracket kit is an optional part, please contact the customer service center for the detail.

1. Ensure the grounded base to which the unit is to be mounted is sufficiently strong enough to carry the weight.
2. The grounded base horizontally (perpendicular to the floor), and mark required mounting hole locations per **Figure 3-13**.
3. Lock the grounded brackets to foots with 8 screws. (**Figure 3-12**)
5. Set the inverter on the ground mounting base.
4. Secure the grounded brackets on the grounded base with 4 M10 screws per **Figure 3-13**.

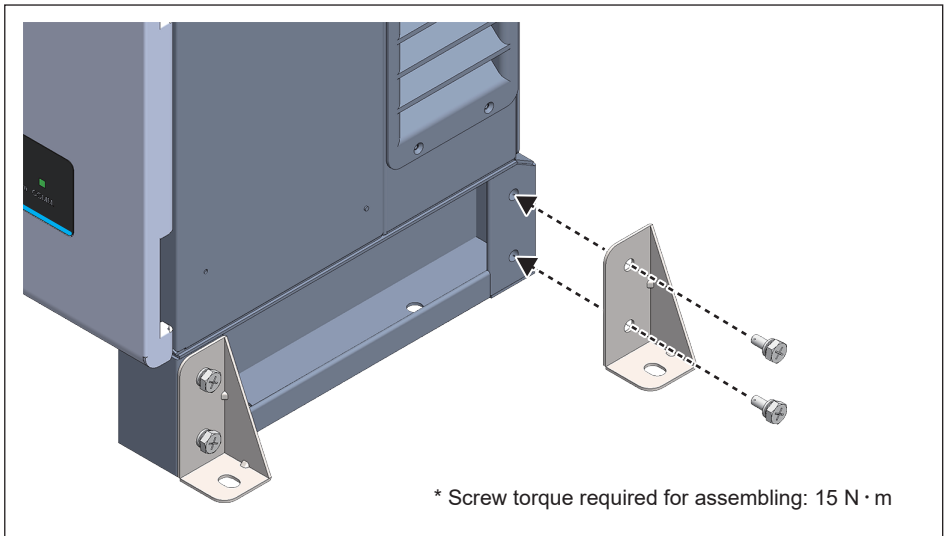
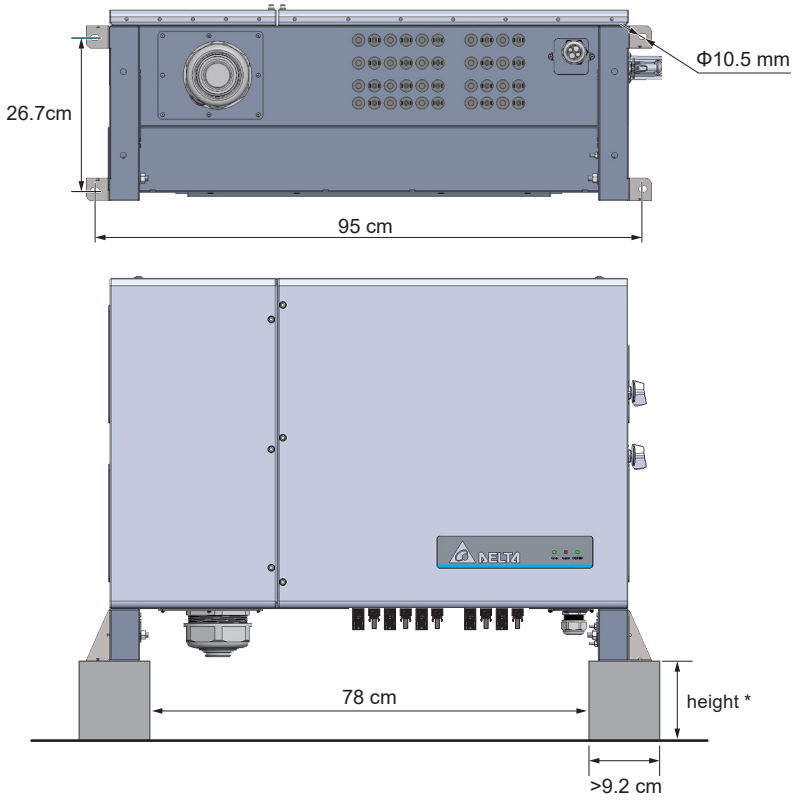


Figure 3-12 : Lock the grounded brackets to foots



* For ground mount installation, make sure the cement base is high enough to have sufficient space for wiring.
(ex: the height of cement base will require 30cm for using 70mm² XLPE cable)

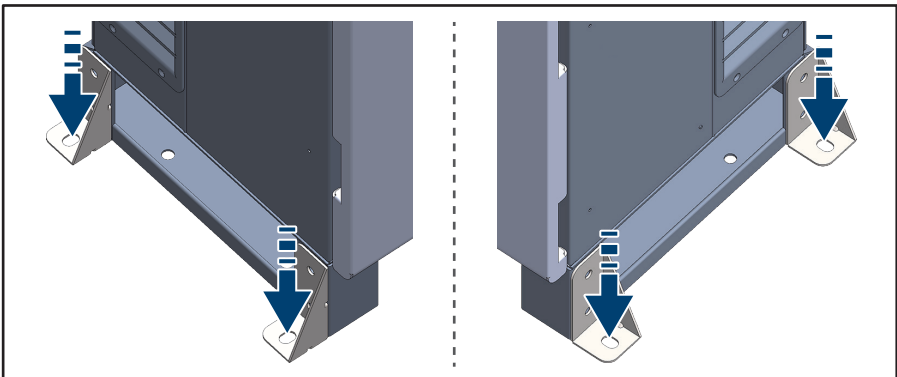


Figure 3-13: To secure inverter grounded brackets to ground-mounting base

3.3 Door

In order to guarantee proper long-term operation of the inverter, procedures in **Section 5.1** must be followed.

For the first time installation, only need to open the AC side (left) door for wiring.

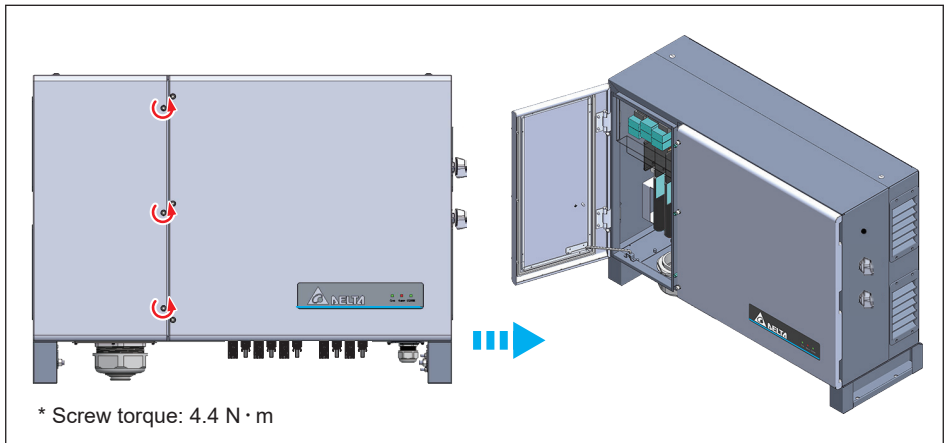


Figure 3-14: First installation of M125HV_111

INFORMATION



- Use Hexagon Driver (Table2-1, Item5) or other proper tool to untighten door screws.
- Door screws are captive screw type. Do not disassemble door screws.
- Please follow the recommended torque to lock-on door screw with torque wrench.

DANGER!



- **It is forbidden to open both doors at the same time.**

3.4 Electrical Installation for AC Wiring

DANGER : ELECTRICAL HAZARD!!



- To avoid shock hazard during cabling, insure any live grid connections are removed from the inverter.

DANGER!



- **It is forbidden to open both doors at the same time.**

WARNING !



- Code compliance is the installer's responsibility.
- Inverter warranty void if the DC input voltage exceeds 1500 Vdc.

CAUTION : INVERTER AND EQUIPMENT DAMAGE MAY OCCUR !



- Installation for AC terminal must meet the local electrical code.
- Failed to follow the instructions may damage AC cable.

CAUTION: WRONG AC WIRING !



- In order not to damage the components in the inverter, ensure the correct conductor is connected to the appropriate AC terminal on the inverter.

3.4.1 AC Grid Types and Connections

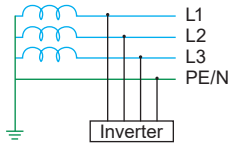
ATTENTION

The default AC Grid connection is 3Ø-3W. It can also connect 3Ø-4W without Neutral (N). The inverter will operate from the following grid connections without need of an external transformer:



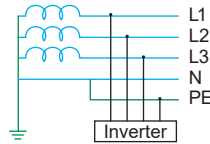
TNC system

347/600V



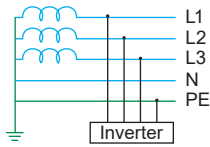
TNC-S system

347/600V



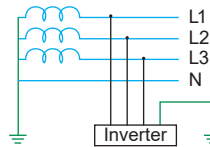
TNS system

347/600V



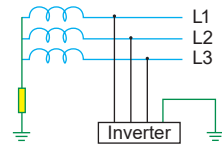
TT system

347/600V



IT system

347/600V



3.4.2 Required Protective Devices

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

Model	Upstream circuit breaker
M125HV_111	175A max.

3.4.3 AC Wiring Preparation

Below is the procedure for preparing the AC conductors for connection to the AC terminals:

- It is important to choose the proper size for AC cable. Refer to **Figure 3-15**.
- The cross-sectional area for each AC conductor is 50~185 mm² for Cu. (95~185mm² for Al)
- The maximum width of each terminal lugs should be within 31mm, the diameter of screw hole should be within Φ 10.5mm, as shown in **Figure 3-16**.
- Terminal can use for Cu lug (Tin plated).

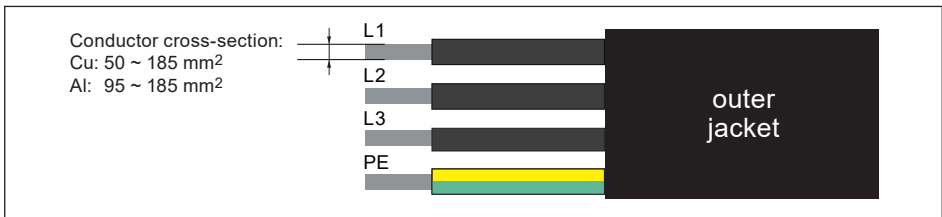


Figure 3-15: Size of AC conductors

Φ10.5 mm
 <31 mm

AC Terminal (tin-plated)		PE Connection (Nickel-plated)	
Conductor	Compatible Lug	Conductor	Compatible Lug
Cu	Cu(Tin-Plated)	Cu	Cu(Tin-Plated)
	Cu(Nickel-Plated)		Pure Cu
	Pure Cu		Aluminum (Tin-Plated)*
	Stainless steel	Bi-metal*	
Al	Aluminum (Tin-Plated)*	Al	Aluminum (Tin-Plated)*
	Bi-metal*		Bi-metal*

* It is recommended to apply electrical grease before fitting wire conductor into terminal lug for best protection.

The working temperature of power cable should be at least 90°C.

Figure 3-16: Dimension of lug

3.4.4 AC Side –Prewire Set-Up

Prior to installing conductors on terminal complete the following procedure to make terminals ready for connections.

For each of the AC terminals (L1, L2, L3, PE):

Tighten/Lose nuts with 17mm socket. If an electric socket is utilized insure the torque setting is low enough to NOT OVER-TORQUE the screw. Once nut bottoms out, do not turn it any further.

NOTICE

Extreme temperature rise at the clamping point

If the contact resistance between the aluminum conductor and clamping point is too high, the clamping point can become very hot and even catch fire in extreme cases.



To ensure a safe and reliable contact, **always** perform the following work steps:

- ▶ Please select the Al wire size according to rules due to lower conductivity of Al.
- ▶ Keep the installation location as free as possible from moisture or corrosive atmospheres.
- ▶ Connect the aluminum cables quickly.
- ▶ Tighten the clamping screw in the clamping body with the maximum permissible tightening torque.

3.4.5 AC Wiring

Refer to **Figure 3-15** in **Section 3.4** for the procedure to prepare AC conductors for connection to the AC terminals.

Ensure the AC conductors used are sized to the correct ampacity per NEC or other local code. Refer to **Figure 3-15**.

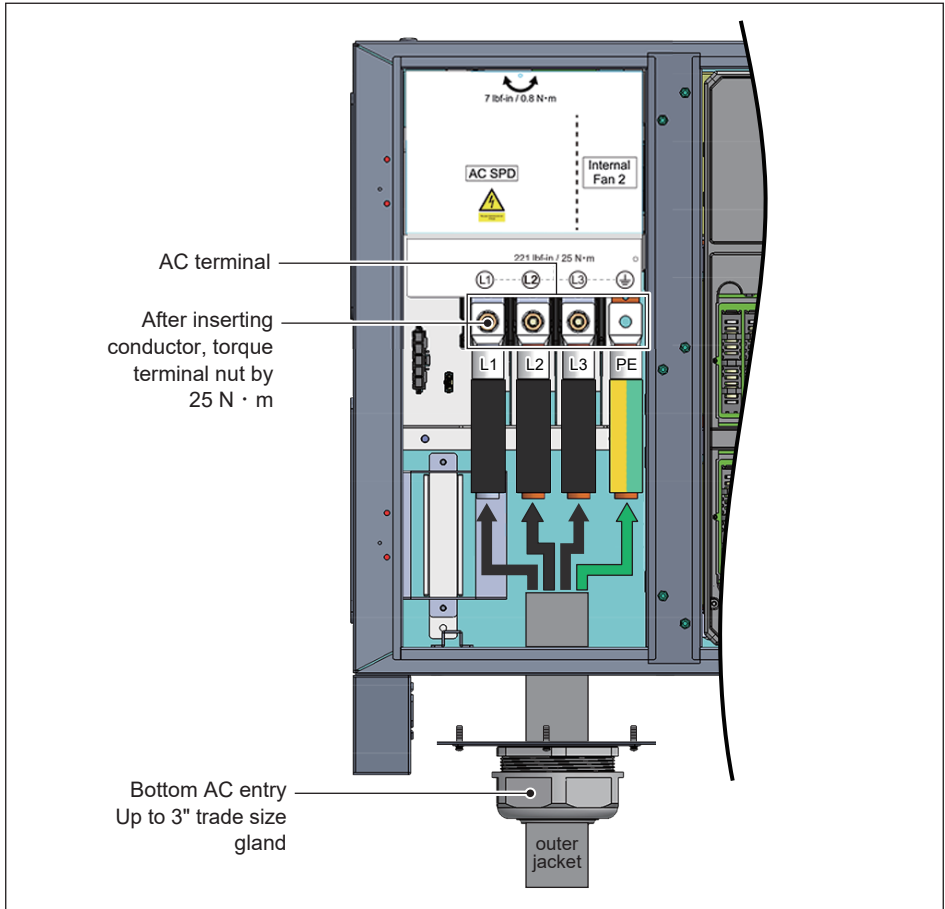


Figure 3-17: Location for AC terminal

Figure 3-17 illustrates the location of the AC conduit entry and connections to the AC terminal block:

- Unscrew all AC terminal nuts as noted in **Section 3.4.4**.
- Ensure the correct conductor is connected to the appropriate terminal.
- After conductor is inserted, use M10 nuts to tight L1~L3, PE terminal with a torque of 25 N · m.

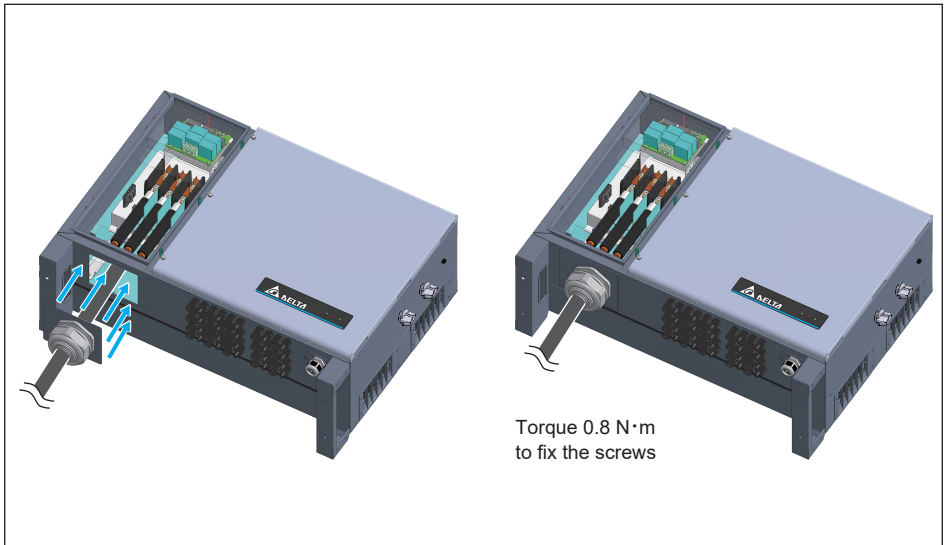
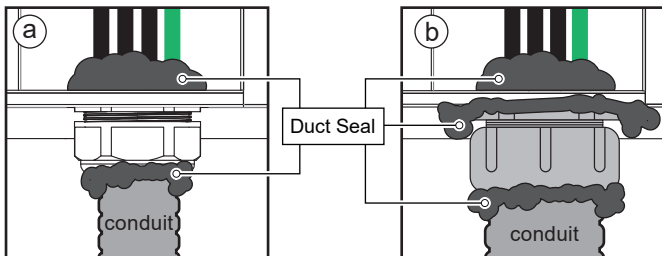


Figure 3-18 : AC gland assembling

CAUTION !

The cable gland is suitable for multi-core cable, if wiring is using single-core cable with 3" flexible metal conduit, please follow below suggestions to avoid water intrusion:

- a. Insert the flexible metal conduit to cable gland and seal the conduit from both inside and outside the wiring box and the gap between gland and conduit by using duct seal to prevent living creature or moisture enter the wiring box.
- b. Replace the cable gland to 3" EMT connector and seal the conduit from both inside and outside the wiring box and the gap between gland and conduit by using duct seal to prevent living creature or moisture enter the wiring box.



3.5 Electrical Installation for DC Wiring

DANGER : ELECTRICAL HAZARD!!



- PV array converts sunlight into electric power with high DC voltage and high DC current which can cause dangerous electrical shock hazard!
- Use an opaque material to cover the PV array before wiring or cabling.
- Ensure the correct polarities are connected when DC cabling is applied.

DANGER!



- **It is forbidden to open both doors at the same time.**

WARNING !



- The risk of electric shock and fire exists because of high DC and AC voltages.
- Only PV modules that are listed with system voltage under 1600V are permitted for use.
- Ensure the two DC switches are placed in the "OFF" position, and the PV array is disconnected when DC conductors are connected.

CAUTION: DC SWITCH ON/OFF !



- In order not to damage the components in the inverter, don't repeat to change the status of DC Switch quickly, the correct operation is waiting for the LED display show "green off and yellow flash" (No DC) or turn on the switch after 5 minutes later.

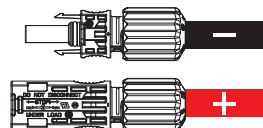
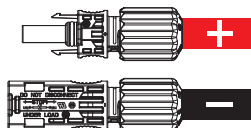
ATTENTION



- The PV Array current carrying conductors (positive or negative) must not be referenced to ground.

DANGER : ELECTRICAL HAZARD!!

- Before plug in the DC connectors, pay attention to the polar is correct. Reverse positive and negative voltage, inverter will probably damage.



3.5.1 DC Wiring Installation

Please read the following instructions for connecting DC connector :

- Ensure the DC conductors used are Cu and sized to the correct ampacity per NEC or other local code.
- Strip off all wires for 6.5~7.5 mm.
- The cross-sectional area for each DC conductor is 12/10 AWG (4/6mm²) .

The Standard H4 Plus connector in accessories (**Figure 3-19**) support cable O.D. from 5.0~7.8mm, if PV cable O.D. over 7.8mm, please refer to **Table 3-1** and contact survice to select H4SxC8DM series connector as optional accessory.

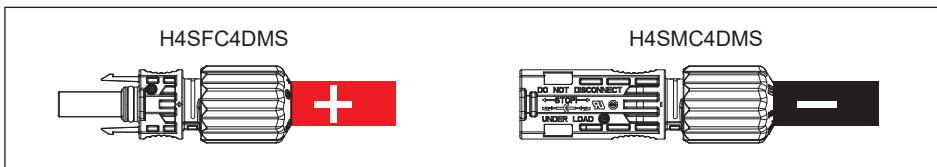


Figure 3-19: DC Wiring illustration

Table 3-1: H4 series connector

Cable certificate	Ref. Cable diameter	H4SxC4DM plus connector (standard) Support cable O.D.: 5.0~7.8mm	H4SxC8DM plus connector (optional) Support cable O.D.: 7.5~8.8mm
UL	12 AWG	O	X
	10 AWG	O	X
	8 AWG	X	O
EN	4 mm ²	O	X
	6 mm ²	O	X
	10 mm ²	X	O

DC wiring polarities are divided into positive and negative, and the layout of the connectors is shown in **Figure 3-20**.

ATTENTION



- Do not remove the waterproof plug for unused DC strings to ensure the machine is IP65 compliant.

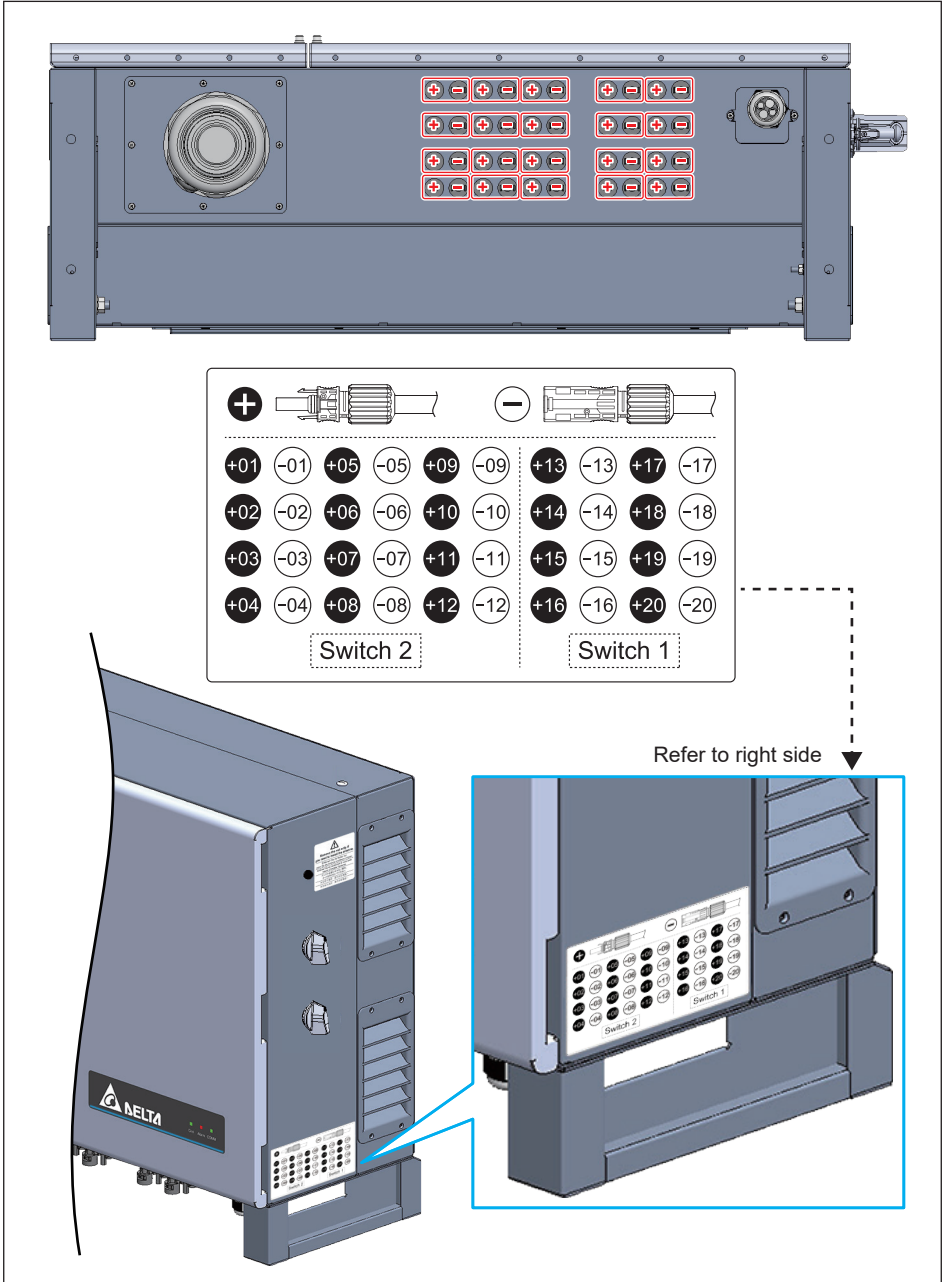


Figure 3-20: Location of H4 connectors to connect array wiring (DC)

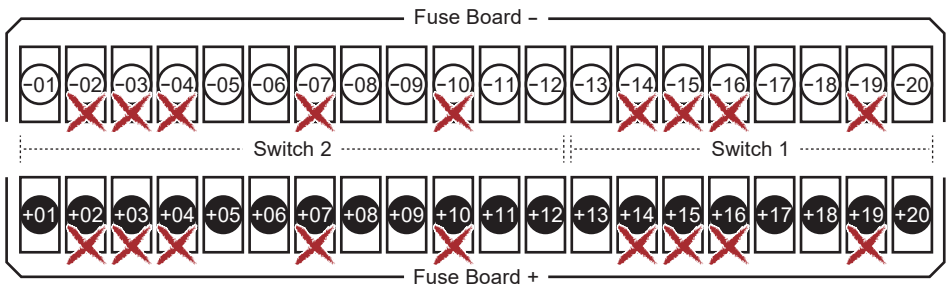
■ DC Side Y connection

M125HV_111 is compatible with 1500V/30A CE listed fuse, however, the designer must be beware of the following requirements:


- The max Isc-stc of a connected array (sum of all paralleled strings) cannot exceed the rated Isc limit of the inverter, that is no more than 150A total.
- Because of internal current limitations and higher string currents allowable with 30A fuses, inputs 2、3、4、7、10、14、15、16 and 19 must **NOT** be used.

Recommend fuse models

1. Vendor: Mersen Vendor P/N: HP15M30
2. Vendor: EATON(Bussmann Series) Vendor P/N: PV-30A10F85L
3. Vendor: Littelfuse Vendor P/N: SPXV 30



CAUTION !



- When 30A string fuses are utilized do **NOT** use input 2、3、4、7、10、14、15、16 and 19 on either MPPT channel.

3.5.2 Equipment Grounding

To ground the inverter, please crimp the grounding wire to the ring terminal lug and fix it on the grounding point shown as **figure 3-21**.

mounting torque: M6/ 7 N · m

M10/ 25 N · m

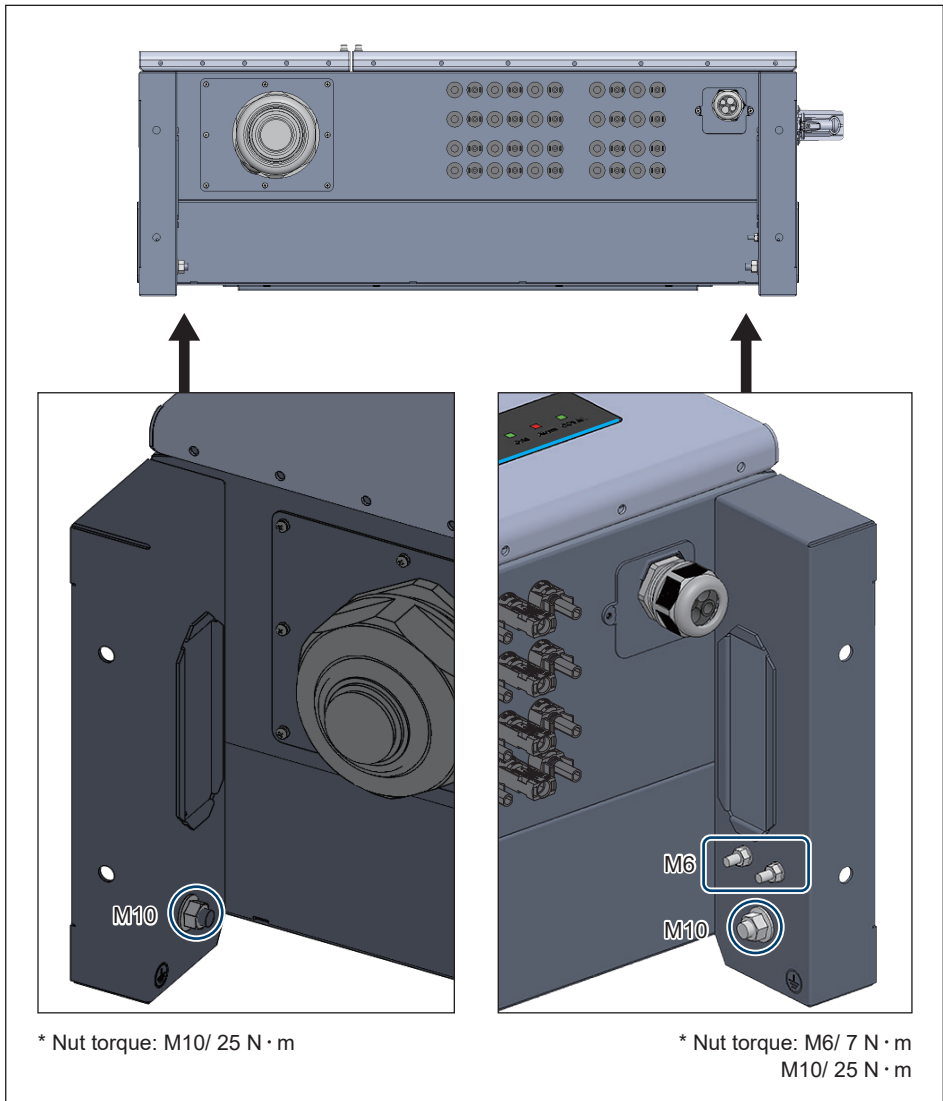


Figure 3-21: Mount the equipment grounding

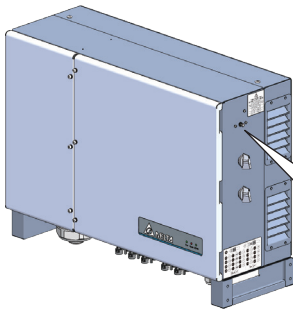
3.6 Antenna

There is an antenna for SUB_1G, it must be installed with 1.2 N·m and some installation notice include antenna and bracket are shown in **Figure 3-22 ~ 3-24**.

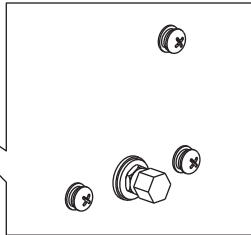
ATTENTION



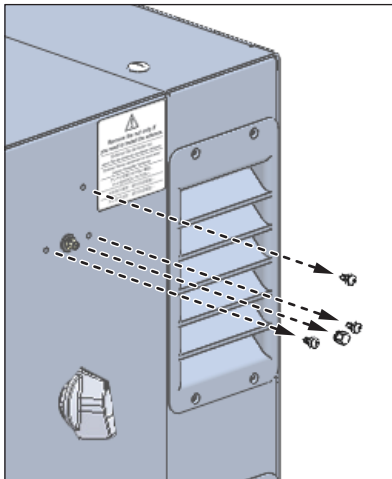
- Always keep nut and screws properly tightened on the case.
- Water leakage may cause serious damage.
- Contact DELTA service when lack for nut and screws.
- Store the nut for spare usage.



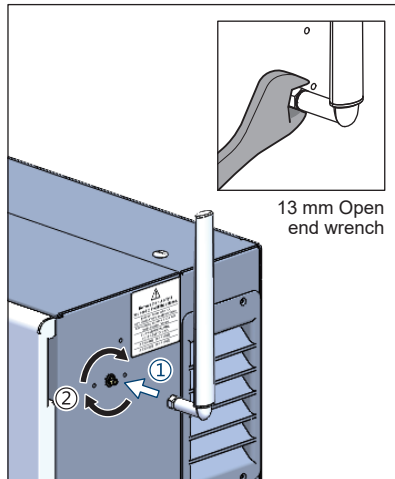
Antenna location



Save the nut after antenna installed.



Remove the nut and 3 screws.



13 mm Open end wrench

Use the 13 mm open end wrench to lock the antenna with 1.2 N·m torque.

Figure 3-22: Installation of antenna

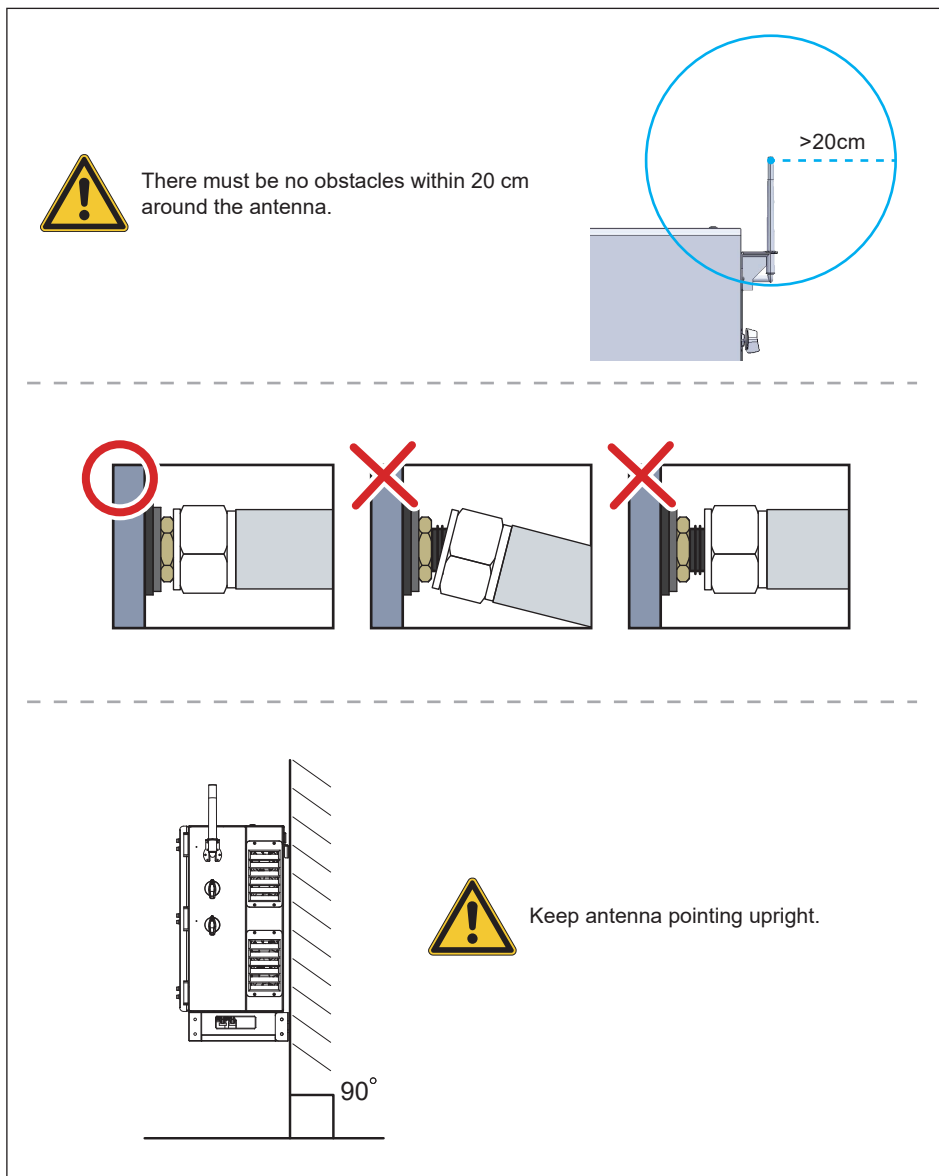
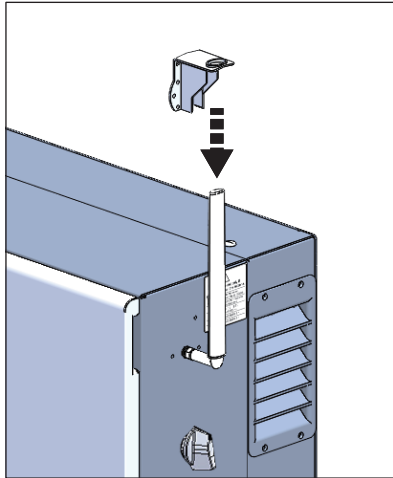
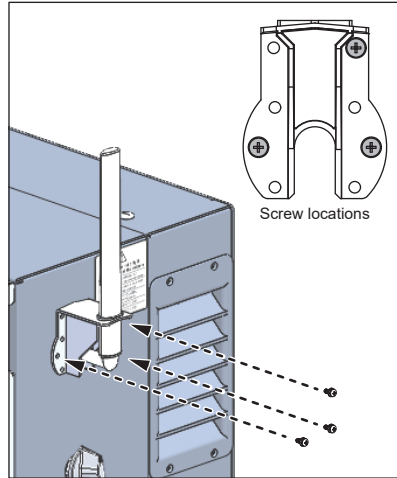


Figure 3-23: Attentions of installing antenna



Put on the bracket from the top of antenna until matching screw holes.



Tighten the 3 M4 screws to antenna bracket with 0.98 N·m torque.

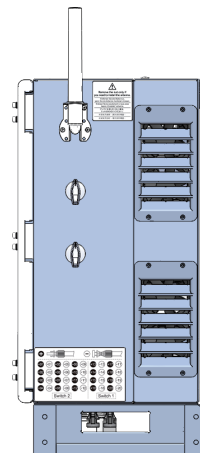
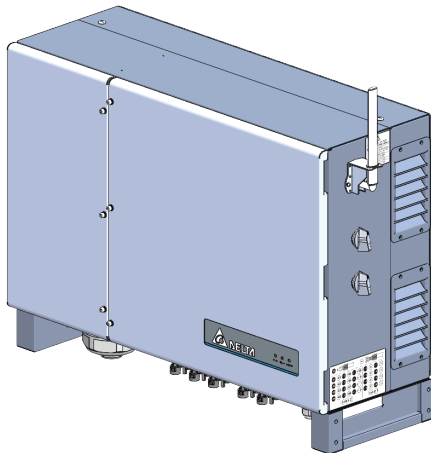


Figure 3-24: Attentions of installing antenna bracket

ATTENTION



- Please refer Data Collector manual for connection of Data Collector.
https://mydeltasolar.deltaww.com/?p=product_manual



3.7 Communication Module Connections

The communication module of M125HV_111 is shown in **Figure 3-25**.

It provides VCC, RS-485, dry contact, EPO, and Digital Input terminals for use in various applications. Details for each are presented below.

There's a 12VDC source between VCC & GND for use with external device.

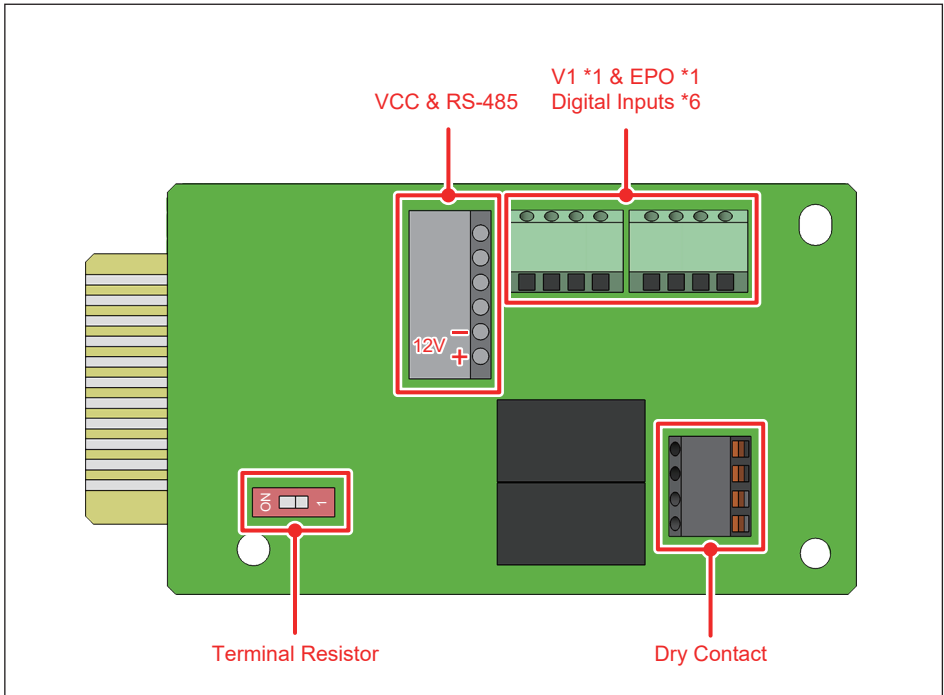


Figure 3-25: Communication Module Layout

3.7.1 Accessing the Communication Module

The communication module consists of an assembly with a PCB and a plastic carrier. It is located in a slot through the bottom of the chassis.

It is accessed from the bottom exterior of the chassis. The carrier is secured to the chassis by two self-retaining screws. See **Figure 3-26**.

To access the communication module, loosen the two self-retaining screws to loosen the carrier from the chassis. Once loosened completely, the card/carrier module can be withdrawn from the chassis by gently pulling the carrier straight out from the chassis.

After pulling the desired signal cable(s) through the wiring gland provided or a connected conduit, and connected electrically as shown in the following sections, the module can be reinstalled by reversing the above directions. Ensure the assembly is oriented into the chassis so as to allow the edge connector to engage properly.

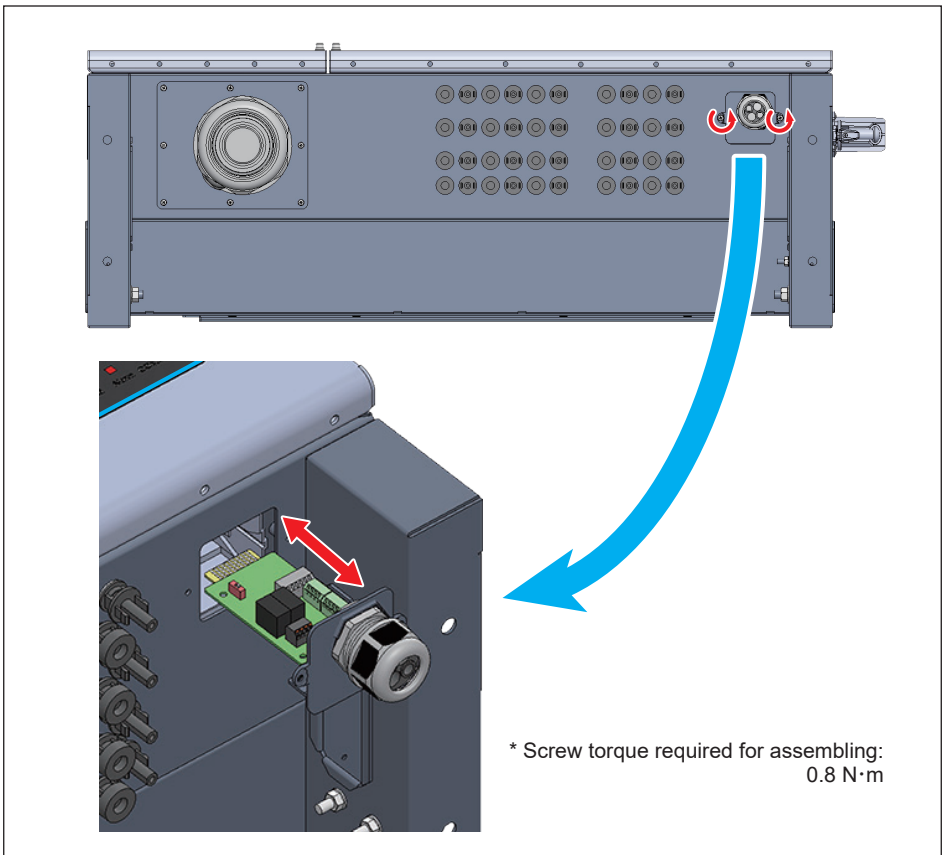


Figure 3-26: Location and access to Communication Module

3.7.2 RS-485 Connection

The pin definition for the RS-485 terminal block is shown in **Table 3-2**.

- Pins 1 and 2 provide a 12VDC bus for use with accessories.
(If use of 12VDC bus is necessary, place switch 1 in ON position.)
- Pins 3 and 5 are both connected to the DATA+ input.
- Pins 4 and 6 are both connected to the DATA- input.

These connections allow easy daisy-chaining of multiple inverters.

A 120ohm bus termination resistor and associated control switch are located on the communication board (See **Figure 3-25**) The switch function is as shown in **Table 3-3**.

Different RS-485 connection scenarios require different set up for the 120ohm bus termination resistor.

- When several inverters are cascaded (i.e., "daisy-chained") only the last inverter in the chain must have its bus termination resistor switched ON. Refer to **Figure 3-27**.
- If the length of any RS-485 bus is greater than 610m, the use of Belden 3105A cable (or eq.) is recommended to insure communication quality.
- The length of RS-485 cable is recommended to be less than 30m in general.

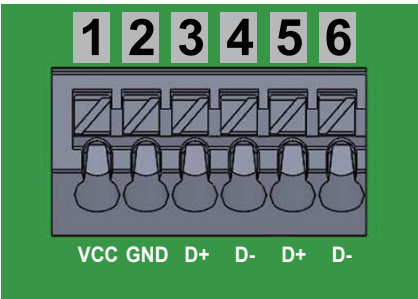
ATTENTION



- In order to have good transfer quality, twisted-pair wire is recommended to be used as communication cable.

Table 3-2: RS-485 Terminal block wiring

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



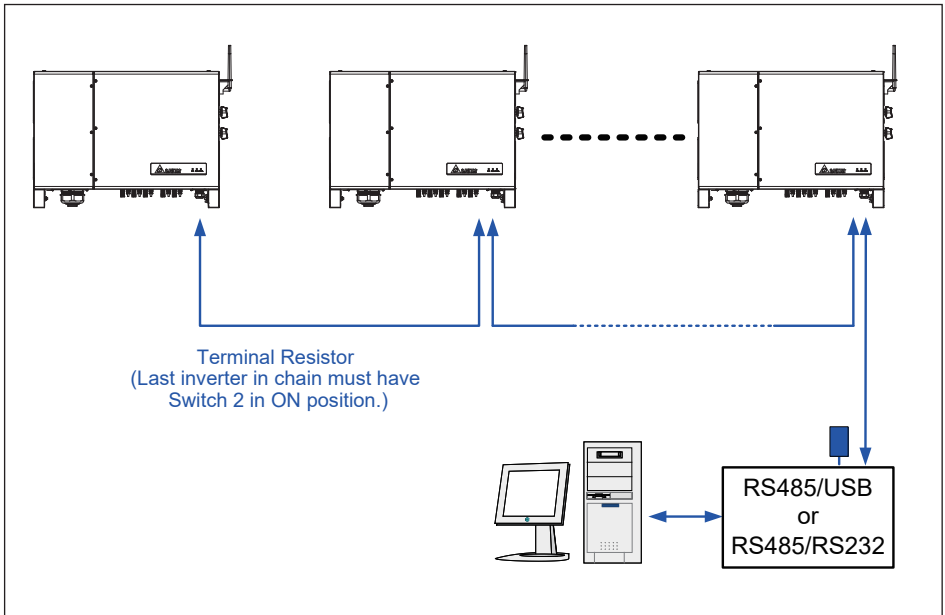


Figure 3-27: Multiinverter connection illustration

Table 3-3: Vcc and Bus Termination switch settings

	Switch 1
ON	Terminal Resistor ON
OFF	Terminal Resistor OFF

3.7.3 EPO Function & Digital Input

The communication Module has an emergency power off function (EPO). Users can customize EPO function in APP or Delta Solar System (DSS).

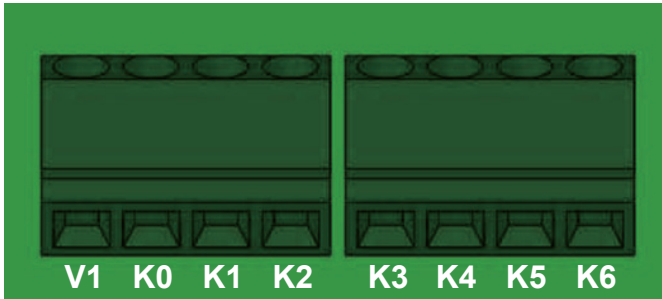


Figure 3-28: EPO function terminal block

Once enabled, the EPO function can be used to turn off the inverter via a NO relay contact connected across terminal [V1 & K0].

Additionally, a digital power reduction control is available that can be set to limit the inverter's available active output power. The control settings for this function are made by placing a hardware short (jumper or relay) between two terminals of the terminal block shown in **Table 3-4**, below.

Table 3-4: Definition of digital input & EPO function

Short terminals	Inverter's action
V1 & K0	Emergency power off (EPO)
V1 & K1	0% active power
V1 & K2	Maximum 30% rated power
V1 & K3	Maximum 60% rated power
V1 & K4	Maximum 100% rated power
V1 & K5	Reserved
V1 & K6	Reserved

3.7.4 Dry Contact Connection

M125HV_111 provides a dry control contact pair that may be used to control external devices based on the status of operation of the inverter.

The terminal block for this function is shown in **Figure 3-29**. The terminals marked in the figure identify the dry contact connection. The operation of the dry contact is normally open. The functionality of this contact can be customized by users via settings available in the Settings Menu.

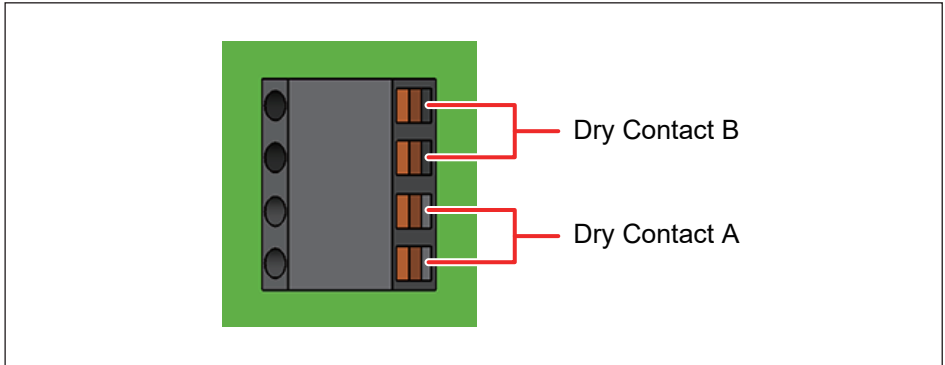


Figure 3-29: Dry Contact connection

4 Commissioning

CAUTION : HOT SURFACES, DO NOT TOUCH!



- Use care to avoid hot surfaces when operating the product!
- Do not perform any task until the unit cools down or appropriate personal protection gear is worn.

4.1 Display Operation Introduction

M125HV_111 with 3 LEDs allow visual display of the inverter's data and status as shown in **Figure 4-1**.

Please refer to **Table 4-1** for information as to the information provided by the LED indicators.

