The power behind competitiveness

Grid-tie Transformerless Solar Inverter

M125HV

Operation and Installation Manual

www.deltaww.com

Smarter. Greener. Together.

Contents

Figure

Table

1 Safety

1.1 Information of the Inverter

1.1.1 Legal Provisions

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 producr warranty.

1.2.1 Condition of Use

- M125HV 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 20μF.
- 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 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.

- 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

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

M125HV as shown in ***Figure 2-2***.
Delta reserves the right to make modifications to the content and technical data in this user manual without prior notice.

DANGER!

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

2.2 Product Overview

The components of M125HV is shown as ***Figure 2-1***.

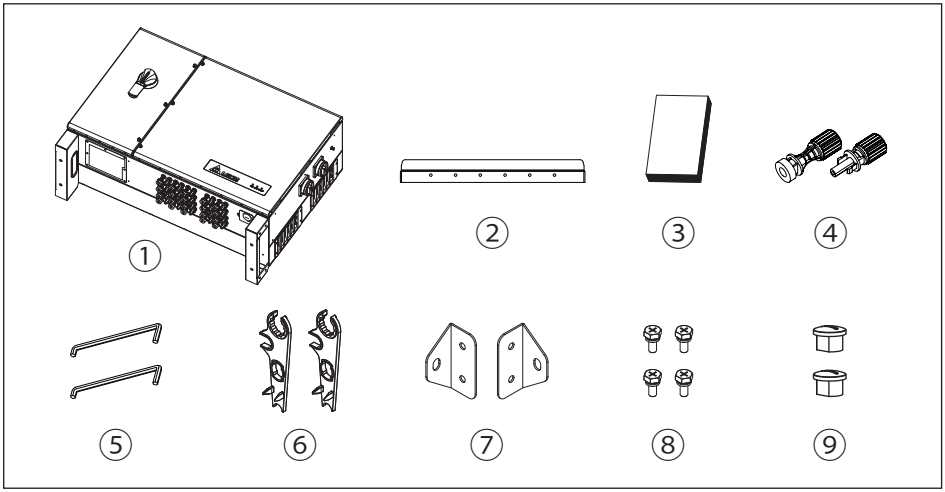


Figure 2-1: Components

Table 2-1: Packing list

M125HV			
	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	UTX Connector	20 pairs	DC String inputs
5	Hexagon Driver	2 pcs	Fixed the door to avoid strong wind breaking it
6	UTX Tool	2 pcs	To disconnect UTX connector
7	Reinforce Bracket	2 pcs	Wall mounting bracket on foot
8	Screw	4 pcs	To lock reinforce bracket with foot
9	Hook Hole Cover	2 pcs	Covers with attached hook hole