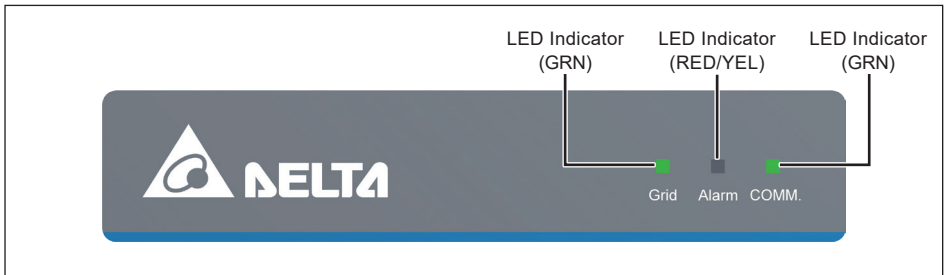


Figure 4-1: Front Panel Display

Table 4-1: LED indicator

Condition	On Grid (Green)	Alarm (Red/Yellow)
Countdown	FLASH	OFF
On Grid	ON	OFF
Inverter Fault / Remote off	OFF	ON / OFF
Inverter Warning	ON (or OFF)	FLASH / OFF
Field Fault	OFF	OFF / ON
Field Warning	ON	OFF / FLASH
NO DC	OFF	OFF / FLASH SLOW
FW Upgrade	FLASH	FLASH / OFF
Standby	FLASH	OFF / FLASH
Check PV Power	FLASH FAST	OFF / FLASH FAST

*FLASH: ON 1s / OFF 1s

**FLASH FAST: ON 0.25s / OFF 0.25s

***FLASH SLOW : ON 5s / OFF 10s

Table 4-2: LED COMM indicator


SUB_1G Condition	COMM (Green)
Work	FLASH
Fault	OFF

* FLASH: ON 3s / OFF 2s


4.2 Auto ID Commission Tool

The Auto ID function could set all inverter IDs at monitoring center after wiring RS-485.

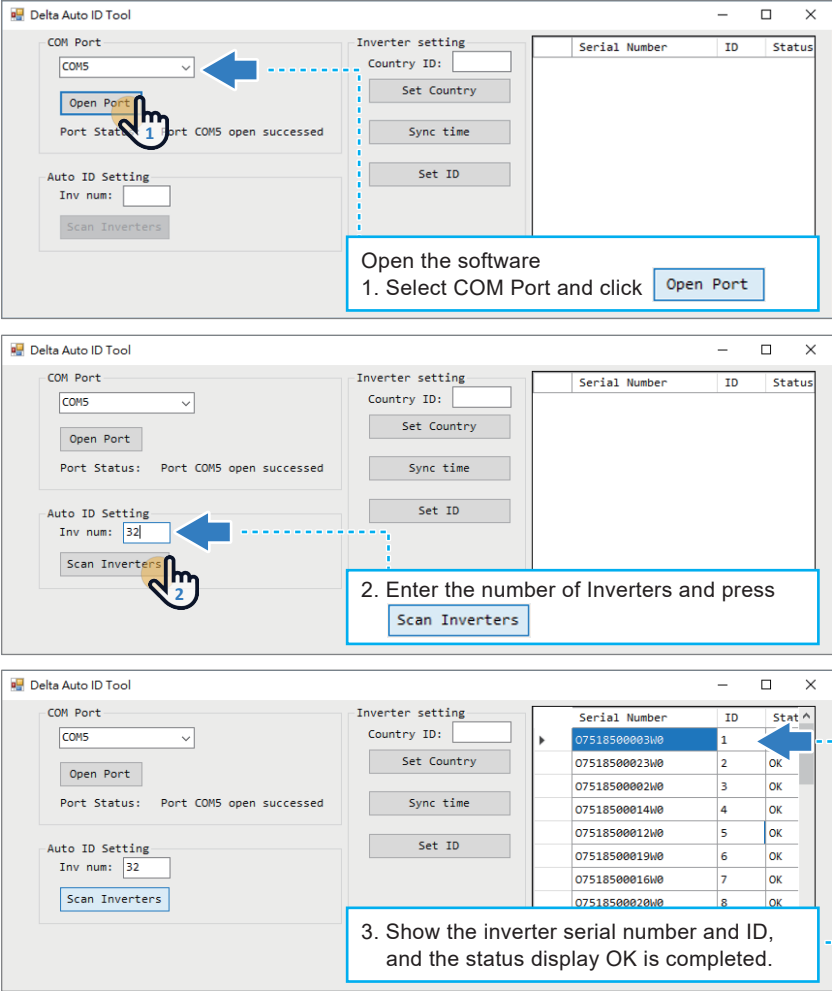
ATTENTION



Please download the software from the following website:
https://mydeltasolar.deltaww.com/dl_installer_guide.php?f=autoid



4.2.1 Auto ID Setting



Open the software
1. Select COM Port and click **Open Port**

2. Enter the number of Inverters and press
Scan Inverters

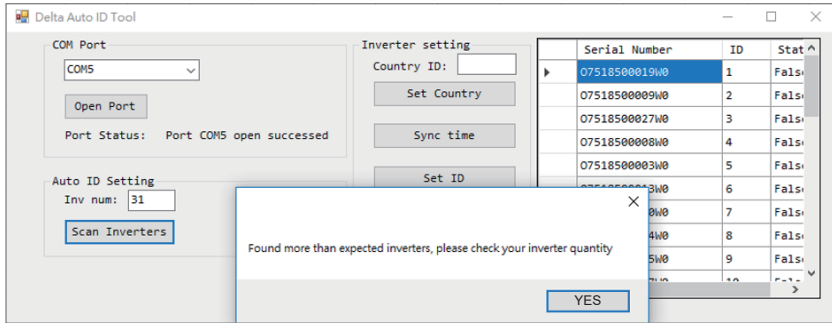
3. Show the inverter serial number and ID,
and the status display OK is completed.

Serial Number	ID	Status
0751850003n0	1	OK
07518500023n0	2	OK
07518500002n0	3	OK
07518500014n0	4	OK
07518500012n0	5	OK
07518500019n0	6	OK
07518500016n0	7	OK
07518500020n0	8	OK

Figure 4-2: Steps of auto ID setting by tool



The numbers of ID setting less than amounts of inverter, status show False.



The numbers of ID setting more than amounts of inverter, status show False.

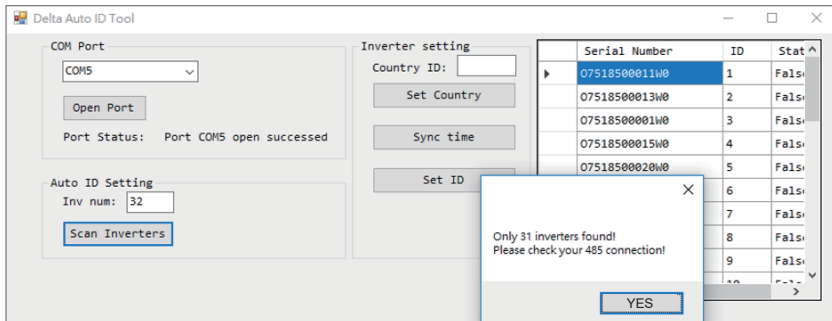


Figure 4-3: False of auto ID setting by tool

4.2.2 Set ID

To adjust the ID order, please follow the settings below.

The figure consists of two screenshots of the Delta Auto ID Tool interface. The top screenshot shows the 'Inverter setting' section with 'Country ID: 126' and a table of inverters. The table has columns for 'Serial Number', 'ID', and 'Stat'. The ID '5' is highlighted in red in the first row. A blue arrow points to the ID column header. A text box below the table says '1. Enter the ID you want to change .'. The bottom screenshot shows the same interface, but the 'Set ID' button is highlighted with a hand icon and the number '2'. A dialog box titled 'ID Setting Successful.' with a 'YES' button is open. A text box below the 'Set ID' button says '2. Click Set ID to complete.'

Serial Number	ID	Stat
0751850007W0	5	OK
0751850008W0	2	OK
07518500014W0	3	OK
0751850000W0	4	OK
0751850009W0	1	OK
07518500022W0	6	OK
07518500015W0	7	OK
07518500027W0	8	OK
07518500012W0	9	OK

Figure 4-4: Steps of set ID

The figure shows a screenshot of the Delta Auto ID Tool with a warning icon (a yellow triangle with an exclamation mark) at the top left. The interface is the same as in Figure 4-4, but the 'Set ID' button is highlighted. A dialog box is open with the text 'There is the overlapping ID setting ! Please check your ID Number!' and a 'YES' button. The table in the background shows the same data as in Figure 4-4, but the ID '5' is highlighted in red in two rows (the first and the fifth), indicating a duplicate ID.

The wrong ID setting of overlapping.

Serial Number	ID	Stat
0751850007W0	5	OK
0751850008W0	2	OK
07518500014W0	3	OK
0751850000W0	4	OK
0751850009W0	5	OK
07518500022W0	6	OK
07518500015W0	7	OK
07518500027W0	8	OK
07518500012W0	9	OK

Figure 4-5: False of set ID

4.2.3 Set Country

Set country by the AUTO ID.

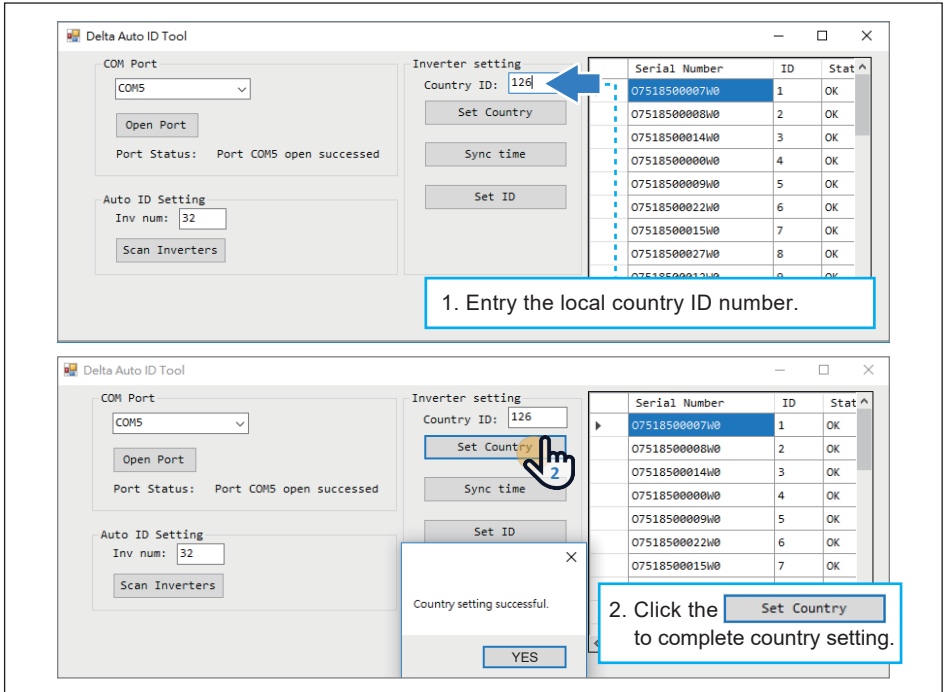


Figure 4-6: Steps of set country



Enter as a country that does not exist.

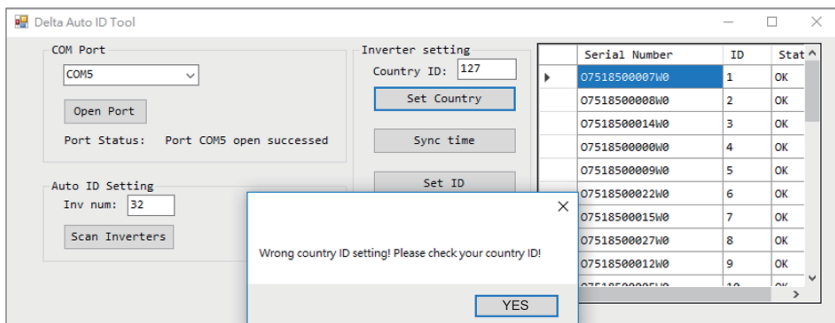


Figure 4-7: False of set country

4.2.4 Synchronize time

Synchronize time by Auto ID tool.

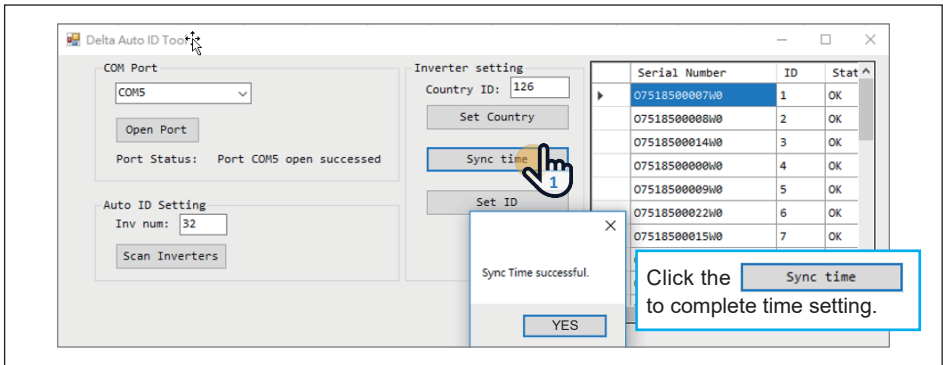


Figure 4-8: Steps of synchronize time

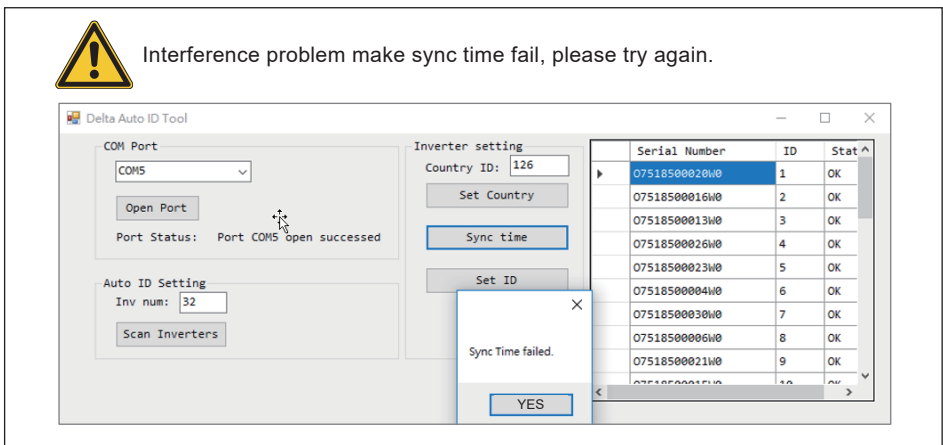


Figure 4-9: False of synchronize time

4.3 Delta Function Setting

Delta offers two setting tools:

DSS (Delta Solar System Software) and APP (MyDeltaSolar)

Function	
Active power control	Q(U) control (volt-var control)
P-F control (watt-frequecy control)	Q by night(Q setting 24/7)
P(U) control (volt-watt control)	Anti-PID
Fixed cosφ	Dry contact
Fixed Q(%)	Pro EL mode

Please go to the following link to refer to the setting method manual.

DSS Operation Manual:

https://mydeltasolar.deltaww.com/manual/eng/SUB_1G/DSS.pdf



MyDeltaSolar (APP) Operation and Installation Manual:

https://mydeltasolar.deltaww.com/?p=product_manual

- Mobile App > MyDeltaSolar(APP) Operation Manual



5 Maintenance

Please check the unit regularly. If there are any impaired or loose parts, please contact your solar installer. Ensure that there are no fallen objects in the path of the heat outlet.

WARNING !



- Please make sure AC and DC power are both off prior to any maintenance procedures to avoid risk of electric shock.
- **It is forbidden to open both doors at the same time.**

5.1 Open and Close the Door

In order to guarantee proper long-term operation of the inverter, the following procedures must be followed to open and close the door, refer to **Figure 5-1 ~ Figure 5-3**.

To fix door by hexagon driver per **Figure 5-2**.

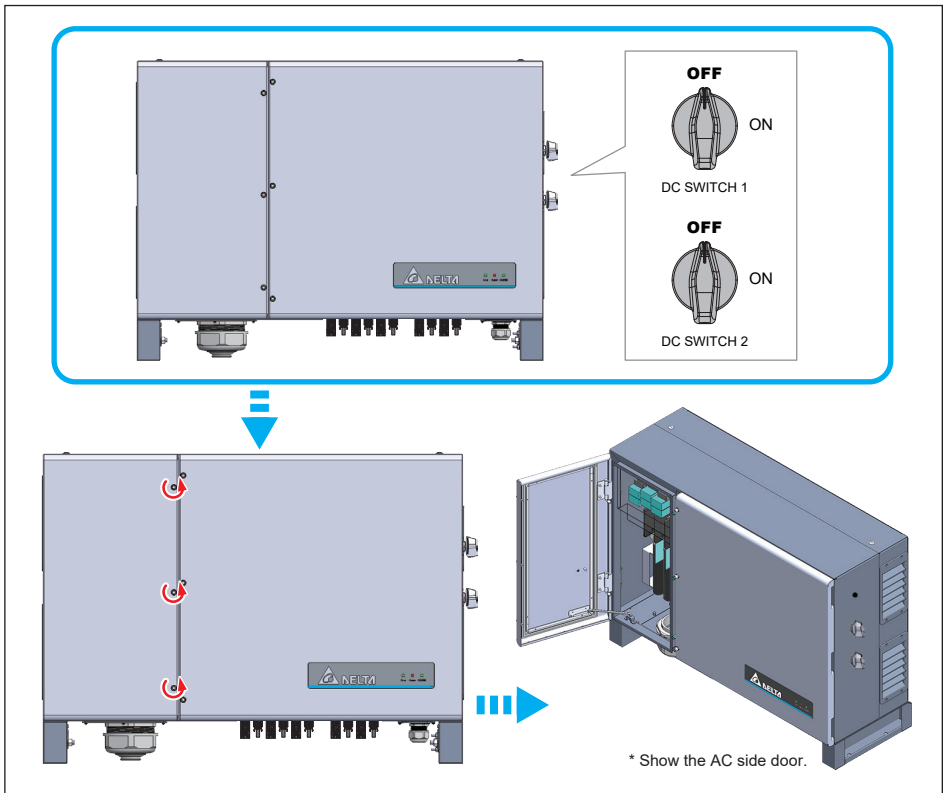
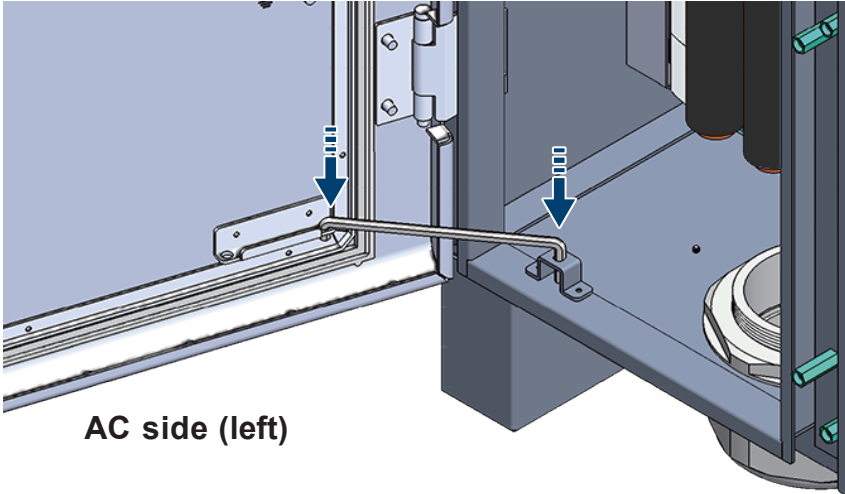
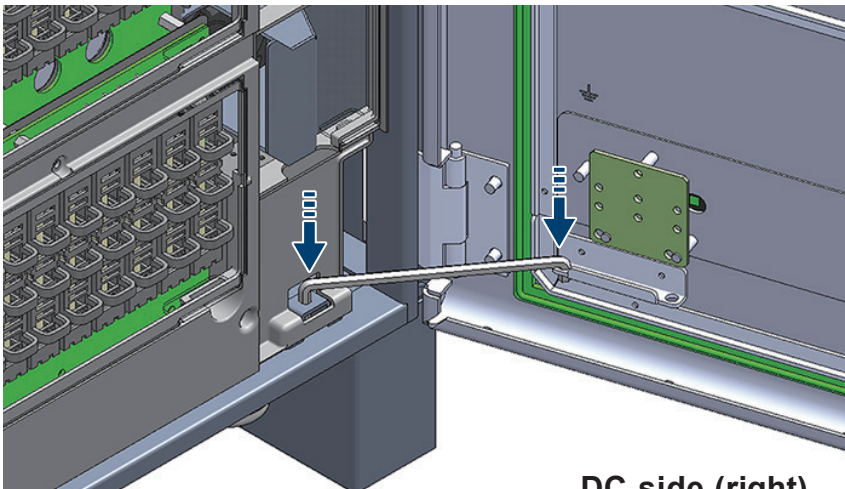


Figure 5-1: Open and close the door



AC side (left)

or



DC side (right)

ATTENTION



- After opening the door, please make sure the door is fixed by hexagon driver to avoid strong wind breaking it.

Figure 5-2: To secure door by hexagon driver

INFORMATION



- Use Hexagon Driver (Table2-1, Item5) or other proper tool to untighten door screws.
- Door screws are captive screw type. Do not disassemble door screws.
- Please follow the recommended torque to lock-on door screw with torque wrench.

5.1.1 Open the Door

- Do not attempt to open the door under raining condition.
- Switch DC power off and wait until LED display turns off.
- Loosen the 3 screws on the door and open its.
- Use care not to contaminate the door's gasket and mating surfaces.

Do not open the door for long periods of time.

5.1.2 Close the Door

Before closing the door:

1. Ensure rubber sealant and mating surface are clean and in good condition.
2. The rubber sealant has to be properly mounted on the enclosure.

When closing the door:

Tighten the door screws to $4.4\text{N} \cdot \text{m}$ of torque with torque wrench.

After closing the door:

Make sure the screws are locked securely. See **Figure 5-3**.

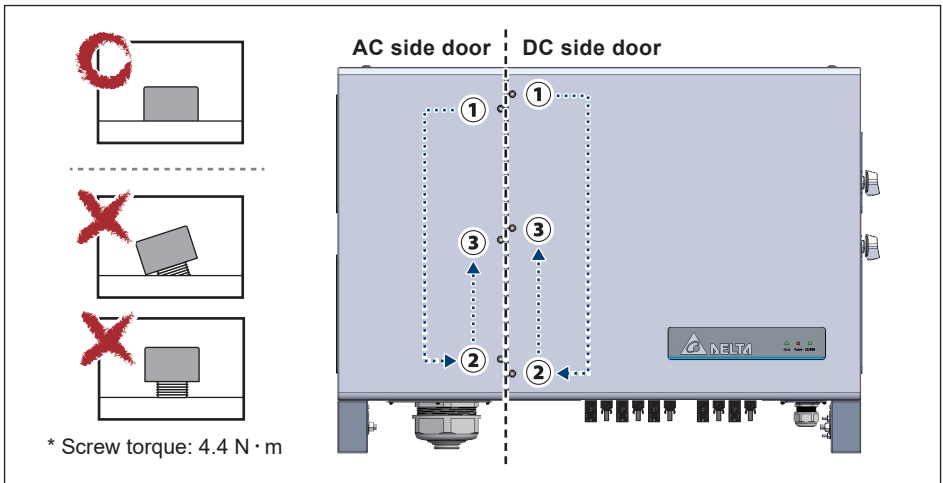


Figure 5-3: Closing process for the door

5.2 Replacement of Surge Protection Devices (SPD)

M125HV_111 have the surge protection device (SPD) at both AC and DC side as shown in **Figure 5-4**. **Table 5-1** summarizes the specifications of AC and DC SPD.

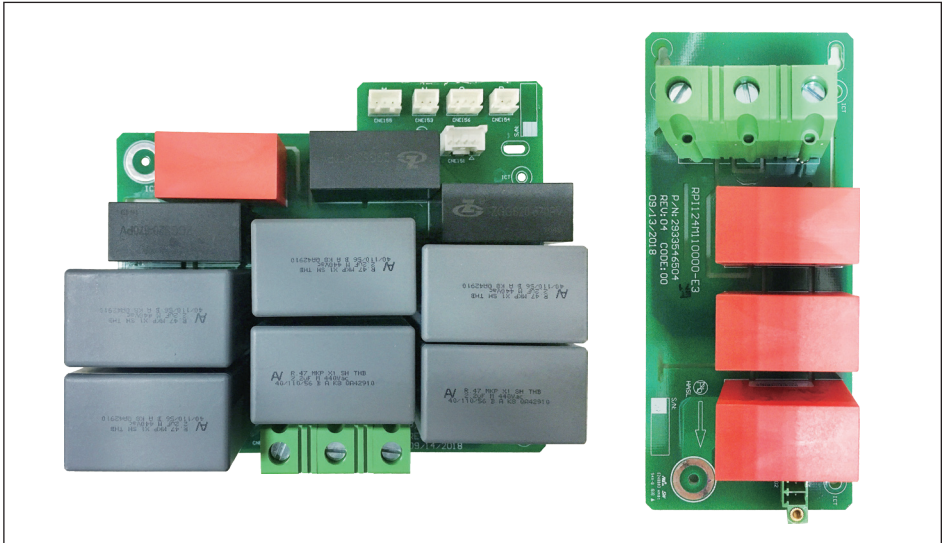


Figure 5-4: AC and DC SPD modules

Table 5-1: SPD Specifications

Description		Value
Working voltage:	AC Module	1190VRMS
	DC Module	1800VDC
Working Current (8/20us)		10kA
Rated Current (IMAX – 8/20us)		20kA
Operating Ambient Temperature Range		-40°C to 85°C
Manufacturer:	Sichuan Zhongguang Lightning Protection Technologies Co., Ltd	

Surge protection devices (SPD) are designed to protect sensitive circuit elements of the inverter from damage caused by lightning and other electrical transients/surges, as such they are sacrificial components and periodically, may need replacement.

The SPDs are located in the inverter.

If a warning message “AC Surge” or “DC Surge” appears on APP and DSS, follow the procedure below to replace the SPD.

- Determine if the SPD unit is damaged. See **Figure 5-5**.

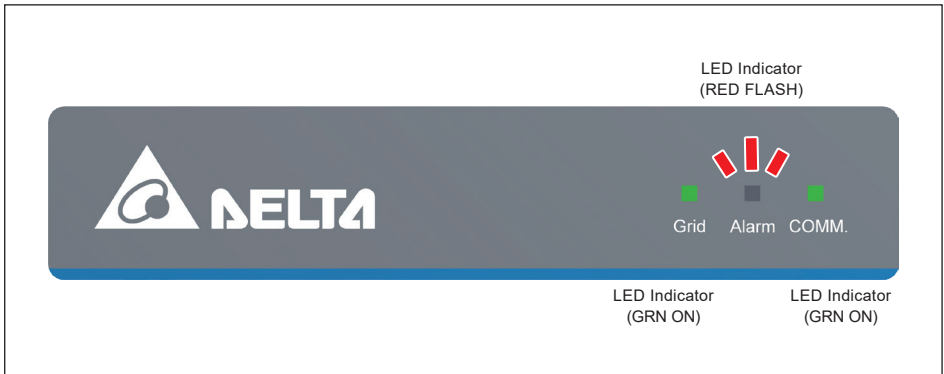


Figure 5-5: Display Indicating AC and DC SPD failure

- Accessing the door
 1. Switch DC power off and wait until LED display turns off.
 2. **To access the door, use procedure found in Section 5.1.1**
Do not leave the door opened for long periods of time.

- Changing the SPD modules - use the following procedure:
The AC and DC SPD units are located as shown in **Figure 5-6**.

- **To remove the defective AC SPD (Figure 5-7)**
 1. Disengage the 5 signal wiring connectors from the AC SPD PCB.
(4-pin x 1, 3-pin x 2, 2-pin x 2)
 2. Disengage the 3 power wirings from the AC SPD PCB.
 3. Remove two self-retaining screws located on the left (AC) side of the AC SPD PCB.
 4. Lift and remove the entire AC SPD PCB and replace with new unit.
 5. Install the new AC SPD using the above procedure in reverse order.
Tighten the five screws to a torque value shown in **Figure 5-7**.

- **To remove the defective DC SPD (Figure 5-8)**
 1. Disengage 1 signal wiring connector from the DC SPD PCB.
 2. Disengage the 2 power wirings from the DC SPD PCB.
 3. Remove two self-retaining screws located on the right (DC) side of the DC SPD PCB.
 4. Lift and remove the entire DC SPD PCB and replace with new unit.
 5. Install the new DC SPD using the above procedure in reverse order.
Tighten the five screws to a torque value shown in **Figure 5-8**.

- Closing the door
To close the door, use the procedure found in Section 5.1.2

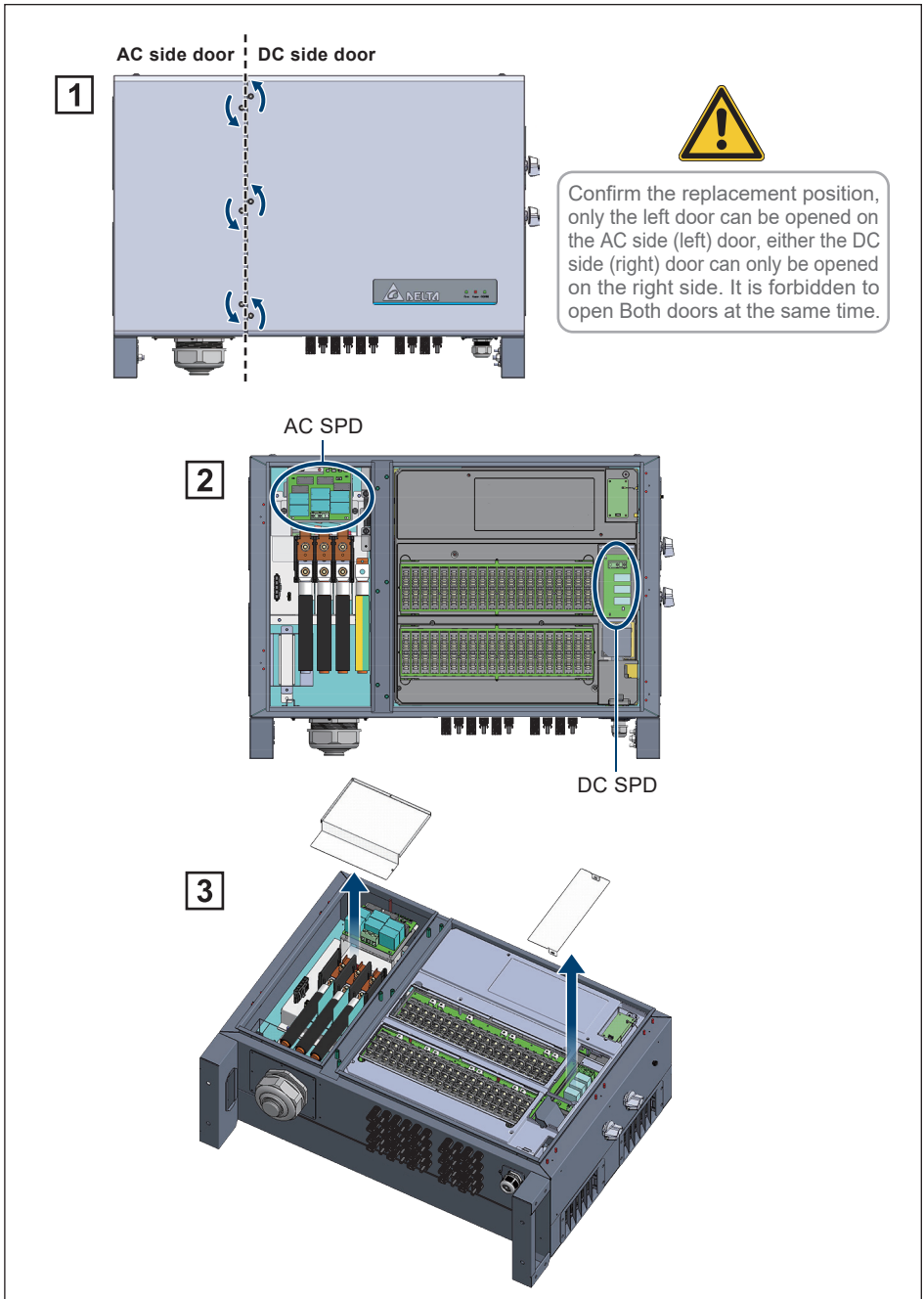
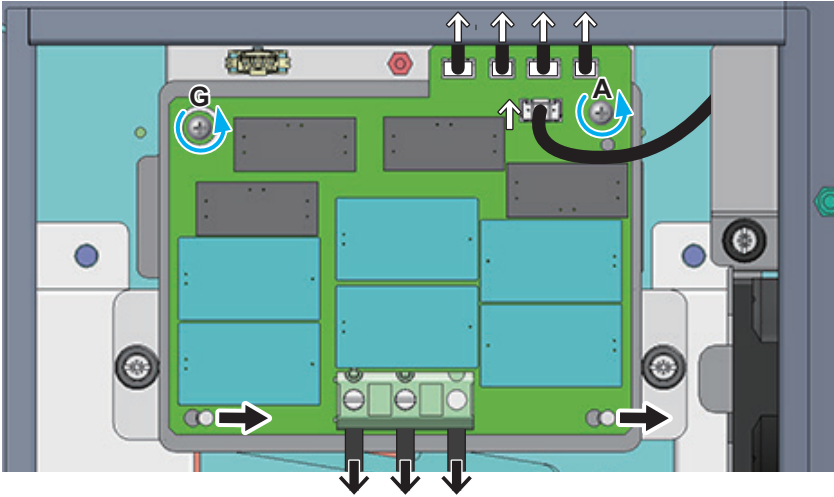
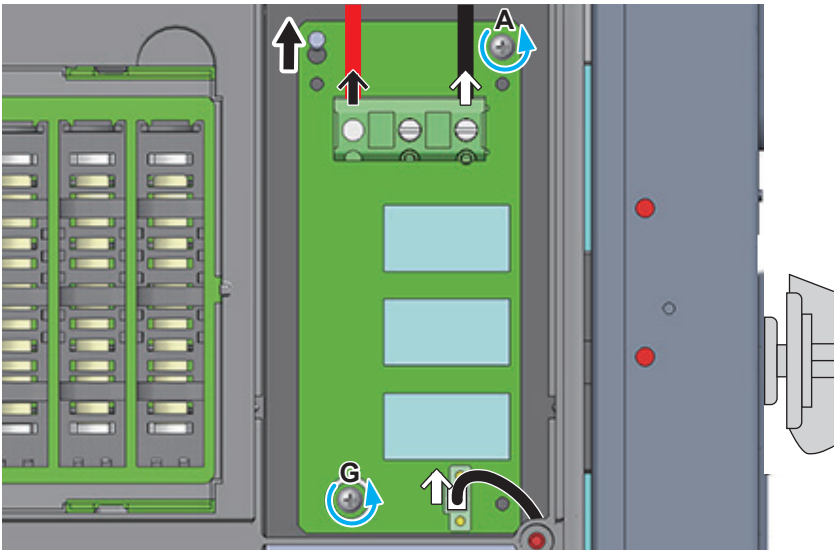


Figure 5-6: Steps of changing SPDs

AC SPDs

* A/G: Screw torque $0.8\text{N} \cdot \text{m}$ *Figure 5-7: Remove wirings as connectors of AC SPD*

DC SPDs

* A/G: Screw torque $0.8\text{N} \cdot \text{m}$ *Figure 5-8: Remove wirings as connectors of DC SPD*

5.3 Replace Internal String Fuse

M125HV_111 have independent MPPT inputs.

The combiners utilize standard 10mm x 85mm PV combiner fuses and associated fuse holders. Because of the TL design, all strings are floating with respect to ground, and two fuses are required per string input connected in series with the positive and negative string leads.

Any 10mm x 85mm listed PV fuse (15A / 20A) can be used for replacement purposes. The standard built in M125HV_111 is 20A Fuse.

The specifications for the required fuse and fuse brands used in the factory are listed below.

Table 5-2: Combiner Fuse Specification

Rated current	20 A	IEC listed	IEC 60269-6
Rated voltage	1500 V	Typical Mfr	Littelfuse
Operating Class	Solar PV	Mfr P/N	SPXV 20
Fuse Type	10x85 ferrule		

CAUTION – Shock/Fire hazard



Before removing the fuses, please turn off DC switch and make sure the inverter has stopped working, then remove the corresponding UTX connector.

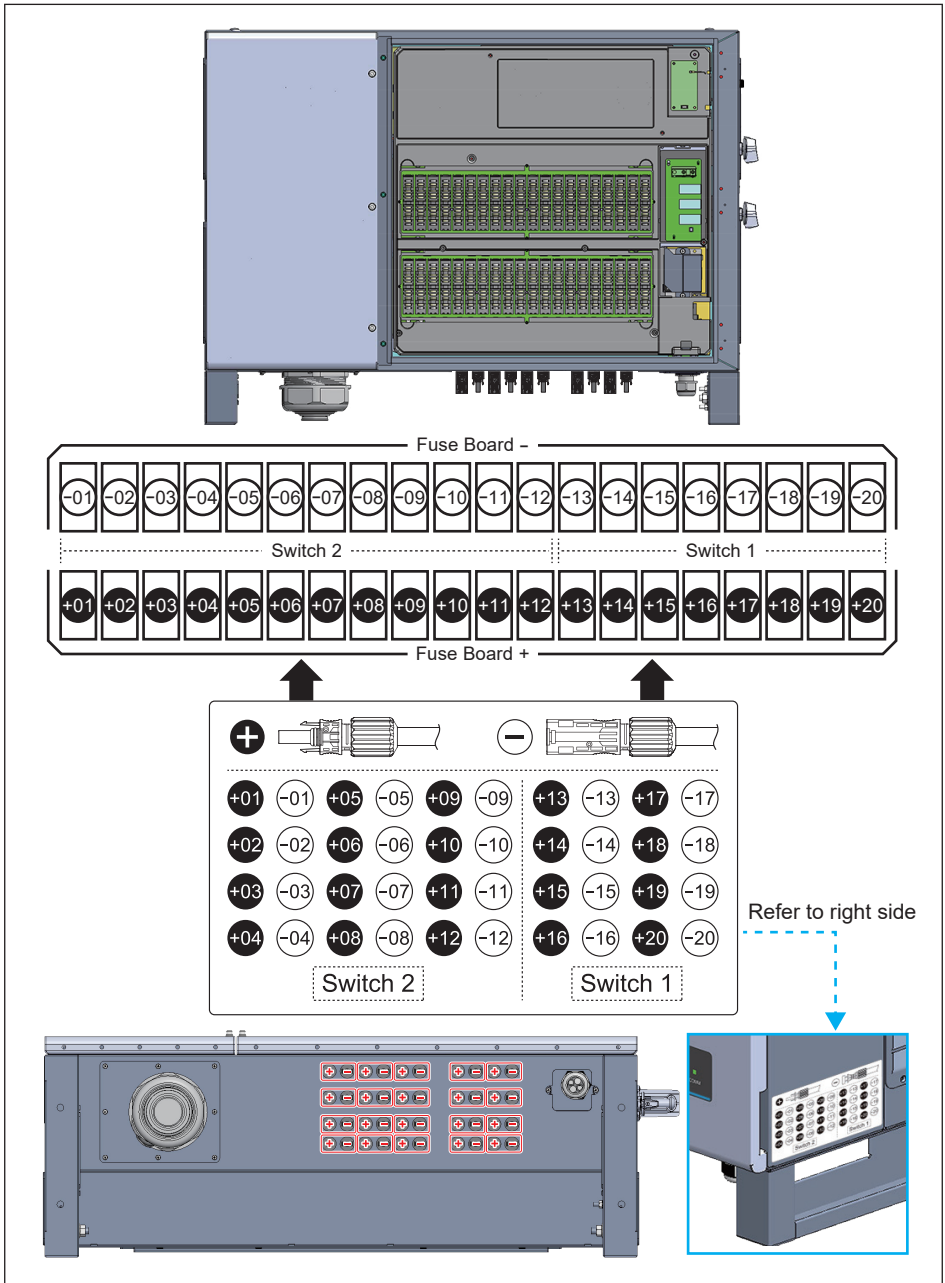


Figure 5-9: Layout of fuse board and location of UTX connectors

M125HV_111 is equipped with 40 combiner fuses in “pull-out fuse holders, which support connection of up to 20 strings. The fuse holders are mounted on two PWBs. The pull-out fuse holders allow safe removal of fuses which are inserted into a carrier.

Figure 5-10 shows the location of the combiner fuse holders and shield cover, and **Figure 5-11** provides details to remove a fuse; refer to **Figure 2-5** for additional information.

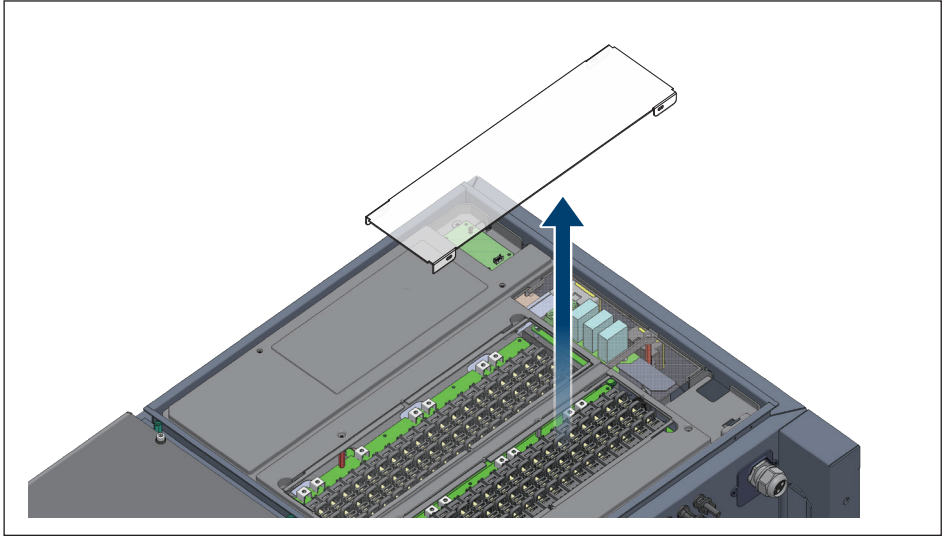


Figure 5-10: Fuse holder locations

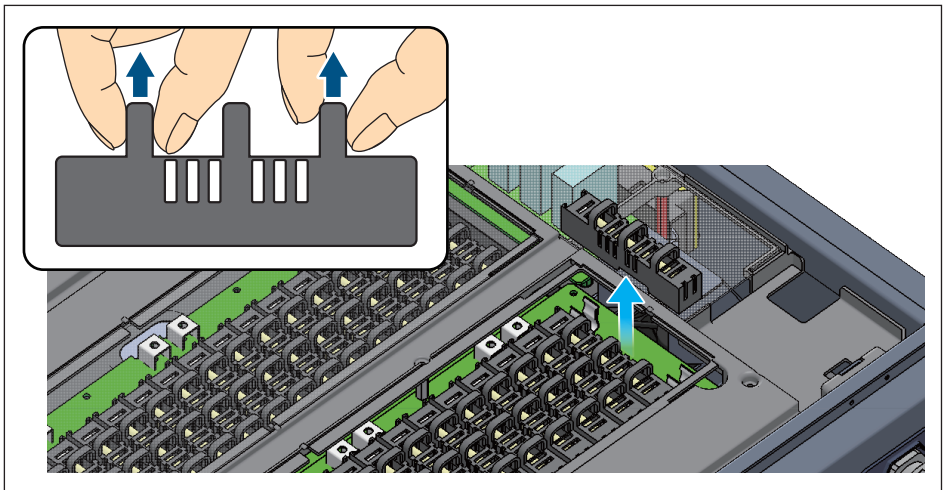


Figure 5-11: Accessing the individual fuses

- ① Open the lid of the fuse holder.
 - ② Tilt the fuse holder slightly to take out the fuse.
- * Please be careful not to drop the fuse at this time.

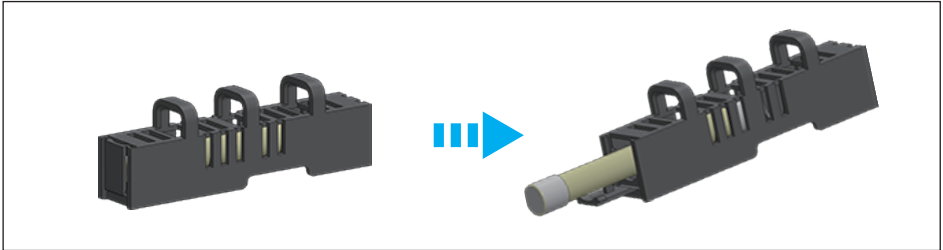


Figure 5-12: Replace the fuse

Check the combiner fuses if the power generation of inverter is abnormal using the following procedure:

1. Check to determine if any string current measurement is zero, which will most probably indicate a blown fuse.
2. AC and DC power off and wait until LED display turns off.
3. **To access the DC side (right) door, use procedure found in Section 5.1.1**
4. Based on step 1, check the corresponding fuse locations by pulling out the fuse holder (**Figure 5-11**) and checking continuity of the fuse.
5. Replace the fuse if necessary.
6. **Closing the DC side (right) door, using the procedure found in Section 5.1.2**

5.4 Smart Fans Replacement and Filter Cleaning

M125HV_111 is provisioned with processor-controlled "smart fans" for cooling of the electronics. This section provides procedures for cleaning filters associated with these fans, and instructions for field replacement of the fans.

The fans utilized have high reliability ratings and coupled with use of processor controls provide a "smart" cooling system design with a long life. The system features tachometer detection of a failed fan, and generates a "FAN-FAIL" signal that is interfaced to the inverter control to trigger a FAN-FAIL alarm and places the inverter in a power de-rate mode as required for safe operation.

Depending upon the model, fans are installed at two locations within inverter:

- Power Module (PM) compartment
- Inside the inverter compartment

Figures 5-15 illustrates the PM fan locations.

Figures 5-16, 5-17, 5-18, 5-19 illustrates the internal fan 1 locations.

Figures 5-20, 5-21, 5-22, 5-23 illustrates the internal fan 2 locations.

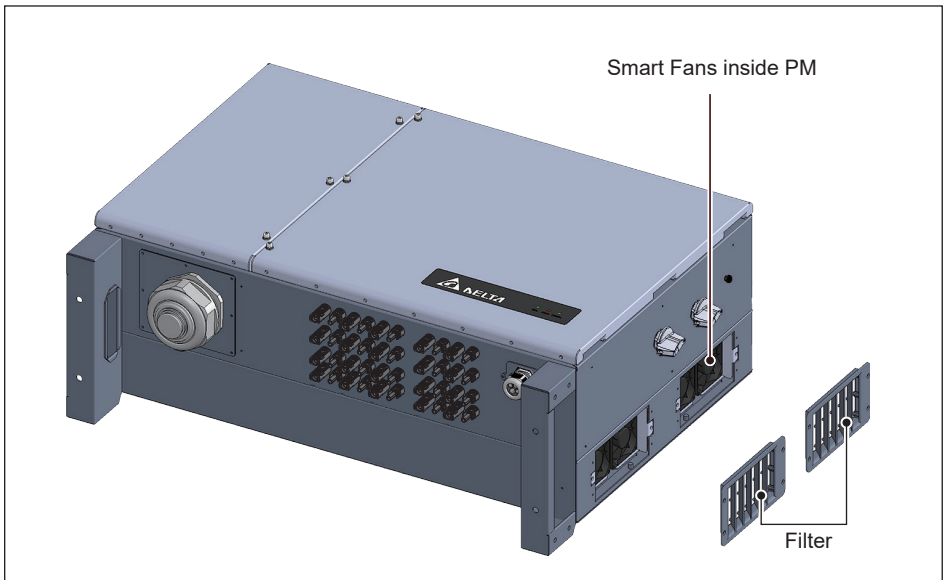


Figure 5-13: Smart Fans location on Power Module chassis

ATTENTION



Periodic fan and filter cleaning is required to insure long life and reliability.

- The time period between cleanings depends on the quality of the environment.
- Under normal duty use, Delta recommends smart fans and filters be cleaned every 4 months
- For very dusty locations, it may be necessary to clean the fans and filters quarterly or monthly.

The cooling fans feature modular designs that make their removal for cleaning or replacement a simple task. As a result, the replacement of fans is also smart.

DANGER : ELECTRICAL HAZARD!!



- Prior to beginning any maintenance procedures outside AC breaker and DC switch off to avoid risk of electrical shock!

5.4.1 Location of failure fan

If the Error-code comes "W11-Fan Fail", please refer to the corresponding code shown on DSS and procedure in following chapters to remove the fan.

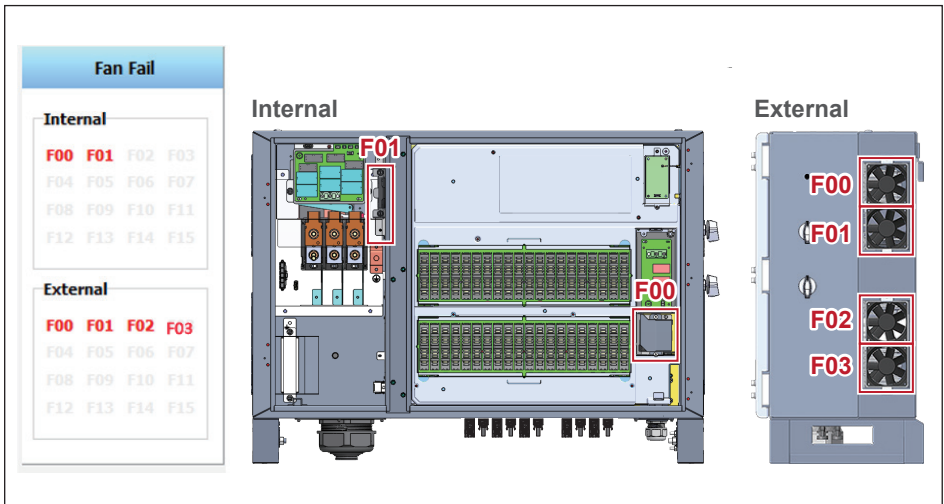


Figure 5-14: The corresponding fan location to the fan fail code on DSS

5.4.2 Power Module (PM) Fan Tray

The inverter electronics are convection cooled. The primary equipment used for this function consists of a fan tray located in a plenum within the inverter. The PM electronics are isolated, and heat is transferred to the plenum airflow via a large heatsink.

The PM fan tray is modular and holds four smart fans that operate together and also provide redundancy; the inverter will operate to full power with four fans operating and will enter a power derating mode under failure of any fan. These fans are protected by air filters at the plenum air inlet and outlet.

The order of fan is shown in **Figure 5-14**.

Follow the warning "FXX" to replace the fan which was broken.

Refer to **Figure 5-15** and follow the steps outlined below:

1. Remove four screws that secure inlet filter cover to case.
Check filter condition on this step and clean it if necessary.
For fan maintenance, continue to do following steps.
2. On the right side, remove two screws for each fan tray.
3. On the right side, unplug fan power connectors for each fan.
(To release snap-fit, press location A and location B from both side .)
4. Pull fan tray out from PM chassis.
To disassemble fan , remove four screws that secure it to fan tray.

To reassemble reverse the order of the above procedure and tighten screws to torque values indicated in **Figure 5-15**.

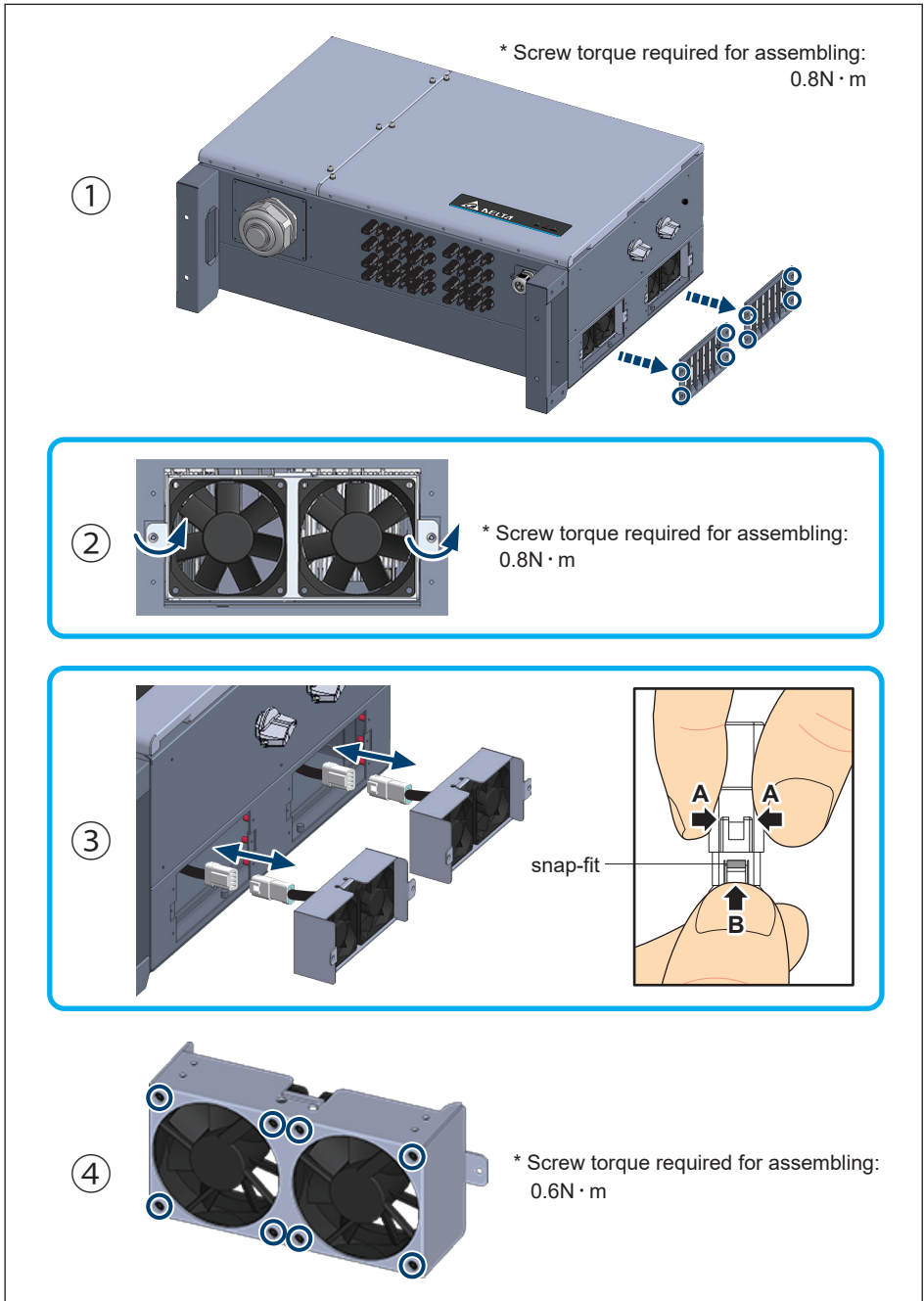


Figure 5-15: Disassembling fan tray from PM chassis

5.4.3 Internal Fan 1

When used, the DC side (right) compartment is provisioned with a single fan module. (See **Figure 5-16, 5-17, 5-18, 5-19**)

If the warning "**Fan Fail- Internal F00**" show on the DSS / APP, please follow the procedure below to remove Internal Fan 1.

- (1) Remove the shield cover.
- (2) Loosen two screws shown in **Figure 5-17** and remove the fan cabinet.
- (3) Disconnect the power connector.
- (4) Lift the entire fan assembly from the DC side (right) compartment. (shown in **Figure 5-18**)
- (5) Clean assembly or replace with a new fan. (shown in **Figure 5-19**)
- (6) Reassemble using a tightening torque of 7 lbf-in.

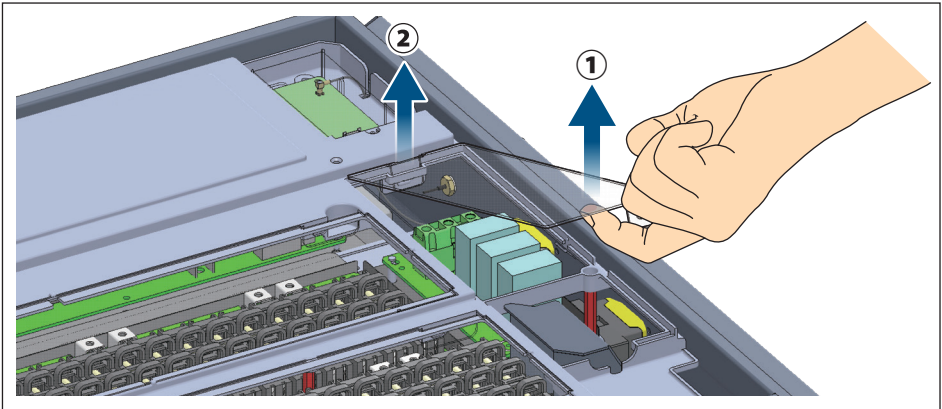


Figure 5-16: Remove the internal fan 1 shield cover

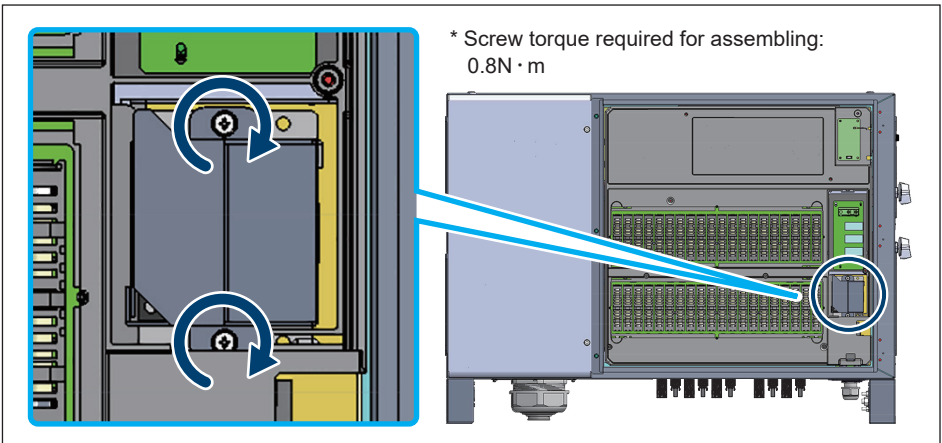


Figure 5-17: Internal fan 1 location

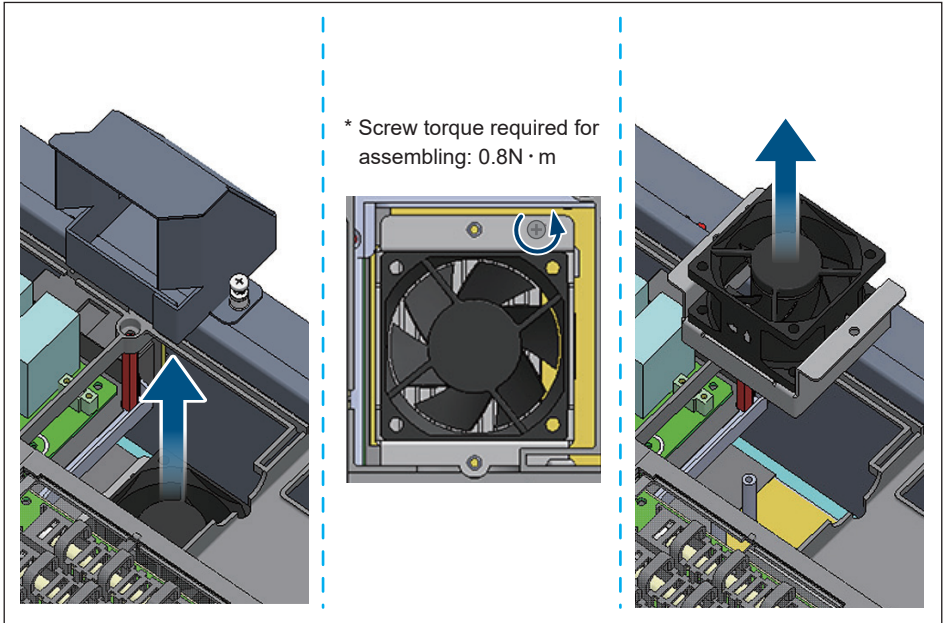


Figure 5-18: Take off the internal fan 1

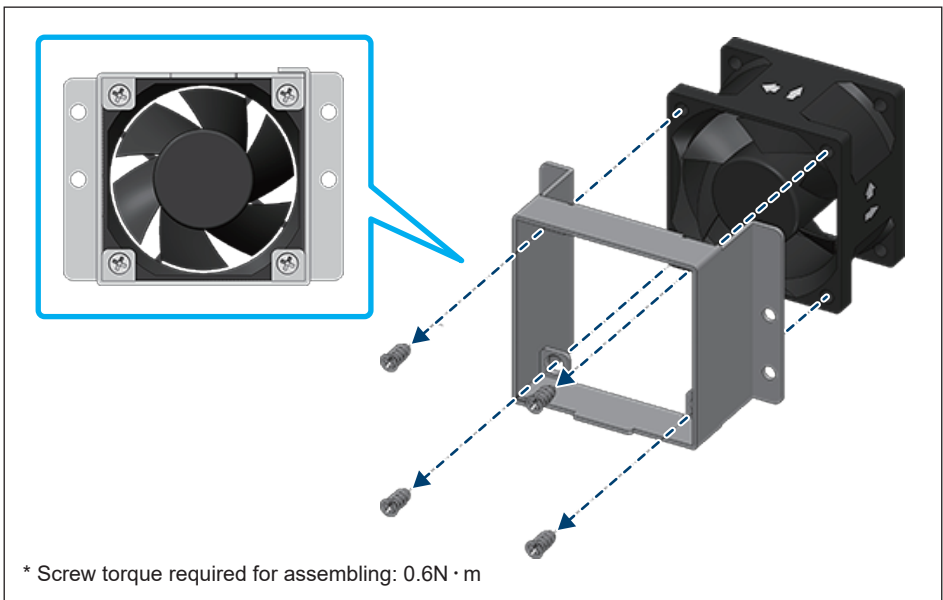


Figure 5-19: Replace with a new fan

5.4.4 Internal Fan 2

When used, the AC side compartment is provisioned with a single fan module.
(See **Figure 5-20, 5-21, 5-22, 5-23**)

If the warning "**Fan Fail- Internal F01**" show on the DSS / APP, please follow the procedure below to remove Internal Fan 2.

- (1) Remove the shield cover. (shown in **Figure 5-20**)
- (2) Remove the two screws shown in **Figure 5-21**.
- (3) Disconnect the fan power connector.
- (4) Lift the entire fan assembly from the left compartment. (shown in **Figure 5-22**)
- (5) Clean assembly or replace with a new fan. (shown in **Figure 5-23**)
- (6) Reassemble using a tightening torque of 17.7 lbf-in.

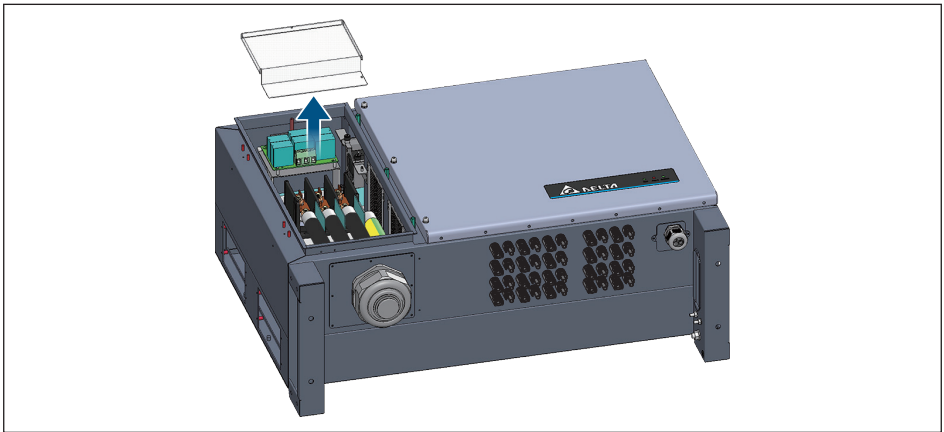


Figure 5-20: Remove the internal fan 2 shield cover

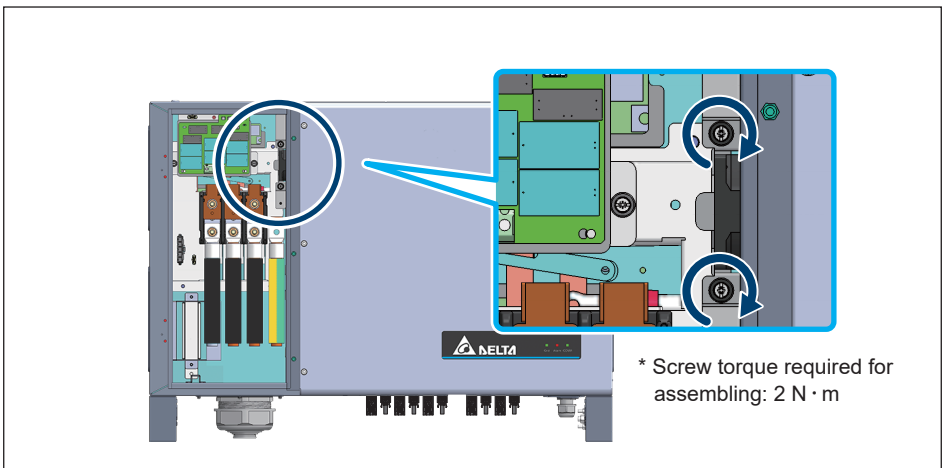


Figure 5-21: Internal Fan 2 location

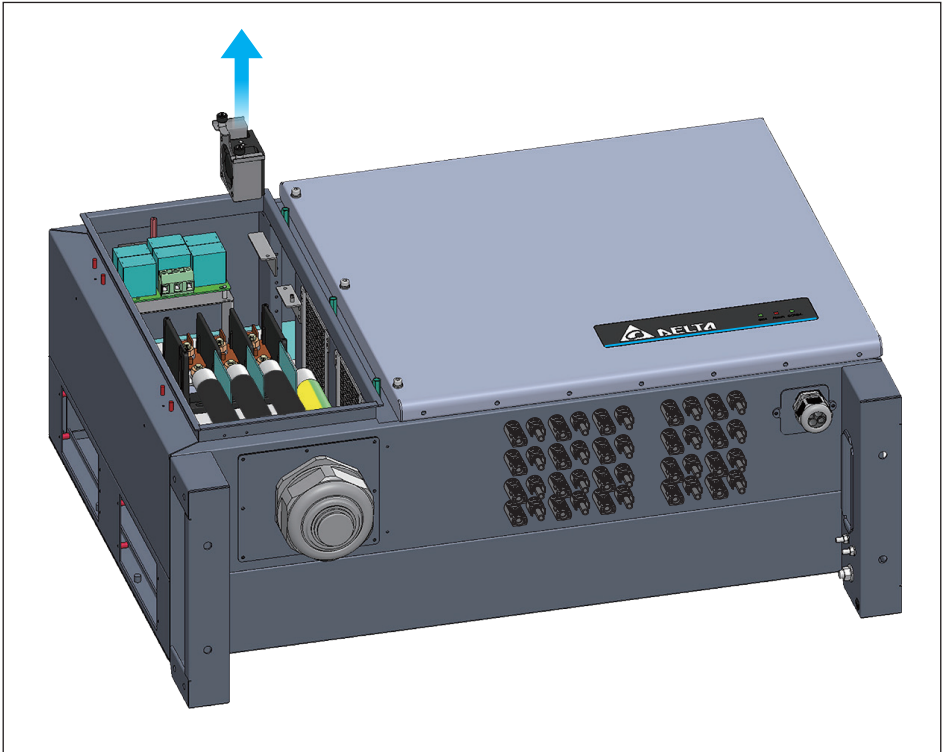


Figure 5-22: Take off the internal Fan 2

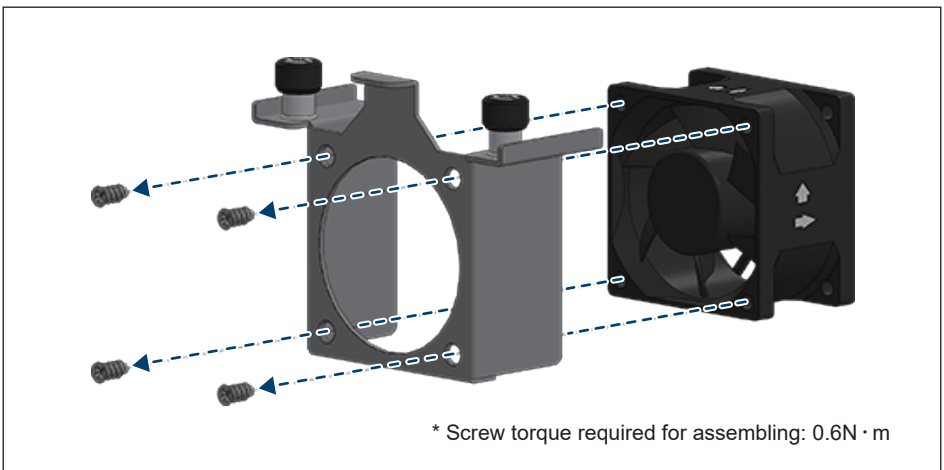


Figure 5-23: Replace with a new fan

5.5 De-Commissioning

When necessary to remove the inverter from active operation for maintenance or replacement, follow the instructions below.

DANGER : ELECTRICAL HAZARD!!



To avoid serious injury, use following procedures.

- Switch off external AC circuit breaker or switch to disconnect the electrical grid from the inverter chassis.
- Switch off both DC switches to cease inverter operation.
- Use H4 wrench tool to disconnect each string from the chassis mounted H4 terminals. Remove array DC from chassis requires opening string level H4 connectors in order to break string continuity at the inverter H4 connectors are not intended for use as a load break switch, therefore:

Ensure inverter DC switches are open and there is no DC current flow.

■ RS-485 Communication module

1. Disconnect all communications wiring from the module terminals.
2. Remove wiring from communications board assembly.

CAUTION : HOT SURFACES, DO NOT TOUCH !

- Use care not to touch hot surfaces if the inverter is just shutting down.
- Do not perform any task until the product cool down sufficiently.

CAUTION : POSSIBLE INJURY !

The inverter weighs 80 kg.

There is risk of injury if the inverter is carried incorrectly or dropped during transport or when attaching or removing it from the wall mounting bracket. Personnel should wear suitable gloves to protect against injury and maintain firm control of the inverter chassis.

ATTENTION

Do not leave loosen screws and nuts inside the case.

6 Error Message and Trouble Shooting

While Delta Electronics endeavors to build electronic products to very high standards of reliability, there will arise instances where the inverter may not operate properly. When such a condition is encountered, please follow the instructions in the Troubleshooting Guide (**Tables 6-1, 6-2, and 6-3**) to attempt to clear the fault. If it can't solve the problem, please contact customer service for technical support.

6.1 Error Codes (Field Fault)

Table 6-1A: Error Codes (Field Fault) & Messages		
Message	Description	Action
AC Freq High (E01)	Grid frequency high	1. Check the utility frequency 2. Check Grid code & Grid setting
AC Freq Low (E02)	Grid frequency low	
Island (E03,E04,E05)	Islanding is detected	Check Grid breaker
AC phase jump (E06)	Phase jump of Grid voltage	If repeated occurrence, contact customer service for technical support
Grid Quality (E07)	Non-linear load in Grid and near to inverter	<i>If repeated occurrence, contact customer service for technical support</i>
AC phase abnormal (E08)	Wrong connection in AC terminal	Check the AC connection in accordance with the user manual
No Grid (E09)	1. AC breaker is OFF 2. Disconnect in AC terminal	1. Check switch or AC breaker turn on 2. Check the connection in AC terminal and make sure it connects to inverter
AC Volt Low (E10)	Grid voltage low	1. Check the utility voltage within the suitable range 2. Check Grid code & Grid setting 3. Check the connection in AC terminal
AC Volt High (E11)	Grid voltage high	
EPO (E25)	EPO is operated by user	Release the EPO button
DC Voltage High (E30)	Input voltage is over 1500Vdc	Modify the solar array setting, and make the Voc less than 1500Vdc
Insulation Fault (E34)	Insulation problem of PV array to ground	1. Check if panel enclosure ground completely 2. Check if inverter ground completely 3. Check if the DC breakers get wet
Remote OFF (E36)	Remote OFF by extern communication	Check if remote OFF function is active

6.2 Fault Codes (Inverter Fault)

Table 6-2A: Fault Codes (inverter fault) & Messages

Message	Description	Action
DC Injection (F01, F02, F03, F04)	Utility waveform is abnormal	Contact customer service for technical support
Temperature High (F05)	One of inner ambient NTC and inverter module NTCs is over high temperature limit	Check the installation ambient and environment
Amb Temp Fault (F06)	The ambient NTC temperature >105 °C or <-40 °C	Contact customer service for technical support
Temperature Low (F07)	One of inner ambient NTC and inverter module NTCs is under low temperature limit.	Check the installation ambient and environment
Inverter Temp Fault (F10)	The inverter NTC temperature >125 °C or <-40 °C	Contact customer service for technical support
AC RLY Fault (F13)	Grid relay open	Contact customer service for technical support
FW Unmatch (F14)	Firmware Incompatibility	Contact customer service for technical support
AC Sensor Fault (F15)	DSP Iac or Vac sensor circuit defective	1. Check the polarity of PV connection (if the error code comes along with W08) 2. Contact customer service for technical support
AC Sensor Fault (F18)	Red Vac sensor circuit defective	Contact customer service for technical support
AC Sensor Fault (F19)	Red Idc sensor circuit defective	Contact customer service for technical support
Red COMM Fault (F22)	The internal communication connection is disconnected	Contact customer service for technical support
DSP COMM Fault (F23)	The communication connection is disconnected	Check the connection interface RS-485
Ground Cur. High (F24)	Insulation problem of PV array to ground	1. Check the insulation of Solar inputs 2. Check the capacitance (+ <-> GND & - <-> GND), must < 10uF. Install external transformer if necessary

Table 6-2B: Fault Codes (inverter fault) & Messages		
Message	Description	Action
Iac Unbalance (F26)	1. Power line is disconnected inside the inverter 2. Current feedback circuit is defective	Check the connection in AC terminal
RCMU Fault (F27)	RCMU circuit is disconnected	Contact customer service for technical support
AC RLY Short (F28)	Grid relay short	Check the connection and Grid voltage in AC terminal
AC RLY Open (F29)	Grid relay open	Contact customer service for technical support
Bus Unbalance (F30)	Voltage unbalance of DC link	Restart inverter by DC switches
Bus Voltage High (F31, F32, F33, F34, F35)	Voc of PV array is over 1500Vdc	Restart inverter by DC switches
AC Current High (F36, F37, F38, F39, F40, F41)	Surge occurs during operation	Contact customer service for technical support
AC CT Fault (F42)	Phase R CT is defective	Contact customer service for technical support
AC CT Fault (F43)	Phase S CT is defective	Contact customer service for technical support
AC CT Fault (F44)	Phase T CT is defective	Contact customer service for technical support
AC Current High (F45)	AC current over range	Restart the inverter by DC switches
ZC Circuit Fault (F50)	The zero crossing circuit defective	Contact customer service for technical support
Inv Circuit Fault (F51)	The inverter circuit defective	Contact customer service for technical support
Arc circuit fail (F58)	Arc circuit fail	Contact customer service for technical support
Arc fault (F59)	Arc fault	1. Check If any damage of DC connector and DC wire 2. Contact customer service for technical support
DC Current High (F60, F70)	DC current over range	Restart inverter by DC switches
Ext COMM. Fault (F74)	The external communication connection is disconnected	1. Check the connection between external unit and COMM 2. Contact customer service for technical support

6.3 Warning Codes (Field Warning)

Table 6-3A: Warning Codes (Field warning) & Messages

Message	Description	Action
De-rating (W07)	<ol style="list-style-type: none"> Over temperature Power Limit function Power vs. Frequency function P(V) function Grid Voltage low Solar Voltage low Solar Voltage High Ramp up function 	<ol style="list-style-type: none"> Check the installation ambient and environment Check Grid Code & Grid setting Check the utility frequency on the inverter terminal Check the utility voltage on the inverter terminal 5-1. Check the utility voltage on the inverter terminal 5-2. Check reactive power setting 6. Check the Solar voltage on the inverter terminal 7. Check the Solar voltage on the inverter terminal 8. Check Ramp up setting
String fault (W08)	<ol style="list-style-type: none"> DC Connectors polar is incorrect String current monitoring function is failure 	<ol style="list-style-type: none"> Check the polarity of PV connection Restart DC switch and AC breaker Contact customer service for technical support

6.4 Warning Codes (Inverter Warning)

Table 6-4A: Warning Codes (inverter warning) & Messages

Message	Description	Action
Fan Fail (W11)	<ol style="list-style-type: none"> One or more fans are locked One or more fans are defective One ore more fans are disconnected 	<p>Ext Fan Fail</p> <ol style="list-style-type: none"> Remove the object that stuck in the fan(s) Check the connections of all fans Replace the defective fan(s) <hr style="border-top: 1px dashed black;"/> <p>Int Fan Fail Contact customer service for technical support</p>
DC SPD Fault (W17) AC SPD Fault (W18)	<ol style="list-style-type: none"> One or more SPD are defective One or more SPD are disconnected 	<ol style="list-style-type: none"> Replace the defective SPD Check the connections of SPDs
Aux Power Fault (W19)	The Aux-Power defective	Contact customer service for technical support
String COMM Fault (W22)	String monitor communication fail	Contact customer service for technical support
String Current Low (W23)	Disconnect in DC connectors	<ol style="list-style-type: none"> Check String Connector and Fuse Contact customer service for technical support

7 Technical Information

7.1 Technical of M125HV_111

Table 7-1A: Specifications	
Model	M125HV_111
DC Input	
Occasionally Max. voltage	1600V *1
Operating voltage range	860 – 1500V
MPP voltage range	860 – 1350V *2
Rated voltage	1050V
MPP tracker	1
Max. operating current	150A
Max. allowable array Isc	320A
String fuse provisioned	20A/1500V PV fuses
Connection	20 pairs of H4 series connectors *3
Surge protection	Type II SPD (option type I, type I+II)
DC switch	YES
String current monitoring	YES
AC Output	
Rated output power	125kW / 125kVA
Max. output power	125kW / 140kVA
Max. output current	135A
Max. inrush current	300A, 100μs
Max. output fault current (rms)	160A
Max. output overcurrent protection	175A
Rated voltage	3P/PE, 600Vac
Operating voltage range	Vac600V: -36% ~ +15%
Operating frequency range	50/60Hz ±5Hz
Power factor	0.8 ind ~ 0.8 cap adjustable (1~0.9 at maximum power)
Surge protection	Type II SPD (option type I, type I+II)
T.H.D	<3%
Connection	Ring terminal lug with Terminal block (Max. 185mm ² Cu or Al wire)
Night time consumption *4	< 3.5W

*1 The max withstand voltage is 1600Vdc. (the inverter stops to operate when the PV voltage is over 1500Vdc)

*2 Ambient < 25°C : 860~1350V : Ambient < 40°C : 860~1250V

*3 Accessories H4 Plus for field wiring, suitable size : 4 / 6 / 10(optional) mm² copper conductor

*4 Night time consumption with standby communication.

Table 7-1B: Specifications	
Model	M125HV_111
Efficiency	
Peak efficiency	>99 %
Euro efficiency	98.7 %
Information	
Communication	RS-485 (Delta / Sunspec) / SUB_1G
Indicator	LED (Grid, Alarm, COMM.)
Regulation	
	Enedis-PRO-RES_64E IEC 62109-1/-2 UTE C 15-712-1 IEC 61439-2 VDE AR-N 4110 IEC 61727 TRF_EN50549-2_2019a IEC 62116 EN 61000-6-2 IEC 62910 EN 61000-6-3 IEC 62109
General Data	
Smart inverter functionality	Voltage/Frequency Ride through, Volt/Var, Volt/Watt, Power curtailment, Frequency/Watt
Max. inverter backfeed current to the array	0A
Pollution degree	3
Overvoltage category	AC output :III, DC Input :II
Protective class	I
AC connection type	Ring terminal lug with Terminal block (Max. 185mm ² Cu or Al wire)
Operating temp. range	-30°~60°C (>50°C de-rating)
Protection level	IP65 (Electronics)
Relative humidity	0% – 100% non-condensing.
Operating elevation	<3000m, Outdoor, wet locations
Cooling	Forced air cooling with Smart Fan control
Noise	71.5 dBA @1m, Amb25°C
Dimension (W x H x D, mm)	900 x 663 x 334
Weight (kg)	80

If the input voltage is higher than 1350V, the inverter may derate the output power. The relationship between the input voltage and the output power derating is shown in **Figure 7-1**.

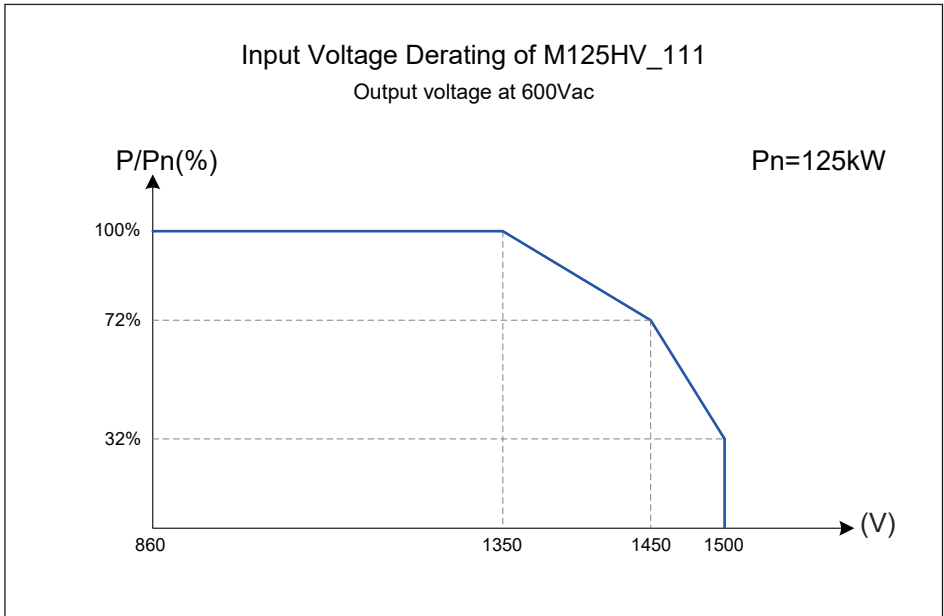


Figure 7-1: Input Voltage Derating Curve

Either power module temperature or inverter internal temperature exceeds the upper limit, the inverter will derate power until the temperature drops within the permissible range.

- Power will derate when ambient temperature is over 50°C. Derating curve is shown in **Figure 7-4**.
- Apparent power could be 110% with ambient temperature is under 40°C. Derating curve with PF=0.9 is shown in **Figure 7-5**.

The width operation input voltage with full power can fulfill high latitudes application with up to 2 times dc/ac ratio. When doing panel configuration design of the solar field, please refer to the input voltage derating curve. Input voltage derating curve with PF=1 and PF=0.9 is shown in **Figure 7-6** and **Figure 7-7**.

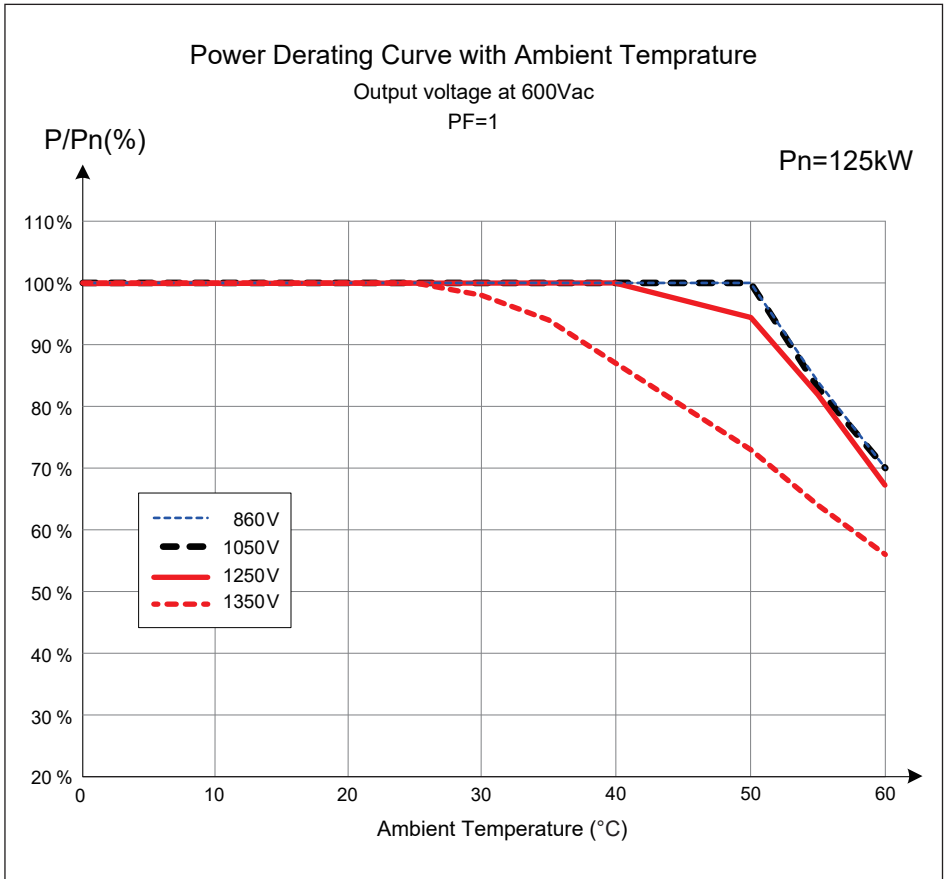


Figure 7-2: Power Derating Curve with Ambient Temperature (PF=1)

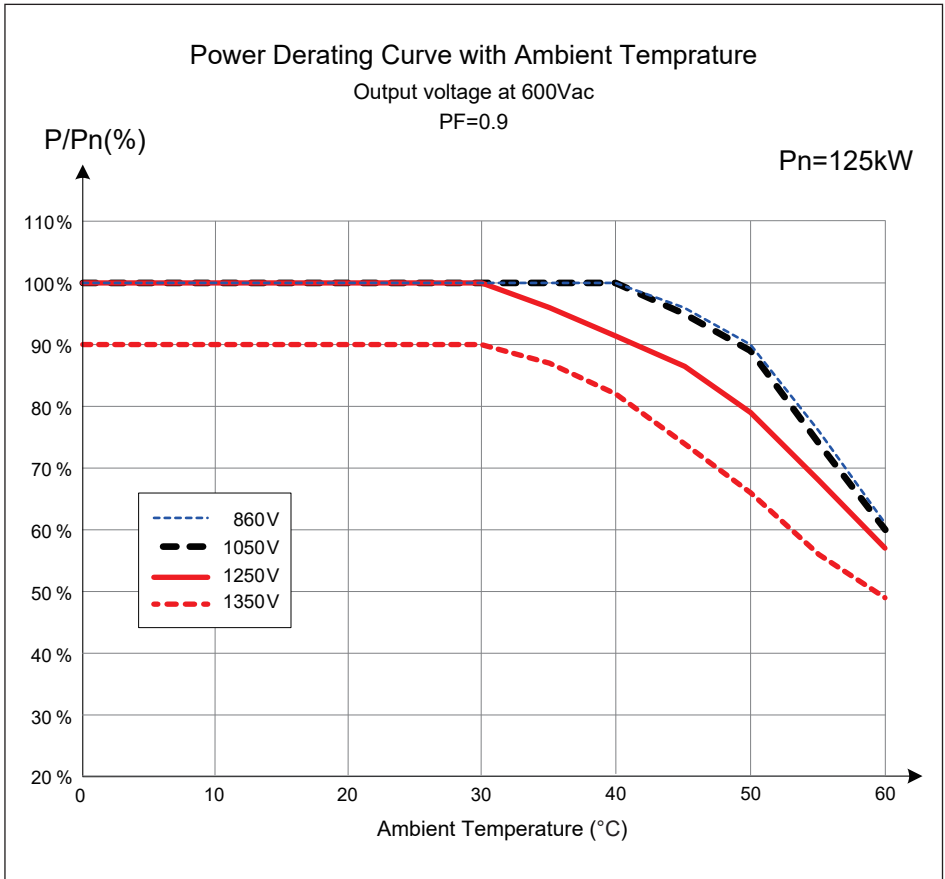


Figure 7-3: Power Derating Curve with Ambient Temperature (PF=0.9)

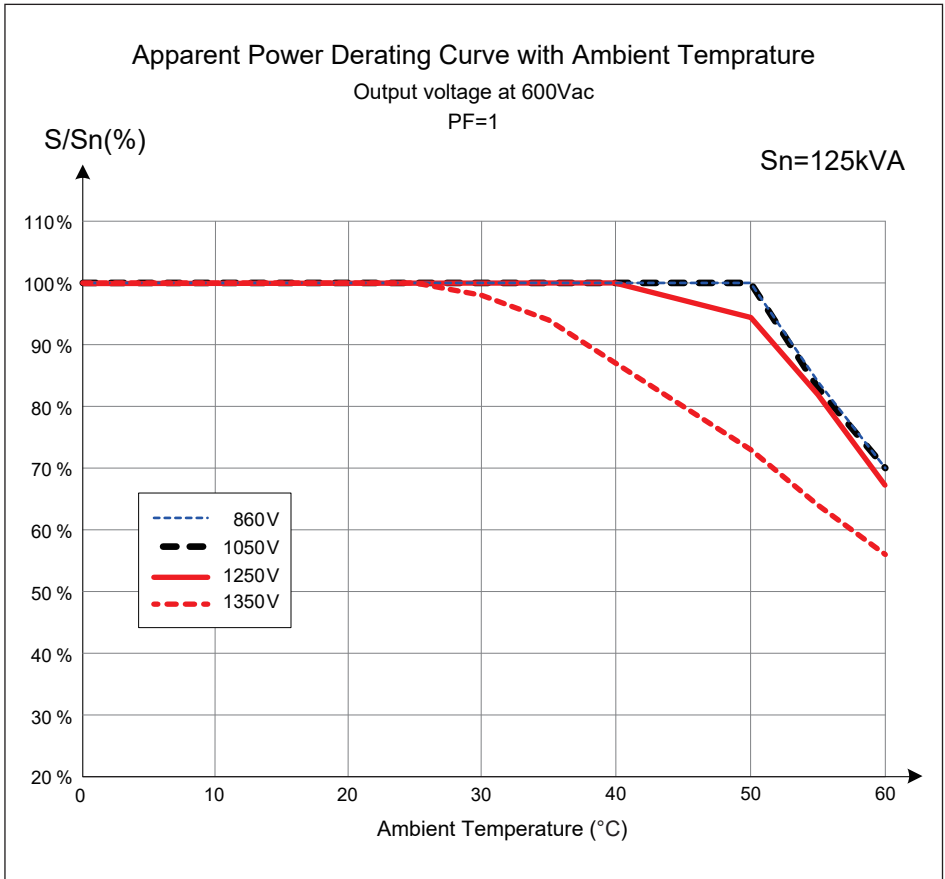


Figure 7-4: Apparent Power Derating Curve with Ambient Temperature (PF=1)

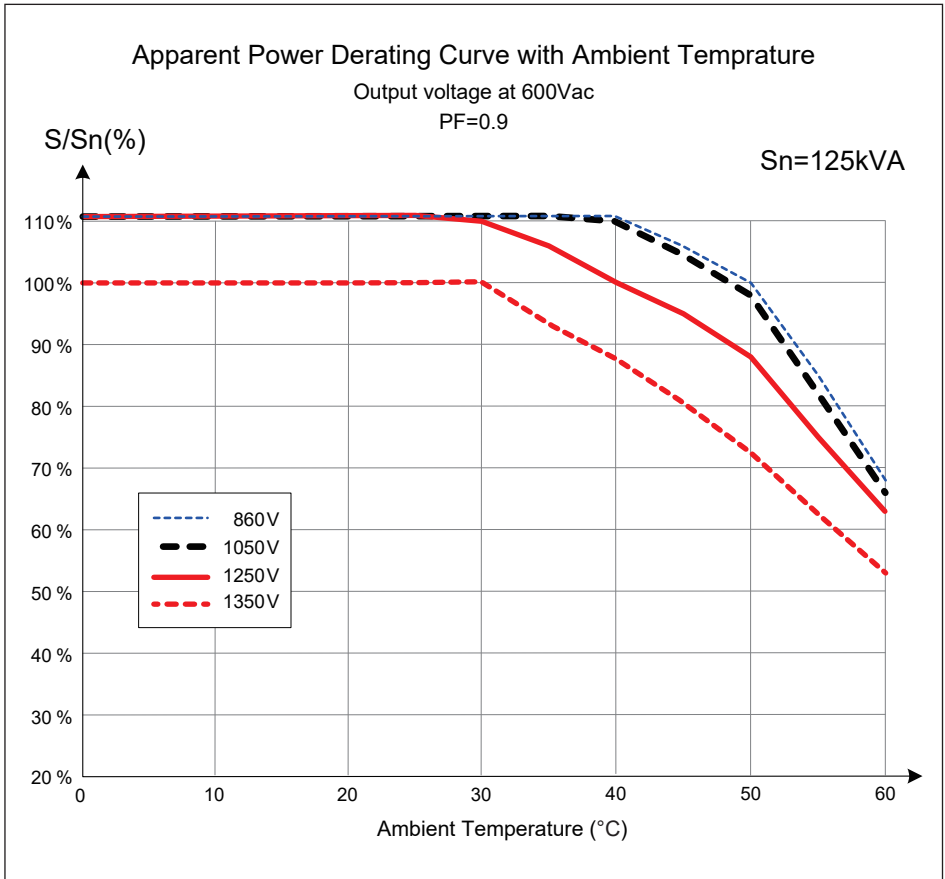


Figure 7-5: Apparent Power Derating Curve with Ambient Temperature (PF=0.9)

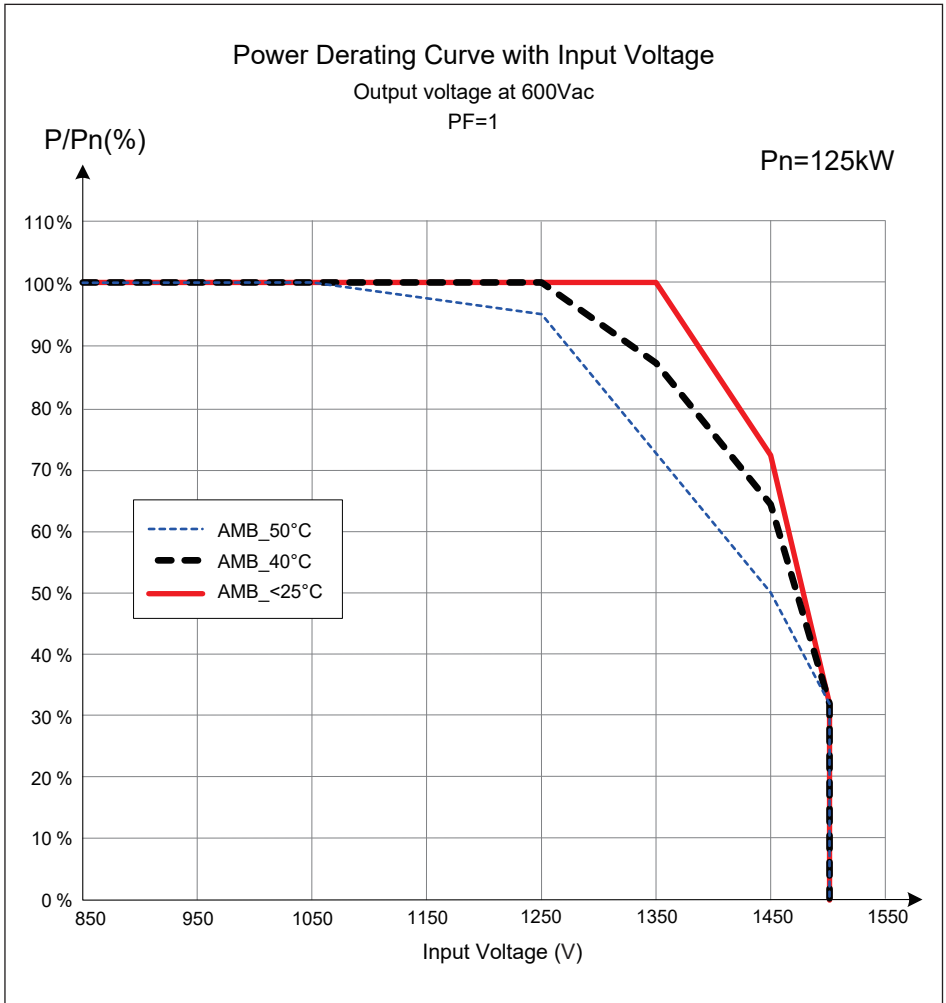


Figure 7-6: Power Derating Curve with Input Voltage (PF=1)

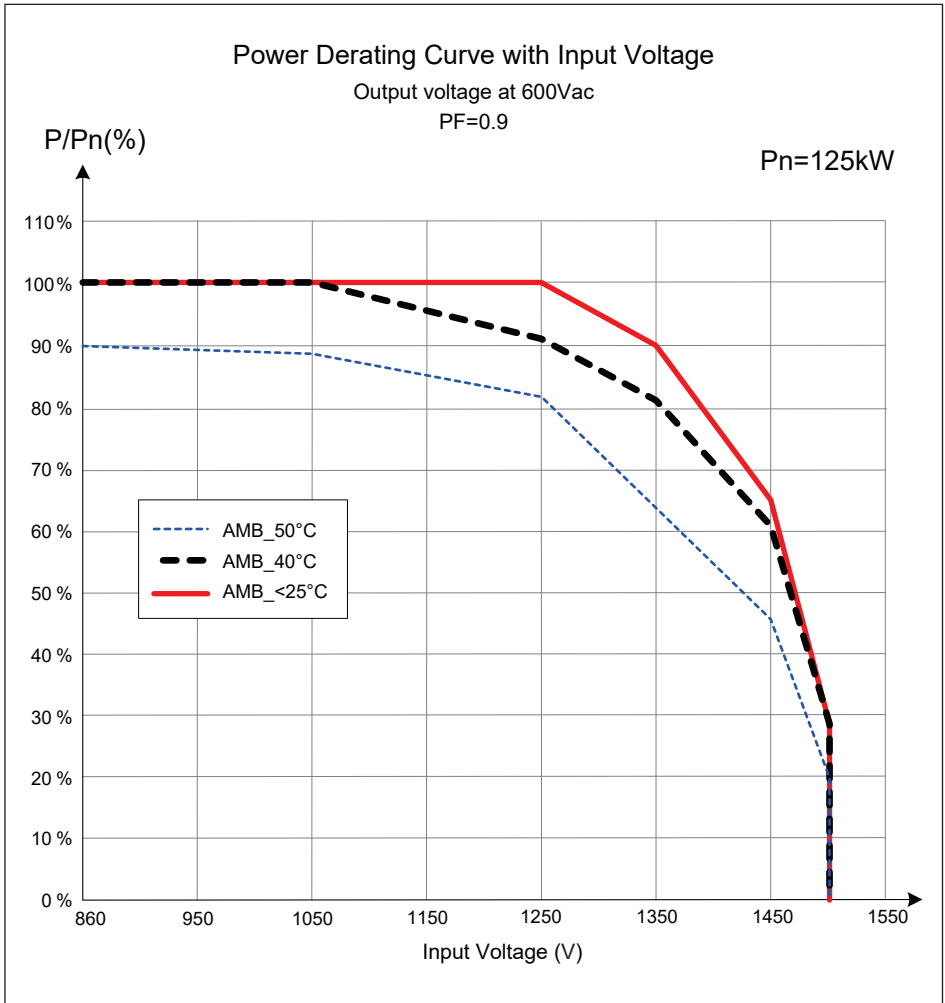


Figure 7-7: Power Derating Curve with Input Voltage (PF=0.9)

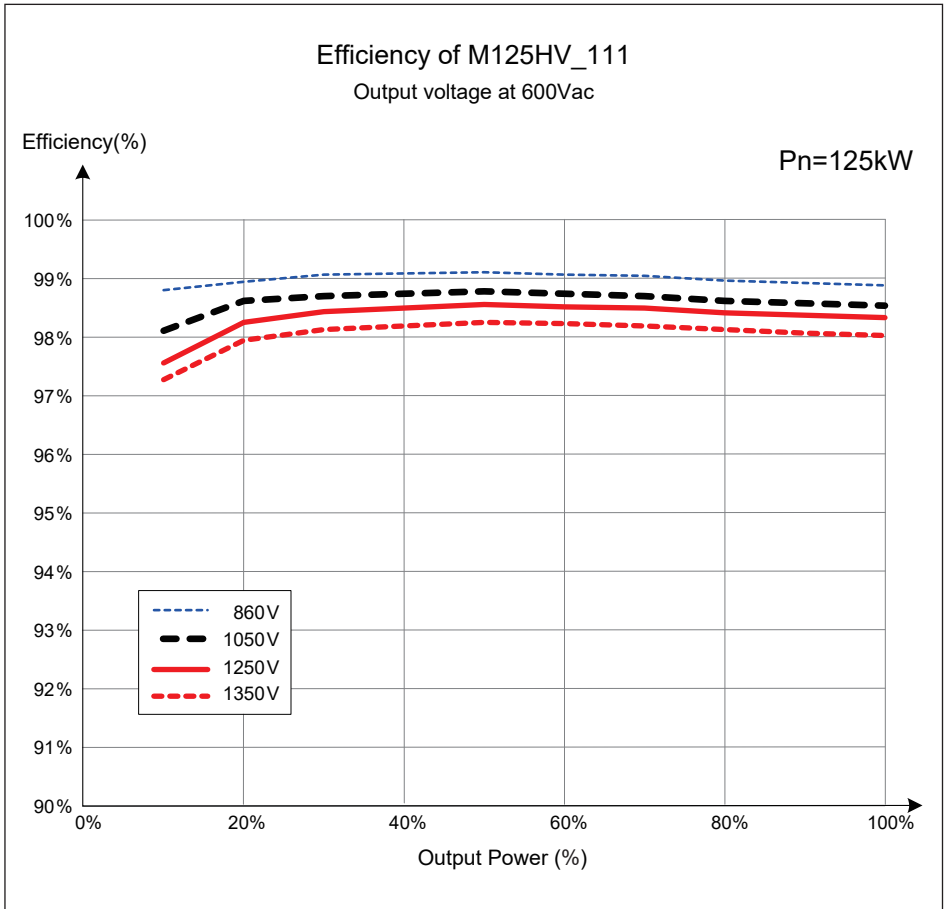


Figure 7-8: Efficiency Curve

Appendix A: Installation of DIN Rail SPD (Optional)

M125HV_111 support the spare parts of DC/AC DIN rail SPDs with typel and typell.