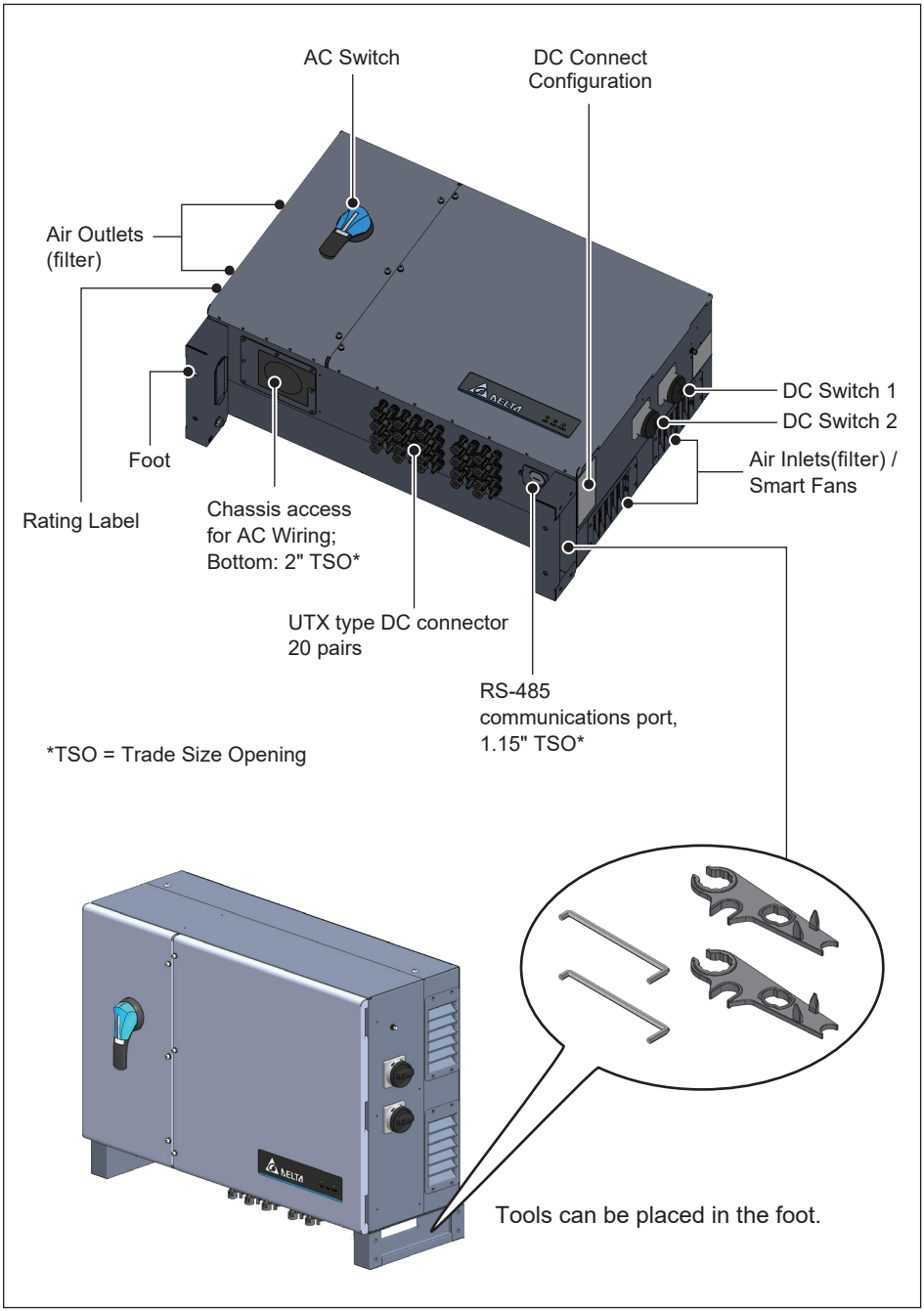


Figure 2-2: Overview

Figure 2-3, below, shows the certification and rating label of M125HV, and ***Table 2-2***, defines the symbol markings on this label.

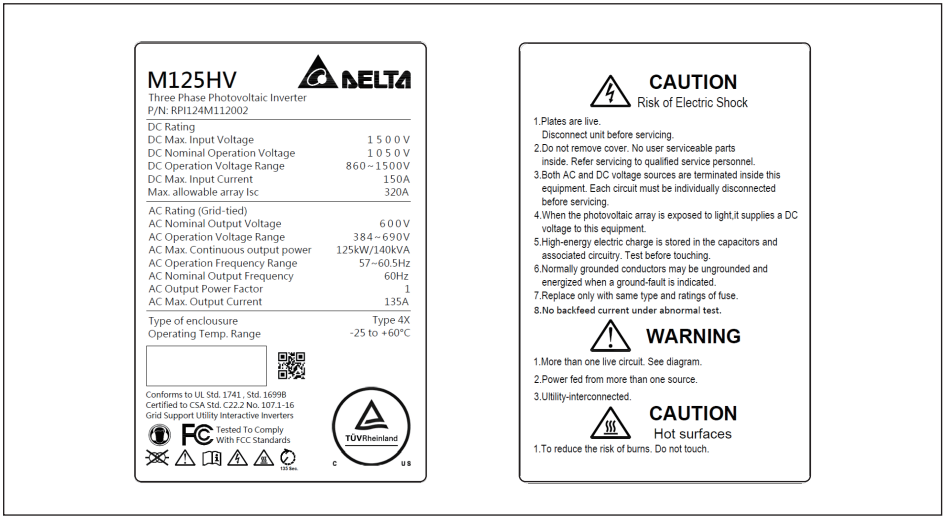


Figure 2-3: Rating label

Table 2-2: Rating label explanation of M125HV

Symbol	Definition		
135 seconds	**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 operatoror installer. Opening the housing will void the warranty.		
	Before working with the inverter, you must read the supplied manual and follow the instructions contained therein.		Please be aware of noise protection.
	This inverter is not separated from the grid with a transformer.		**WEEE marking** The inverter must not be disposed of as standard household waste, but in accordance with the applicable electronic waste disposal regulations of your country or region.
	The housing of the inverter must be grounded if this is required by local regulations.		

In the following pages, ***Figures 2-4*** illustrate the general layout of the M125HV chassis and wiring area. ***Figure 2-5*** and ***Table 2-3***, provides a detailed description of each wiring area option.

The wiring area includes terminals for connection of the output (AC) wiring, AC surge protection devices (SPD).