- Exchange DC SPD, there are some spare parts for exchange SPD, such as PE wiring, track and nuts are shown in **Figure A-2**.
- Exchange AC SPD, there are some spare parts for exchange SPD, such as AC power lines and signal wiring are shown in **Figure A-7**.

WARNING !



- Prior to beginning any maintenance procedures outside AC breaker and DC switch off to avoid risk of electrical shock!
- Confirm the replacement position, only the AC side (left) door can be opened on the left side, either the right door can only be opened on the right side. It is forbidden to open Both doors at the same time.

DC DIN Rail SPD

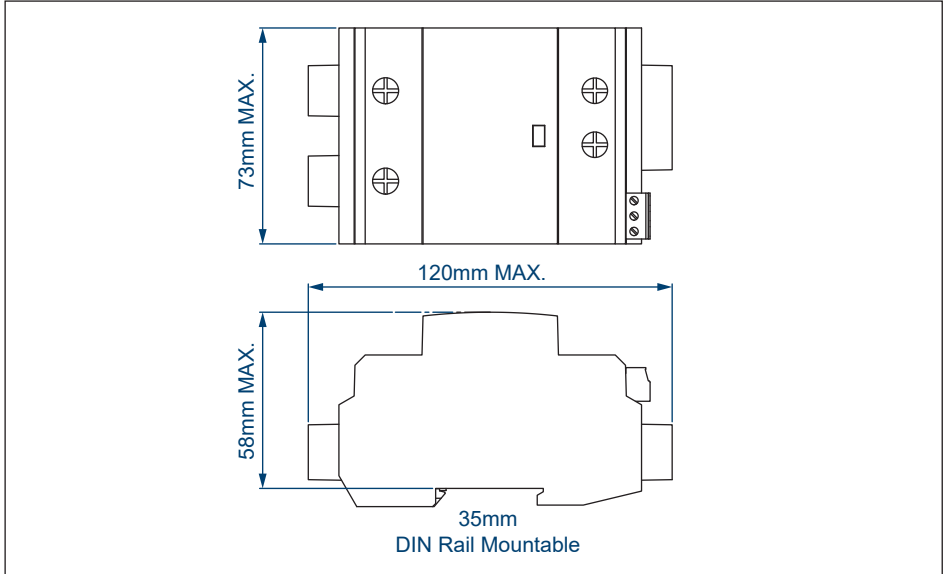


Figure A-1: DC DIN Rail SPD Select

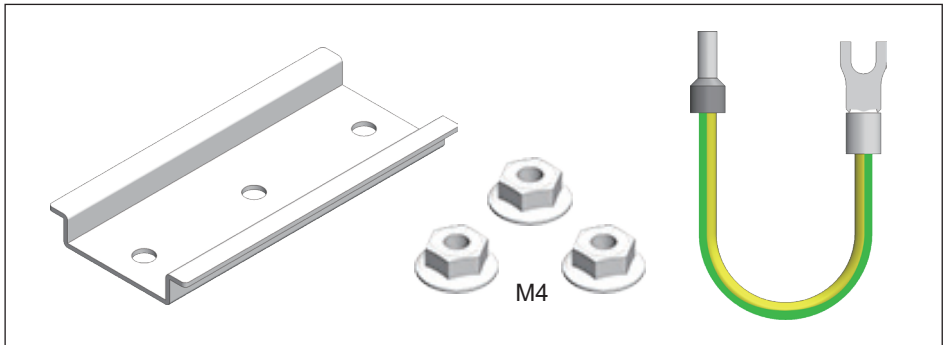


Figure A-2: DC SPD spare parts

The step of exchange DIN rail SPD:

1. Open the shield cover. (**Figure A-3**)
2. Disassemble and remove two screws and DC SPD PCB refer **Figure A-4**.
3. Remove the Copper column (**Figure A-4** ③)
4. Lock the track with 2N · m torque (**Figure A-5** ①) and PE wire.
5. Install the SPD to the track. (**Figure A-5** ②)
6. SPD wiring of power and signal please refer DIN rail manual.
7. Cover the shield.

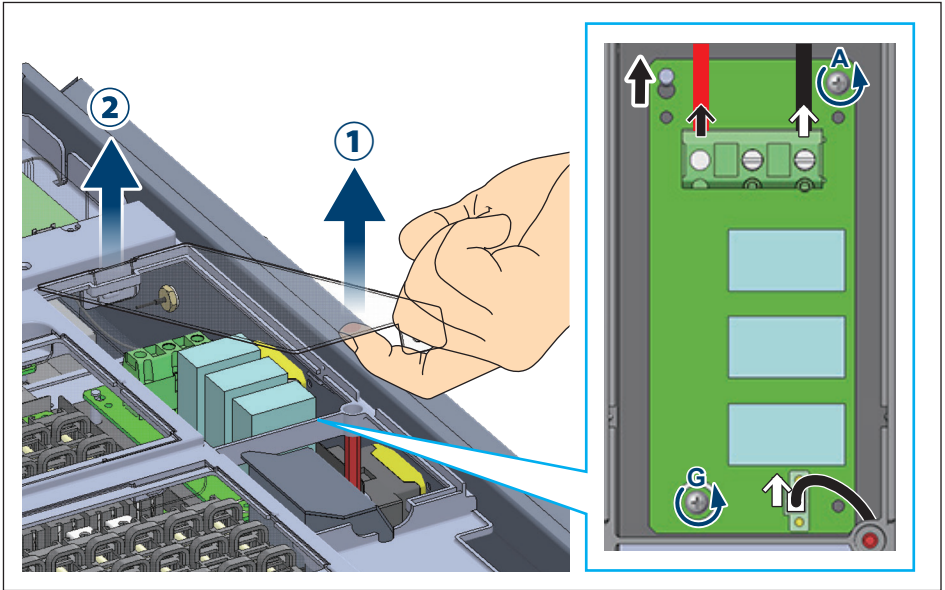


Figure A-3: Open the DC SPD shield cover

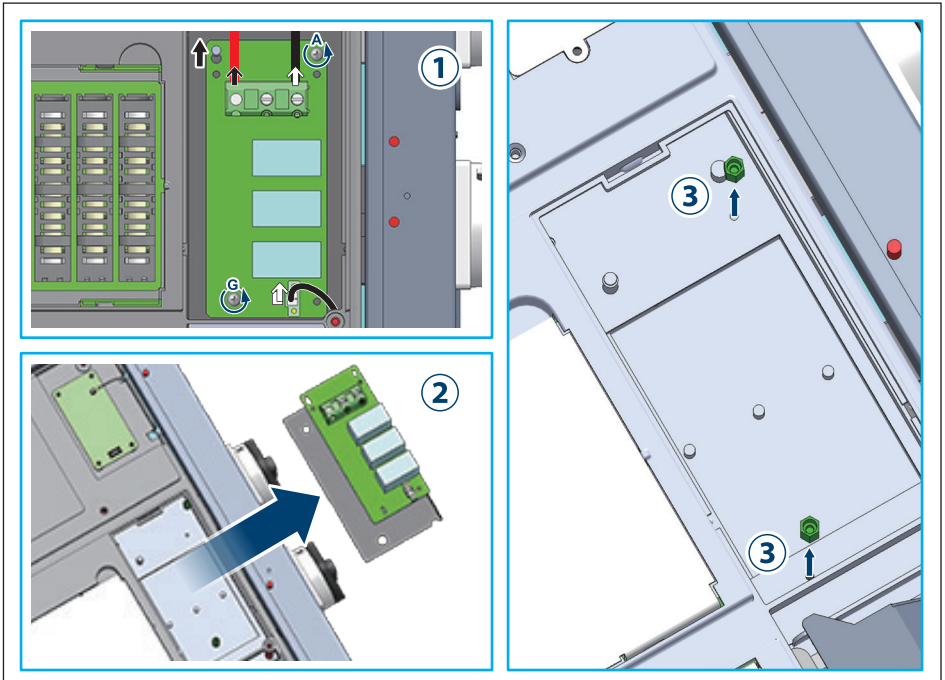


Figure A-4: Disassemble and remove two screws to remove DC SPD PCB

Screw torque $2\text{N} \cdot \text{m}$

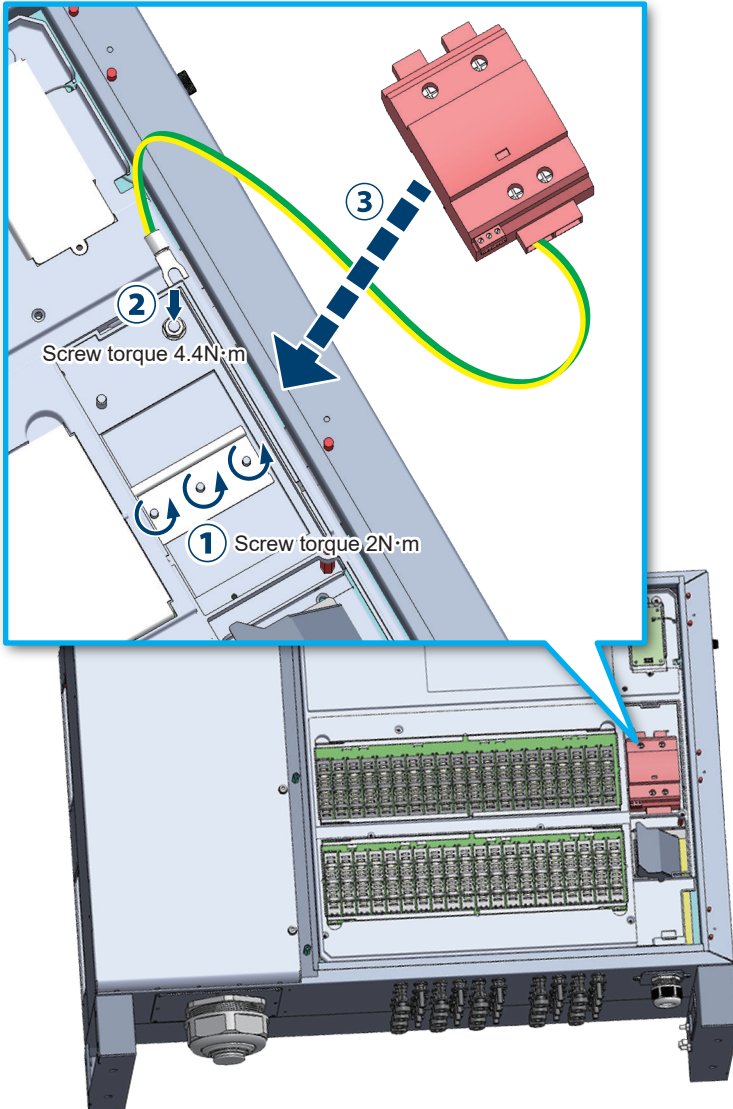


Figure A-5: Lock track and Install

AC DIN Rail SPD

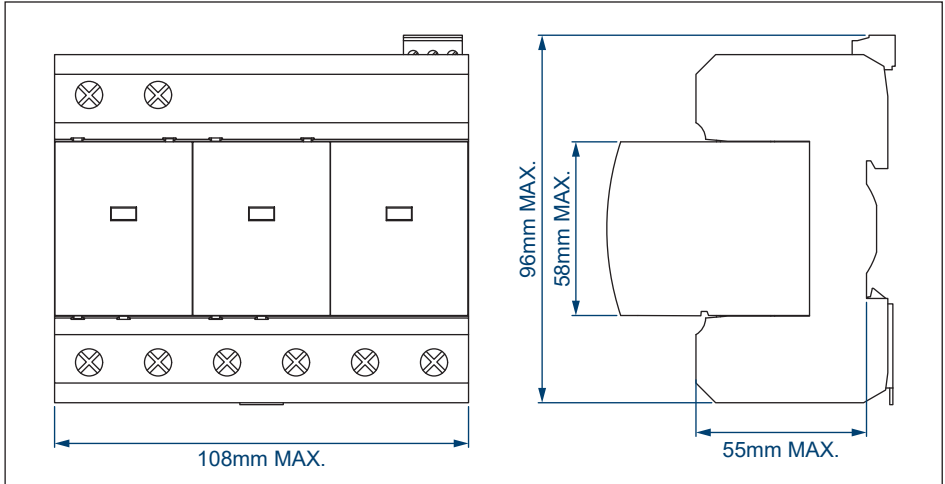


Figure A-6: AC DIN Rail SPD Select

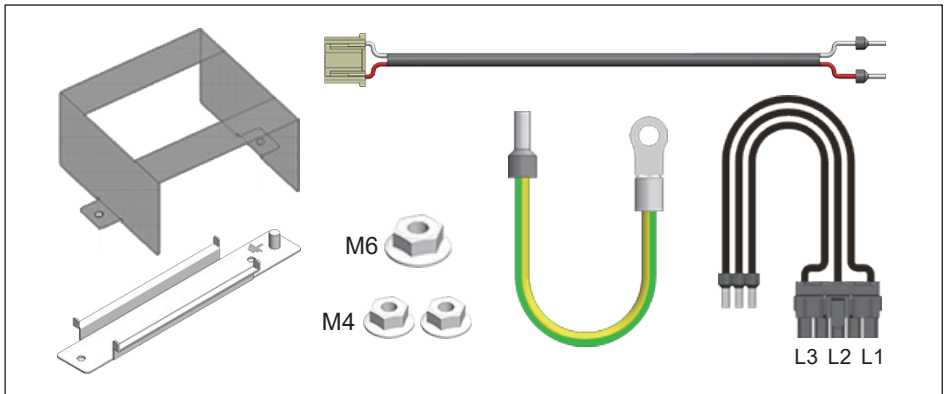


Figure A-7: AC SPD spare parts

The step of exchange DIN rail SPD:

1. Open the shield cover.
2. SPD wiring of power, PE and signal wires with spare parts refer DIN rail manual (**Figure A-8, Figure A-9**).
3. Lock the track (M4: 2N · m) and then install the SPD and shield cover to the track.
4. Lock the PE wire to the track. (M6: 4.4N · m)
5. Connect the spare parts of wiring connectors refer to **Figure A-10**.
6. Remove the 4 pin wiring connectors from on board type to sheet metal type refer to **Figure A-11**.

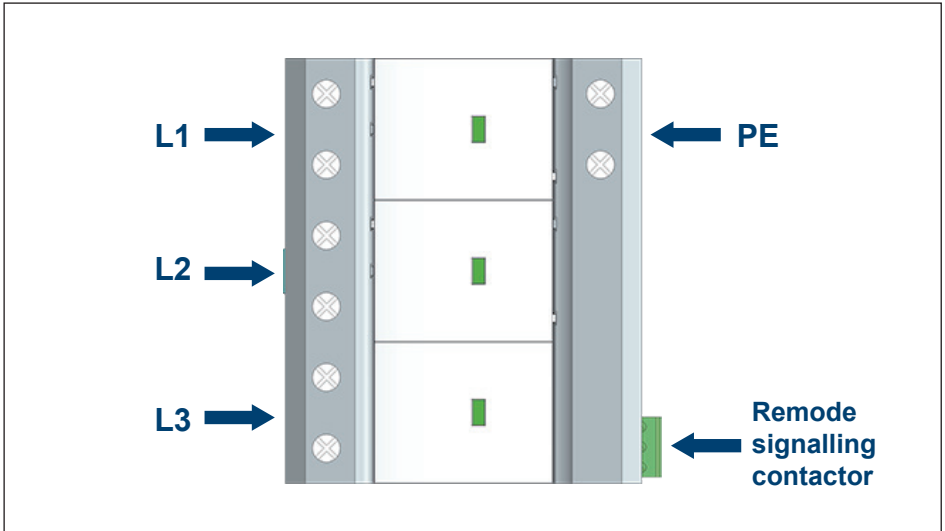


Figure A-8: SPD wiring of wires with spare parts refer DIN rail manual

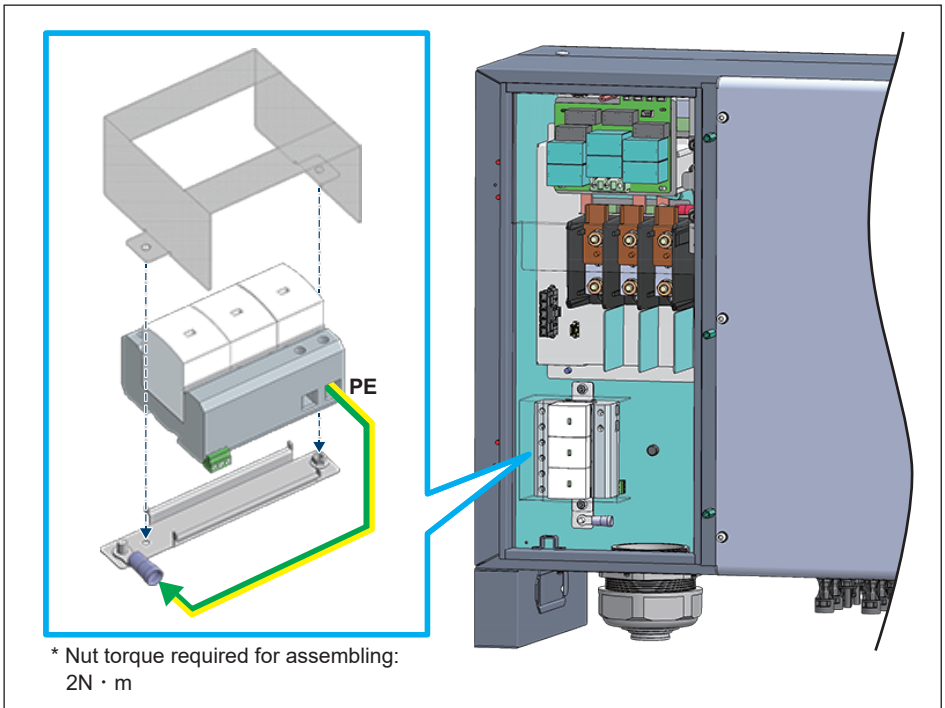


Figure A-9: Install the SPD and shield cover to the track

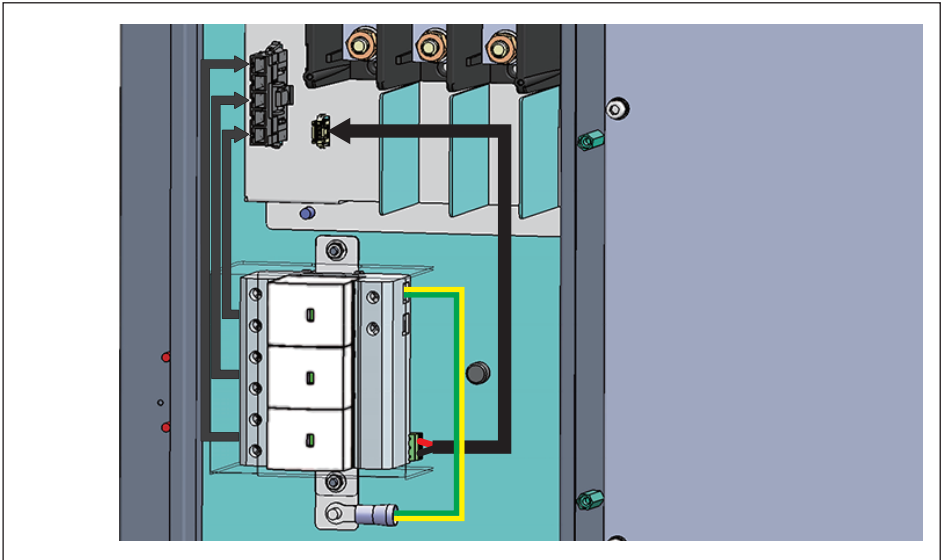


Figure A-10: Connect the spare parts of wiring connectors

AC SPDs

Move the PCB SPD signal to the Din rail SPD signal connector on the sheet metal.

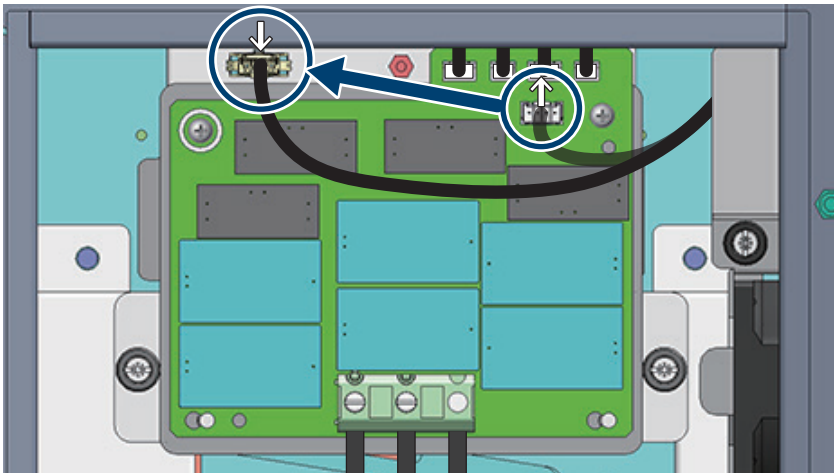
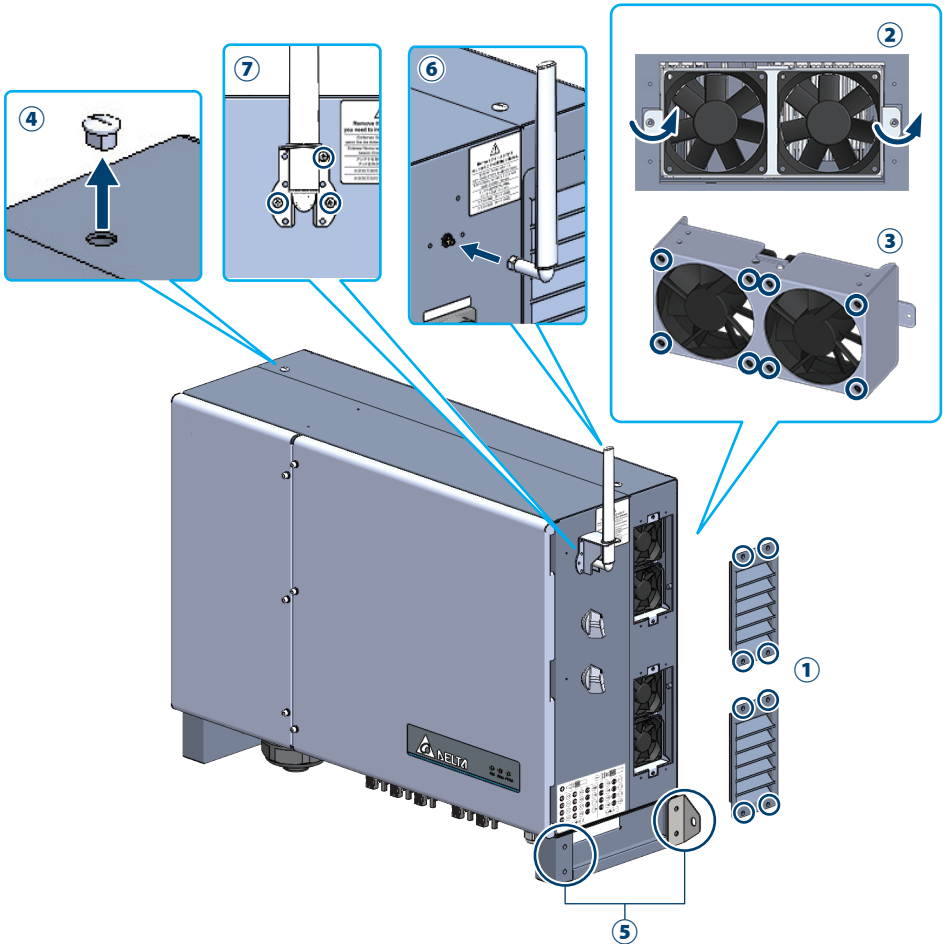


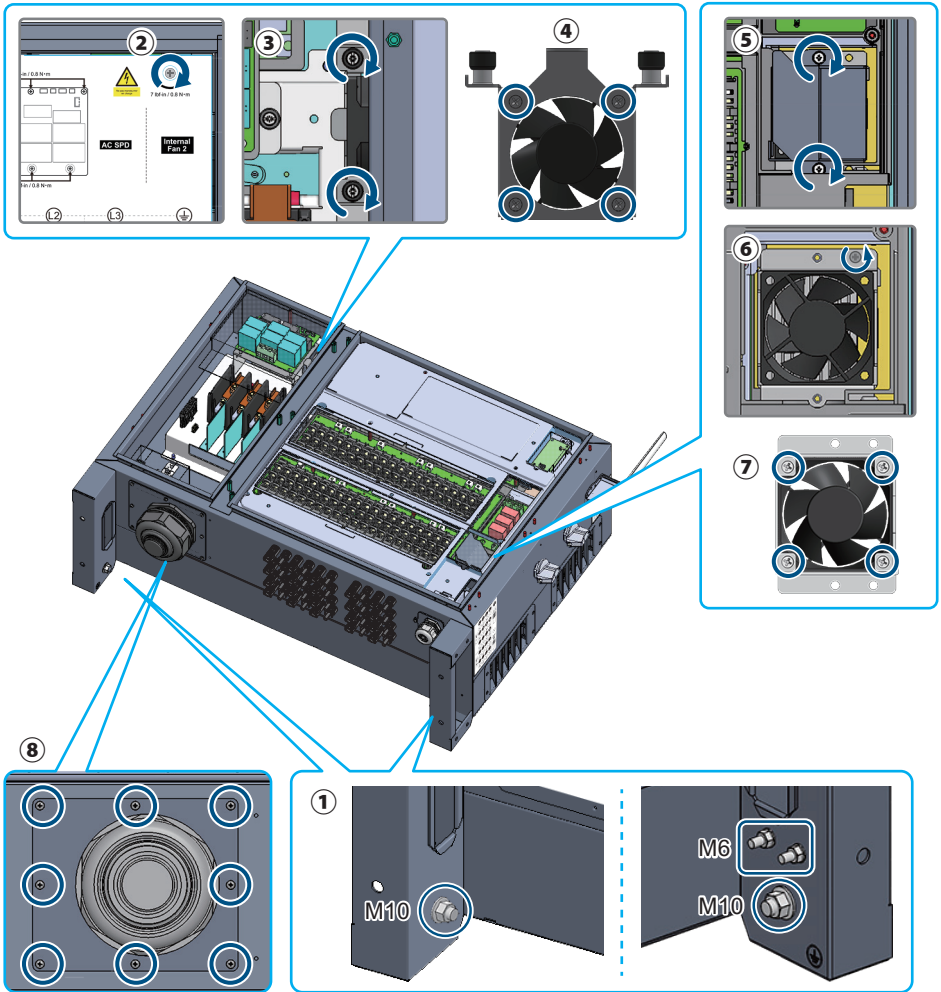
Figure A-11: Remove wiring connectors

Appendix B: Assembly Note



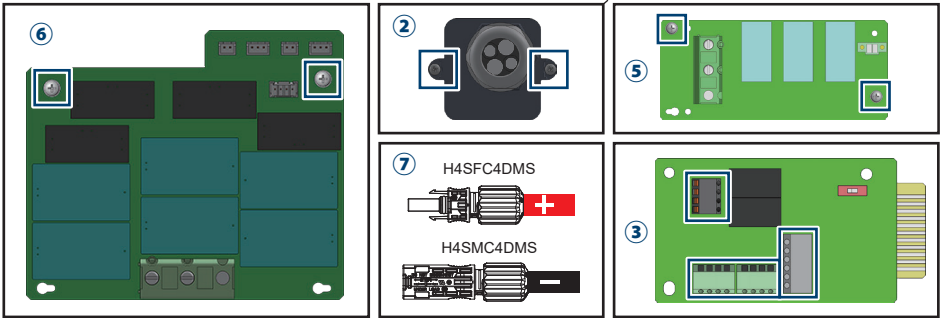
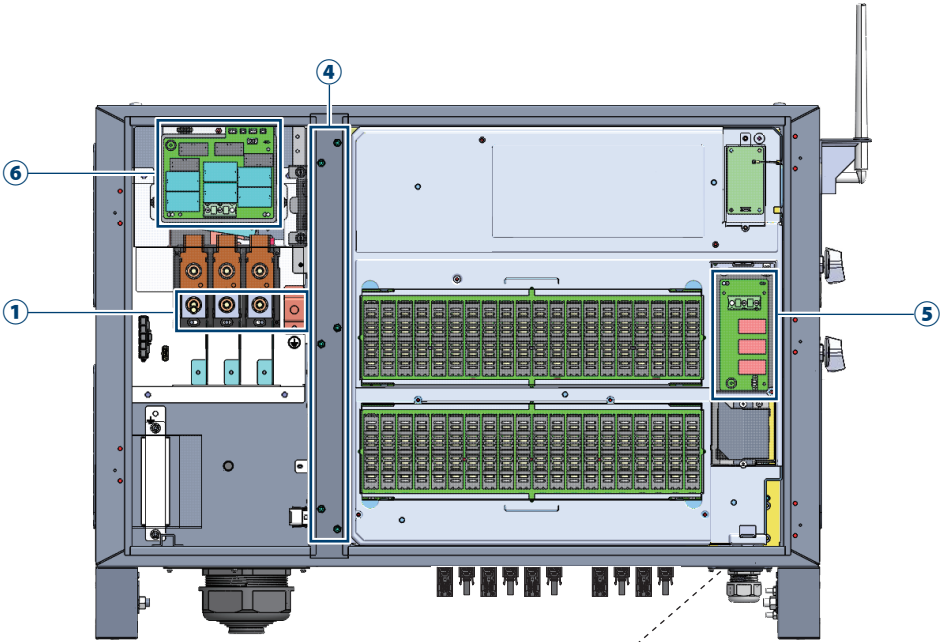
Appendix B-1: Assembly Note-1

NO	Location	Screw torque
1	Filter	8.0 kgf-cm (0.8N·m)
2	Fan Tray	8.0 kgf-cm (0.8N·m)
3	Fan	6 kgf-cm (0.6N·m)
4	Screw Plug	5.0 kgf-cm (0.5N·m)
5	Reinforce Bracket / Grounded Bracket	150 kgf-cm (15N·m)
6	Antenna	12 kgf-cm (1.2N·m)
7	Antenna Bracket (M4)	10 kgf-cm (0.98N·m)



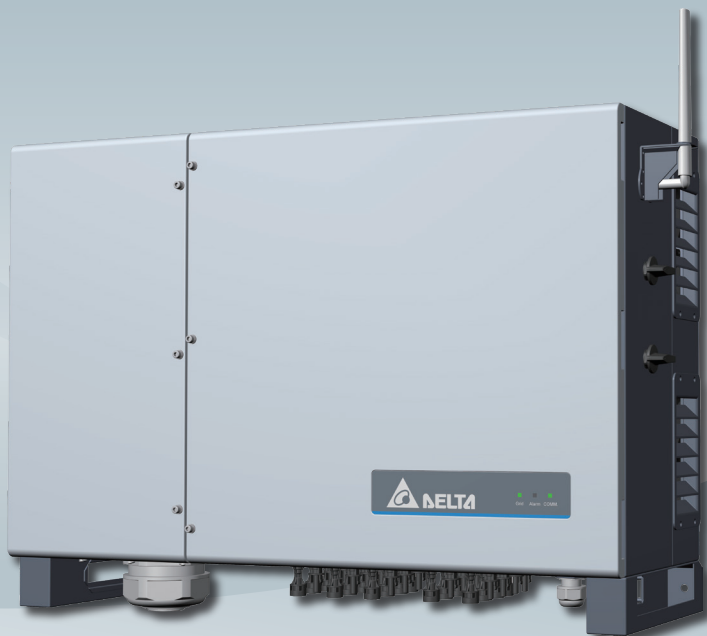
Appendix B-2: Assembly Note-2

NO	Location	Screw torque	
		M6	71 kgf-cm (7.0N·m)
1	Grounding	M10	254 kgf-cm (25N·m)
2	AC Cover		8.0 kgf-cm (0.8N·m)
3	Internal Fan 2 Cover		20 kgf-cm (2.0N·m)
4	Internal Fan 2 Tray		6 kgf-cm (0.6N·m)
5	Internal Fan 1 Cover		8.0 kgf-cm (0.8N·m)
6	Internal Fan 1 Tray		8.0 kgf-cm (0.8N·m)
7	Internal Fan 1 Tray		6 kgf-cm (0.6N·m)
8	AC Gland		8.0 kgf-cm (0.8N·m)



Appendix B-3: Assembly Note-3

NO	Location	Screw torque	Conductor cross-section
1	AC terminal	254 kgf-cm (25N · m)	Cu: 50 ~ 185 mm ² Al: 95 ~ 185 mm ²
2	Communication cover	8.0 kgf-cm (0.8N · m)	-
3	Communication port	-	20 AWG (0.5mm ²)
4	Crossbeam	45 kgf-cm (4.4N · m)	-
5	DC SPD board	8.0 kgf-cm (0.8N · m)	-
6	AC SPD board	8.0 kgf-cm (0.8N · m)	-
7	H4 Plus wire	-	12/10 AWG (4/6mm ²)



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M125HV_111

操作手冊

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1 安全規範

1.1 變流器資料

1.1.1 免責聲明

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本說明書及產品供終端使用者使用。技術資料及內圖文皆為機密資料且不經 DELTA ELECTRONICS, INC. 許可，禁止複製翻印。

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- (b) 產品未依照說明書正確使用
- (c) 產品於拆裝過程受損

1.1.2 適用對象

本說明書適用於針對安裝、試運行、實際操作、後續維護受過良好訓練的人以下基礎及進階技巧為必需的。

- 了解基礎電力、配線、電子元件及電子電路符號
- 了解太陽能變流器如何運行及操作
- 針對電子產品的安裝及試運行受過訓練
- 針對安裝及使用電子產品的過程中會遇到的危險及風險受過訓練
- 遵守本說明書及所有安全規範

開始接觸此產品前，請詳閱本說明書。

1.2 安全概述

重要安全指示：保存所有指示！



- 請詳閱所有指示並保存本說明書以供後續使用。

為了避免人員受傷或其他損失及確保變流器長期運轉，在使用此產品前請務必詳閱所有安全指示。

本說明書針對Delta併網型無變壓器太陽能變流器提供重要指示。本產品進行設計、測試、驗證且經國際安全規範認證，但安裝及使用本產品前仍須做好防範措施。本產品適用於室內及戶外。

注意：無電氣隔離



- 本產品需安裝外部隔離變壓器確保交流側與太陽能模組進行隔離。
- 本產品無附加變壓器，為非電氣隔離型。
市電端與變流器間需加入外部變壓器。
請勿使用需接地(正極或負極)之太陽能板。
若使用了，則本產品會以INSULATION (E34) 告警。
- L1, L2, L3 禁止連接至地。

1.2.1 使用條件

- M125HV_111 為單一MPP追蹤、無變壓器太陽能變流器，能將太陽能串列的變動電流轉換成與市電頻率相同之三相交流能量並饋入市電。
- 所使用之太陽能模組需與變流器匹配。
- 太陽能面板之對地電容不可超過 20 μ F。
- 本產品僅可在經DELTA及市電業者許可之國家運行。

1.2.2 標誌

本節說明本說明書會出現的標誌定義，為了避免人員受傷或其他損失及確保變流器長期運轉，在使用此產品前請務必詳閱所有安全指示並遵守。

危險！



- 此警語表示可能發生致死或嚴重傷亡的情形。

警告！



- 此警語表示可能發生致死或嚴重傷亡的情形。

注意！



- 此警語表示可能發生較輕微傷害的情形。

注意



- 此警語表示可能對資產或環境造成傷害。

資訊



- 進一步的資訊會經由雙圈驚嘆號指示。
這代表後續的內容將含有使用者該遵守的重要資訊以免造成任何傷害。

危險：觸電!!



- 此警語表示可能會有造成嚴重傷亡的觸電可能。

注意：表面高溫，請勿觸碰！



- 此警語表示當變流器運行時機體表面高溫，請待表面溫度下降後再進行需接觸的工作。



- 等待圖示中所顯示的時間後再進行工作



- 設備接地導體

2 產品介紹

M125HV_111 以最先進之高頻切換及低EMI技術設計而成，同時具有高效率及高壽命的特點，亦適用於戶外。

注意：無電氣隔離



- 本產品無附加變壓器，為非電氣隔離型。
- 請勿使用需接地(正極或負極)之太陽能板。
- 若使用了，則本產品會以INSULATION (E34) 告警。
- L1, L2, L3禁止連接至地。

2.1 適用機種

本說明書適用以下機種：

- M125HV_111

安裝、運行及維護過程皆必須遵守本說明書。

DELTA保留在不另行告知的前提下修改內容及技術資料的權力。

危險！



- 禁止同時打開左右兩扇門。

2.2 產品概述

M125HV_111 內容物如圖2-1所示。

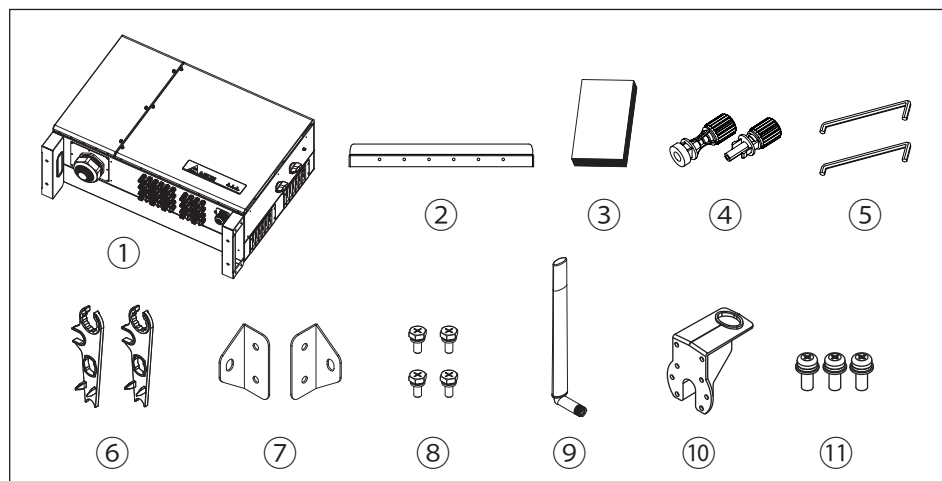


圖2-1：內容物

表2-1：內容清單

M125HV_111			
	物件	數量	描述
1	DELTA太陽能變流器	1	太陽能變流器
2	壁掛架	1	將變流器掛起之壁掛架 (材質: 鋁 / 厚度: 3mm)
3	操作手冊	1	安裝及維運過程中務必參考本說明書中的安全指示
4	H4+ 端子	20 對	直流組串輸入接頭
5	六角板手	2	固定前蓋用門門
6	H4 板手	2	UTX 接頭拆除工具
7	壁掛支撐架	2	用於變流器兩側的壁掛支撐架
8	M8x16L 螺絲	4	用於固定壁掛支撐架
9	SUB_1G 天線	1	SUB_1G專用天線
10	天線支架	1	用於固定SUB_1G天線
11	M4x12L 螺絲	3	用於固定天線支架

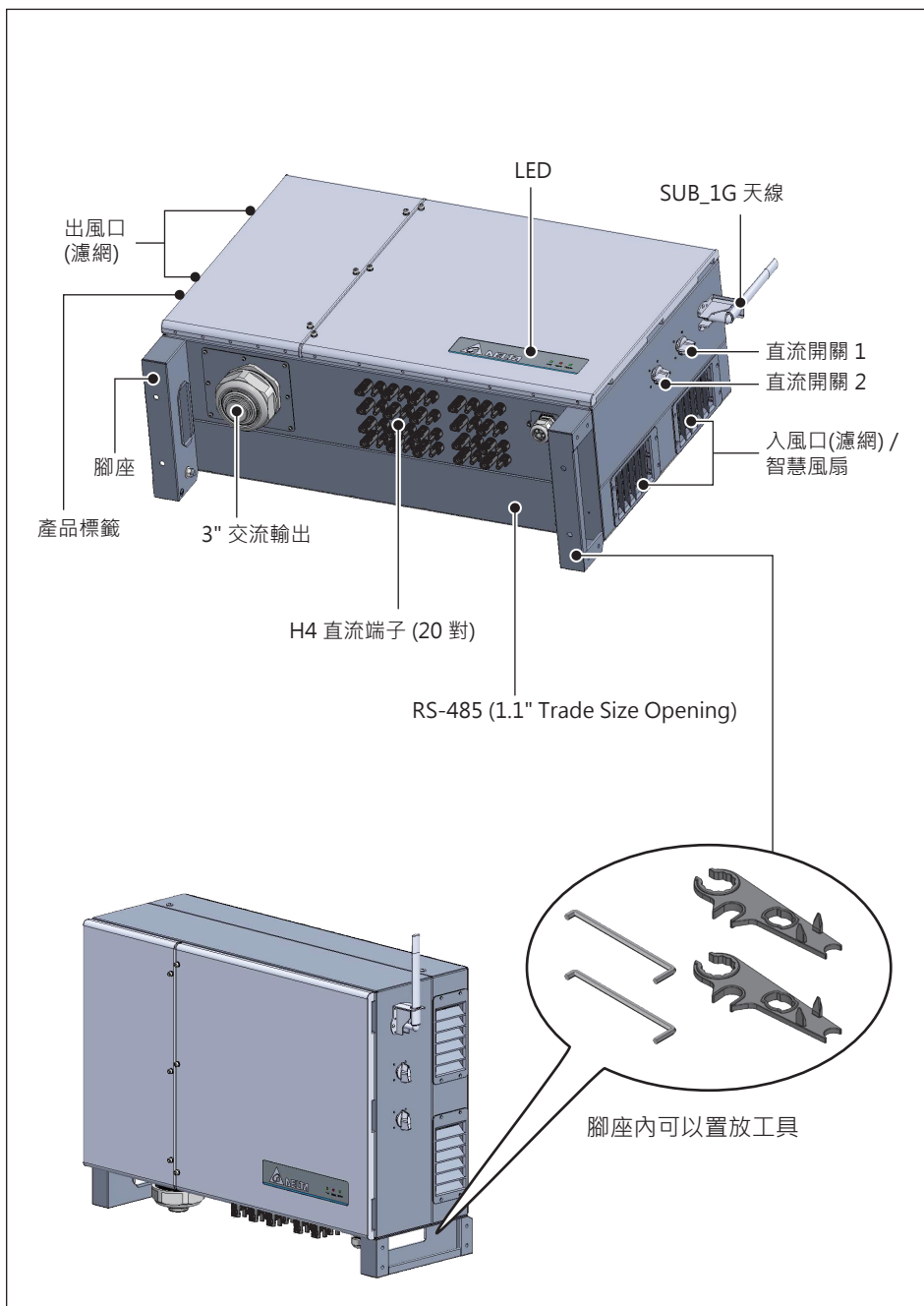


圖2-2 : 外觀介紹

圖2-3為產品標籤並配合表2-2針對特殊符號做解釋。

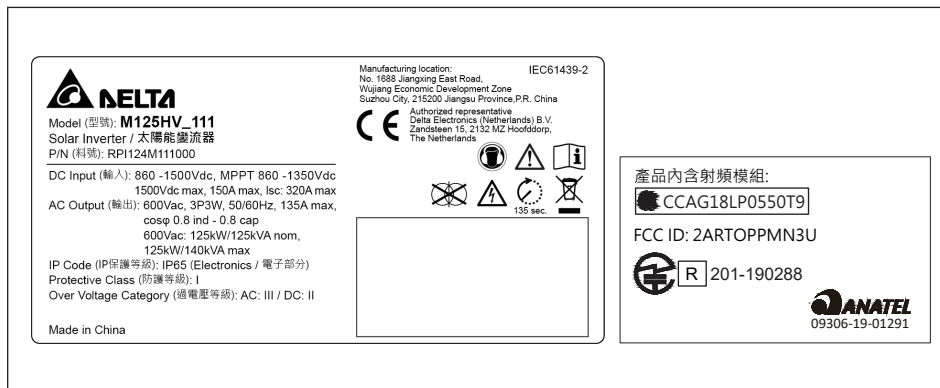


圖2-3：產品標籤

表2-2：標籤內容描述

符號	定義		
	<p>嚴重觸電危險 變流器運行時會有致命高電壓存在，切斷後危險電壓存在約135秒，時間內請勿接觸變流器。 本產品不含任何需要開啟機殼之元件。擅自開啟機殼會使保固失效。</p>		
	使用此變流器前，請詳閱說明書。		請注意噪音防範。
	此變流器本身沒有經由變壓器與市電端分離。		<p>WEEE marking 本變流器須以標準家用廢棄物報廢，並同時遵守當地針對電器報廢的相關規範。</p>
	若當地規範要求，機體外殼請務必下地。		
	M125HV_111 符合 Anatel 認證標準		

圖2-4為配線箱的架構圖，詳細描述可參照圖2-5、表2-3，其中包含輸出端的雷擊保護裝置(SPD)。

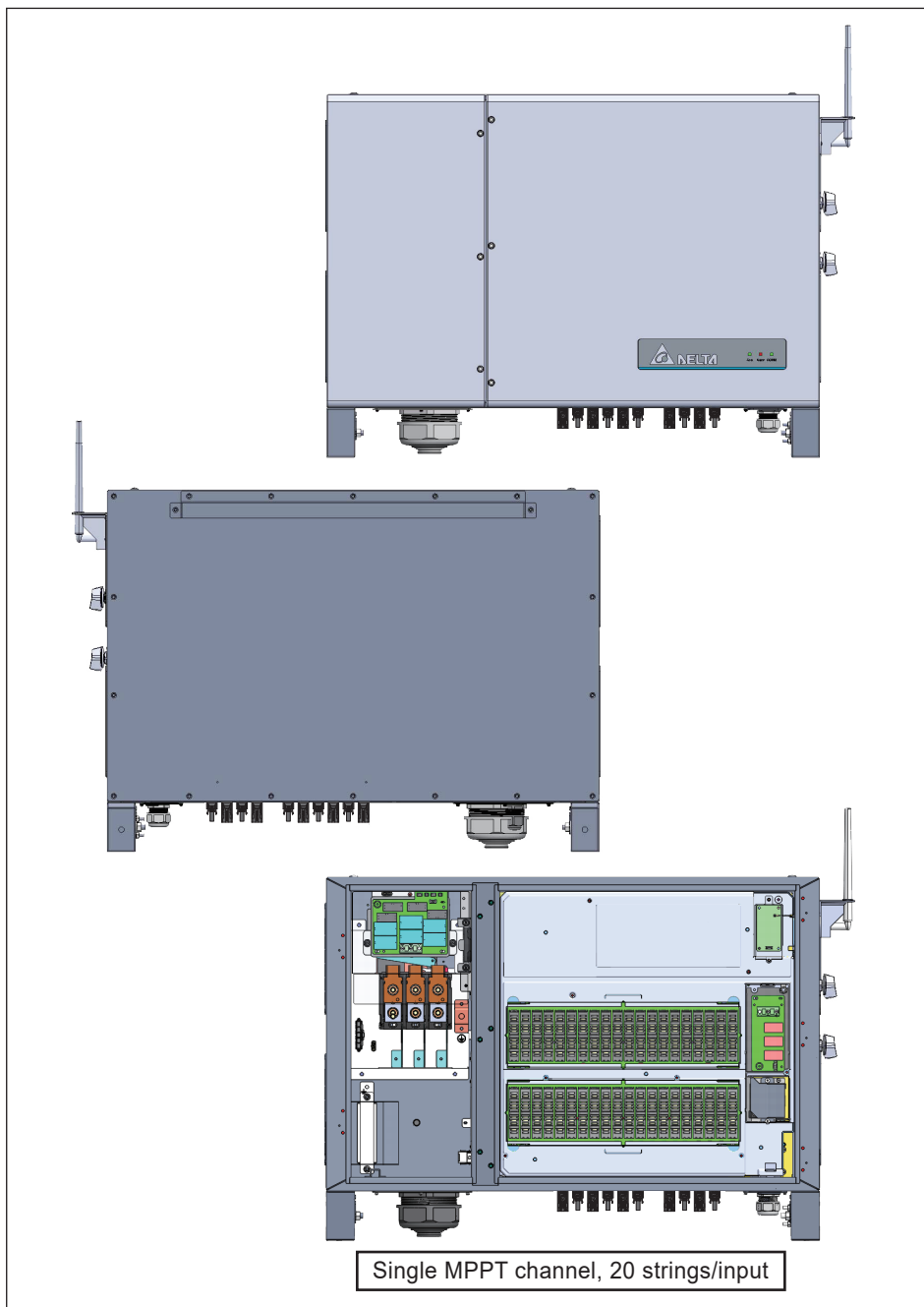


圖 2-4 : 外部/ 內部 結構

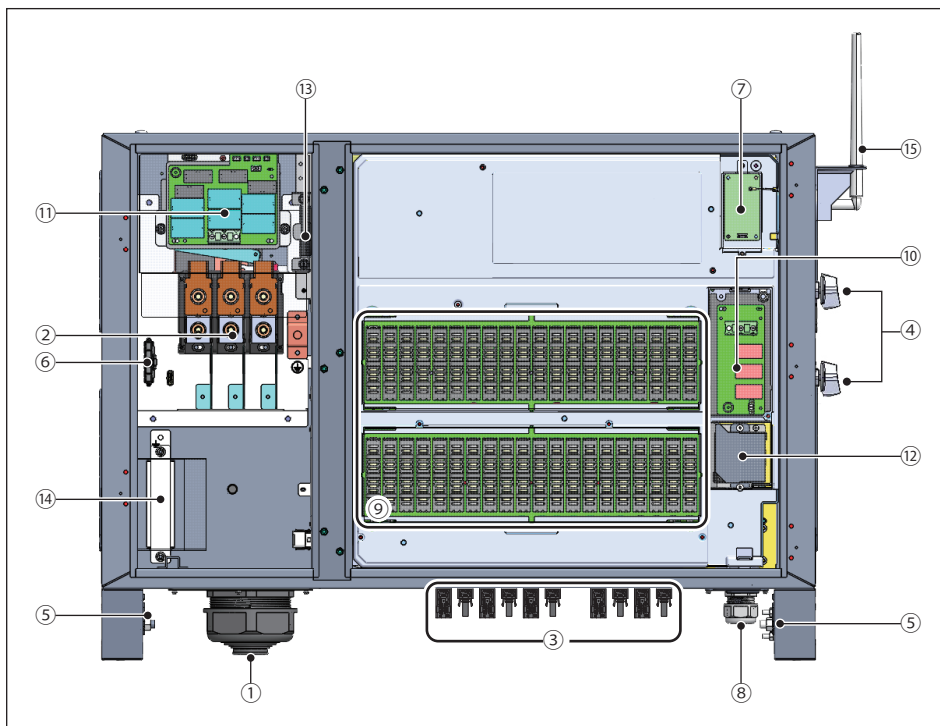


圖2-5 : 內部架構

表2-3 : 內部架構內容

NO.	Component	NO.	Component	NO.	Component
1	3" cable opening for AC	6	Power connect of Din Rail SPD	11	Type II AC SPD
2	AC terminal	7	N3U_SB1	12	Internal fan 1
3	H4 connectors (20 pairs)	8	Communication port	13	Internal fan 2
4	DC switches	9	Fuse holder	14	Din rail for AC SPD (optional)
5	Grounding (M6/10 threaded stud)	10	Type II DC SPD	15	SUB_1G Antenna & bracket