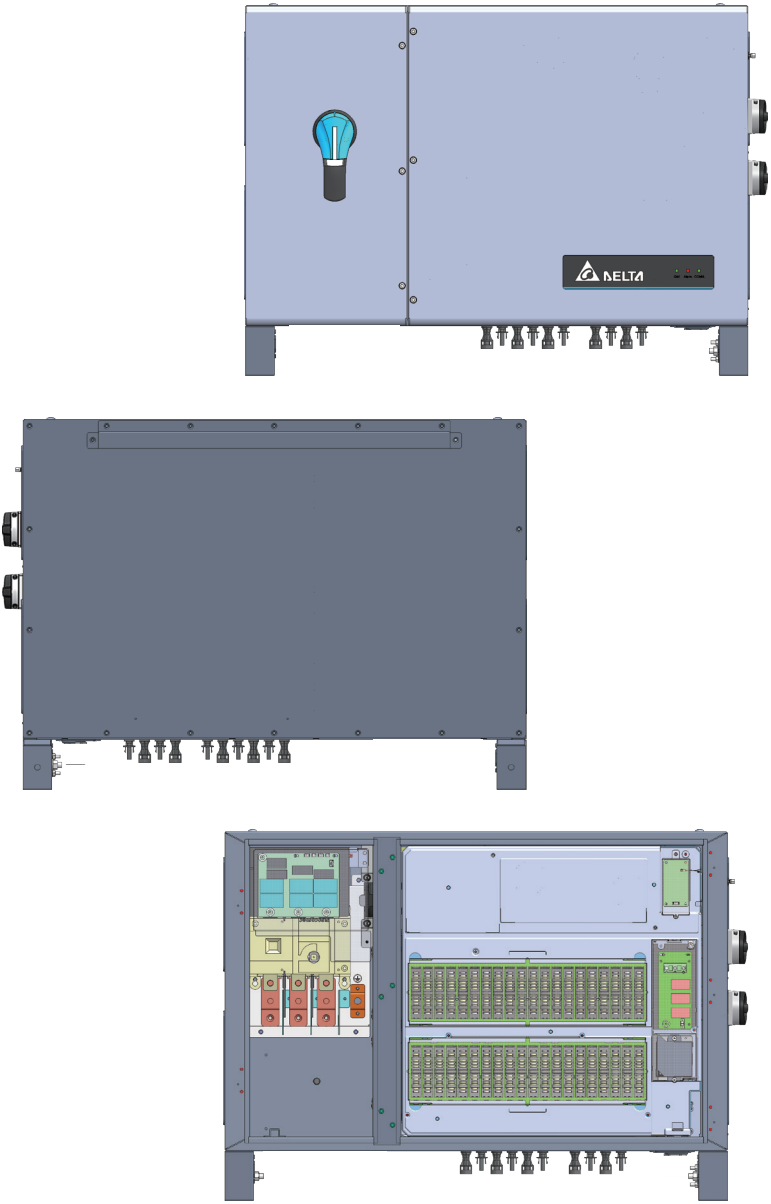


Figure 2-4: External/ internal view

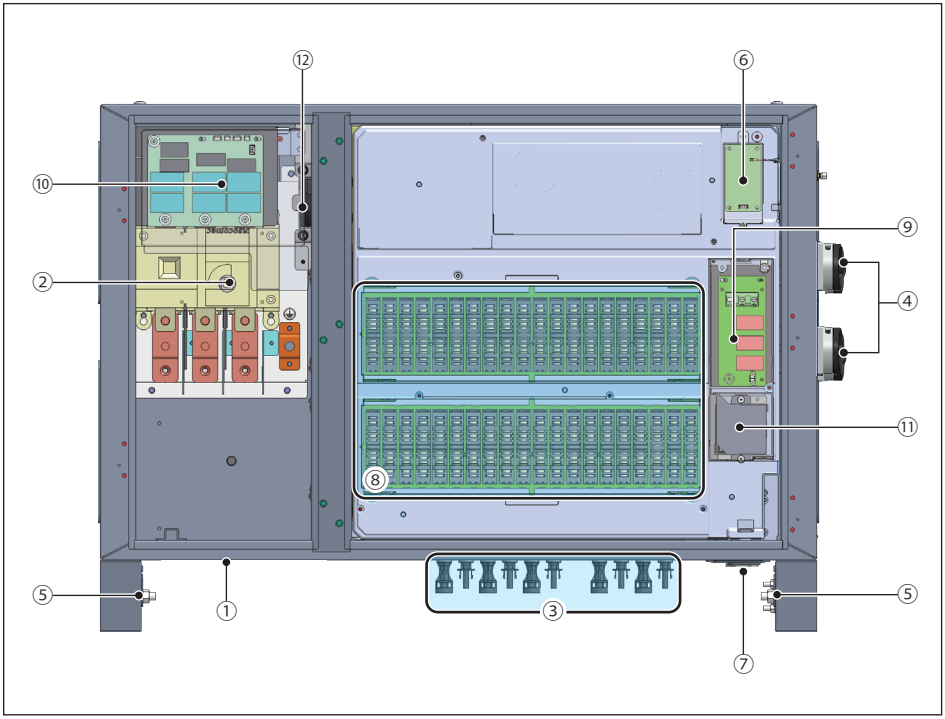


Figure 2-5: M125HV layout

Table 2-3: M125HV layout description

NO.	Component	NO.	Component	NO.	Component
1	2.5” cable opening for AC	5	Grounding (M6/10 threaded stud)	9	Type II DC SPD
2	AC switch	6	N3U_SB1	10	Type II AC SPD
3	UTX connectors (20 pairs)	7	Communication port	11	Internal fan 1
4	DC switches	8	Fuse holder	12	Internal fan 2

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.

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

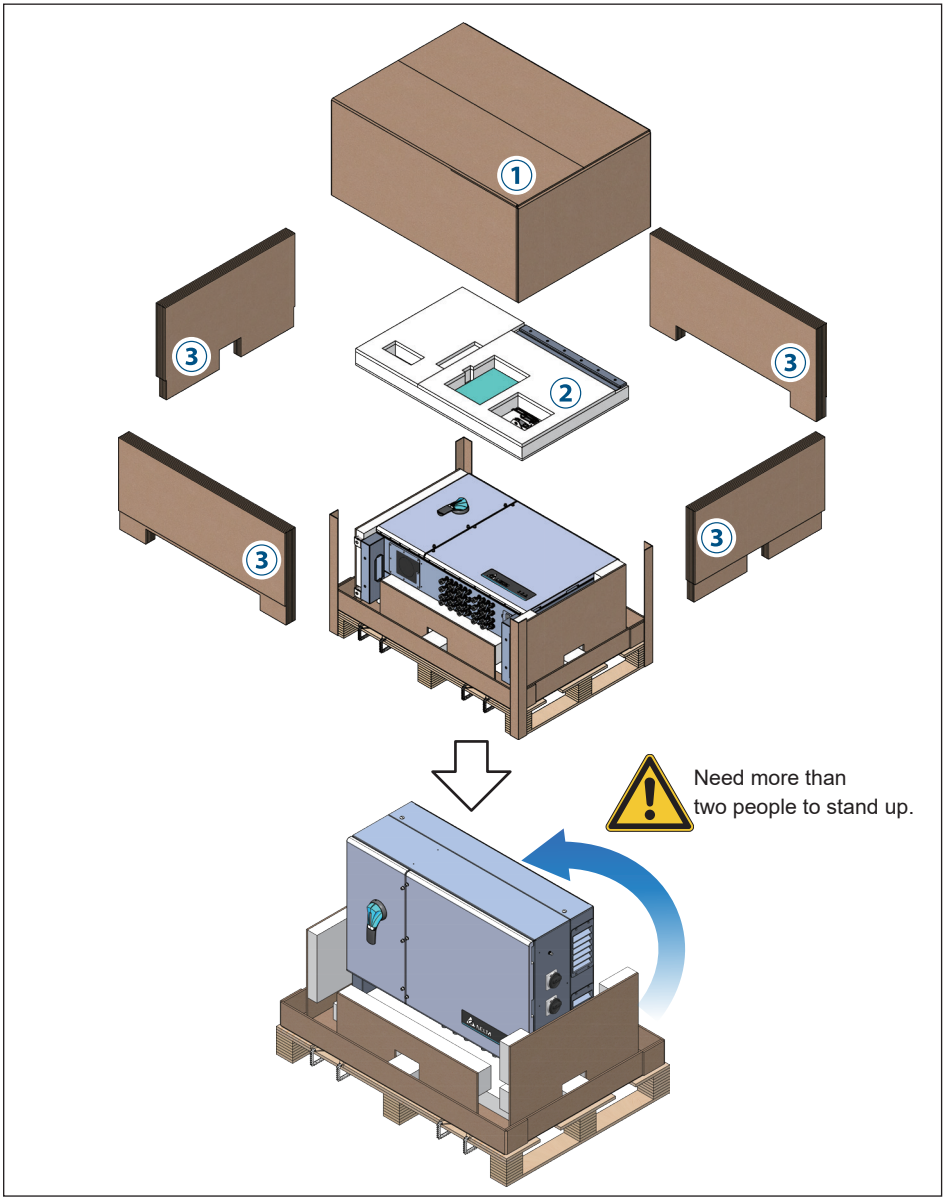


Figure 3-1: The step to unpacking the inverter

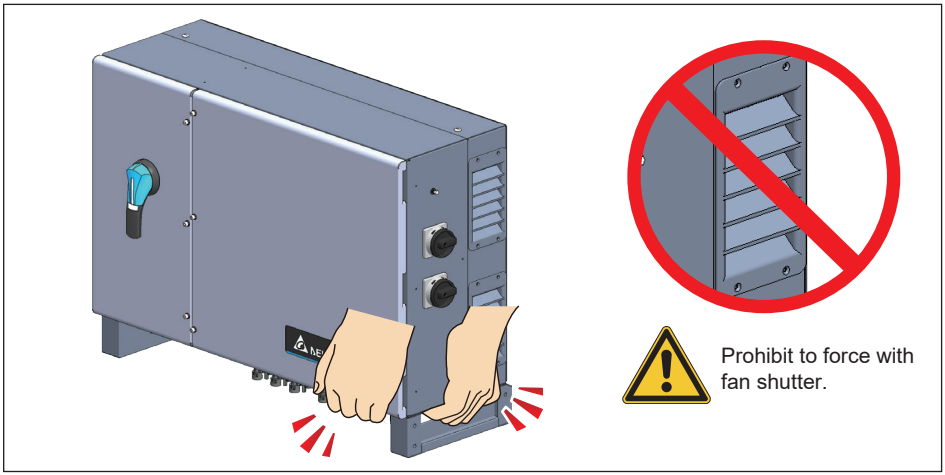


Figure 3-2: Handle position for handling

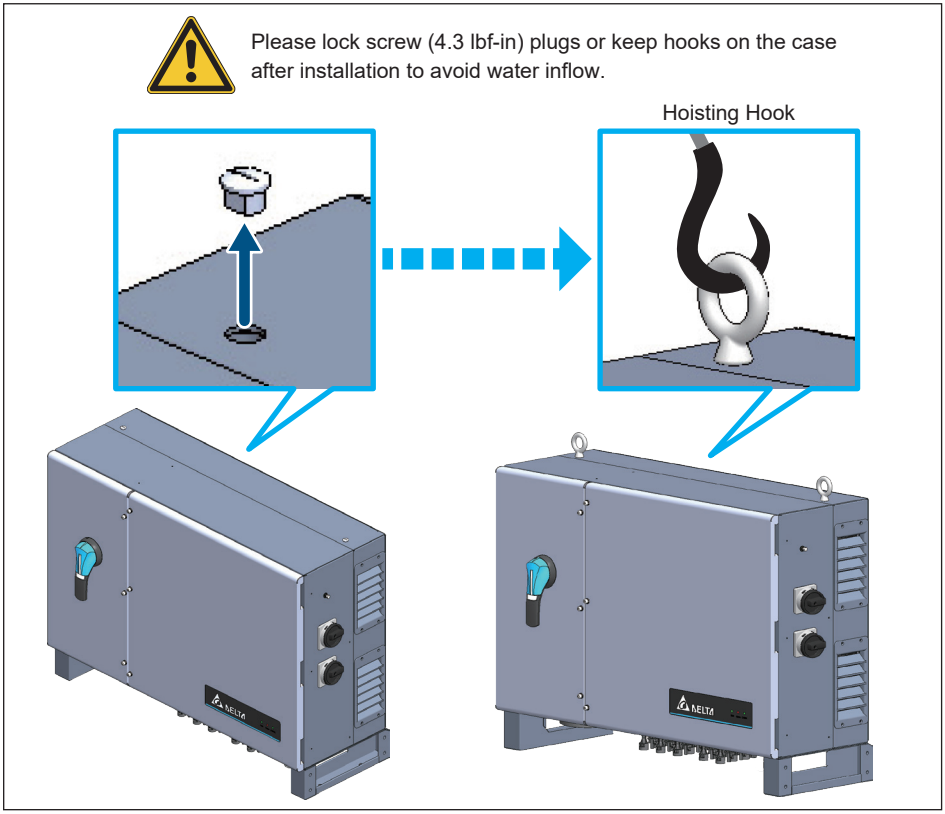


Figure 3-3: Attaching the Hoisting hooks

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 (***Figure 3-5***) horizontally (perpendicular to the floor), with the large plate at the bottom, and mark required mounting hole locations per ***Figure 3-9.***
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 (item 8, ***Figure 2-1***) as shown in ***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)