3 安裝

注意！



- 本產品不建議安裝在直接日照曝曬處。

警告！



- 請勿將本產品安裝在易燃表面附近。
- 請將本產品安裝於堅固且平順之表面。
- 變流器可能造成電磁干擾，不適合安裝於居家環境，或者需採取緩解措施。

本章節包含以下指示

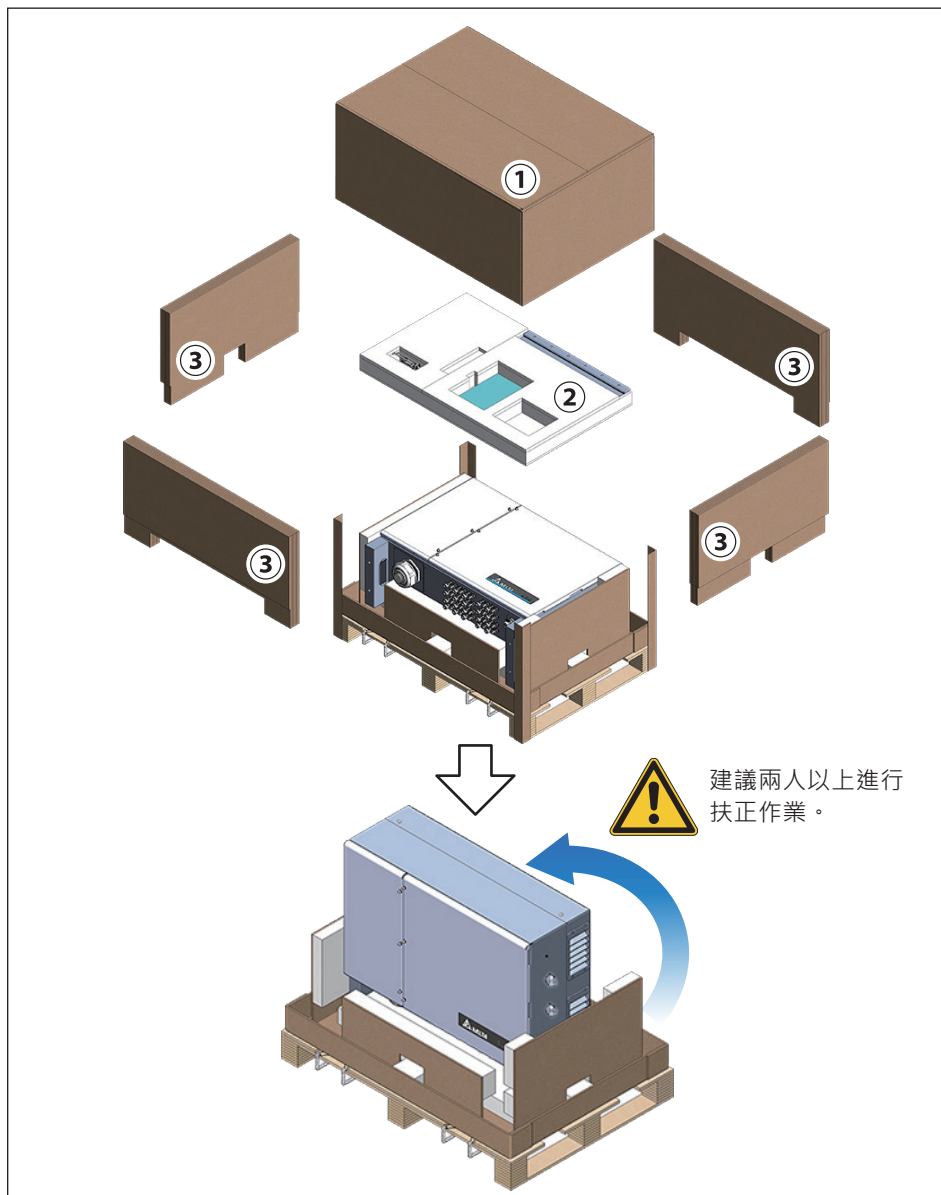
1.機構安裝 2.電氣安裝 3.通訊安裝

圖3-4提供變流器詳細尺寸

3.1 拆箱與檢視

請依照圖 3-1所示進行拆封。

建議兩人以上進行作業(圖 3-2)或以起重機搬運(圖 3-3)。



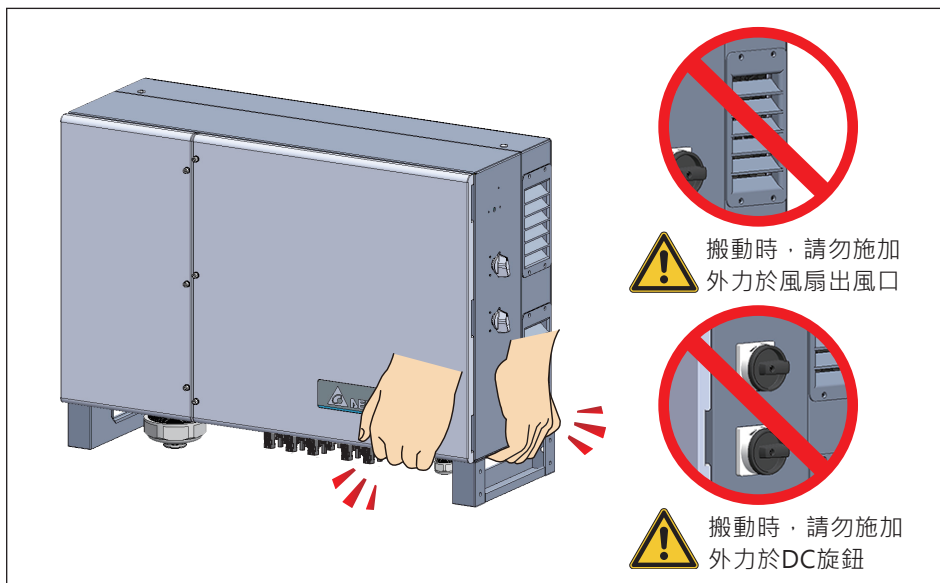


圖 3-2: 搬動施力位置

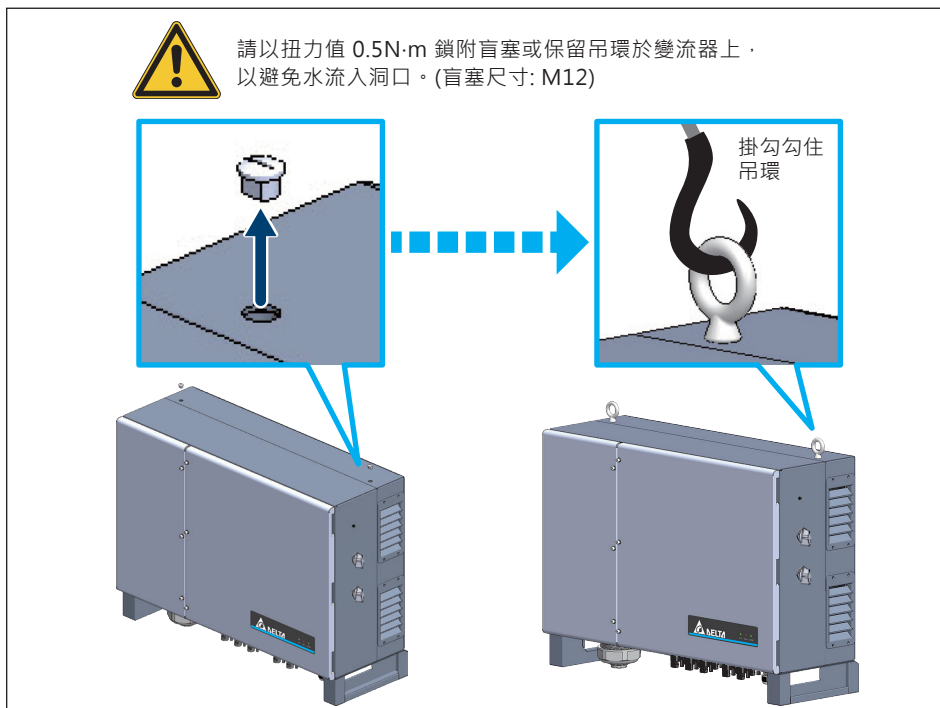


圖 3-3: 安裝吊掛鋼環

3.2 機構安裝

此機器設計支援壁掛式安裝，請參考3.2.1 章節；同時亦支援地上站立式安裝，請參考3.2.2章節。

3.2.1 直立壁掛式安裝

請參考圖3-5至3-9說明

1. 首先請先確定產品安裝牆面足以承載產品重量。
2. 水平固定壁掛架(垂直於地板)，並依照圖3-5所示標記安裝孔洞位置。
3. 鎖附6枚M10螺絲於壁掛架上。
4. 將產品放置於壁掛架上。
5. 將產品鎖附上2枚M10螺絲如圖3-9。

注意！



- 該壁掛架為本產品專用，請勿使用其他壁掛架來搭配本產品使用。
- 使用6枚M10螺絲將壁掛架固定牆上。(至少5枚)

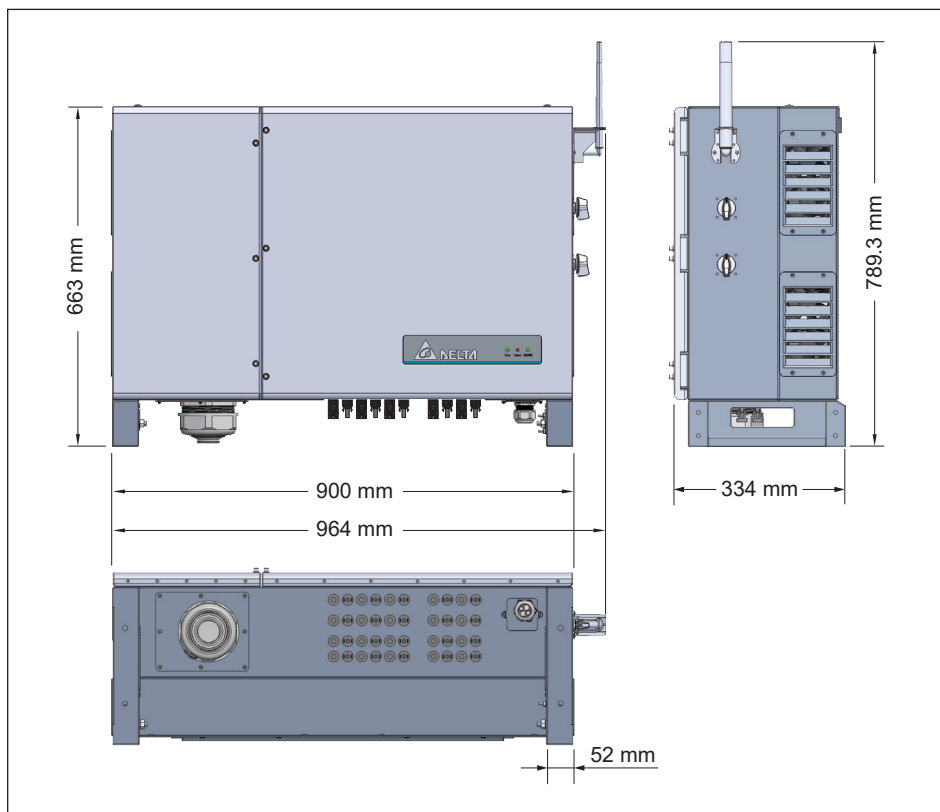


圖 3-4: 變流器尺寸

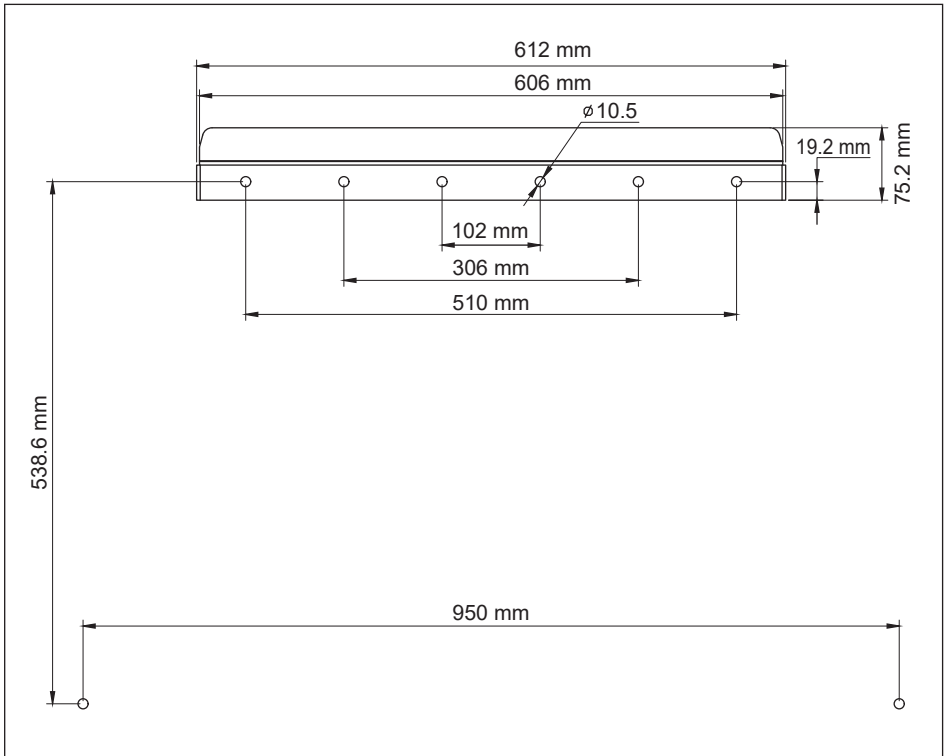


圖 3-5: 壁掛架尺寸

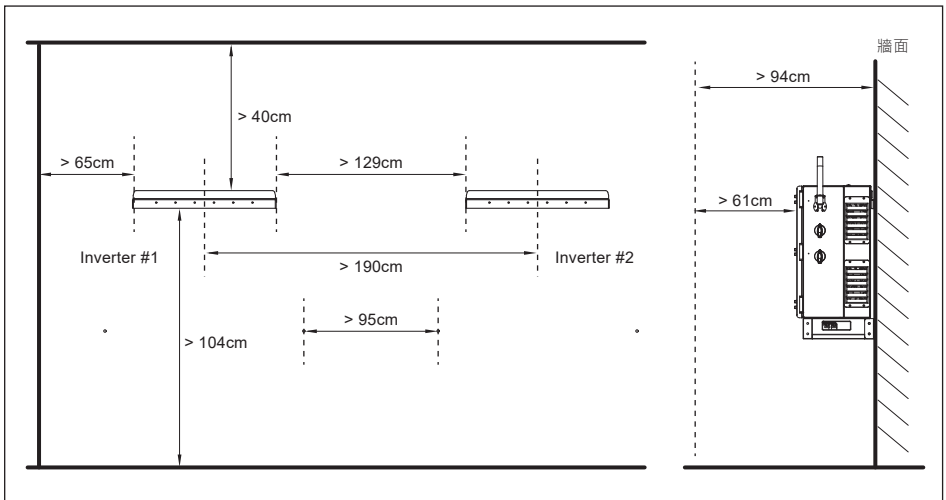


圖 3-6: 壁掛所需間距

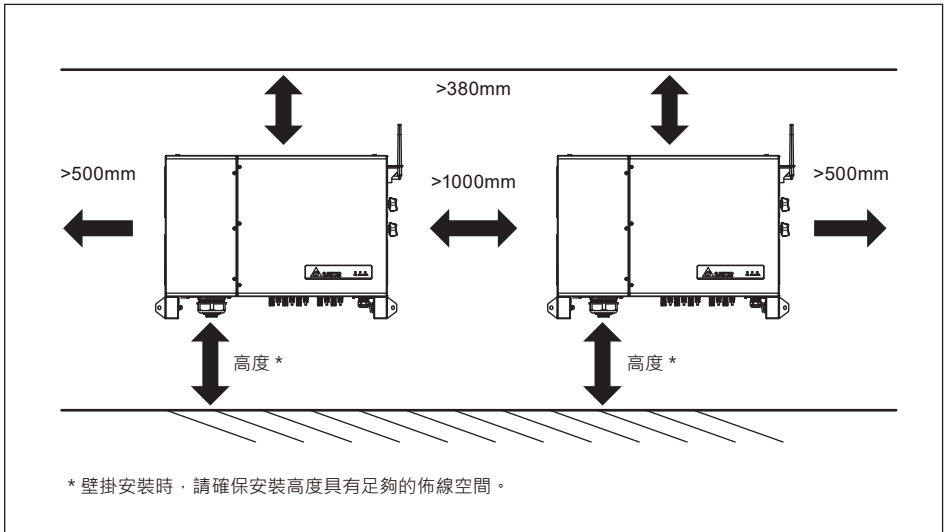


圖 3-7: 機台間最低要求距離

注意！



- 請按照上述說明中的方向和機器間隙安裝，以避免降額功率輸出及保固失效。

依圖3-8所示之扭力安裝壁掛支撐架於兩側之後，鎖附兩枚M8螺絲(圖2-1, 物件8)於牆面(如圖3-9)。

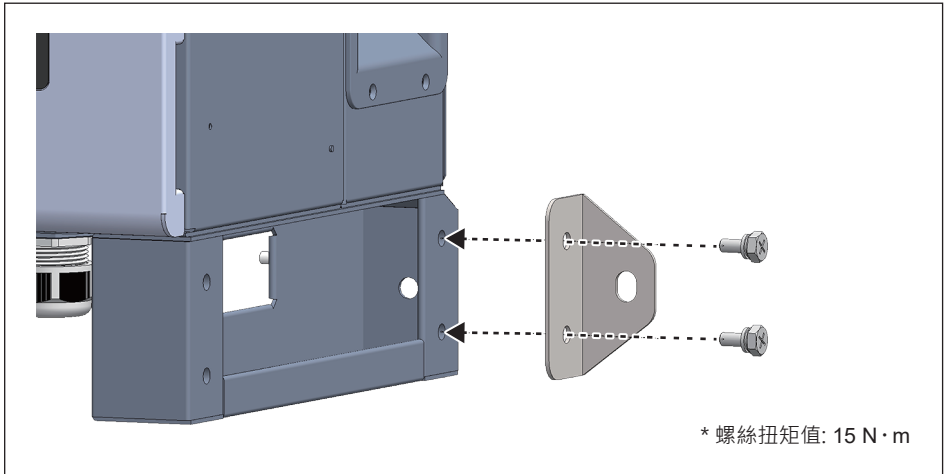
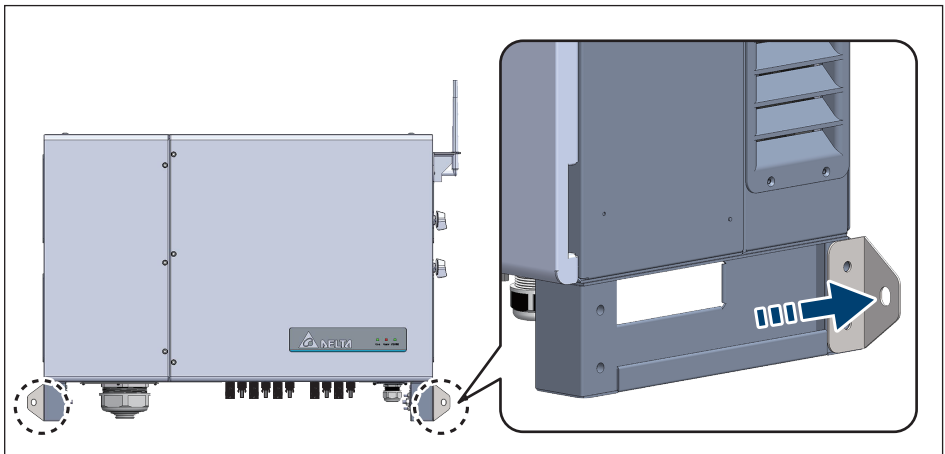


圖 3-8: 安裝壁掛支撐架



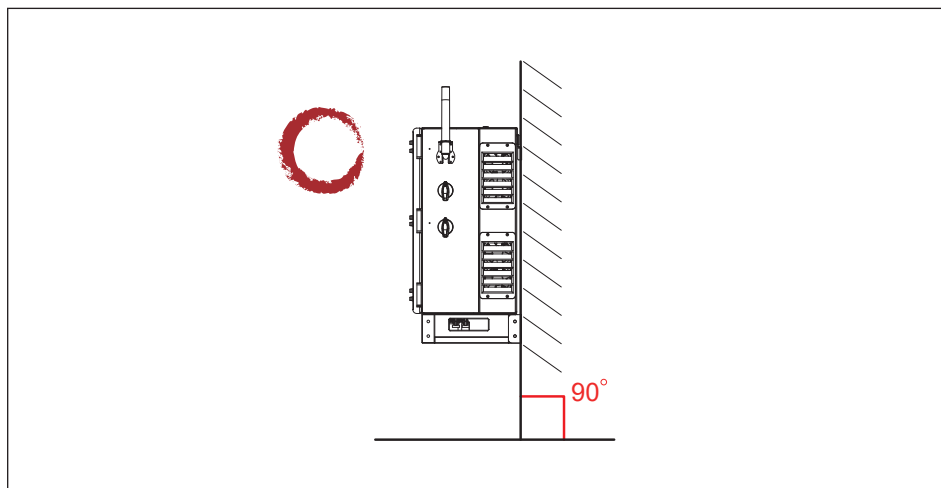


圖 3-10: 正確的安裝位置

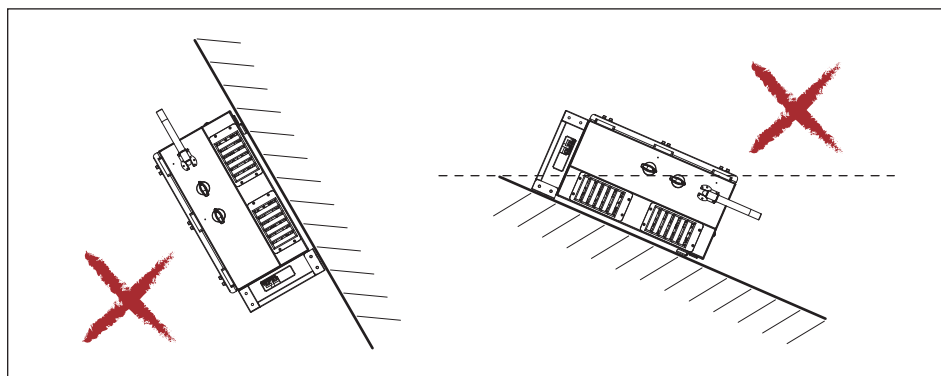


圖 3-11: 禁止的安裝方式

O : 正確 / X : 禁止

3.2.2 落地式安裝 (選配)

落地支架為選配套件，請聯繫客服中心取得詳細資訊。

1. 確保安裝設備的地面基座強度足以承載變流器重量。
2. 水平安裝落地支架(垂直於地板)，並標記所需安裝孔位置如圖3-13所示。
3. 用8個螺絲將落地支架固定到機器腳座上(圖3-12)。
4. 將變流器放置在地面安裝基座上。
5. 使用4個M10螺絲將落地支架固定於安裝基座上(圖3-13)。

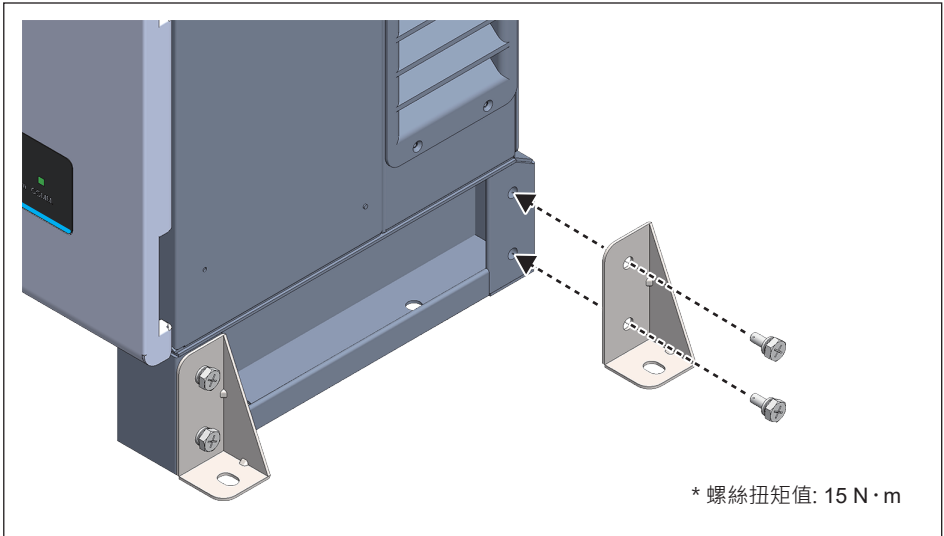


圖 3-12: 落地支架安裝

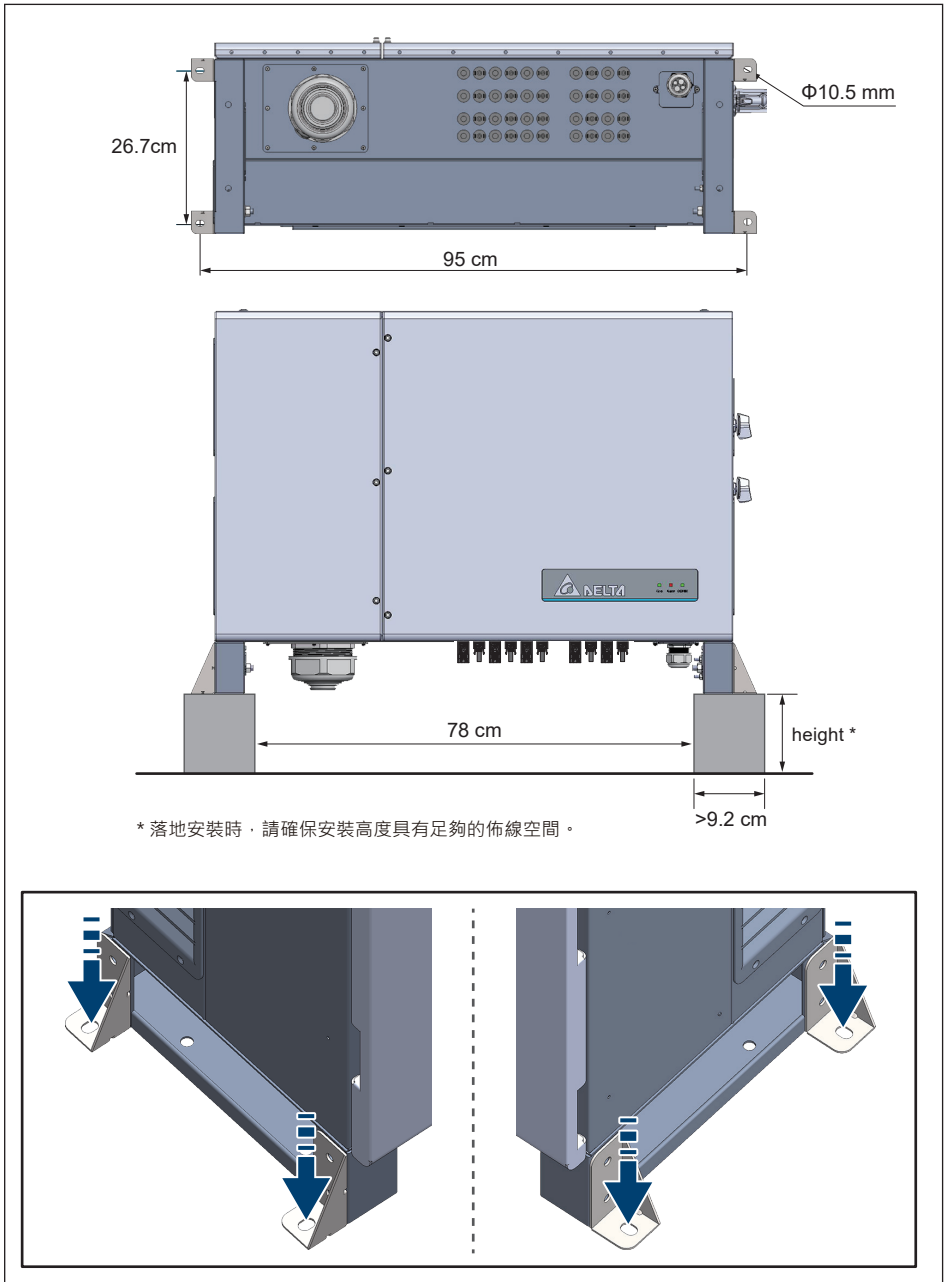


圖 3-13: 將變流器安裝在地面安裝基座上

3.3 前蓋

為了確保變流器可以良好的長期運轉，開關前蓋時，請務必參考5.1章節步驟。初次安裝M125HV_111時，只需打開交流側(左側)前蓋配線。請參考圖3-14。

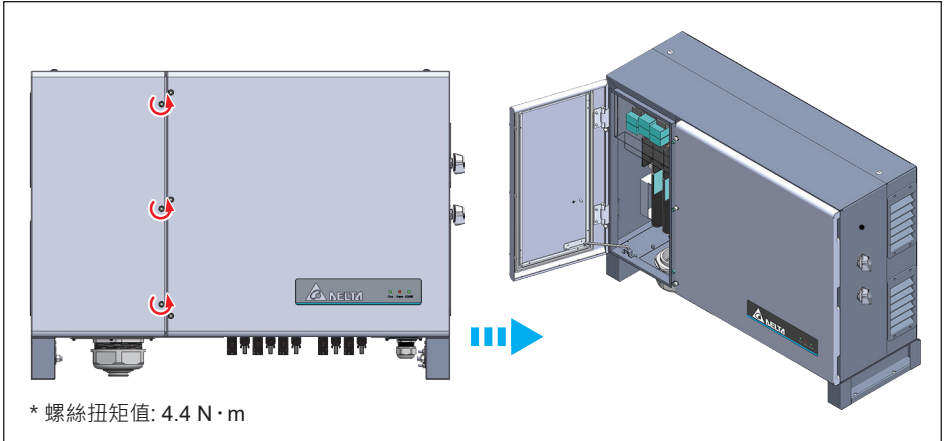


圖3-14：交流側(左側)前蓋

注意



- 請使用六角板手(圖2-1, 物件5)或其他適當的工具鬆開前蓋螺絲。
- 前蓋螺絲為固定式螺絲，請勿拆卸。
- 關門時，請使用扭力板手並依上圖扭矩值鎖附螺絲。

3.4 交流配線安裝

危險：觸電危險!!



- 配線時禁止供給變流器任何電源。

危險！



- 禁止同時開啟兩側前蓋。

警告！



- 遵守條文為安裝者的責任。
- 直流電壓超過1500V則保固失效。

注意：變流器及設備可能損毀！



- AC端子安裝須遵守當地電氣法規。
- 不遵守指示可能會損壞交流線材。

注意：錯誤的交流線材！



- 為了不損壞變流器中的組件，請確保將正確的線材連接到變流器上相應的交流端子。

3.4.1 AC 形式與連接方式

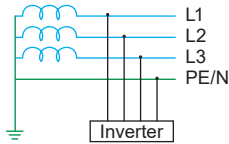
注意

機器初始設定為 3 Φ -3W 接線方式，也可變更為 3 Φ -4W 不含中性點N的接線方式。變流器可工作於下述電力系統連接方式無須額外接外部變壓器。



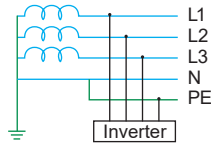
TNC system

347/600V



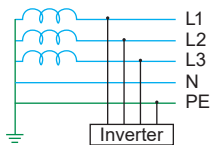
TNC-S system

347/600V



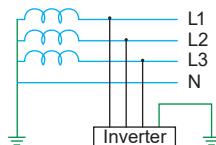
TNS system

347/600V



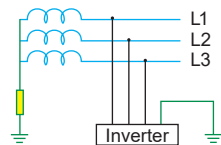
TT system

347/600V



IT system

347/600V



3.4.2 必要保護裝置

建議於市電端與變流器間加入斷路器做為過電流保護。

型號	斷路器規格
M125HV_111	175A max.

3.4.3 交流配線安裝

請遵循以下步驟組裝交流端子：

- 請選用適當線材尺寸(圖3-15)
- 線材表面積範圍: 銅線- 50~185 mm² / 鋁線- 95~185mm²
- 每個壓接端子的最大寬度需小於31mm，內徑需小於 Φ 10.5mm (圖3-16)
- 可以使用銅端子

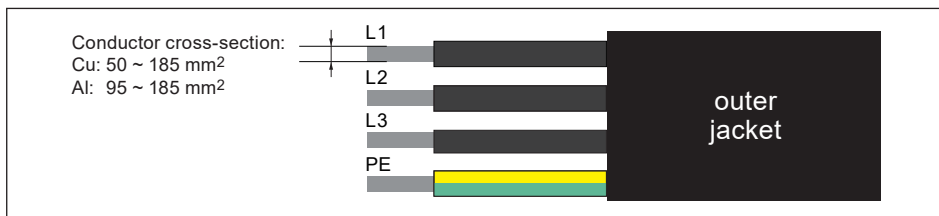


圖3-15 : 交流線材剝線

AC Terminal (tin-plated)

Conductor	Compatible Lug
Cu	Cu(Tin-Plated)
	Cu(Nickel-Plated)
	Pure Cu
	Stainless steel
Al	Aluminum (Tin-Plated)*
	Bi-metal*

PE Connection (Nickel-plated)

Conductor	Compatible Lug
Cu	Cu(Tin-Plated)
	Pure Cu
Al	Aluminum (Tin-Plated)*
	Bi-metal*

* 將導線插入端子接線片之前，建議塗抹凡士林（須為中性、不含酸、鹼成分），以獲得最佳保護。

選用的纜線操作溫度要有到 90°C。

圖3-16 : 壓接端子尺寸

3.4.4 交流側- 配線前準備

在進行導線與端子座安裝連接之前，請遵循以下步驟。

對於每個AC端子 (L1 · L2 · L3 · PE) :

請用17mm六角板手進行拆裝螺絲。如果使用電動工具進行施工，請確保使用適當扭力值，避免超過或不足擰緊螺絲的扭力值。當AC鎖附螺絲頂到最低點時，請勿再進行鎖附，避免造成端子座損傷。

注意

有可能產生高溫:

若壓接點的阻抗過高，該點則有可能產生高溫導致火災。

為確保安全性及可靠的接觸點，請確實遵守以下步驟

- ▶ 鋁線的導電性較銅線差，鋁線線徑請至少選用比銅線線徑大一個等級。
- ▶ 安裝鋁線時請盡量在低濕度且低腐蝕性的環境下進行。
- ▶ 安裝過程需快速。
- ▶ 使用最大允許的壓接扭力進行壓接。

3.4.5 交流配線

有關用於連接交流端子的導線準備步驟，請參閱第3.4節。

確保所使用的交流導體尺寸符合NEC或當地電力法規的規範，參閱圖3-15。

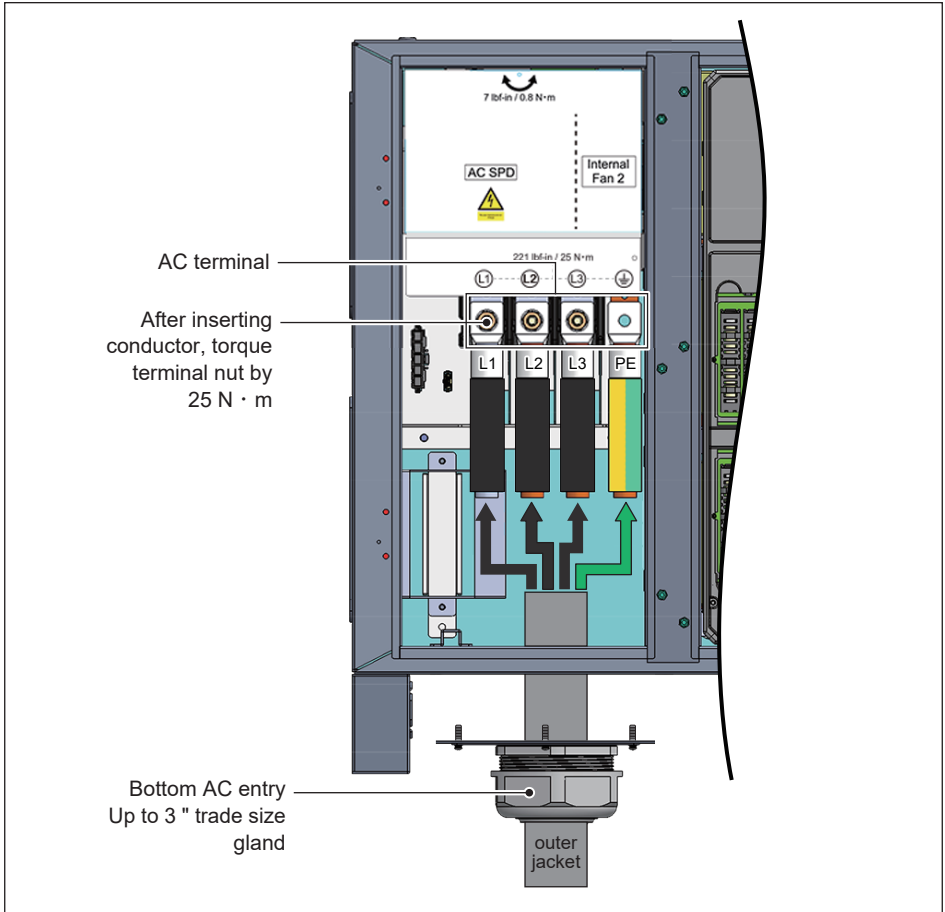


圖 3-17: 交流端子位置圖

圖3-17為交流導管安裝處和連接機器內部交流端子的位置圖：

- 如第3.4.4節所述，卸下所有交流端子上的六角螺絲
- 確保將正確的導線連接到相應的端子位置
- 插入導線後，使用M10螺母鎖緊L1~L3及PE端子，安裝鎖附扭力值為25 N·m

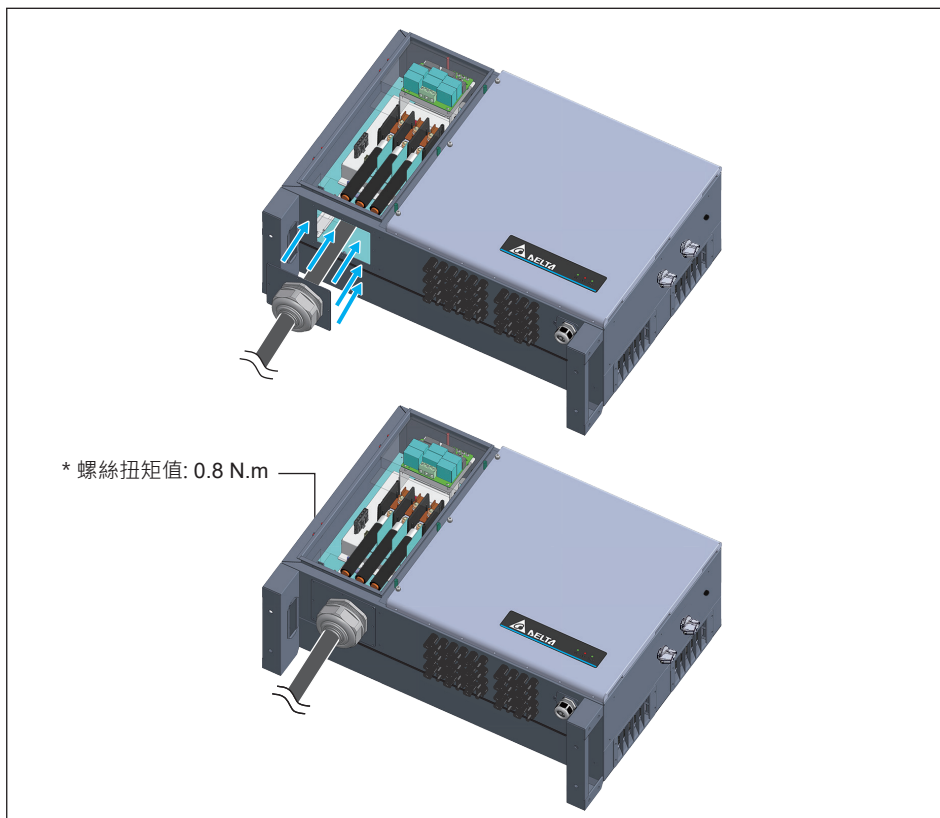


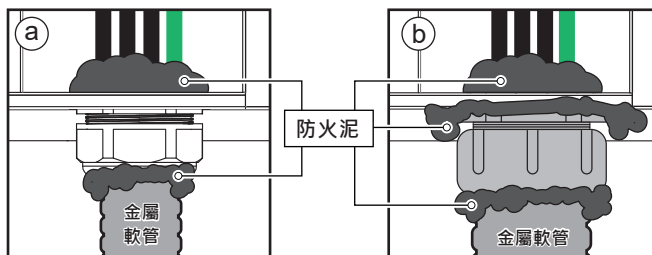
圖 3-18: 交流電纜安裝

注意！

機器上的電纜接頭適用於多芯電纜，當使用單芯電纜搭配3" 金屬軟管配線時，請遵照下列建議預防水氣侵入：



- 將金屬軟管接入電纜接頭內，並使用防火泥填補軟管與接線盒內外部及電纜接頭與軟管間的縫隙
- 將電纜接頭更換為3" 金屬管接頭，並使用防火泥填補軟管與接線盒內外部及金屬管接頭與軟管間的縫隙



3.5 直流配線安裝

危險:觸電危險!!



- 太陽能串列將太陽能轉換成高壓直流形式，此高壓有可能造成觸電危險。
- 配線前請使用非透明物質將太陽能串列遮蓋起來。
- 配線時請確認電壓極性

危險!



- 禁止同時開啟兩側前蓋。

警告!



- 直流及交流高電壓，存在觸電及火災危險。
- 僅允許使用有標示低於1600V的太陽能串列。
- 配線時請確認直流開關在"關"的模式，且太陽能陣列沒有連接。

注意：DC開關！



- 為了不損壞變流器內部元件，請勿頻繁且快速地切換直流開關，正確的操作方式為等待LED顯示"綠燈滅及黃燈閃爍"(無直流)或間隔5分鐘。

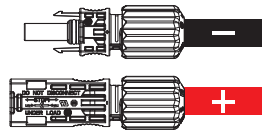
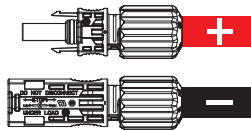
注意



- 太陽能陣列的正或負端皆禁止接到地。

危險:觸電危險!!

- 在安裝直流端子時，請務必確認端子極性是否正確，錯誤的極性，將可能導致變流器造成損壞。



3.5.1 直流接線安裝

連接時請遵循以下步驟：

- 請使用材質為銅的導線，並確認尺寸符合NEC或當地法規。
- 剝除6.5-7.5mm的電線外皮。
- 每根直流導線的橫截面積為12/10 AWG (4/6mm²)。
- 直流端導線分為正負極配接，其配線方式如圖3-20所示。

配件包附有H4 Plus端子(圖3-19)適用導線外徑5.0~7.8mm。

若導線外徑超過7.8mm，請聯繫客服選配H4SxC8DM系列端子，適用線徑請參考表3-1。

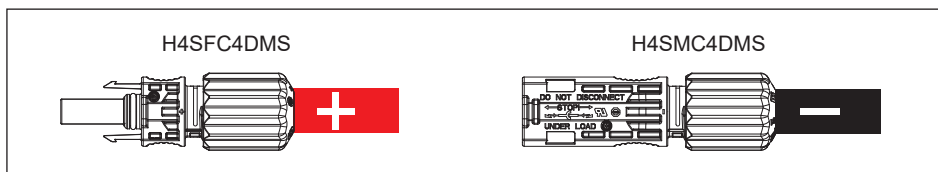


圖 3-19: 直流接線端子

表 3-1: H4 系列端子

導線橫截面積	H4SxC4DM Plus (標配) 適用外徑: 5.0~7.8mm	H4SxC8DM Plus (選配) 適用外徑: 7.5~8.8mm
12 AWG (4mm ²)	○	X
10 AWG (6mm ²)	○	X
8 AWG (10mm ²)	X	○

注意



- 請勿拆除未使用的直流端防水塞，以確保IP65。

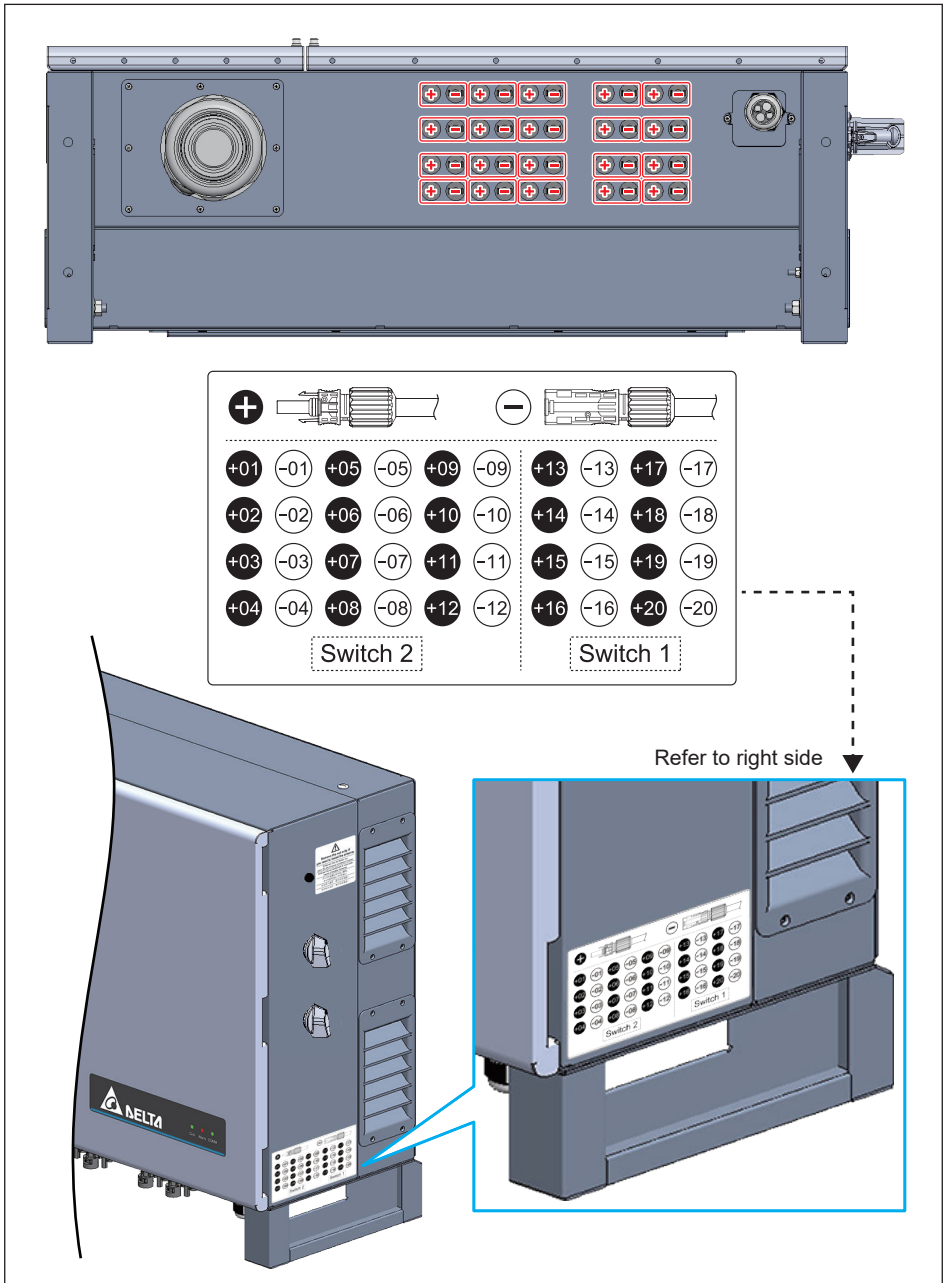


圖 3-20：UTX 端子與直流光伏組串對照圖

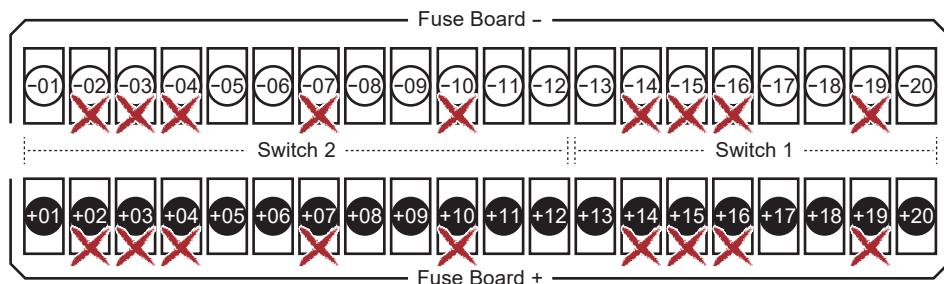
■ 直流側擴充端子

M125HV_111適用CE承認的1500V/30A保險絲，如下說明：

- 光伏電池並聯的最大短路電流(Isc-stc)需低於變流器之最大短路電流(150A)
- 內部電流裝配限制為30A保險絲，故第2、3、4、7、10、14、15、16及19組串不能使用

建議保險絲型號

1. Mersen Vendor P/N: HP15M30
2. EATON(Bussmann Series) Vendor P/N: PV-30A10F85L
3. Littelfuse Vendor P/N: SPXV 30



注意！



- 第2、3、4、7、10、14、15、16及19組串不能使用。

3.5.2 設備接地

將接地線壓接O型端子後，鎖附於機殼外部接地點(如圖3-21所示)。

安裝扭矩: M6/ 7 N·m

M10/ 25 N·m

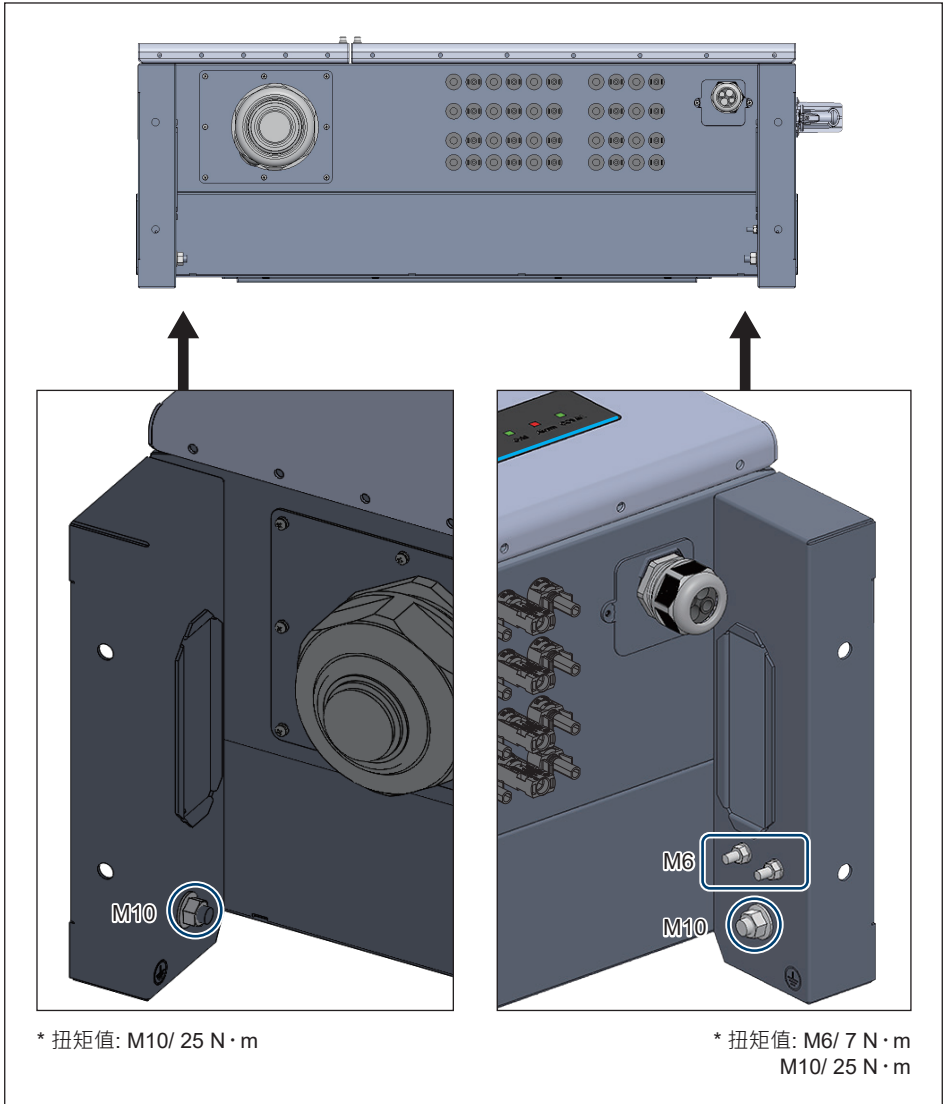


圖 3-21 : 設備接地

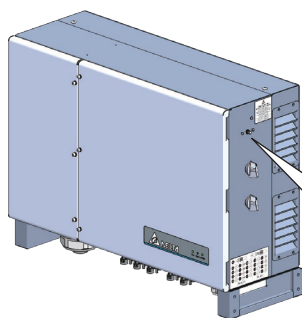
3.6 天線

本機器支援SUB_1G無線通訊，使用前須採用1.2 N·m安裝專用天線。
安裝步驟及注意事項如圖3-22~3-24所示。

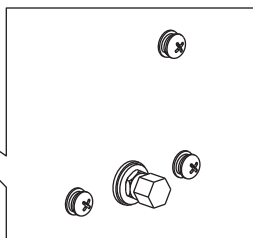
注意



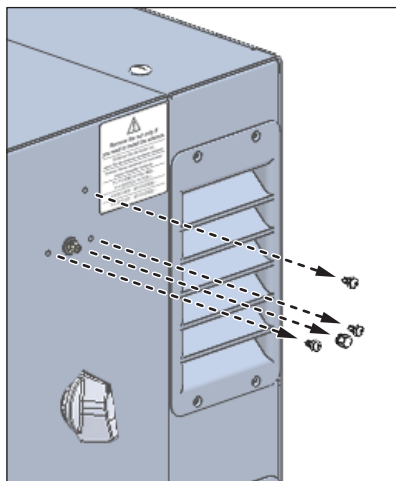
- 不使用天線時，請將防水螺母外蓋及天線支架的三顆M4螺絲鎖上。
- 安裝天線後，請妥善保存防水螺母外蓋。
- 防水螺母外蓋遺失時，請與DELTA聯繫。



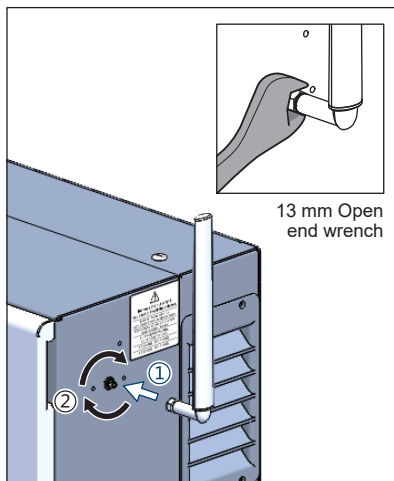
天線安裝位置



安裝天線後，請妥善保存防水螺母外蓋。



拆下防水螺母外蓋及螺絲

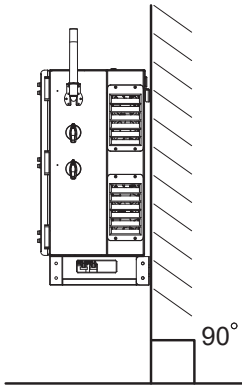
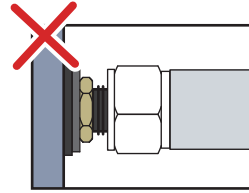
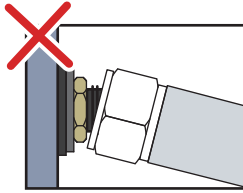
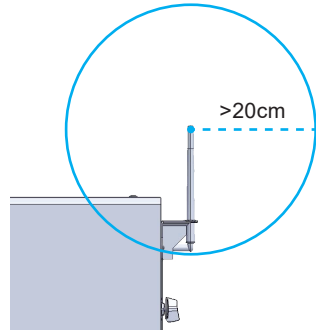


使用13 mm開口板手以1.2 N·m扭力鎖上天線

圖 3-22 : 天線安裝

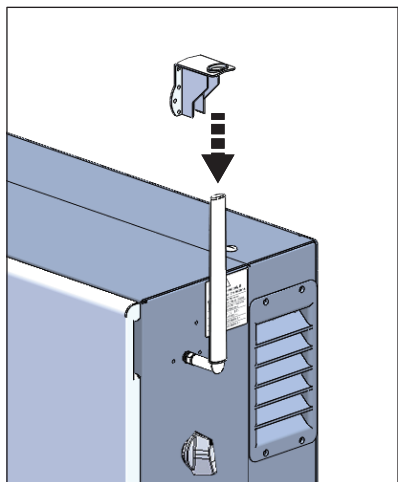


為保持良好通訊品質，請確保天線
周圍20cm無遮蔽物

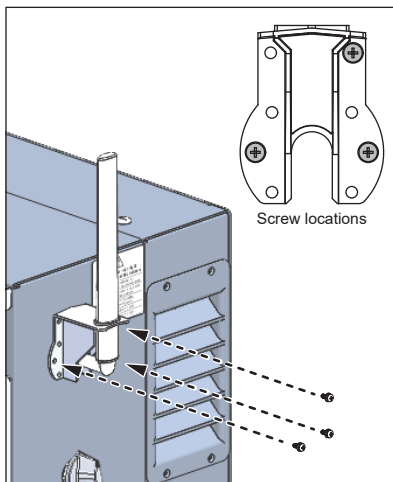


天線保持向上

圖 3-23 : 安裝天線的注意事項



從天線頂端套入天線支架至螺絲孔洞相符位置



以0.98 N·m的扭力鎖附3顆M4螺絲

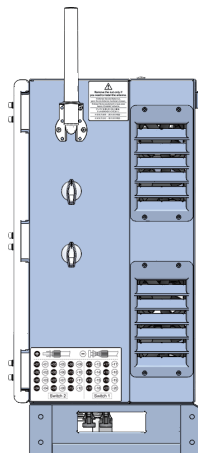
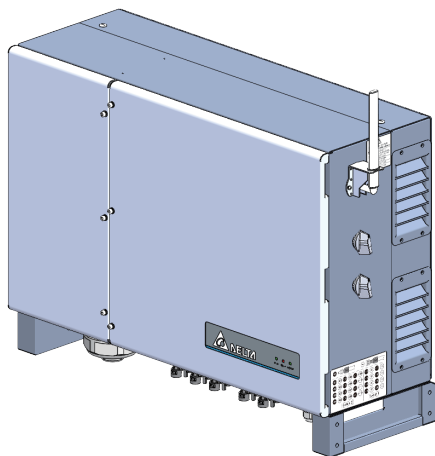


圖 3-24 : 安裝天線支架

注意



- 當配合DELTA PPM DC1_100使用時，請參閱PPM DC1_100使用說明書
https://mydeltasolar.deltaww.com/?p=product_manual



3.7 通訊模組配接方式

M125HV_111的通訊模組如圖3-25所示。

該模組提供一組12V電壓源VCC、RS-485、乾接點、EPO和數位輸入端子供功率控制使用；詳細說明如下。

使用VCC 與GND輸出腳位，可提供一12VDC電源，可供外部裝置使用。

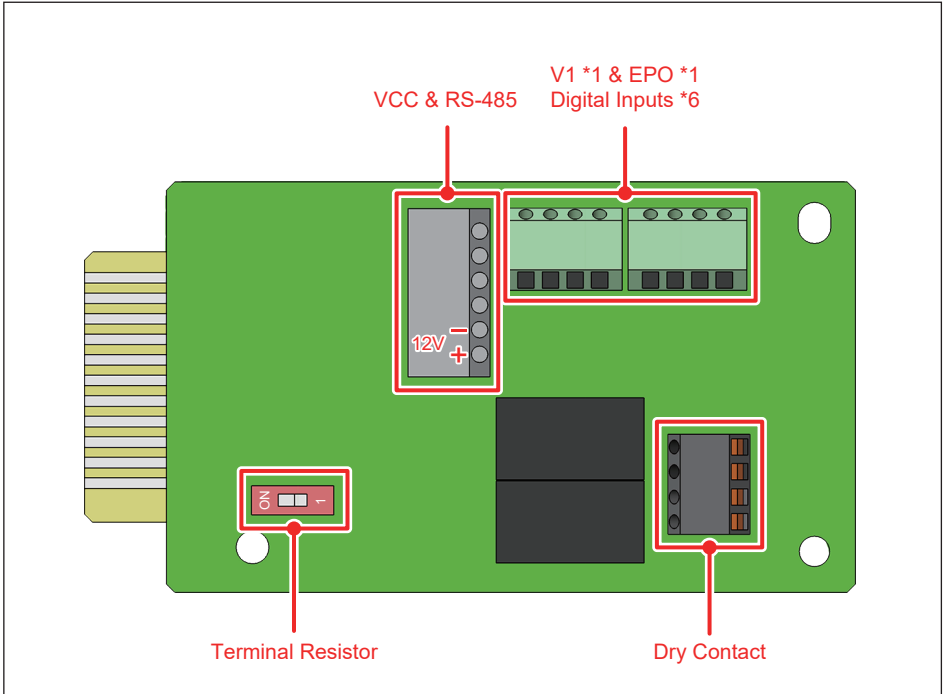


圖 3-25 : 通訊模組

3.7.1 連接通訊模組

M125HV_111底部插槽中搭載通訊模組。模組托架以兩個防脫落螺絲固定於機箱上(圖3-26)。使用通訊模組時，請鬆開兩顆防脫落螺絲並取出拖架，拉出通訊模組後，將訊號線穿過防水導管，並按照以下各節所示進行電氣連接後，按上述步驟反序安裝模組，並確保組件與機箱正確接合。

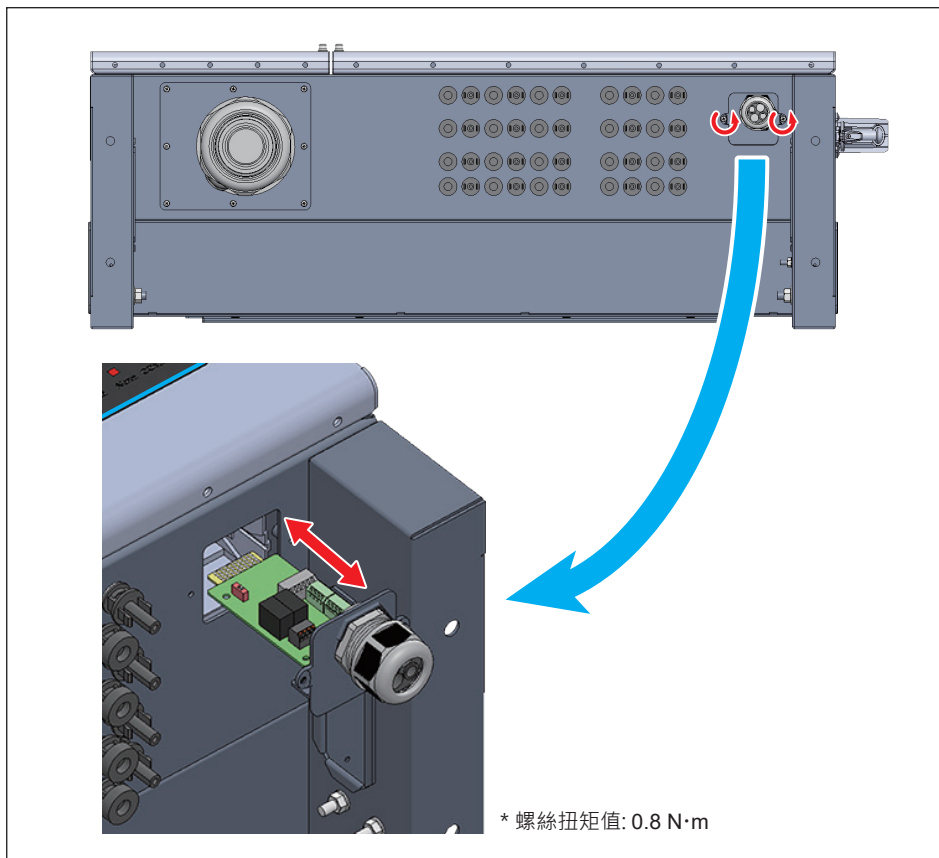


圖 3-26 : 通訊模組位置與連接

3.7.2 RS-485 連線

RS-485端子座腳位定義如表3-1所示

- 腳位1與2提供直流電壓12VDC電源
- 腳位3與5為RS-485差動信號之DATA+信號專用腳位
- 腳位4與6為RS-485差動信號之DATA-信號專用腳位

依據上述的腳位，可以實現多台變流器的通信連接。

本機器設有120歐姆終端電阻，可使用通信模組上的控制開關進行切換(見圖3-25)開關切換方式如表3-2所示。

不同的RS-485連接方式時，需使用不同的終端電阻設定方式。

- 當多台變流器連接時，只有最後一台變流器必須將終端電阻接通如圖3-27。
- 如果RS-485總線長度大於610m，建議使用Belden 3105A電纜或同規品來確保通信品質。
- 一般情況下，RS-485線長建議小於30m

注意



- 為確保良好的通信品質，建議使用絞線之電纜方式配置。

表 3-1: RS-485 端子座說明

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

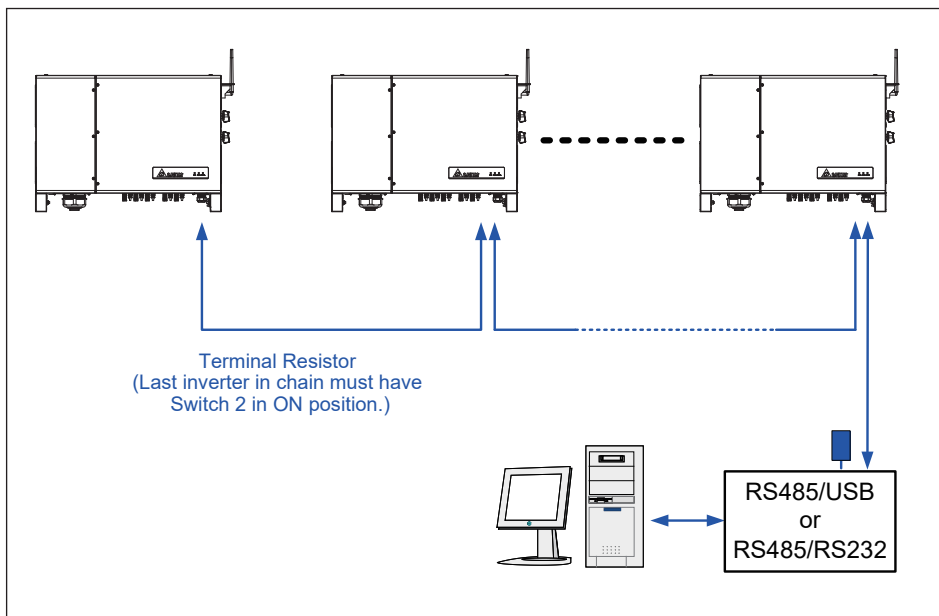


圖 3-27 : 多台併接通訊示意圖

表 3-2 : 終端電阻設定說明

	Switch 1
ON	Terminal Resistor ON
OFF	Terminal Resistor OFF

3.7.3 EPO 緊急關斷功能與數位輸入

本通信模組提供緊急關斷功能(EPO)。
可使用APP或Delta Solar System (DSS)進行設定。

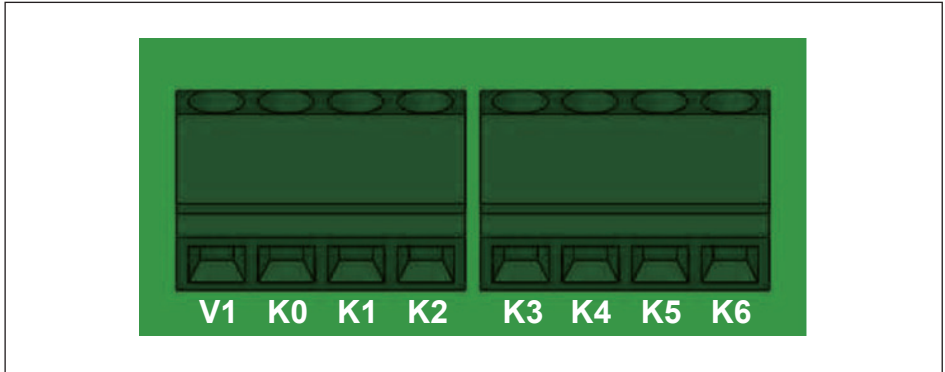


圖 3-28：緊急關斷功能端子座

EPO功能可通過端子[V1 & K0]兩端連接繼電器觸點進行關閉變流器。

此外，可以透過功率降低控制功能限制變流器的輸出功率。
請依表3-3中所示的兩個端子之間放置硬件短路（跳線或繼電器），即可進行此功能的控制設置。

表 3-3: 數位輸入與EPO功能說明

短路腳位	變流器動作反應
VCC & K0	緊急關斷 (EPO)
VCC & K1	控制至0 % 額定功率
VCC & K2	控制至30 % 額定功率
VCC & K3	控制至60 % 額定功率
VCC & K4	控制至100 % 額定功率
VCC & K5	預留
VCC & K6	預留

3.7.4 乾接點連接說明

M125HV_111提供兩組乾接點端子，可依據變流器運行狀態控制外部裝置。該功能的接線端子如圖3-29所示，圖中標示為兩組乾接點端子位置，乾接點為常開狀態，其動作方式定義，使用者可藉由DSS或APP進行設定。

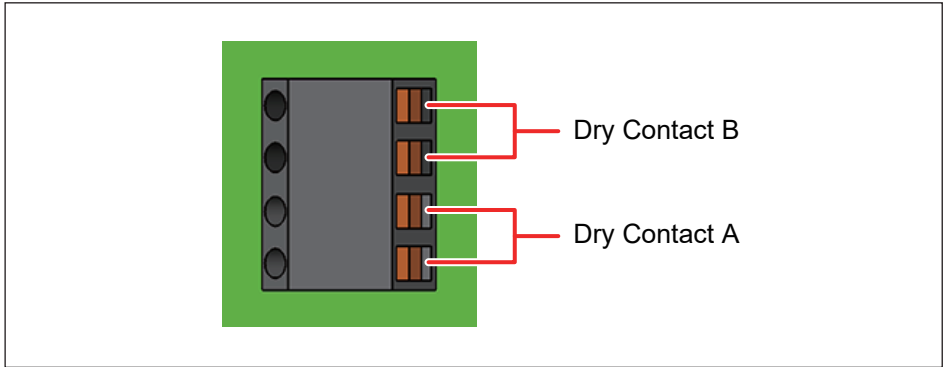


圖 3-29：乾接點連接位置圖

4 試運行

注意：表面高溫，請勿觸碰！



- 當開蓋時請小心表面高溫。
- 表面冷卻前請勿接觸變流器。

4.1 控制面板介紹

M125HV_111 提供3顆LED 燈號提供變流器的狀態顯示，如圖4-1所示。
LED燈狀態對應表，請參考表 4-1 所示，可利用該表獲得變流器運行狀態資訊。

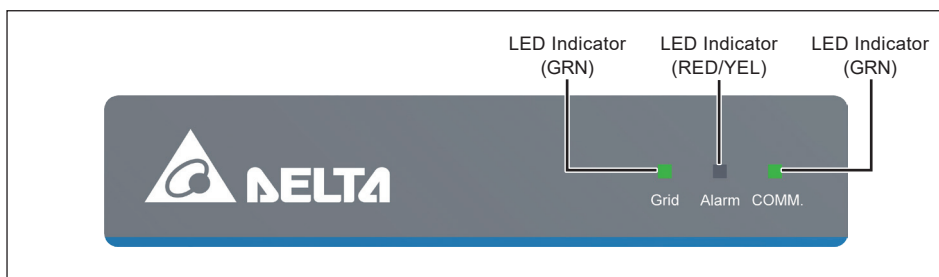


圖 4-1：顯示面板

表 4-1: LED 指示燈

狀況	Grid (綠)	Alarm (紅/黃)
Countdown	FLASH	OFF
On Grid	ON	OFF
Inverter Fault / Remote off	OFF	ON / OFF
Inverter Warning	ON (or OFF)	FLASH / OFF
Field Fault	OFF	OFF / ON
Field Warning	ON	OFF / FLASH
NO DC	OFF	OFF / FLASH SLOW
FW Upgrade	FLASH	FLASH / OFF
Standby	FLASH	OFF / FLASH
Check PV Power	FLASH FAST	OFF / FLASH FAST

*FLASH: ON 1s / OFF 1s

**FLASH FAST: ON 0.25s / OFF 0.25s

***FLASH SLOW : ON 5s / OFF 10s

表 4-2: LED 通訊指示燈

SUB_1G Condition	COMM (綠)
Work	FLASH
Fault	OFF

* FLASH: ON 3s / OFF 2s

4.2 自動ID連線工具使用說明

當機器完成RS-485 連接後，可利用自動ID連線工具進行全部變流器的ID設定。

注意



請至下方網址進行軟體下載
https://mydeltasolar.deltaww.com/dl_installer_guide.php?f=autoid



4.2.1 自動ID 設定

The screenshots illustrate the following steps:

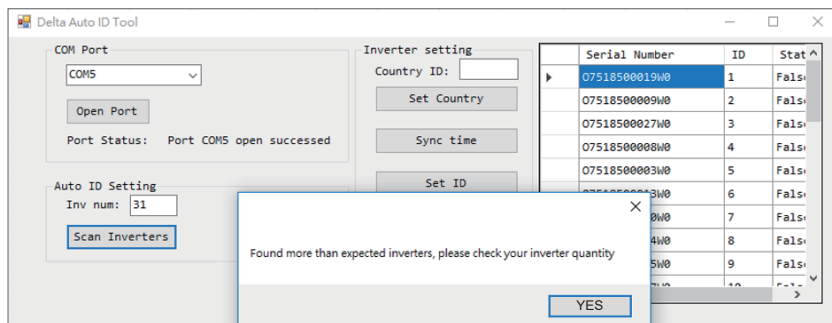
- 開始軟體**
1. 選擇 COM Port 並點 **Open Port**
- 2. 輸入變流器數量並點 **Scan Inverters****
- 3. 出現變流器編號及 ID,並顯示 OK 即完成。**

Serial Number	ID	Status
0751850003W0	1	OK
07518500023W0	2	OK
0751850002W0	3	OK
07518500014W0	4	OK
07518500012W0	5	OK
07518500019W0	6	OK
07518500016W0	7	OK
07518500020W0	8	OK

圖 4-2：自動ID設定步驟



當輸入的ID設置數量少於變流器數量時，狀態將顯示錯誤。



當輸入的ID設置數量大於變流器數量時，狀態將顯示錯誤。

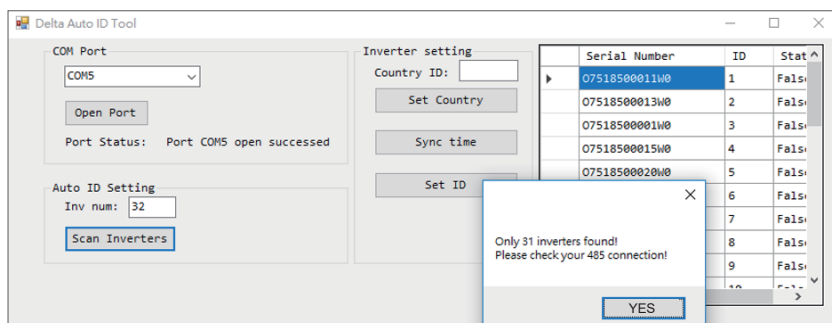


圖 4-3 : 自動ID 設定無效說明

4.2.2 ID設定

當需要調整ID順序時，請依下述說明進行設定

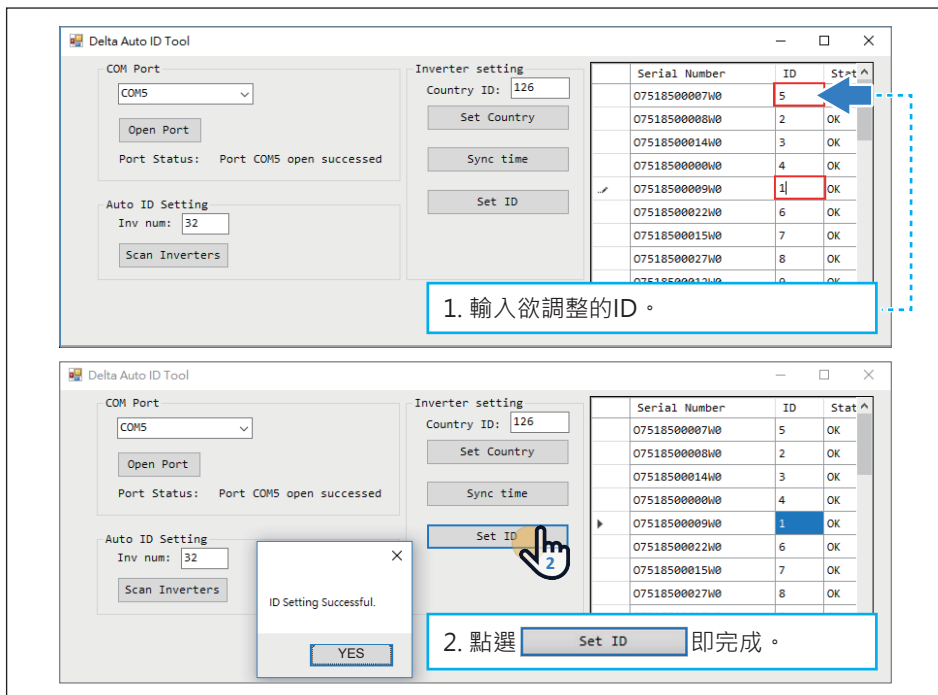


圖 4-4：設定ID 步驟

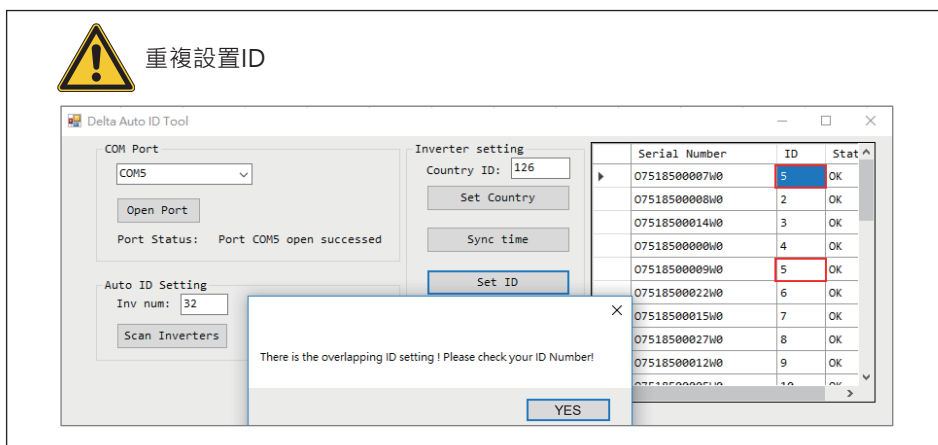


圖 4-5：ID設定錯誤範例

4.2.3 國別設定

藉由Country ID 設定國別

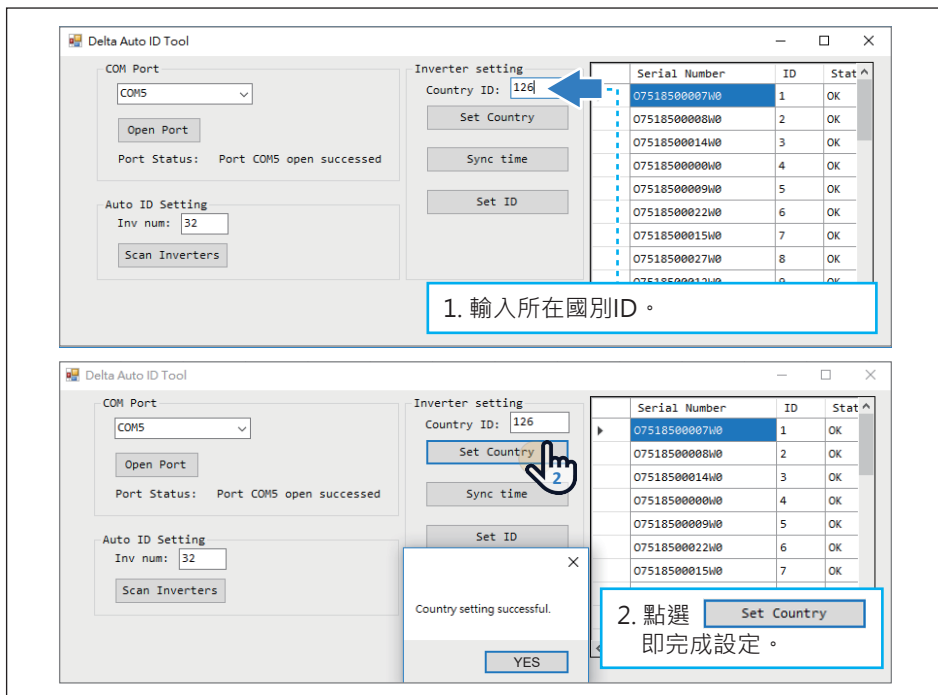


圖 4-6：國別設定步驟

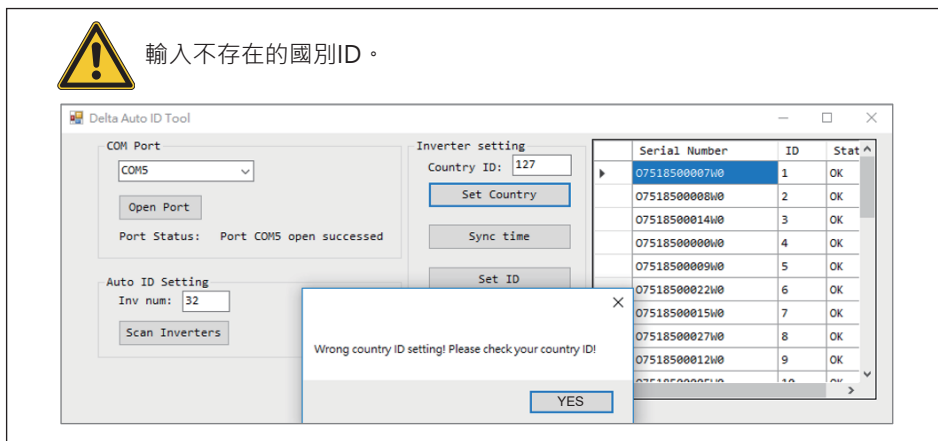


圖 4-7：國別設定錯誤範例

4.2.4 時間同步設定

藉由自動ID工具進行時間同步。

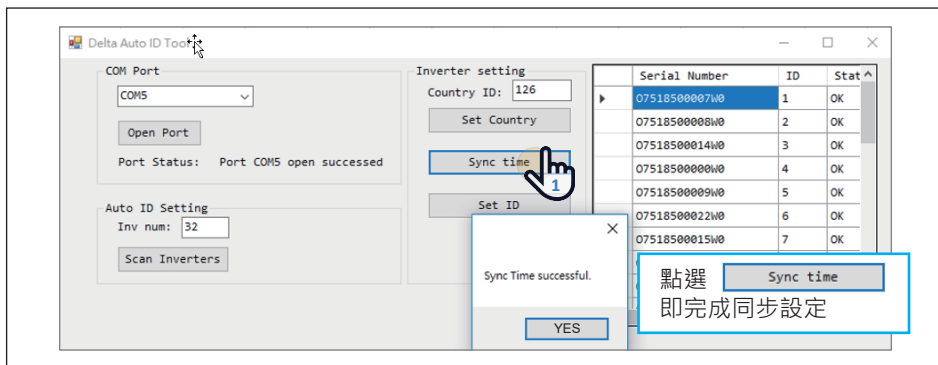


圖 4-8：時間同步設定步驟

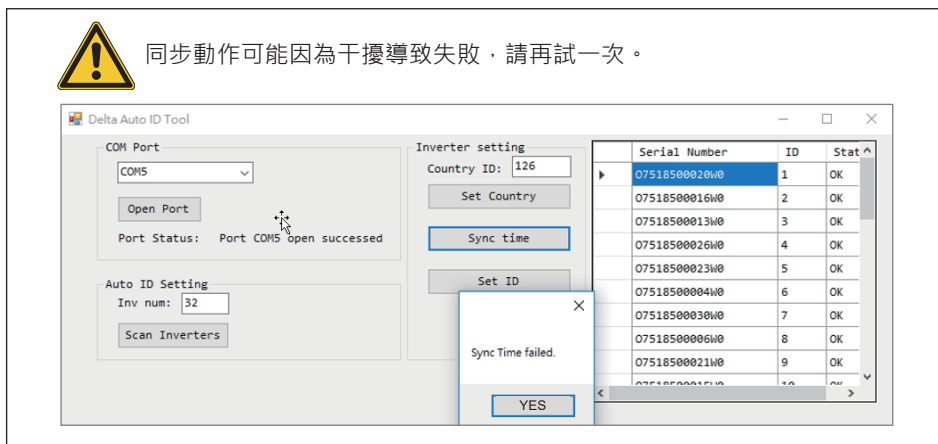


圖 4-9：時間同步設定錯誤範例

4.3 Delta功能設定

Delta 提供兩種機器設定方式：

DSS (Delta Solar System Software) 與 APP(MyDeltasolar)

功能列表	
Active power control	Q(U) control (volt-var control)
P-F control (watt-frequecy control)	Q by night (Q setting 24/7)
P(U) control (volt-watt control)	Anti-PID
Fixed cosφ	Dry contact
Fixed Q(%)	Pro EL mode
Auto ID	

請使用下面連結取得使用說明

DSS 操作手冊:

https://mydeltasolar.deltaww.com/manual/eng/SUB_1G/DSS.pdf



APP (MyDeltaSolar) 操作手冊:

https://mydeltasolar.deltaww.com/?p=product_manual

- 資料收集器 > PPM DC1_100



5 維護

為確保變流器正常運轉，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、散熱出風口有無異物阻塞。如有上述情形，請聯絡合格之技術人員進行維修、清理或更換。

警告！



- 進行任何維修動作前，請確定交直流電源皆已切斷以避免觸電危險。
- 禁止同時開啟兩側前蓋。

5.1 開啟與關閉前蓋

為確保變流器正常運行，開啟或關閉前蓋時，請遵守圖5-1~5-3步驟。
開啟前蓋後，請依照圖5-2方式，將前蓋固定。

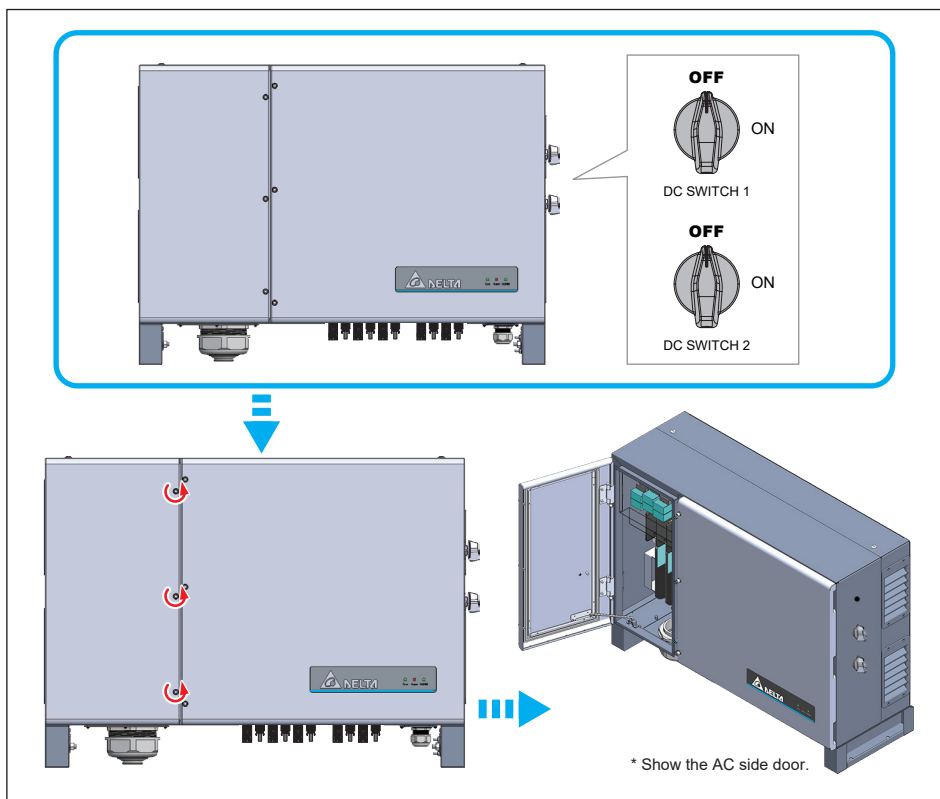
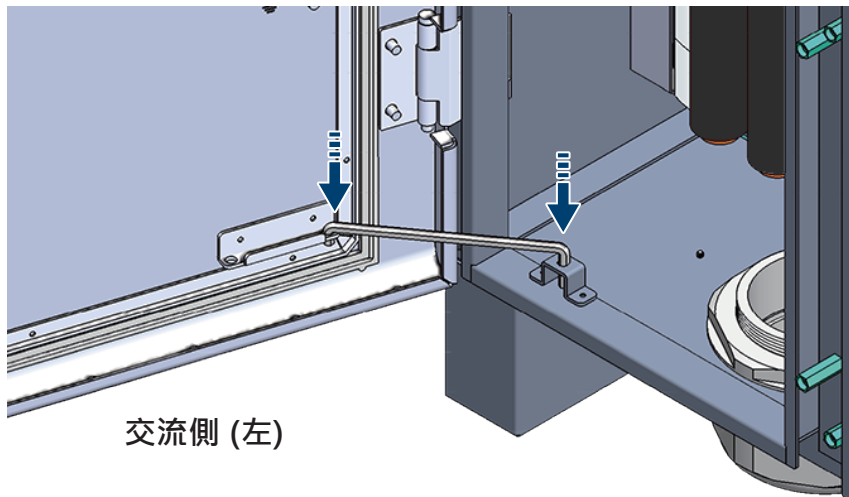
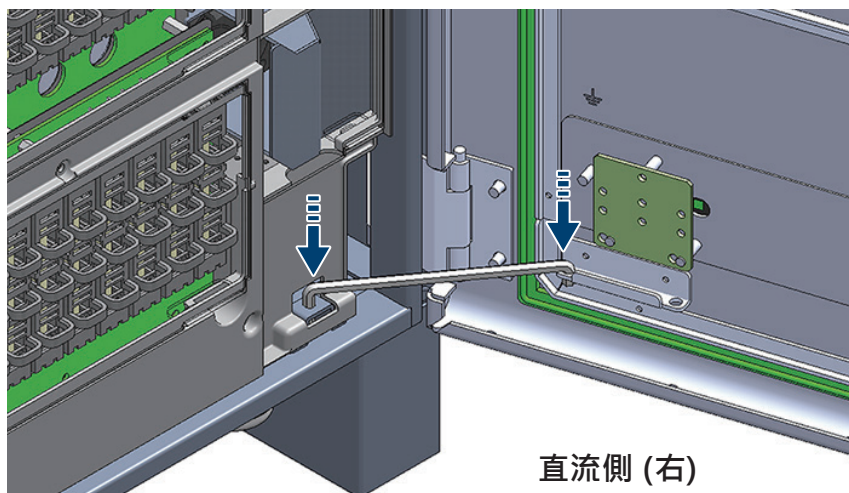


圖 5-1：開啟與關閉前蓋



交流側 (左)

or



直流側 (右)

注意



- 開啟前蓋後，請利用板手將前蓋進行固定，避免因為強風導致前蓋搖晃。

圖 5-2：利用板手將前蓋進行固定

注意



- 請使用六角板手(圖2-1, 物件5)或其他適當的工具鬆開前蓋螺絲。
- 前蓋螺絲為固定式螺絲，請勿拆卸。
- 關門時，請使用扭力板手並依下圖扭矩值鎖附螺絲。

5.1.1 開啟前蓋

- 在沒有雨遮的情況下，切勿在陰雨天氣下打開前蓋，以保護變流器。
- 關閉直流電源並等待LED指示燈熄滅。
- 使用六角板手鬆開3個前蓋螺絲。
- 注意不要污染前蓋上的墊圈和接合表面。

請勿長時間開啟前蓋。

5.1.2 關閉前蓋

關閉前蓋之前注意事項：

1. 確認前蓋門框表面與前蓋防水墊圈清潔，必要時請先擦拭。
2. 確認墊圈在其安裝槽中且定位正確並對齊。

當關閉前蓋時：

請使用扭力板手依下圖之順序與扭力鎖附螺絲。

關閉前蓋後：

確認螺絲確實鎖附無歪斜(圖5-3)。

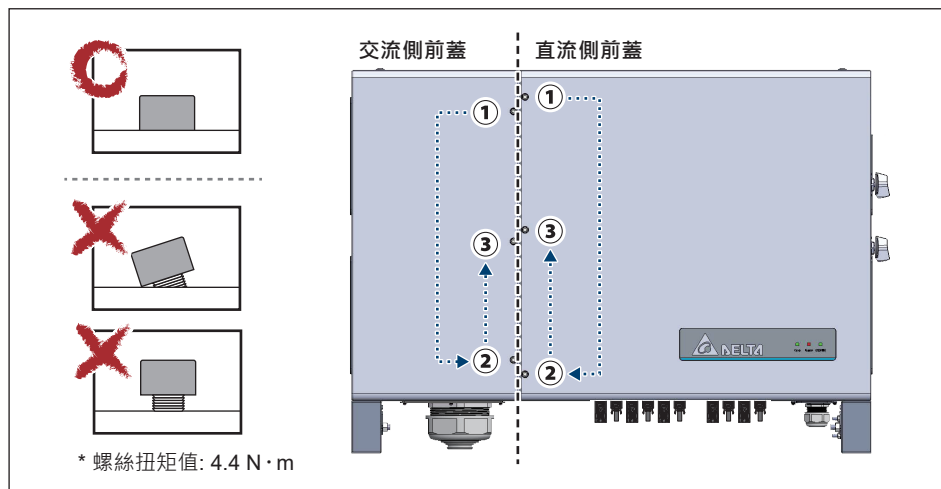


圖 5-3：關門步驟

5.2 更換雷擊保護裝置 (SPD)

M125HV_111 配置交流與直流側的雷擊保護裝置 (SPD) · 如圖 5-4 所示。
表 5-1 為交流與直流側雷擊保護裝置的規格。

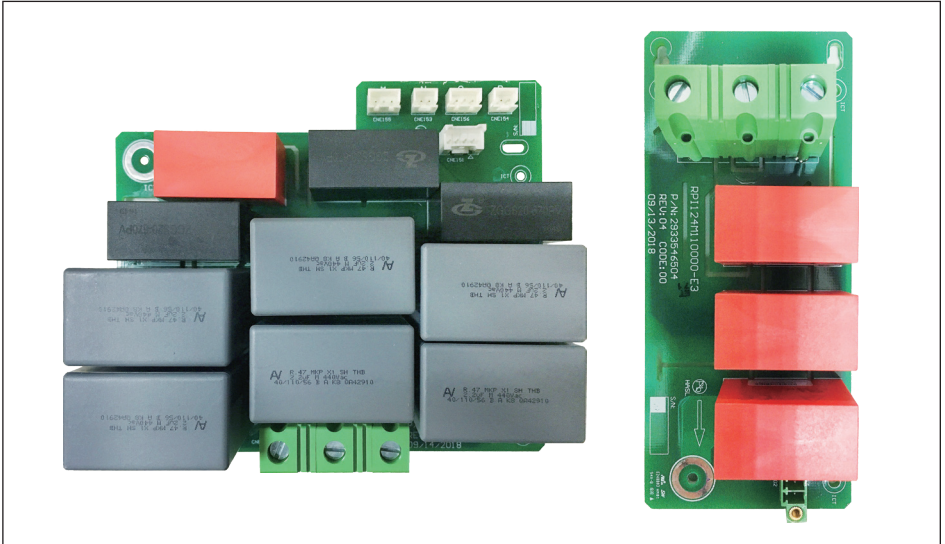


圖 5-4 : 交流與直流側的雷擊保護裝置

表 5-1 : 雷擊保護裝置規格

Description		Value
Working voltage:	AC Module	1190VRMS
	DC Module	1800VDC
Working Current (8/20us)		10kA
Rated Current (IMAX – 8/20us)		20kA
Operating Ambient Temperature Range		-40°C to 85°C
Manufacturer:	Sichuan Zhongguang Lightning Protection Technologies Co., Ltd	

雷擊保護裝置是為了保護較為敏感的電路元件，避免當其受到雷擊或電壓驟變時損壞。雷擊保護電路位於變流器內部，當APP或DSS故障訊息出現 " AC Surge" 或"DC Surge" 時，請按照下頁順序進行更換。

請參考圖5-5 所示，依據LED燈號進一步判斷SPD是否損壞。

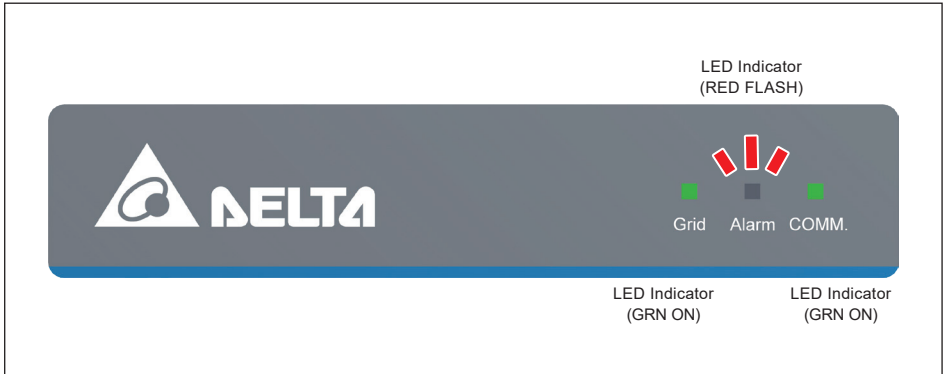


圖 5-5 : SPD故障時的面板顯示

- 開啟前蓋步驟
 1. 將直流電源關閉，並等待LED 燈號熄滅。
 2. 遵照5.1.1章節順序開啟前蓋，施工時請勿長時間開啟前蓋。

- 依據以下順序更換SPD模組：
交流與直流雷擊保護器位置如圖5-6 所示。

- **更換異常的AC SPD模組 (圖 5-7)**
 1. 從AC SPD電路板上拆下5條信號排線。(4-pinx1, 3-pinx2, 2-pinx2)
 2. 從AC SPD電路板上拆下3條power wirings。
 3. 拆下AC SPD電路板左側的2顆防脫落螺絲。
 4. 取下異常AC SPD電路板並更換新模組。
 5. 按反順序使用上述步驟安裝新的AC SPD。
將5個螺絲鎖緊至扭矩值如圖5-7所示。

- **更換異常的DC SPD模組 (圖 5-8)**
 1. 從DC SPD電路板上拆下1條信號排線。
 2. 從DC SPD電路板上拆下2條power wirings。
 3. 拆下DC SPD電路板右側的2顆防脫落螺絲。
 4. 取下異常DC SPD電路板並更換新模組。
 5. 按反順序使用上述步驟安裝新的DC SPD。
將5個螺絲鎖緊至扭矩值如圖5-8所示。

- 關上前蓋
請依據5.1.2 章節說明，關閉前蓋。

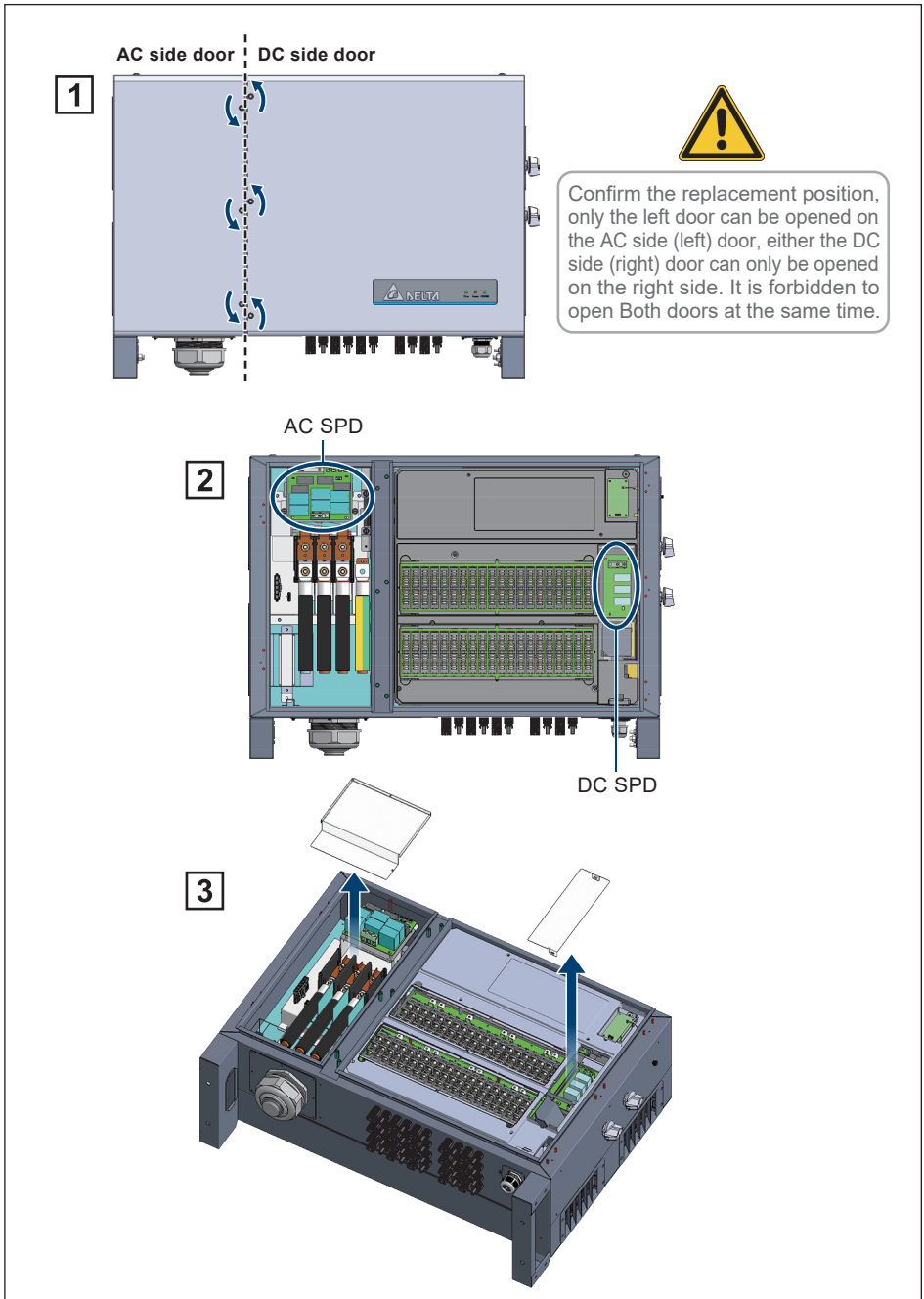


圖 5-6 : SPD更換步驟

AC SPDs

* A/G 螺絲扭矩值: $0.8N \cdot m$

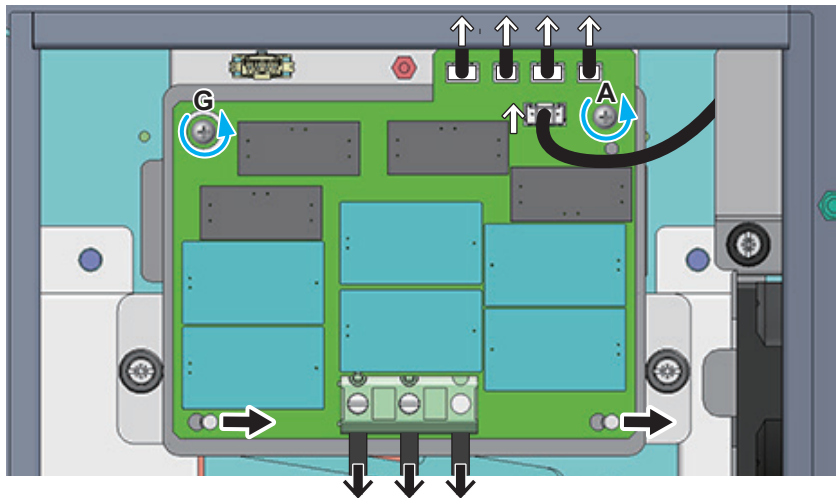


圖 5-7：移除AC SPD 螺絲與排線

DC SPDs

* A/G 螺絲扭矩值: $0.8N \cdot m$

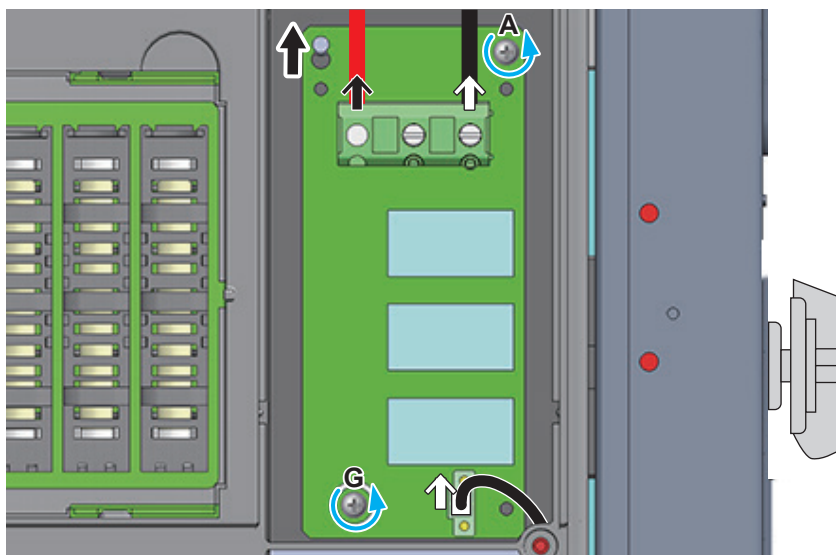


圖 5-8：移除DC SPD 螺絲與排線

5.3 更換保險絲

M125HV_111使用標準的10mm x 85mm PV保險絲和相關的保險絲座。由於採用TL設計，所有組串都不接地，並且每個組串輸入都需要正負極保險絲。

表5-2列出的保險絲品牌與規格均為10mm x 85mm PV保險絲（15A / 20A），皆可用於更換。M125HV_111標配為20A保險絲。

表 5-2 : 保險絲規格

Rated current	20 A	IEC listed	IEC 60269-6
Rated voltage	1500 V	Typical Mfr	Littelfuse
Operating Class	Solar PV	Mfr P/N	SPXV 20
Fuse Type	10x85 ferrule		

危險：觸電危險!!