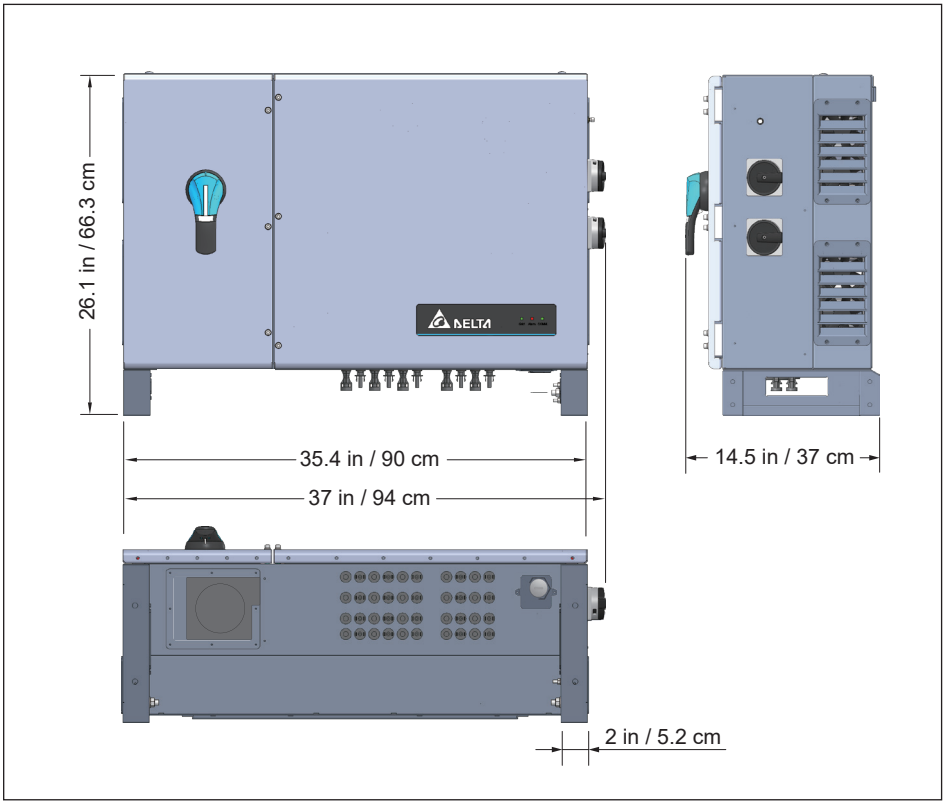


Figure 3-4: Inverter dimensions

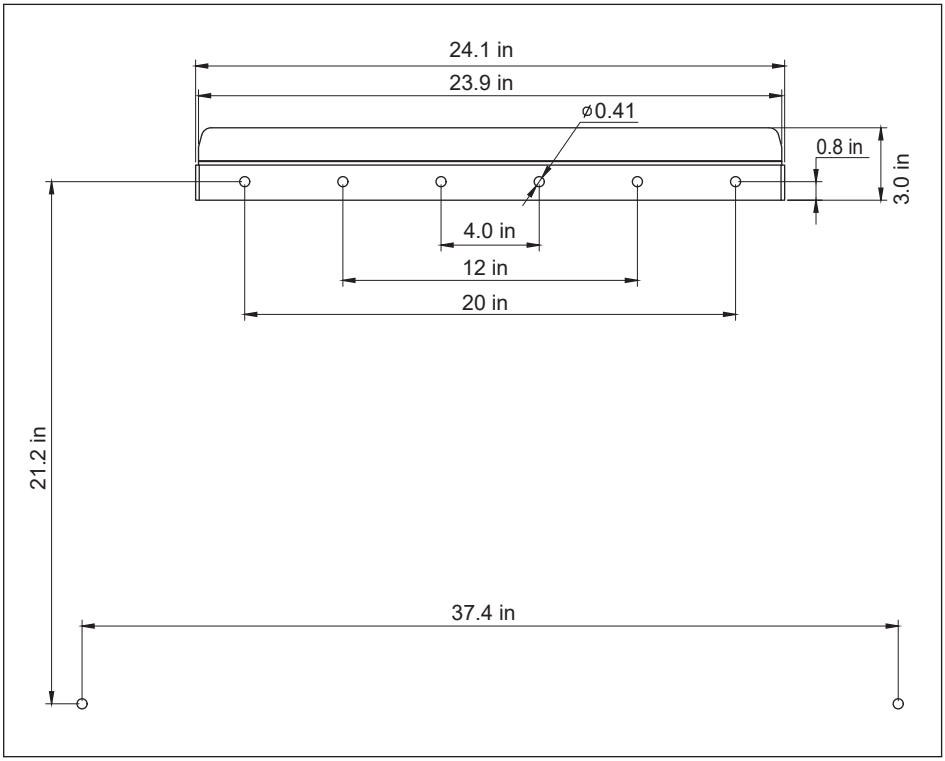


Figure 3-5: Mounting bracket dimensions

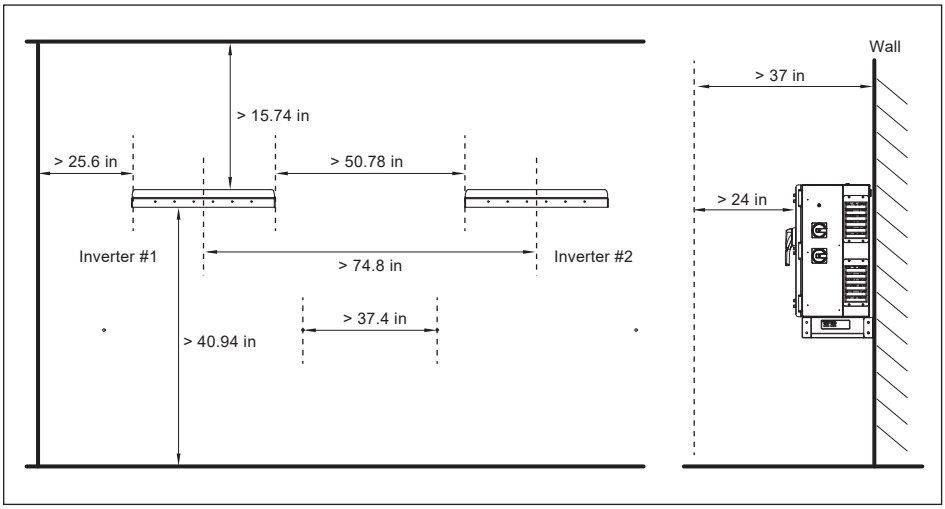
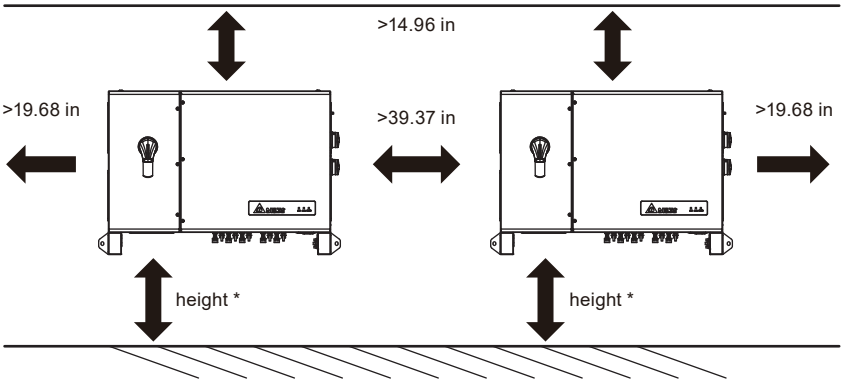


Figure 3-6: Required mounting clearances



* For wall mount installation, make sure it is high enough to have sufficient space for wiring.
(ex: the height will require 11.81 in for using 70mm^2 XLPE cable)