更換保險絲前，請關閉直流開關，並確保變流器停止運作。

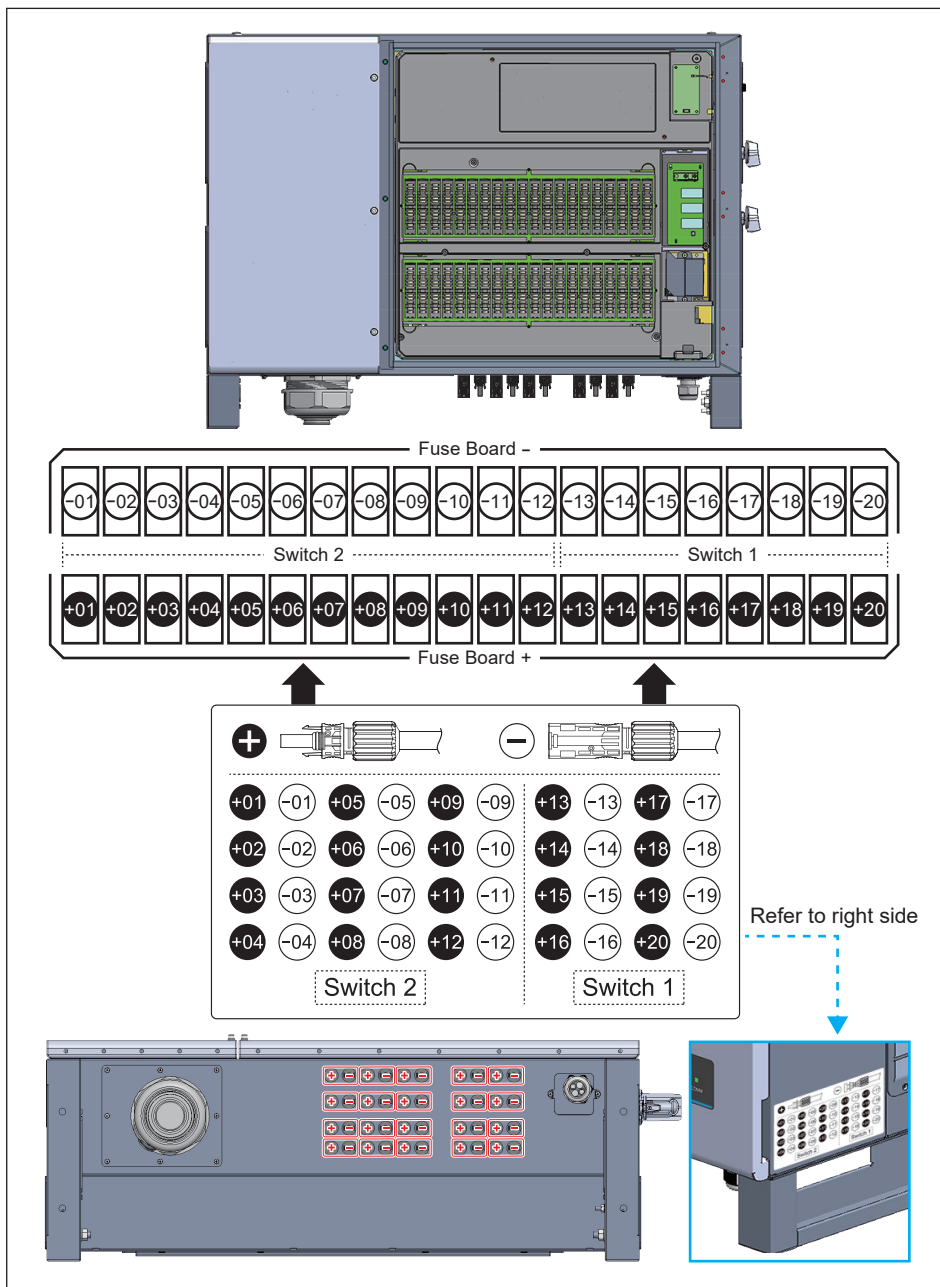


圖 5-9：內部保險絲與底部端子對照

M125HV_111配有40組保險絲，最多可連接20個組串。保險絲座安裝在兩個電路板上，可安全插拔保險絲。

圖5-10為組合式保險絲座和保護罩的位置，請依圖5-11所示拆卸保險絲。詳細內部架構請參閱圖2-5。

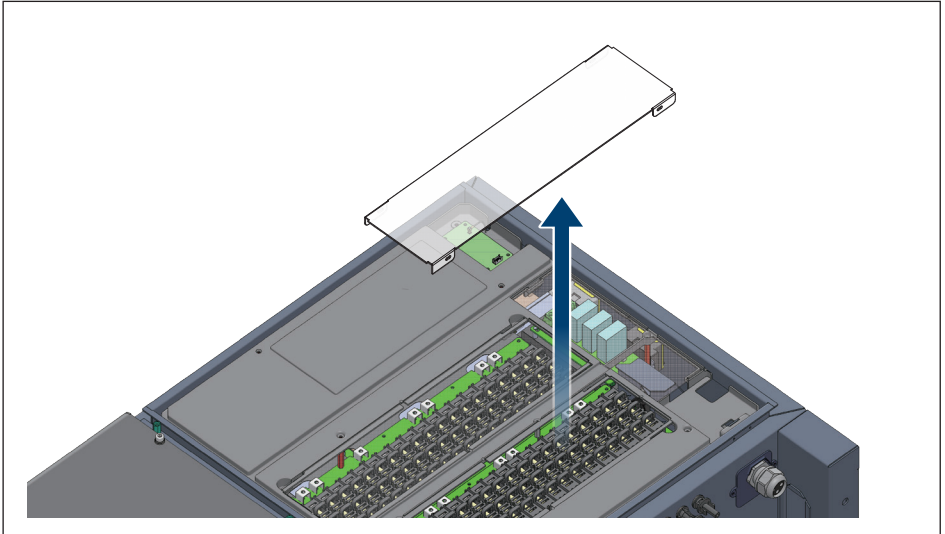


圖 5-10：保險絲座與保護罩位置

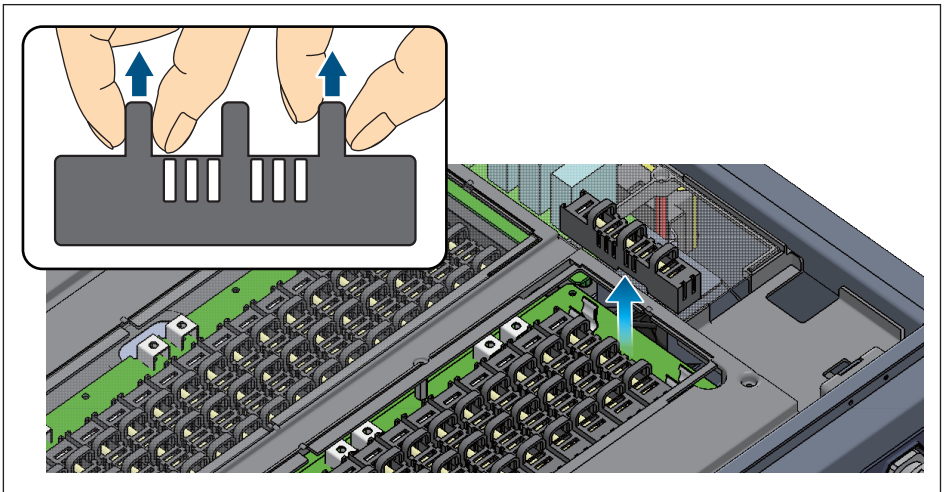


圖 5-11：保險絲座拆卸

① 打開保險絲座

② 取出保險絲

* 請注意一旦保險絲掉落，則須更換新的保險絲

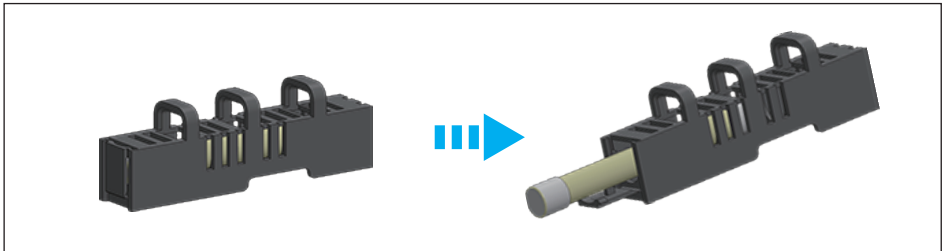


圖 5-12：更換保險絲

若變流器發生發電異常，請依照下列步驟檢查保險絲：

1. 確認是否有組數顯示為零，若有則該組的保險絲有可能已經熔斷。
2. 切斷直流與交流電源並且等待液晶顯示面板熄滅。
3. 請參考5.1.1步驟開啟直流側(右側)前蓋。
4. 根據第一步驟，確認熔斷的保險絲位置並取下(圖5-11)，取下後請確認用三用電錶是否已熔斷。
5. 若需要請更換新的保險絲。
6. 請參考5.1.2步驟關閉直流側(右側)前蓋。

5.4 智慧風扇更換與濾網清潔

M125HV_111提供可控型的智慧風扇冷卻變流器系統，此章節中說明濾網清潔與組裝，以及在案場中更換風扇的方式說明。

此風扇模組具有高可靠度，並且結合控制器提供一個"智能化"的長效型冷卻系統。當控制器偵測到風扇系統異常時，會產生"FAN-FAIL"的故障警報，此時變流器會在安全的運作範圍內進行降載運作。

依據功能性不同，變流器所使用的風扇安裝於兩個位置：

- 功率模組部位
- 變流器內部位置

圖 5-15 為功率模組風扇位置。

圖 5-16, 5-17, 5-18, 5-19 為內部風扇1的位置。

圖 5-20, 5-21, 5-22, 5-23 為內部風扇2的位置。

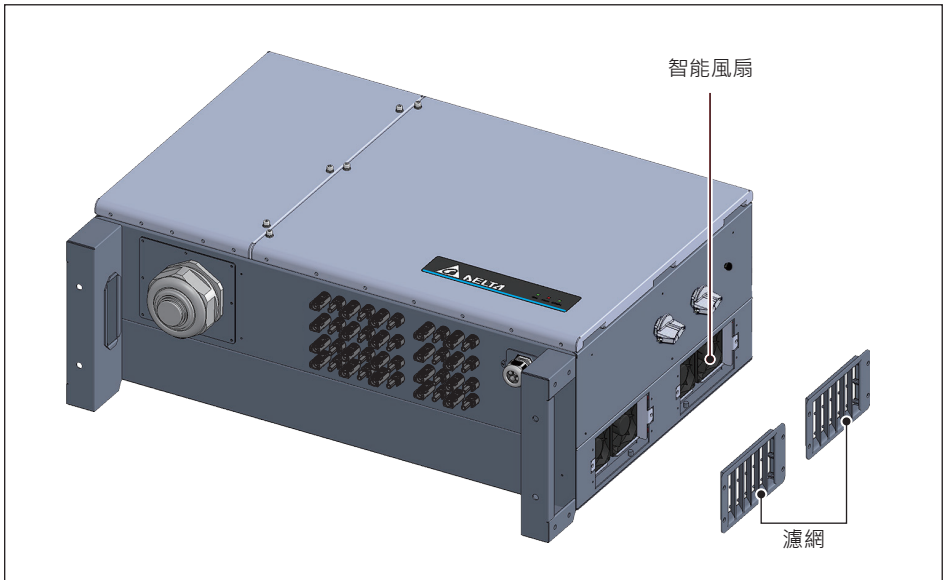


圖 5-13 : 功率模組之智能型風扇位置

注意



需要定期的將風扇和過濾網清潔，以確保長壽命和可靠性。

- 風扇及濾網清潔頻率由當地環境決定。
- 正常環境條件使用下，每四個月需清潔風扇及濾網一次。
- 若安裝於嚴苛環境，建議每個月或每一季需清潔風扇及濾網一次。

因該冷卻系統採用模組化設計，因此具有易清潔與易維護更換的特性。

危險:觸電危險!!



- 在開始任何維護程序之前，請將交流斷路器和直流開關關閉以避免電擊危險！

5.4.1 風扇告警對應位置

當警告訊息顯示 "W11-Fan Fail"，請參考DSS上的錯誤代碼並依循以下章節的步驟，更換對應位置的風扇。

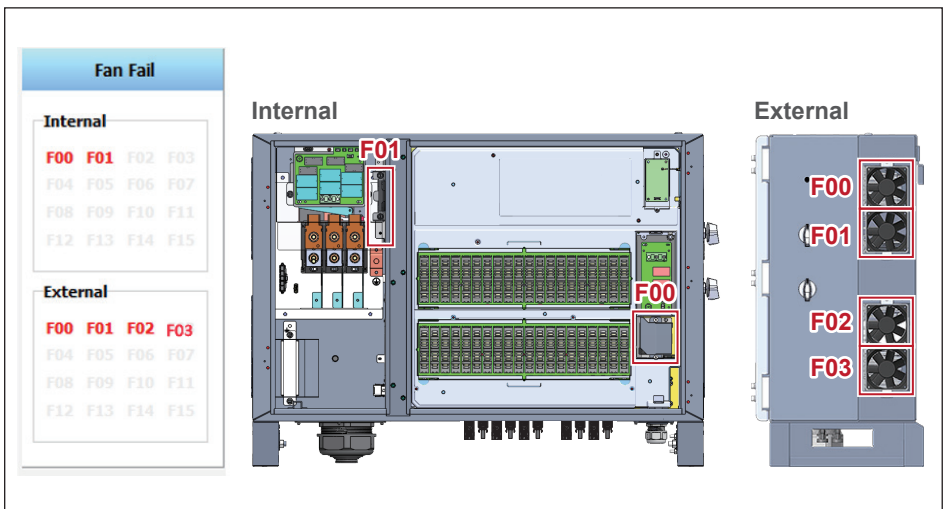


圖 5-14 : DSS錯誤代碼對應之風扇位置

5.4.2 功率模組專用風扇

變流器電子設備主要是利用對流進行冷卻。

而主要的功率元件則必須利用變流器後方的風扇組進行散熱，藉由隔離的配置將熱量透過散熱鰭片通過空氣流動達到散熱的功能。

功率模組使用的風扇組，採用風扇架將四顆風扇進行模組化，同時可進行全速運轉亦可進行轉速調節；當變流器在額定輸出且高溫狀態，風扇將以全速運轉，當風扇故障時，變流器發電狀態則進入降載模式運行。同時在風扇組的入風與出風口處，均有濾網進行保護。

風扇順序如圖5-14所示。

依照告警 "FXX" 所示，更換故障的風扇。

請參閱圖5-15並按照以下步驟操作：

1. 卸下入風口過濾網外蓋的四顆螺絲。
此步驟進行後，同時確認過濾網狀態，必要時進行清潔。
進行風扇維護時，請繼續執行以下步驟。
2. 卸下右側的風扇托盤上的兩顆螺絲
3. 拔除右側風扇電源線的防水端子
(拔除端子時，請依圖5-15-③所示施力於A、B兩端)
4. 從機箱中取出風扇托盤。
要單獨拆卸風扇時，請卸下其固定到風扇托架的四顆螺釘。

重新安裝風扇架時，請按照上述步驟反序組裝並鎖緊螺絲。

螺絲所需扭矩值如圖5-15所示。

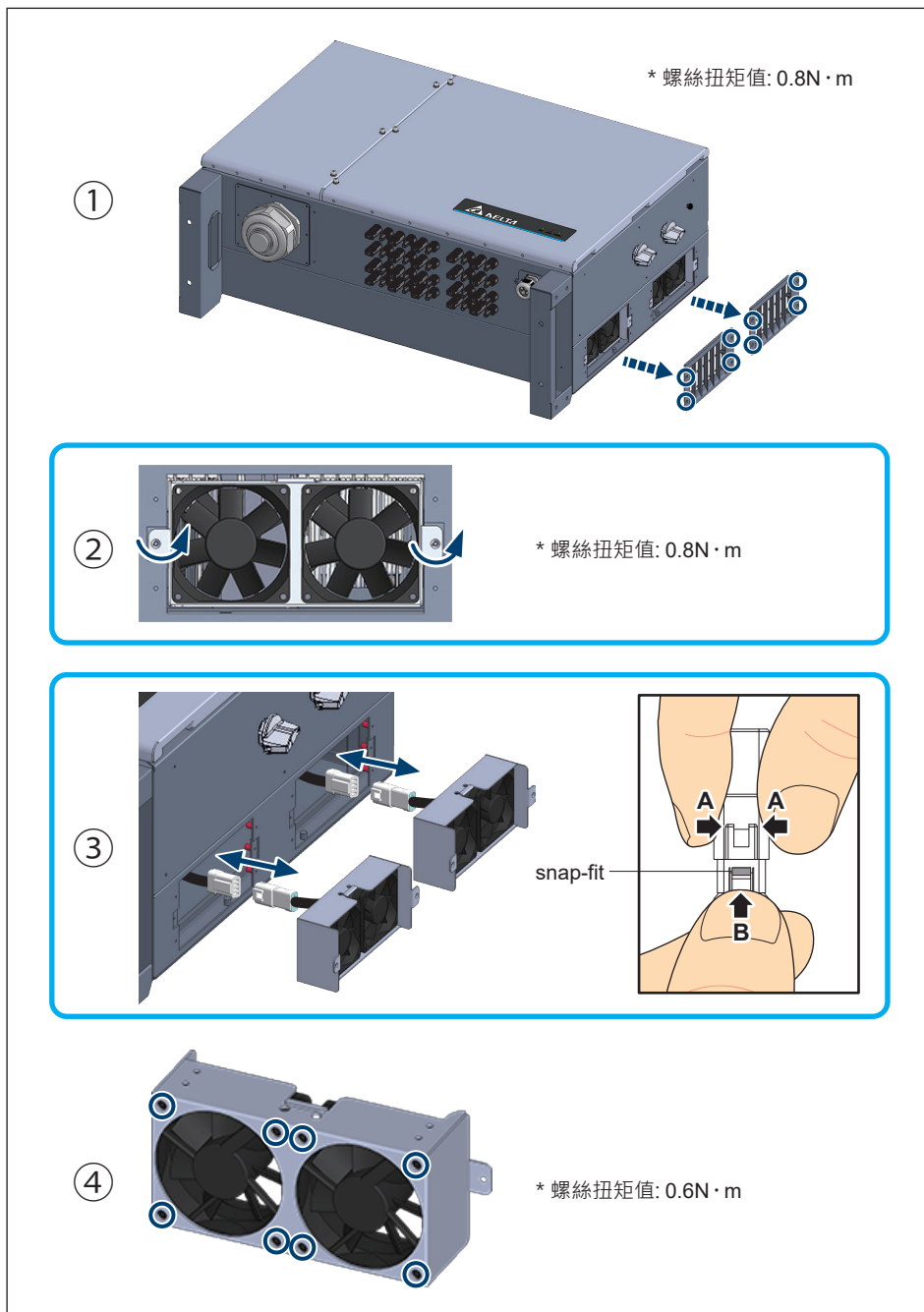


圖 5-15：風扇架拆卸示意圖

5.4.3 內部風扇1

直流側(右側)配有單一風扇模組(圖 5-16, 5-17, 5-18, 5-19)

拆裝內部風扇1步驟

- (1) 拆下保護蓋。(如圖5-16所示)
- (2) 鬆開圖5-17中所示的兩顆螺絲，然後拆下風扇架。
- (3) 斷開風扇電源連接。
- (4) 從直流側(右側)取下風扇組件。(如圖5-18所示)
- (5) 清潔風扇組件或更換新風扇。(如圖5-19所示)
- (6) 使用0.8N·m的扭矩重新組裝。

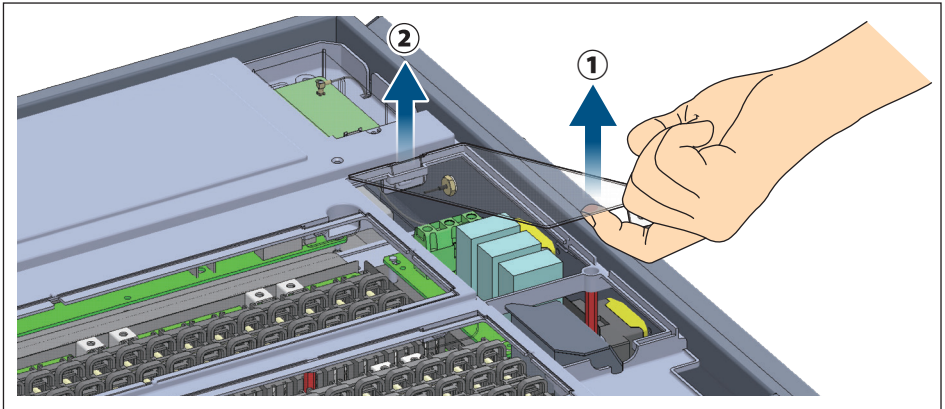


圖 5-16：拆下內部風扇1 保護蓋

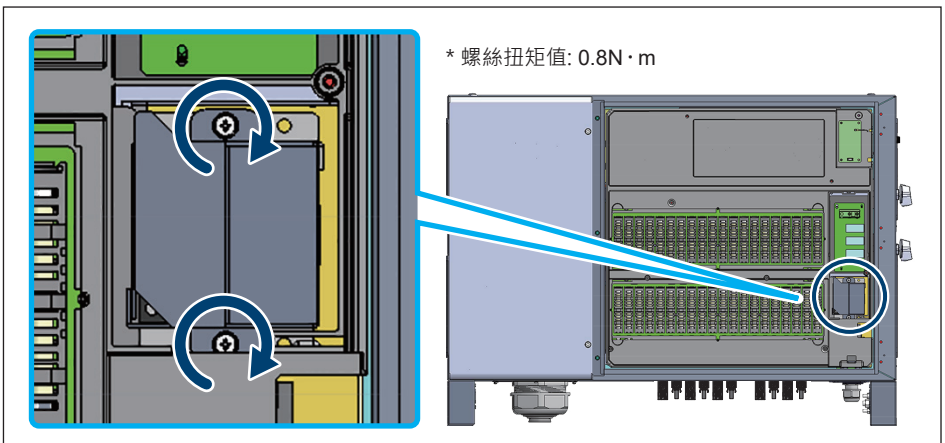


圖 5-17：內部風扇1 位置

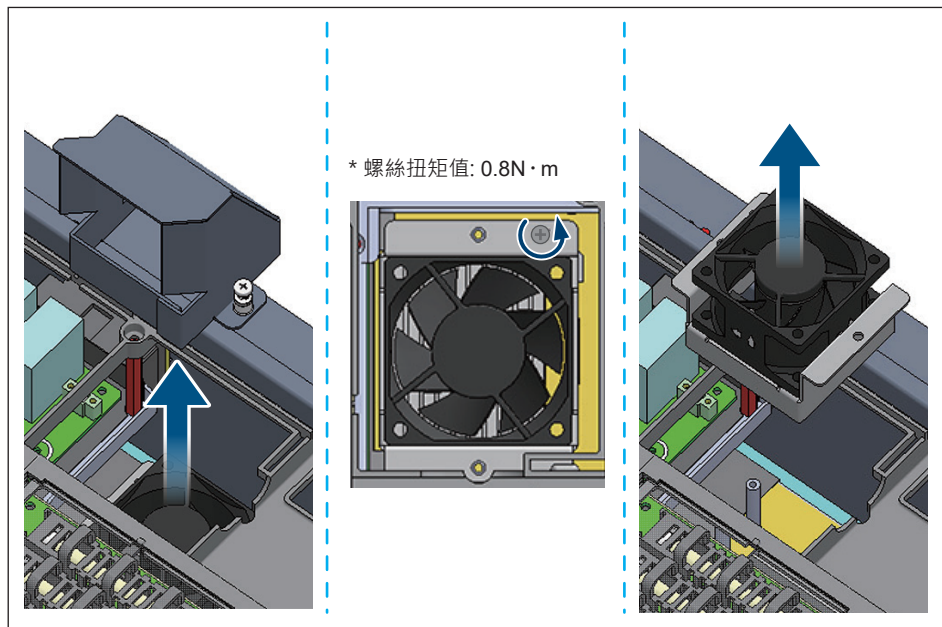


圖 5-18 : 取出內部風扇1

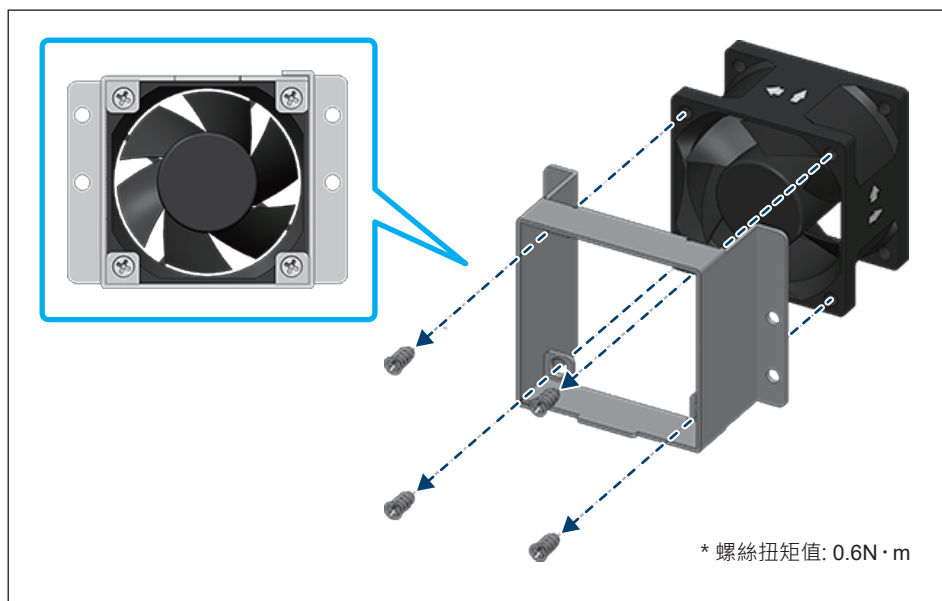


圖 5-19 : 更換新的風扇

5.4.4 內部風扇2

交流側(左側)配有單一風扇模組(圖 5-20, 5-21, 5-22, 5-23)

拆裝內部風扇2步驟

- (1) 拆下保護蓋。(如圖5-20所示)
- (2) 鬆開圖5-21中所示的兩顆螺絲。
- (3) 斷開風扇電源連接。
- (4) 從交流側(左側)取下風扇組件。(如圖5-22所示)
- (5) 清潔風扇組件或更換新風扇。(如圖5-23所示)
- (6) 使用2N·m的扭矩重新組裝。

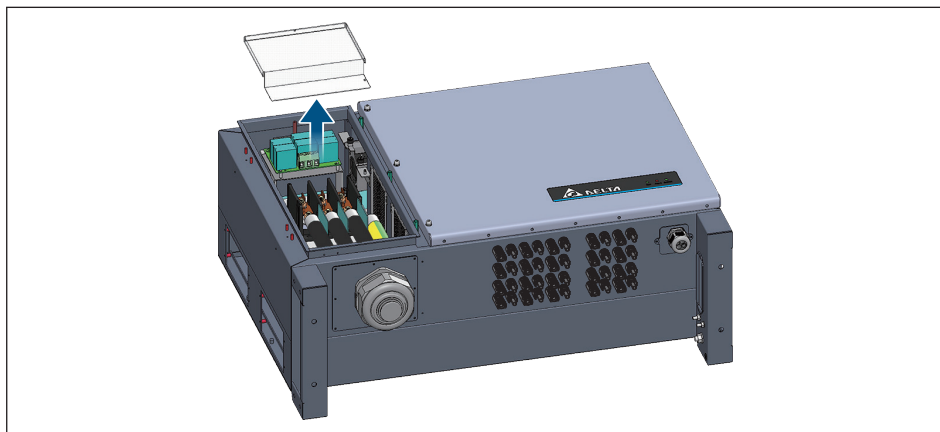
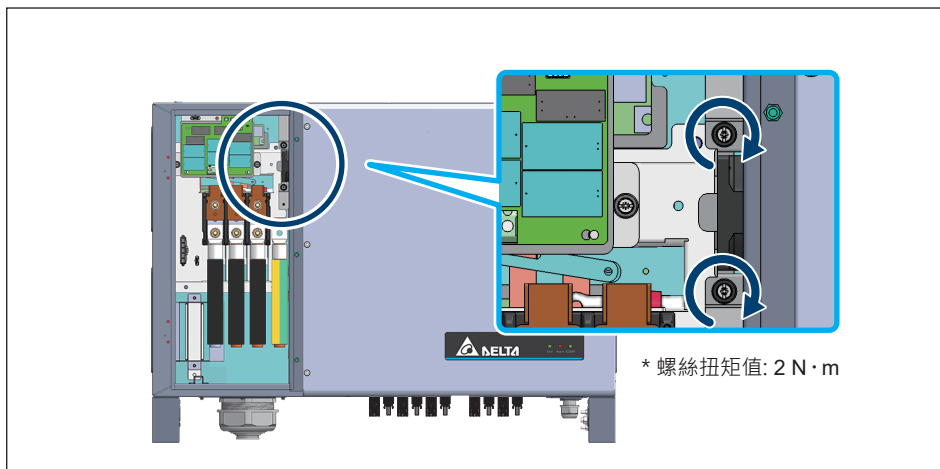


圖 5-20：拆下內部風扇2 保護蓋



* 螺絲扭矩值: 2 N·m

圖 5-21：內部風扇2 位置

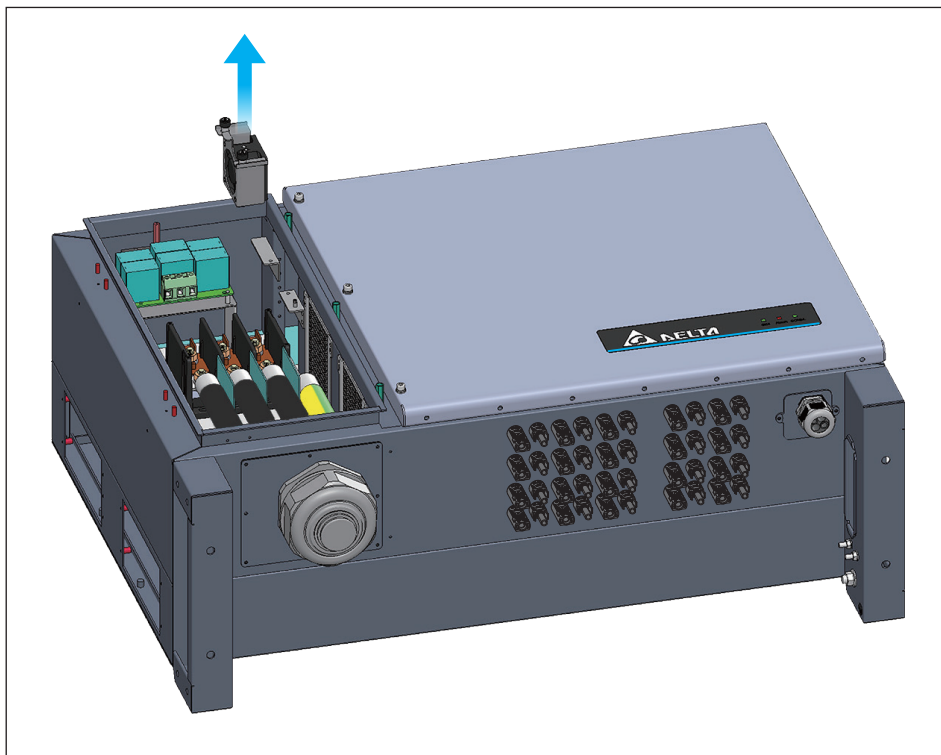


圖 5-22：取出內部風扇2

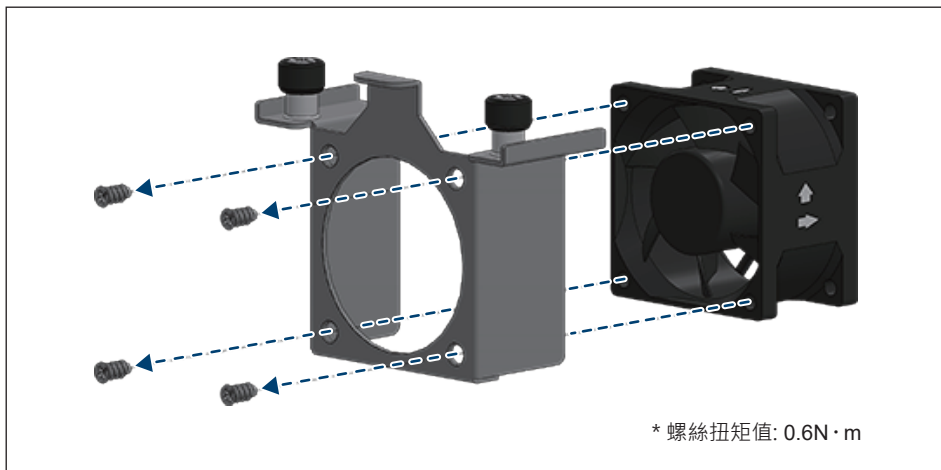


圖 5-23：更換新的風扇

5.5 終止運轉

當機器需要停止運轉進行維護或保存時，請依照下面指示進行。

危險:觸電危險!!



- 為避免嚴重傷亡，請依照下列步驟進行。

- 關斷外部AC斷路器或開關確認與市電解離。
- 關閉兩組DC開關
- 使用H4端子專用工具卸下安裝於變流器底部的直流輸入端子，移除作業時，請務必確認變流器DC開關必須為OFF，且無直流電流狀態。

■ RS-485 通訊模組

- 1.從變流器移除通訊模組。
- 2.切離與通訊板連接的所有通信線路。
- 3.從通信板組件上拆下接線。
- 4.重新安裝通訊板。

注意: 表面高溫 請勿觸碰 !

- 變流器剛中斷時，請注意表面高溫。
- 直到表面降至適當溫度前，請勿碰觸變流器。

注意: 可能造成傷害 !

- 變流器重達 80 公斤。
- 若在搬運或從壁掛架拆卸過程中意外掉落可能造成傷害。
- 操作人員應配戴手套並穩固變流器底座以防止受傷。

注意

- 螺絲與螺帽移除後請留意，切勿遺漏於機器內。

6 錯誤告警及排除問題

台達致力於打造高可靠標準的電子產品，若出現變流器無法正常動作的情況時，請使用故障排除指南（表6-1、6-2和6-3）中的說明，進行故障排除；若經過排除後仍無法解決問題，請聯繫客服中心尋求技術協助。

由於孤島、過欠壓或過欠頻等電網故障，變流器將停止輸出電流並斷開交流繼電器。顯示故障請參見表6-1A。

6.1 錯誤訊息(配置端故障)

表 6-1A: 錯誤訊息 (配置端故障)

資訊顯示	可能原因	故障排除
AC Freq High (E01)	市電頻率過高	1. 檢查變流器端的市電頻率 2. 檢查國家與電網設定
AC Freq Low (E02)	市電頻率過低	
Island (E03,E04,E05)	市電中斷	檢查AC 斷路器
AC phase jump (E06)	市電相位異常	當重複發生時，請聯繫客服人員，尋求技術支援
Grid Quality (E07)	在電網或靠近變流器附近非線性的負載	當重複發生時，請聯繫客服人員，尋求技術支援
AC phase abnormal (E08)	在AC介面連接錯誤	檢查AC連接，必須和使用手冊一致
No Grid (E09)	1. AC 斷路器跳開 2. 市電中斷	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)	市電電壓過低	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
AC Volt High (E11)	市電電壓過高	
EPO (E25)	使用者執行緊急斷電	請解除EPO按鈕
DC Volt High (E30)	輸入電壓超過 1500Vdc	修正solar array設定並使得Voc小於1500Vdc
Insulation Fault (E34)	太陽能模組與接地間發生隔離阻抗問題	1. 檢查太陽能模組接地是否確實 2. 檢查變流器接地是否確實 3. 檢查直流斷路器是否受潮
Remote OFF (E36)	外部通訊執行遠端關機	請檢查外部通訊Remote OFF設定

6.2 故障訊息(變流器故障)

表 6-2A: 錯誤訊息 (變流器故障)

資訊顯示	可能原因	故障排除
DC Injection (F01, F02, F03, F04)	市電波形異常	請聯繫客服人員，尋求技術支援
Temperature High (F05)	變流器內部環溫或功率模組溫度過高	檢查設備的周遭和環境
Amb Temp Fault (F06)	環境溫度 > 105°C 或 < -40°C	請聯繫客服人員，尋求技術支援
Temperature Low (F07)	變流器內部環溫或功率模組溫度過低	檢查設備的周遭和環境
Inveter Temp Fault (F10)	變流器溫度 > 125°C 或 < -40°C	請聯繫客服人員，尋求技術支援
AC Sensor Fault (F15)	交流電壓或電流回綫電路異常	請聯繫客服人員，尋求技術支援
Vdc Sensor Fault (F16)	直流電壓回綫電路異常	請聯繫客服人員，尋求技術支援
AC Sensor Fault (F18)	交流電壓或電流回綫電路異常	請聯繫客服人員，尋求技術支援
Idc Sensor Fault (F19)	直流電壓或電流回綫電路異常	請聯繫客服人員，尋求技術支援
Red COMM Fault (F22)	變流器內部通訊異常	請聯繫客服人員，尋求技術支援
DSP COMM Fault (F23)	變流器內部通訊斷綫	請聯繫客服人員，尋求技術支援
Ground Cur. High (F24)	太陽能模組與接地隔離阻抗異常	1. 檢查輸入端的絕緣 2. 檢查電容值 (+ <-> GND & - <-> GND)，必須 < 20uF。必要時安裝外部的變壓器

表 6-2B: 錯誤訊息 (變流器故障)

資訊顯示	可能原因	故障排除
Iac Unbalance (F26)	1. 變流器內部的電源線未連接 2. 電流回授電路無效	檢查AC介面連接
RCMU Fault (F27)	RCMU連接中斷	請聯繫客服人員，尋求技術支援
AC RLY Short (F28)	AC Relay 短路	請確認端子座配線與市電端配線是否正確
AC RLY Open (F29)	AC Relay 開路	請聯繫客服人員，尋求技術支援
Bus Unbalance (F30)	變流器內部直流電壓不平衡	重新啟斷DC開關
Bus Voltage High (F31,F33,F34,F35)	太陽能板Voc超過1500Vdc	重新啟斷DC開關
AC Current High (F36,F37,F38,F39,F40,F41)	操作期間突波發生	請聯繫客服人員，尋求技術支援
AC CT Fault (F42)	交流側R相電流感測器異常	請聯繫客服人員，尋求技術支援
AC CT Fault (F43)	交流側S相電流感測器異常	請聯繫客服人員，尋求技術支援
AC CT Fault (F44)	交流側T相電流感測器異常	請聯繫客服人員，尋求技術支援
AC Current High (F45)	交流電流輸出過大	重新啟斷DC開關
ZC Circuit Fault (F50)	相位偵測電路故障	請聯繫客服人員，尋求技術支援
Inv Circuit Fault (F51)	變流器電路故障	請聯繫客服人員，尋求技術支援
Arc Circuit Fault (F58)	電弧偵測電路故障	請聯繫客服人員，尋求技術支援
Arc Fault (F59)	電弧故障	1. 請檢查直流端端子與線材是否損壞 2. 請聯繫客服人員，尋求技術支援
DC Current High (F60, F70)	直流端過電流保護	重新啟斷DC開關
Ext COMM. Fault (F74)	外部通訊異常	1. 請檢查外部通訊接線是否異常 2. 請聯繫客服人員，尋求技術支援

6.3 警告訊息(配置端警告)

表 6-3A: 警告訊息 (配置端警告)

資訊顯示	可能原因	故障排除
De-rating (W07)	<ol style="list-style-type: none"> 1. 本體及環境溫度過高 2. 實功功率限制功能作動 3. P-F功能作動 4. P(V) 功能作動 5. 市電電壓過低 6. 輸入電壓過低 7. 輸入電壓過高 8. 爬升功能 	<ol style="list-style-type: none"> 1. 確認安裝機器本體及環境溫度 2. 確認國別及最大功率限制參數設定 3. 確認市電頻率是否異常 4. 確認市電電壓是否異常 5-1. 確認市電電壓是否異常 5-2. 確認虛功控制功能設定 6. 確認PV panel輸入電壓是否過低 7. 確認PV panel輸入電壓是否過高 8. 確認爬升功能設定
String fault (W08)	<ol style="list-style-type: none"> 1. 不正確接線導致組串過電流 2. 組串電流偵測功能異常 	<ol style="list-style-type: none"> 1. 請確認直直流接線是否正確 2. 若仍顯示異常，請聯繫客服人員，尋求技術支援

6.4 警告訊息(變流器警告)

表 6-4A: 警告訊息 (變流器警告)

資訊顯示	可能原因	故障排除
Fan Fail (W11)	<ol style="list-style-type: none"> 1. 一個或多個風扇鎖死 2. 一個或多個風扇無效 3. 一個或多個風扇未連接 	<p>外部風扇</p> <ol style="list-style-type: none"> 1. 移除卡在風扇內的對象 2. 檢查風扇的連接 3. 替換無效的風扇 <p>-----</p> <p>內部風扇</p> <p>請聯繫客服人員，尋求技術支援</p>
DC SPD Fault (W17) AC SPD Fault (W18)	<ol style="list-style-type: none"> 1. 一個或多個SPD有缺陷 2. 一個或多個SPD未連接 	<ol style="list-style-type: none"> 1. 更換有缺陷之SPD 2. 檢查SPD的連接
Aux Power Fault (W19)	輔助電源異常	請聯繫客服人員，尋求技術支援
String COMM Fault (W22)	組串電流通訊異常	請聯繫客服人員，尋求技術支援
String Current Low (W23)	DC端子連接異常	<ol style="list-style-type: none"> 1. 請檢查直直流配線與保險絲 2. 請聯繫客服人員，尋求技術支援

7 技術資料

7.1 技術資料

表 7-1A: 規格	
Model	M125HV_111
直流輸入	
最大輸入電壓	1600V *1
工作電壓範圍	860 – 1500V
MPP 電壓範圍	860 – 1350V *2
額定電壓	1050V
MPP 追蹤	1
最大輸入電流	150A
最大承受短路電流	320A
保險絲	20A/1500V PV 保險絲
接頭種類	20對 H4接頭
雷擊保護	Type II SPD (選配; type I, type I+II)
直流開關	內建
組列電流監控	內建
交流輸出	
額定輸出功率	125kW / 125kVA
最大輸出功率	125kW / 140kVA
最大輸出電流	135A
最大浪湧電流	300A, 100µs
最大輸出故障電流 (rms)	160A
最大輸出過流保護	175A
額定輸出電流	3P/PE, 600Vac
工作電壓範圍	Vac600V: -36% ~ +15%
工作頻率範圍	50/60Hz ±5Hz
功率因數 (可調)	0.8 ind ~ 0.8 cap (最大功率1~0.9)
雷擊保護	Type II SPD (選配; type I, type I+II)
T.H.D	<3%
接頭種類	○型端子鎖附端子台 (最大可用185mm ² 銅線或鋁線)
夜間耗電 *3	< 3.5W

*1 The max withstand voltage is 1600Vdc. (the inverter stops to operate when the PV voltage is over 1500Vdc)

*2 Ambient < 25°C : 860~1350V : Ambient < 40°C : 860~1250V

*3 Night time consumption with standby communication.

表 7-1B: 規格

表 7-1B: 規格													
Model	M125HV_111												
效率													
最高效率	>99 %												
歐洲效率	98.7 %												
資訊													
通訊埠	RS-485 (Delta / Sunspec) / SUB_1G												
指示器	LED (Grid, Alarm, COMM.)												
規範認證													
	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Enedis-PRO-RES_64E</td> <td style="width: 50%;">IEC 62109-1/-2</td> </tr> <tr> <td>UTE C 15-712-1</td> <td>IEC 61439-2</td> </tr> <tr> <td>VDE AR-N 4110</td> <td>IEC 61727</td> </tr> <tr> <td>TRF_EN50549-2_2019a</td> <td>IEC 62116</td> </tr> <tr> <td>EN 61000-6-2</td> <td>IEC 62910</td> </tr> <tr> <td>EN 61000-6-3</td> <td>IEC 62109</td> </tr> </table>	Enedis-PRO-RES_64E	IEC 62109-1/-2	UTE C 15-712-1	IEC 61439-2	VDE AR-N 4110	IEC 61727	TRF_EN50549-2_2019a	IEC 62116	EN 61000-6-2	IEC 62910	EN 61000-6-3	IEC 62109
Enedis-PRO-RES_64E	IEC 62109-1/-2												
UTE C 15-712-1	IEC 61439-2												
VDE AR-N 4110	IEC 61727												
TRF_EN50549-2_2019a	IEC 62116												
EN 61000-6-2	IEC 62910												
EN 61000-6-3	IEC 62109												
一般數據													
智能變頻功能	Voltage/Frequency Ride through, Volt/Var, Volt/Watt, Power curtailment, Frequency/Watt												
最大反饋電流至太陽能模組端	0A												
汙染程度	3												
過電壓類別	AC output :III, DC Input :II												
保護等級	I												
工作溫度範圍	-30°~60°C (超過50°C降載)												
防水防塵等級	IP65 (Electronics)												
溼度範圍	0% – 100% non-condensing.												
運行高度限制	<3000m, Outdoor, wet locations												
散熱方式	智能風扇控制												
噪音	71.5 dBA @1m, Amb25°C												
尺寸 (W x H x D, mm)	900 x 663 x 334												
重量 (kg)	80												

如果輸入電壓高於1350V，變流器會降低輸出功率。輸入電壓與輸出功率降載之間的關係如圖7-1所示。

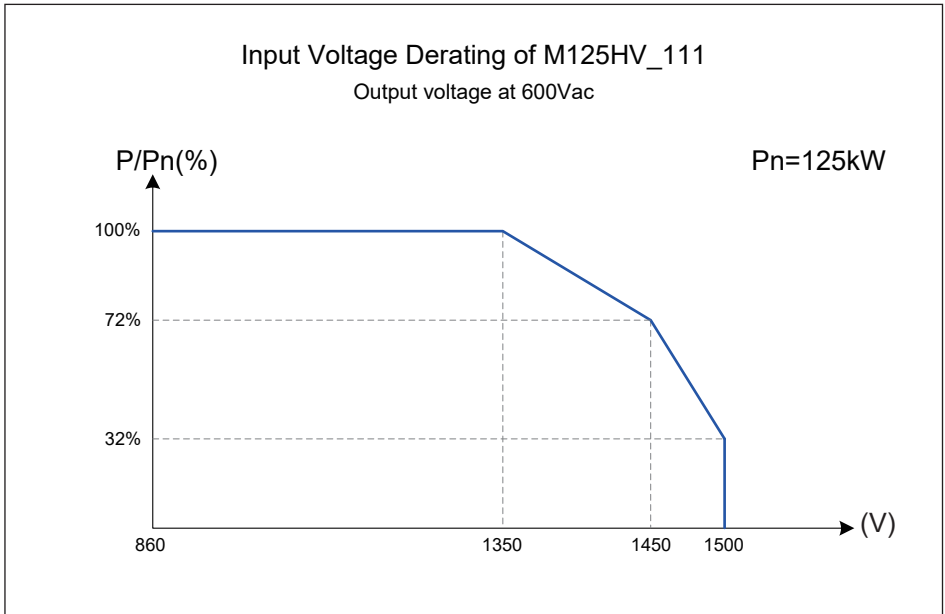


圖 7-1: 輸入電壓降載曲線

當功率元件溫度或變流器內部溫度超過上限，變流器將降低功率，直到溫度降至允許範圍內。

- 當環境溫度超過50°C時，功率將降低。降額曲線如圖7-4所示。
 - 當環境溫度低於40°C時，視在功率可能為110%。
- PF=0.9時的降載曲線如圖7-5所示。

滿載的輸入電壓可以滿足高達2倍超配額度，高緯度也能應用自如。在進行太陽能場的面板配置設計時，請參考輸入電壓降載曲線。

PF=1和PF=0.9時的輸入電壓降載曲線如圖7-6和圖7-7所示。

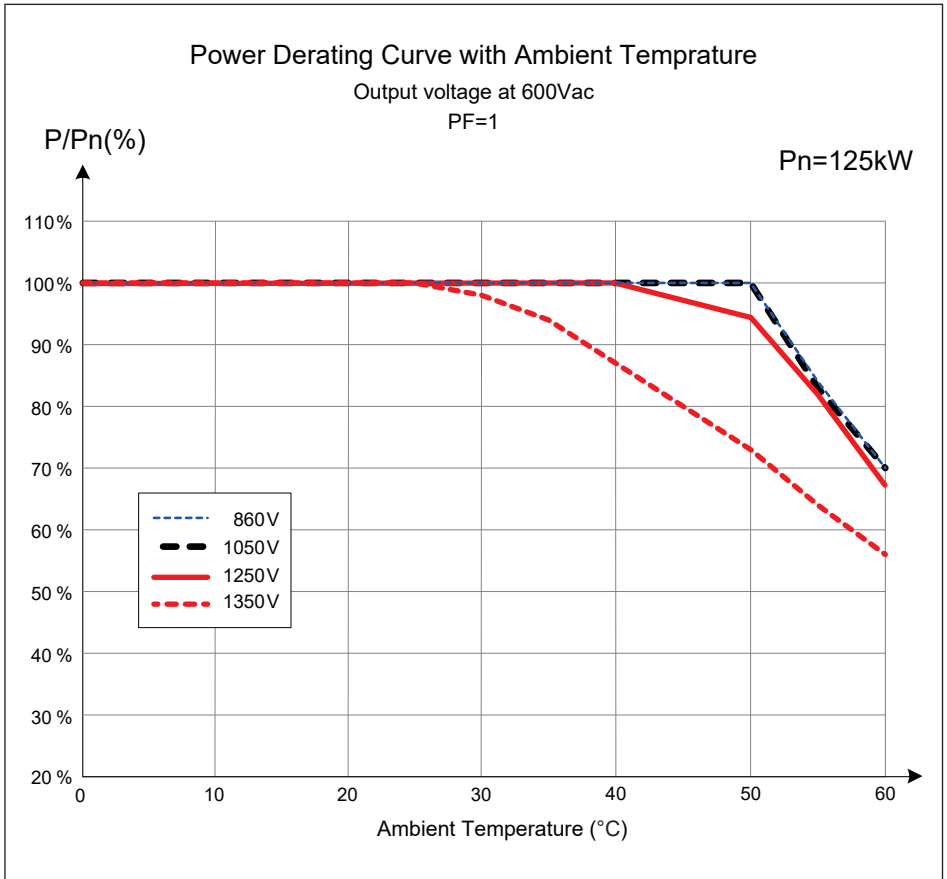


圖 7-2: 環溫對應降額曲線圖(PF=1)

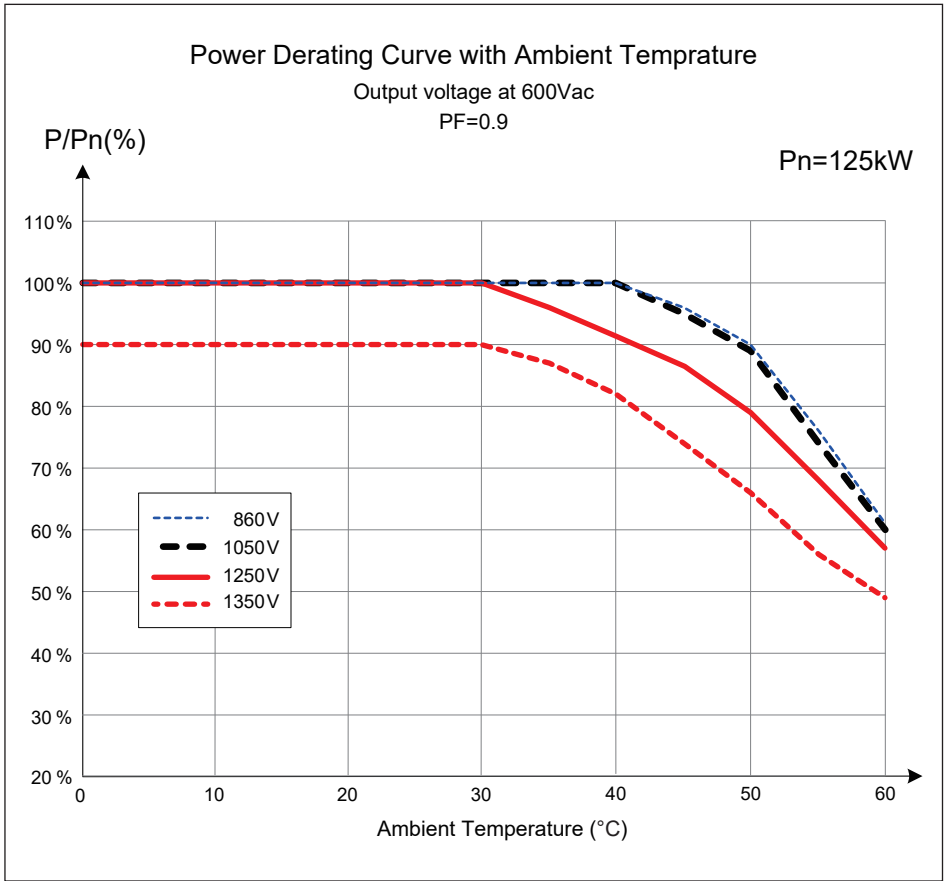


圖 7-3: 環溫對應降額曲線圖(PF=0.9)

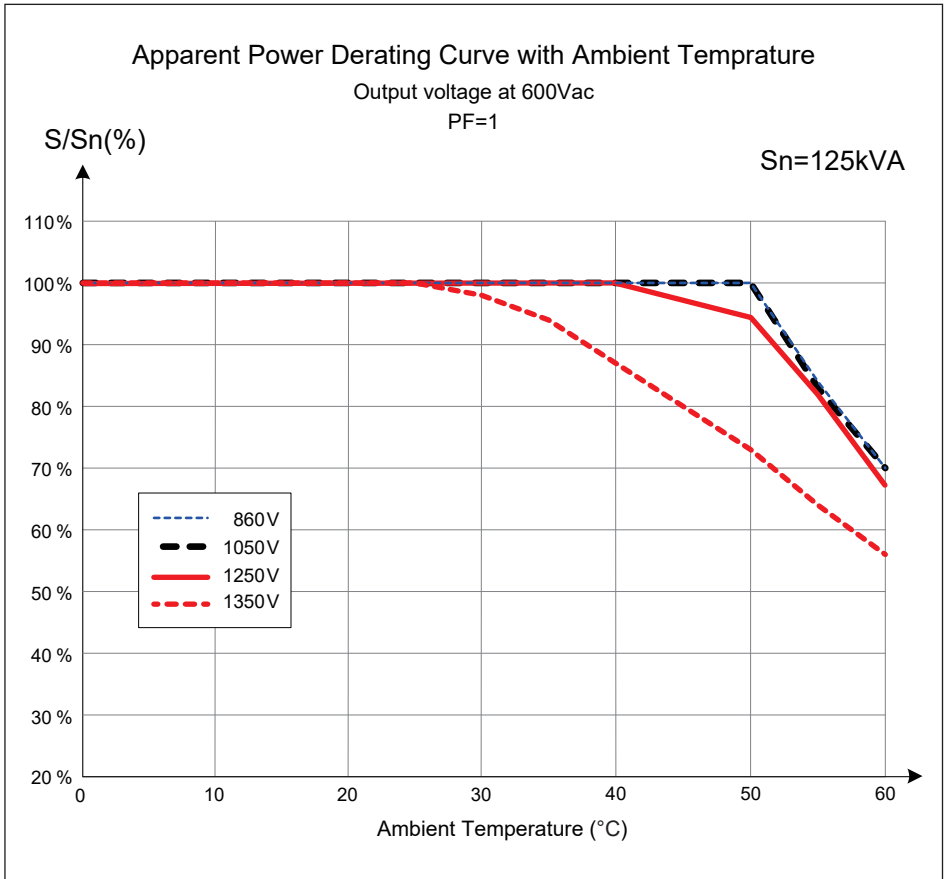


圖 7-4: 環溫對應視在功率降額曲線圖(PF=1)

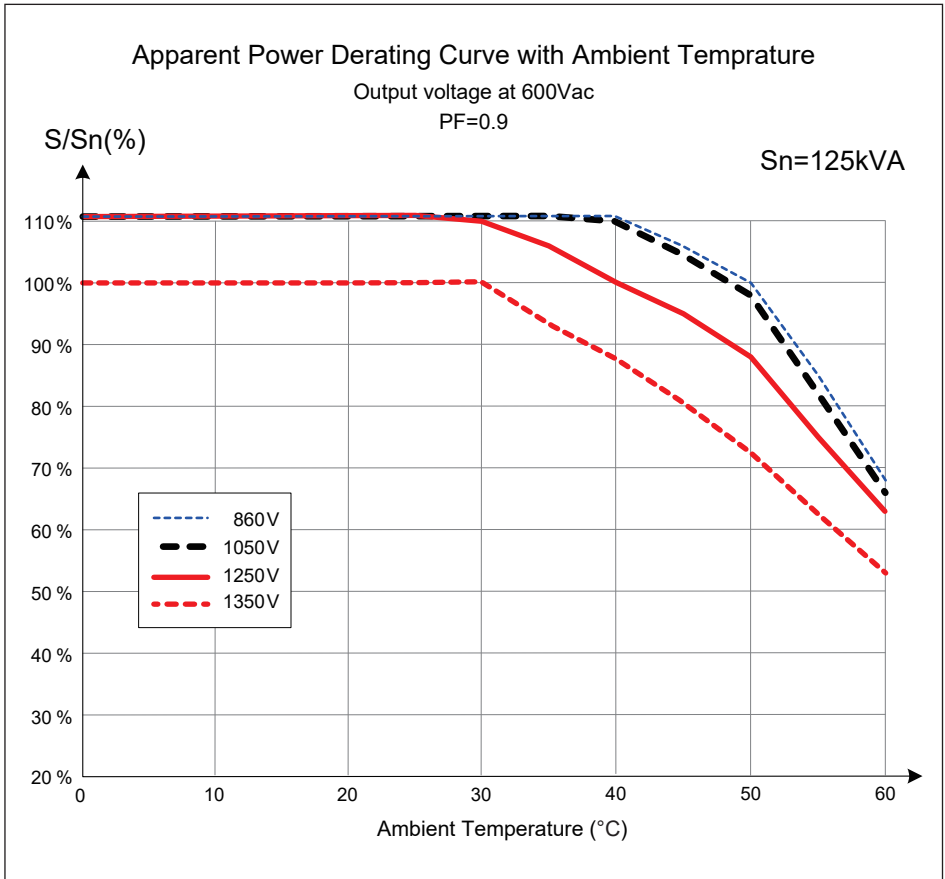


圖 7-5: 環溫對應視在功率降額曲線圖(PF=0.9)

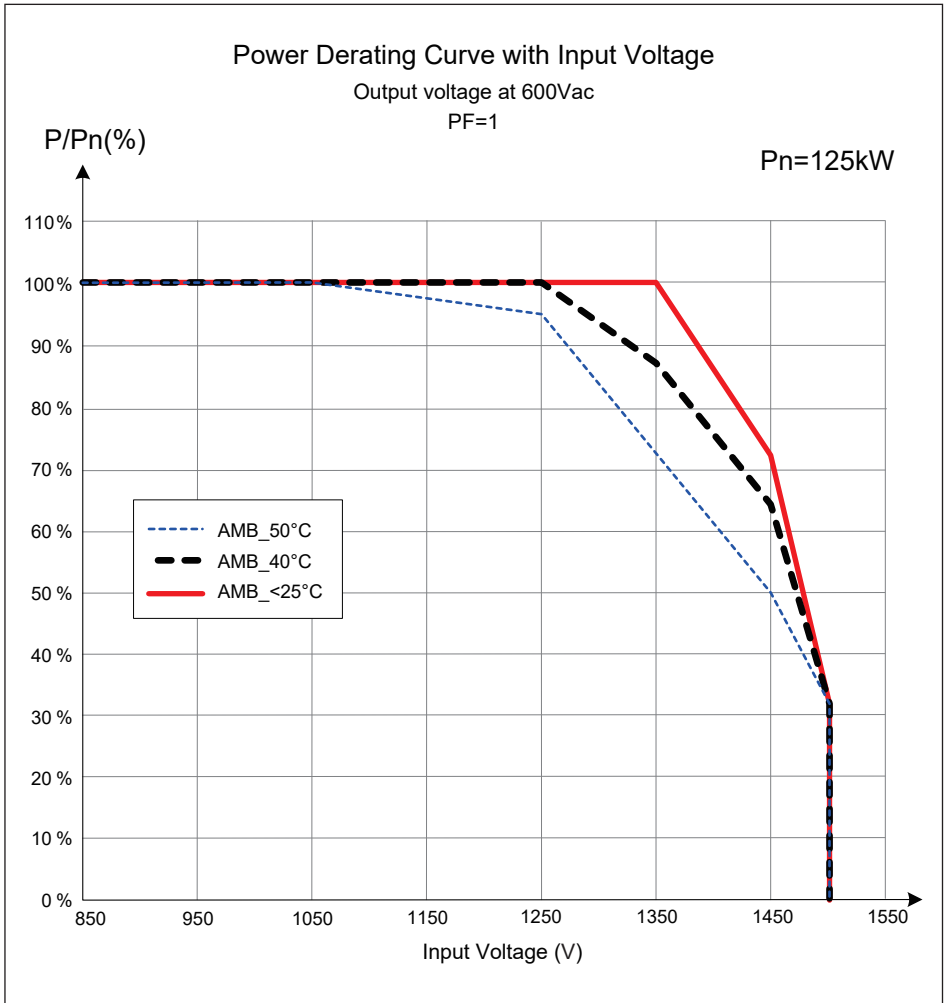


圖 7-6: 輸入電壓對輸出功率降載曲線(PF=1)

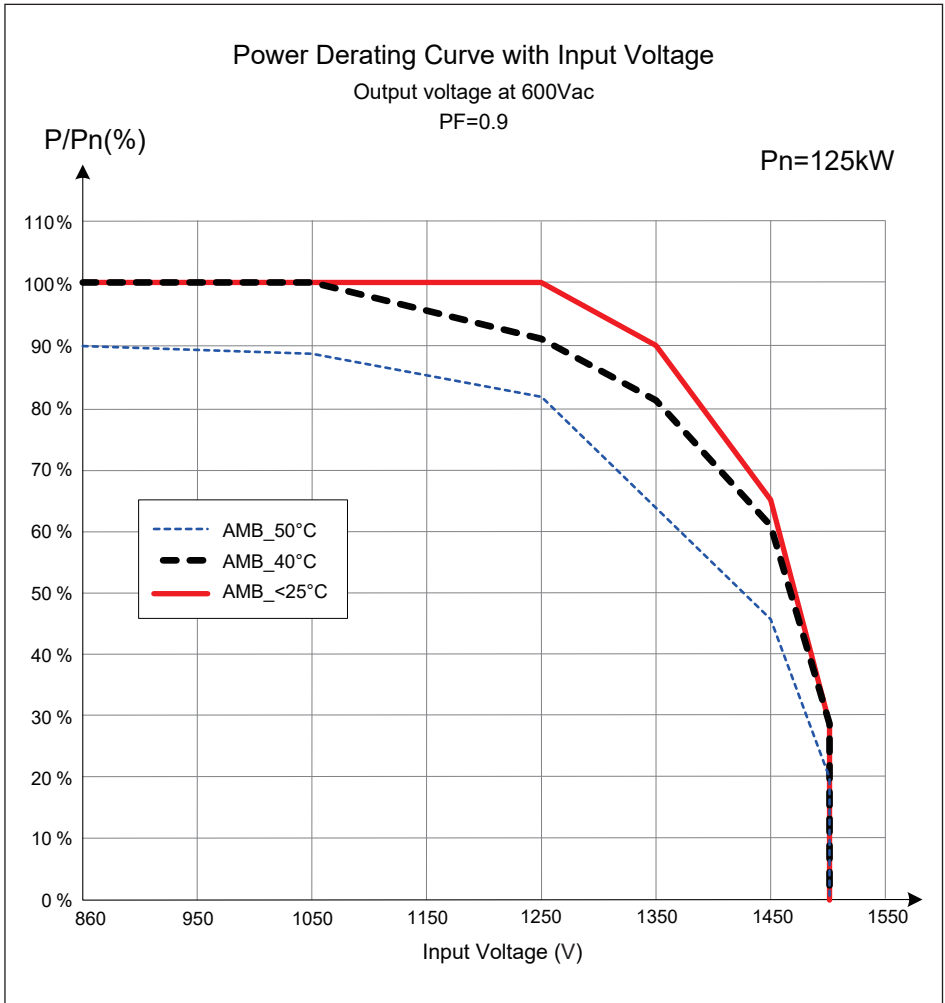


圖 7-7: 輸入電壓對輸出功率降載曲線(PF=0.9)

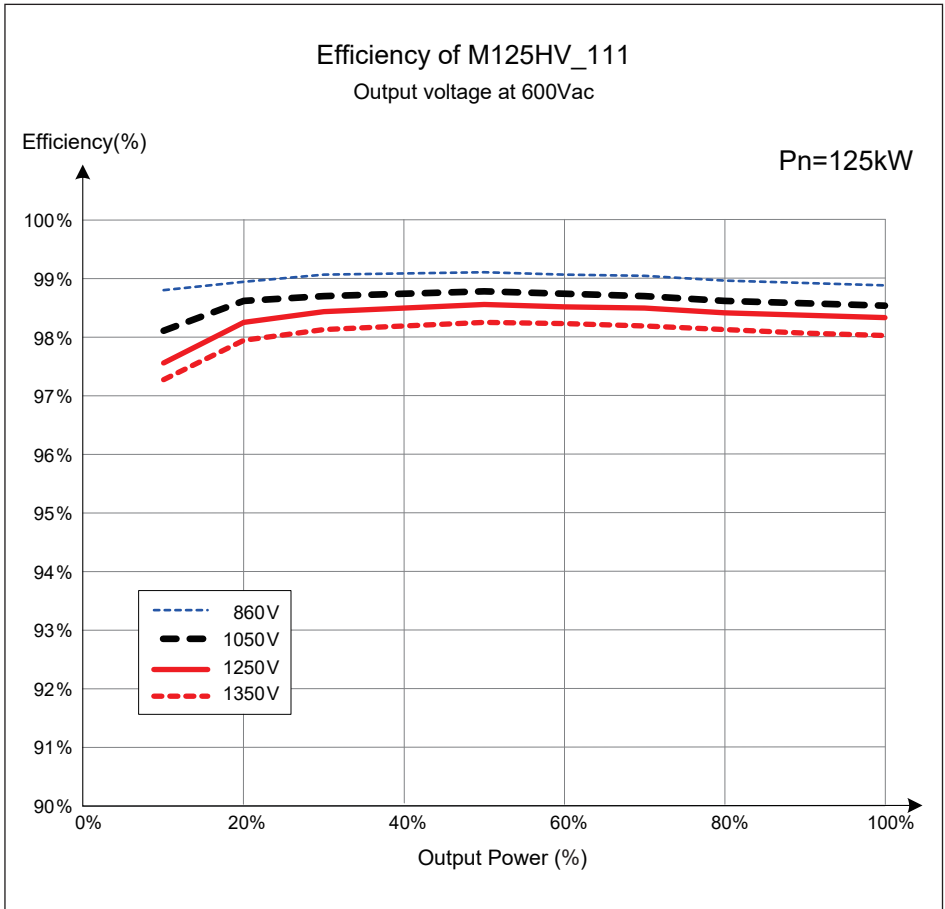


圖 7-8: 效率曲線圖

附錄A: 軌道式雷擊保護裝置安裝 (選配)

M125HV_111支援更換 type I 和 type II 的直流/交流軌道式雷擊保護裝置。

- 直流側雷擊保護器配件如PE接線、軌道和螺母用於更換DC SPD，如圖A-2所示。
- 交流側雷擊保護器配件如交流電源線路和信號接線用於更換AC SPD，如圖A-7所示。

警告！



- 在進行交流斷路器和直流開關之維護程序時，請避免電擊危險！
- 請先確認更換位置，左側為交流側門，右側為直流側門。禁止同時打開兩側。

DC DIN Rail SPD

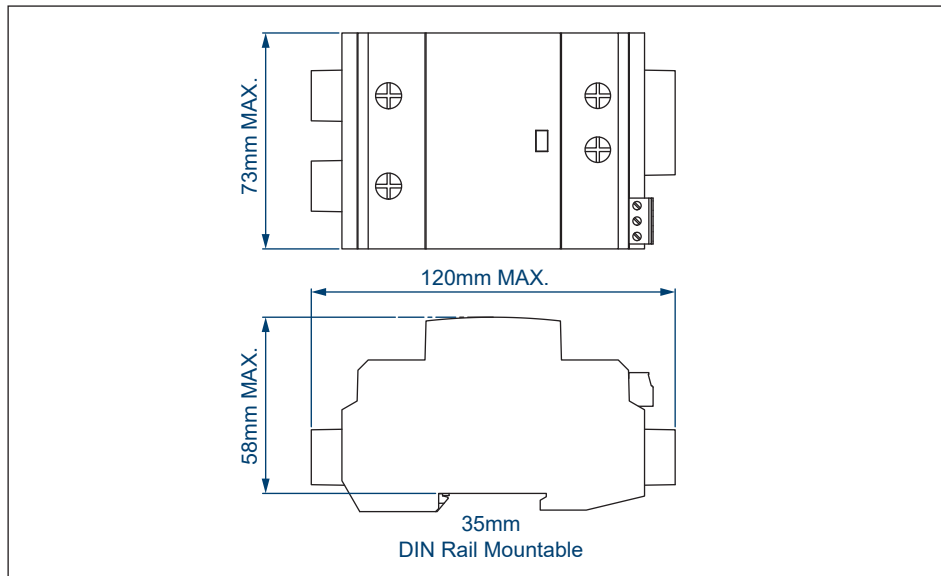


圖 A-1: 直流側雷擊保護器尺寸限制

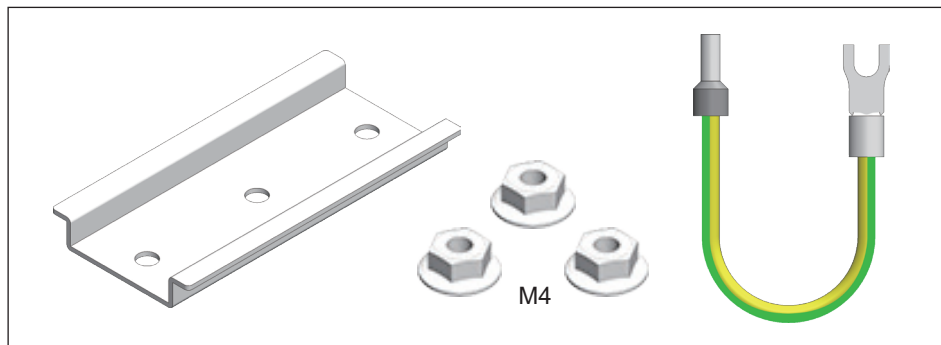


圖 A-2: 直流側雷擊保護器配件

直流側軌道式雷擊保護裝置更換步驟:

1. 掀開保護蓋 (圖 A-3)
2. 移除DC SPD電路板上的兩顆螺絲與雷擊保護裝置如圖A-4
3. 移除六角銅柱 (圖 A-4 ③)
4. 以扭力值 $2\text{N}\cdot\text{m}$ 鎖上軌道 (圖 A-5 ①) 接著安裝接地線
5. 在軌道上安裝雷擊保護裝置 (圖 A-5 ②)
6. 雷擊保護裝置的配線請參考其產品說明書
7. 蓋上保護蓋

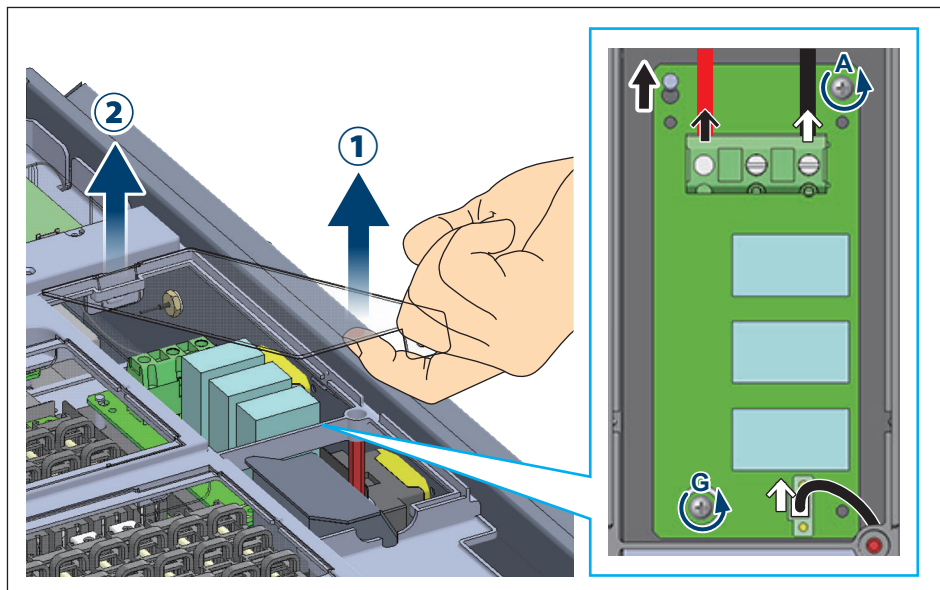


圖 A-3: 掀開直流側雷擊保護器保護蓋

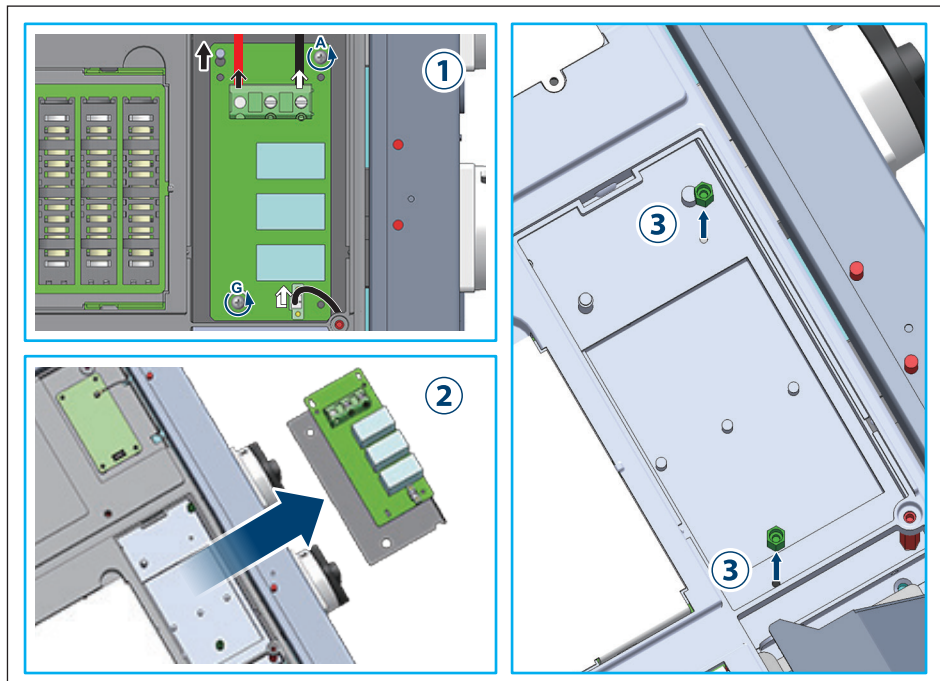


圖 A-4: 移除螺絲並拆卸DC SPD電路板

Screw torque $2\text{N} \cdot \text{m}$

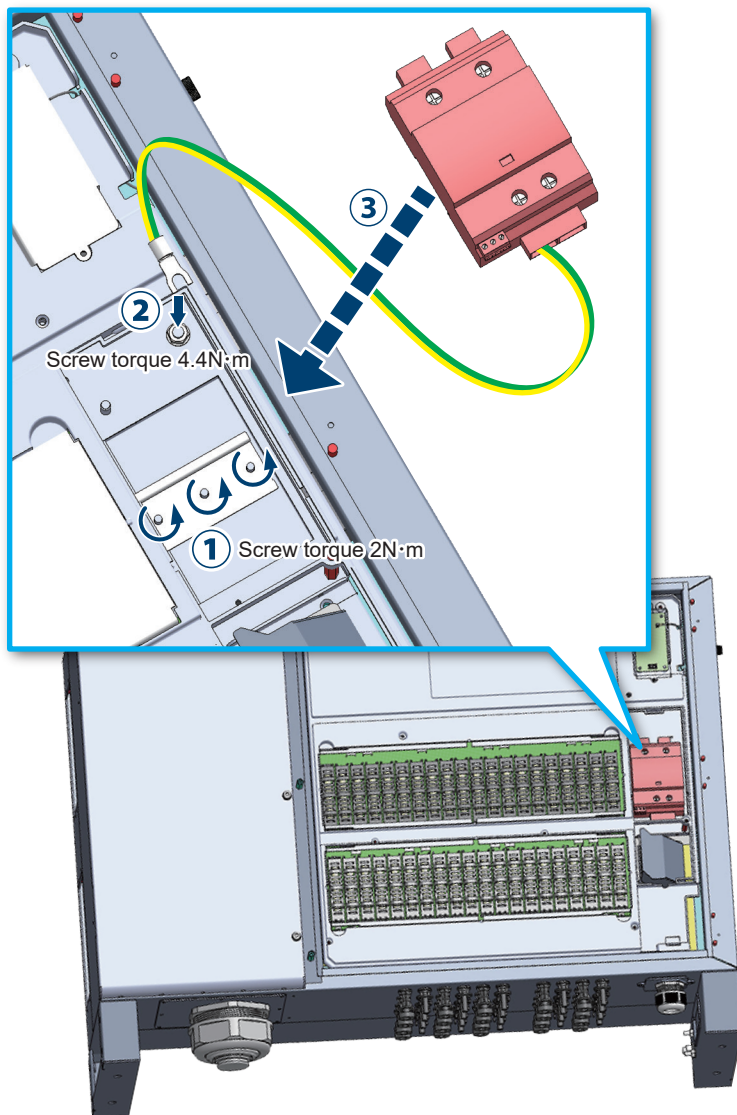


圖 A-5: 安裝軌道與雷擊保護裝置

AC DIN Rail SPD

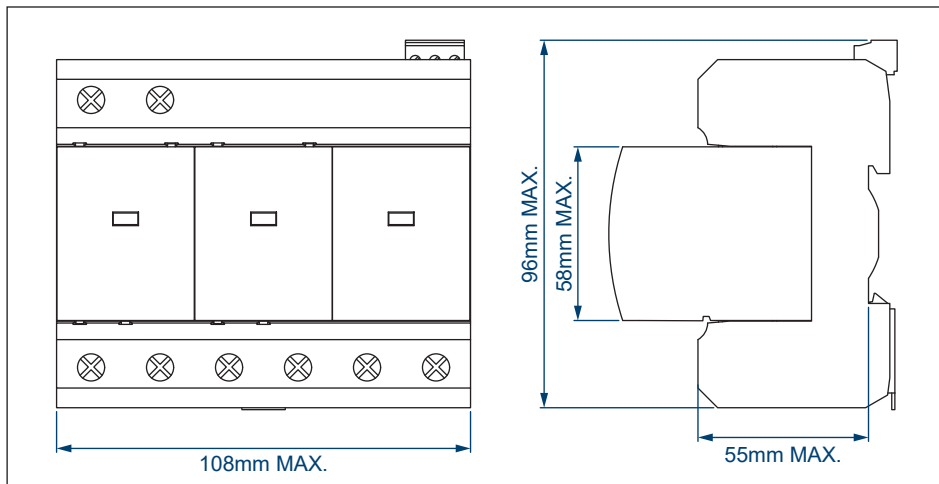


圖 A-6: 交流側雷擊保護器尺寸限制

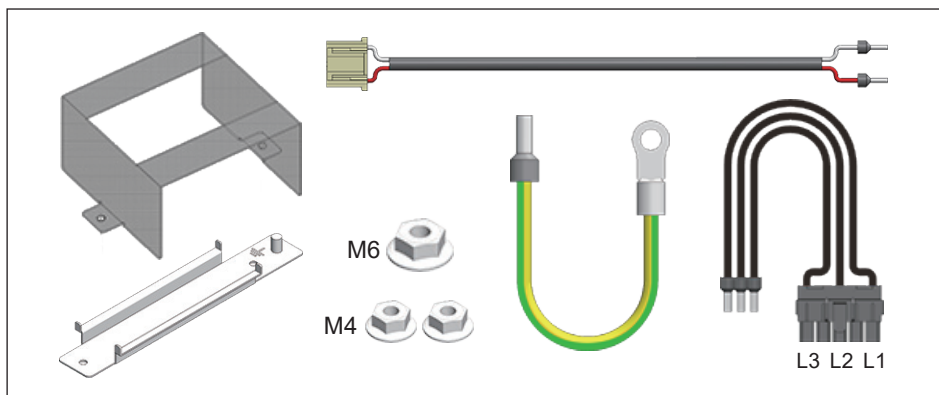


圖 A-7: 交流側雷擊保護器配件

交流側軌道式雷擊保護裝置安裝步驟:

1. 掀開保護蓋
2. 雷擊保護裝置的配線請參考其產品說明書(圖 A-8, A-9)
3. 鎖上軌道 (M4: 2N·m) 並安裝上雷擊保護裝置及保護蓋
4. 鎖上接地線 (M6: 4.4N·m)
5. 連接交流雷擊保護裝置配件 (圖 A-10)
6. 拆卸 4 pin 訊號線端子，並將其插入板金端上 (圖 A-11)

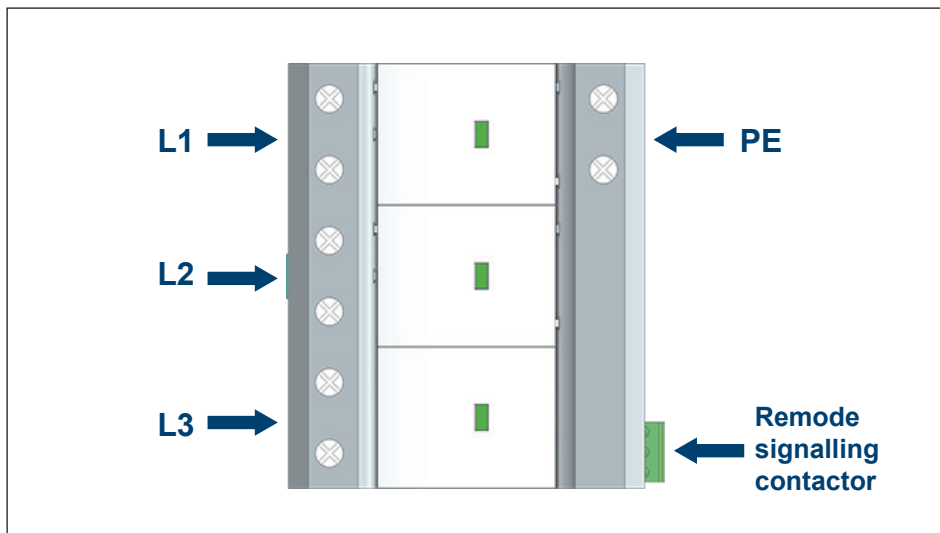


圖 A-8: 雷擊保護裝置的配線請參考其產品說明書

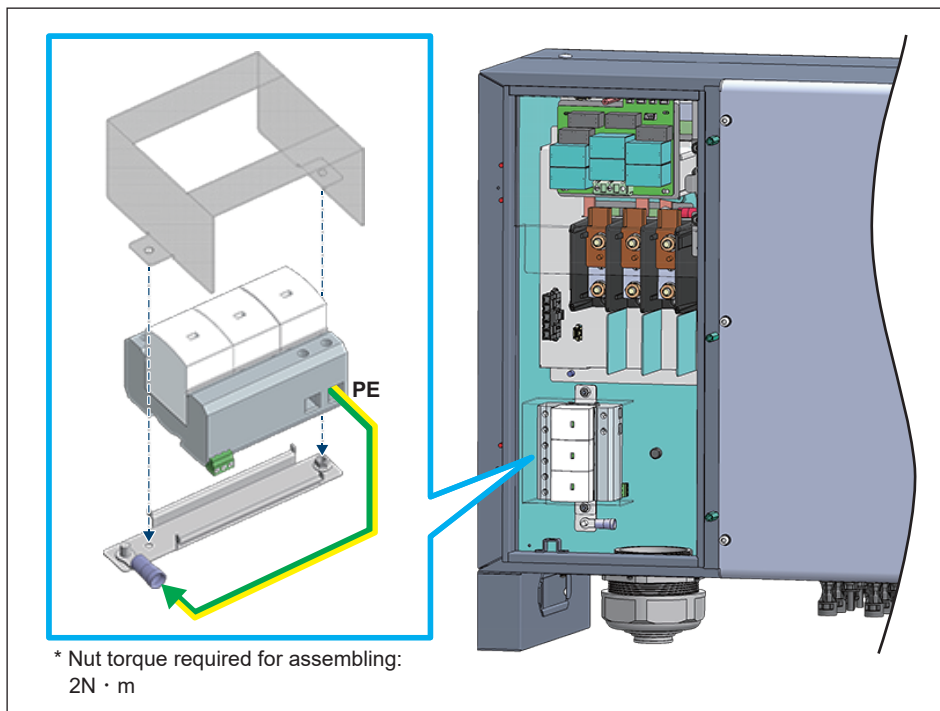


圖 A-9: 鎖上軌道並安裝雷擊保護裝置及保護蓋

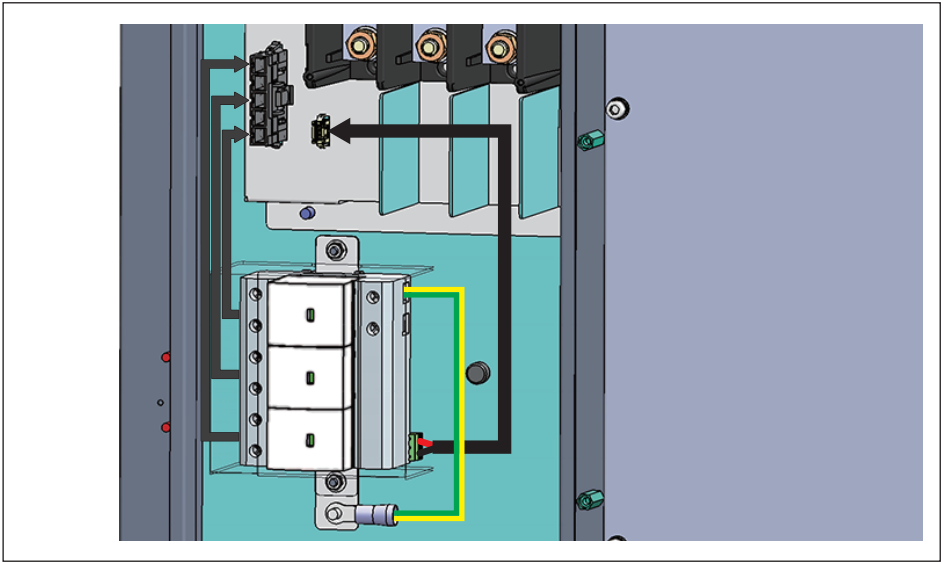


圖 A-10: 連接交流雷擊保護裝置配件

AC SPDs

Move the PCB SPD signal to the Din rain SPD signal connector on the sheet metal.

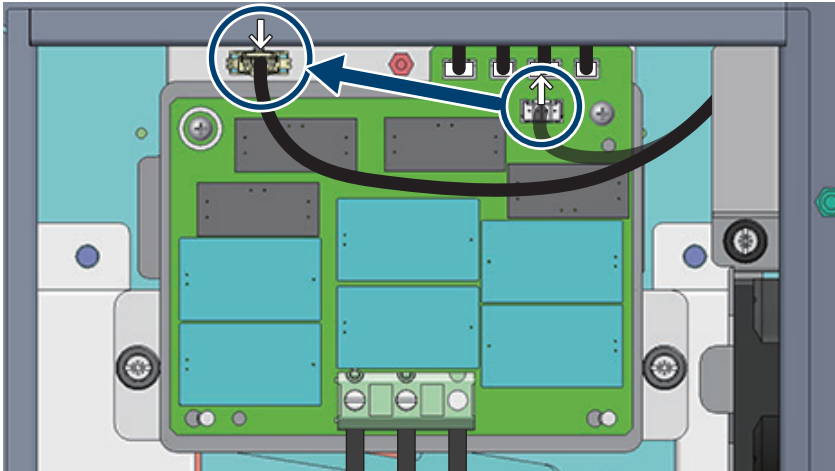
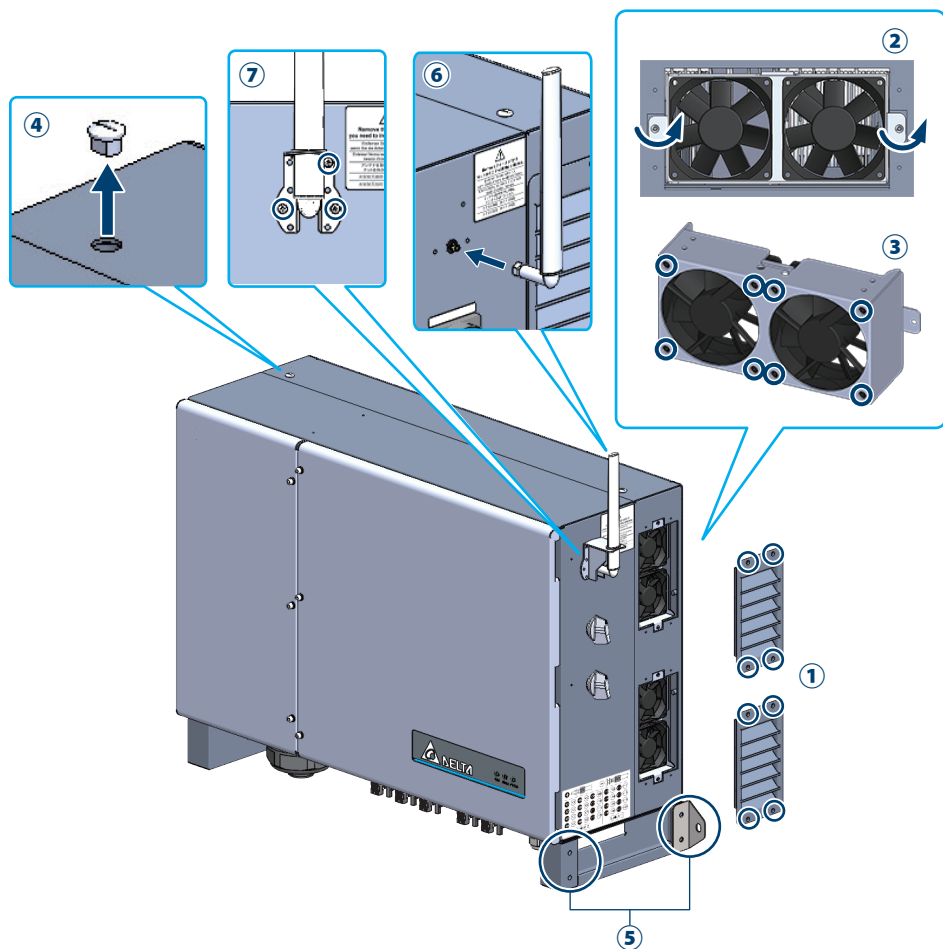


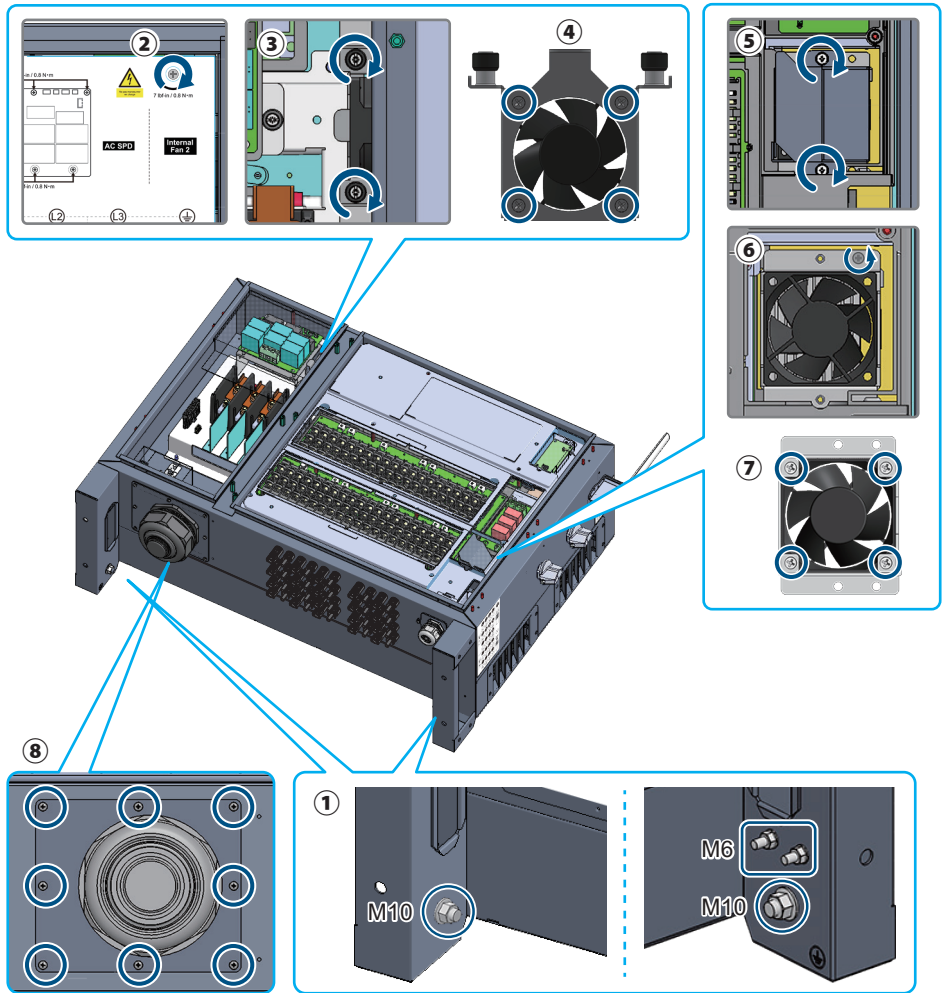
圖 A-11: 拆卸訊號線端子

附錄B: 組裝說明



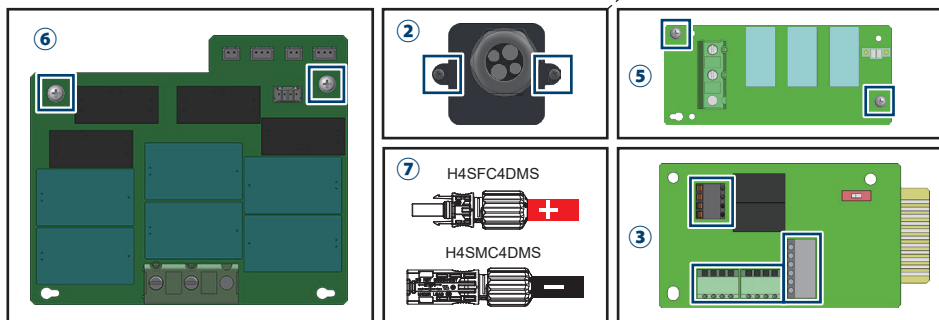
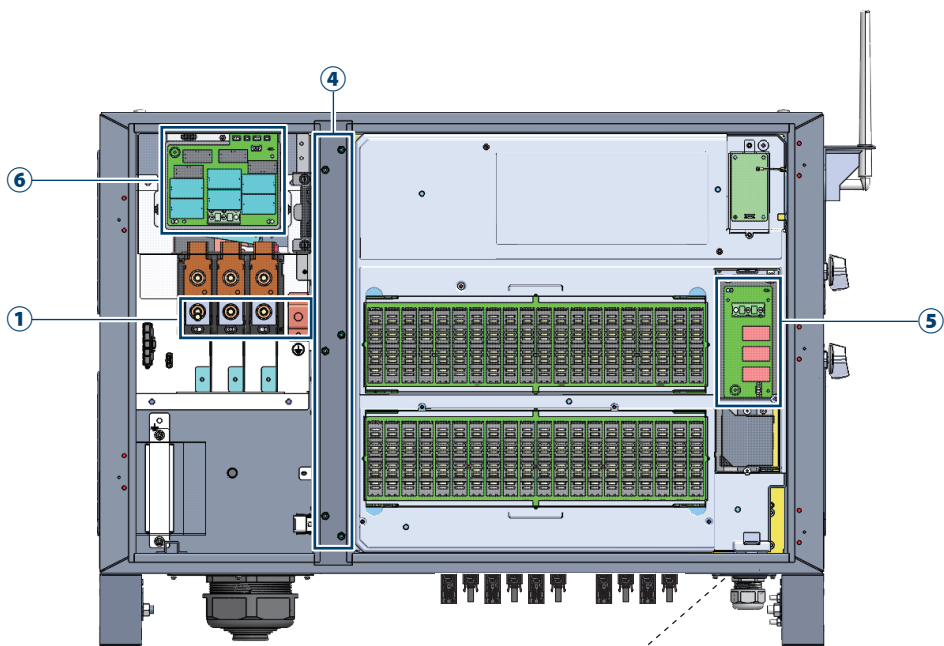
附錄B-1: 組裝說明-1

NO	位置	螺絲扭力
1	濾網外蓋	8.0 kgf-cm (0.8N·m)
2	風扇托盤	8.0 kgf-cm (0.8N·m)
3	風扇	6 kgf-cm (0.6N·m)
4	盲塞	5.0 kgf-cm (0.5N·m)
5	壁掛支架 / 落地支架	150 kgf-cm (15N·m)
6	天線	12 kgf-cm (1.2N·m)
7	天線支架 (M4)	10 kgf-cm (0.98N·m)



附錄B-2: 組裝說明-2

NO	位置	螺絲扭力	
		M6	71 kgf-cm (7.0N·m)
1	接地	M10	254 kgf-cm (25N·m)
2	AC Cover		8.0 kgf-cm (0.8N·m)
3	內部風扇 2 外蓋		20 kgf-cm (2.0N·m)
4	內部風扇 2 托盤		6 kgf-cm (0.6N·m)
5	內部風扇 1 外蓋		8.0 kgf-cm (0.8N·m)
6	內部風扇 1 托盤		8.0 kgf-cm (0.8N·m)
7	內部風扇 1 托盤		6 kgf-cm (0.6N·m)
8	AC Gland		8.0 kgf-cm (0.8N·m)



附錄B-3: 組裝說明-3

NO	位置	螺絲扭力	導體橫截面
1	AC 端子	254 kgf-cm (25N · m)	Cu: 50 ~ 185 mm ² Al: 95 ~ 185 mm ²
2	通訊蓋	8.0 kgf-cm (0.8N · m)	-
3	通訊孔	-	20 AWG (0.5mm ²)
4	中隔板	45 kgf-cm (4.4N · m)	-
5	直流側雷擊保護裝置	8.0 kgf-cm (0.8N · m)	-
6	交流側雷擊保護裝置	8.0 kgf-cm (0.8N · m)	-
7	H4+ 端子	-	12/10 AWG (4/6mm ²)



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