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

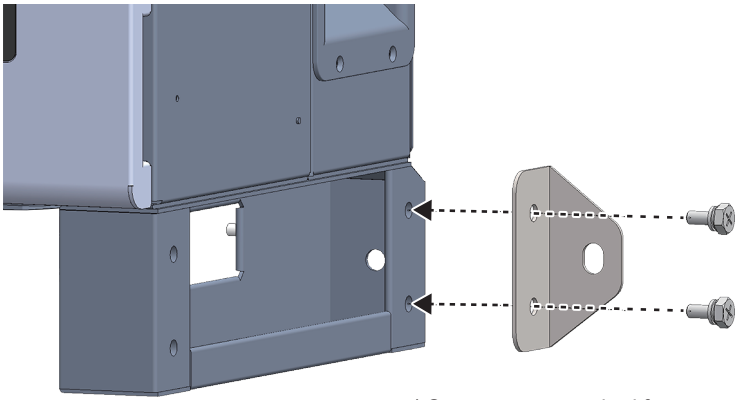


Figure 3-8: Install the unit on the foots

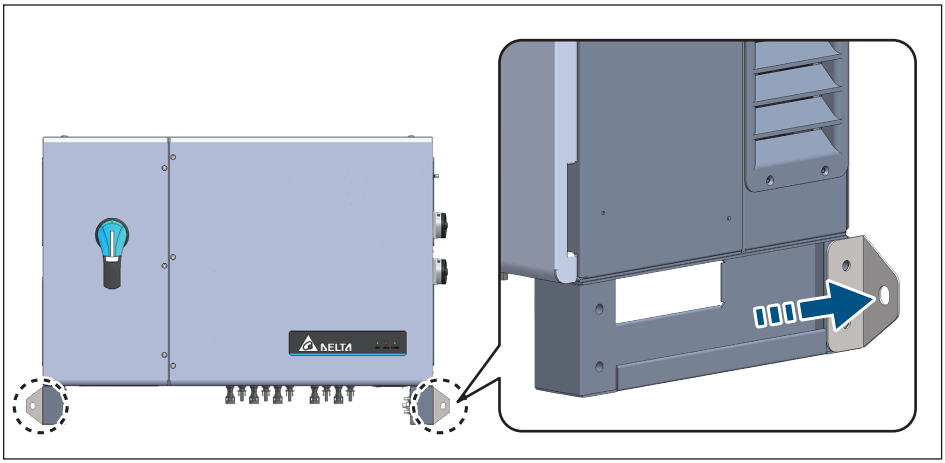


Figure 3-9: To secure inverter reinforce brackets to wall-mounting bracket

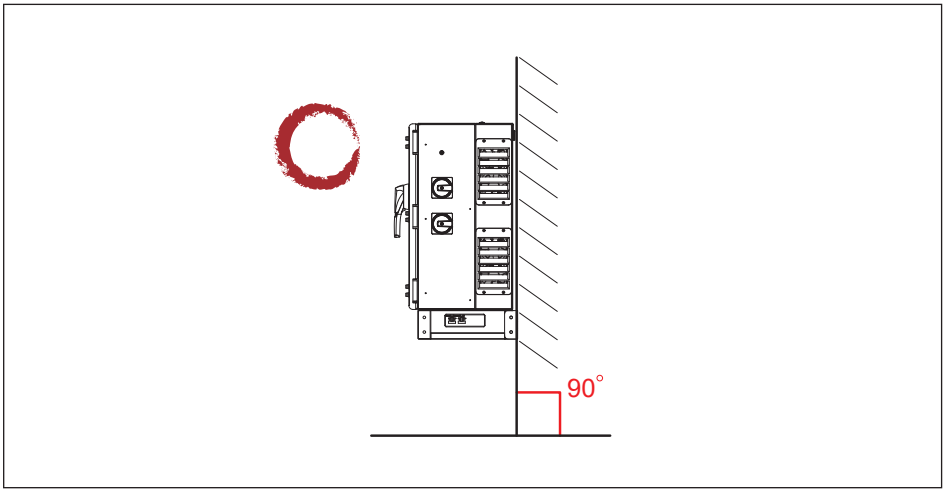


Figure 3-10: Permitted mounting positions

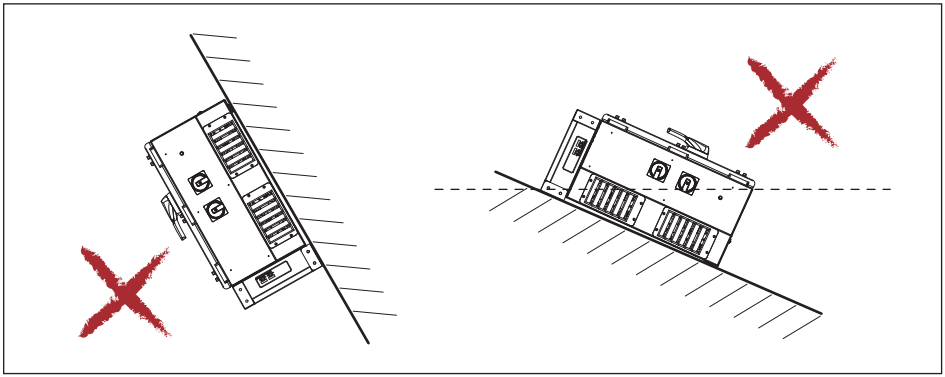


Figure 3-11: Prohibited mounting positions

O : Permitted / X : Prohibited

3.2.2 Ground Mount (Option)

Buy the spare parts of grounded brackets if ground mounted.

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***)
4. Secure the grounded brackets on the grounded base with 4 M10 screws per ***Figure 3-13***.
5. Ser the inverter on the ground mounting base.

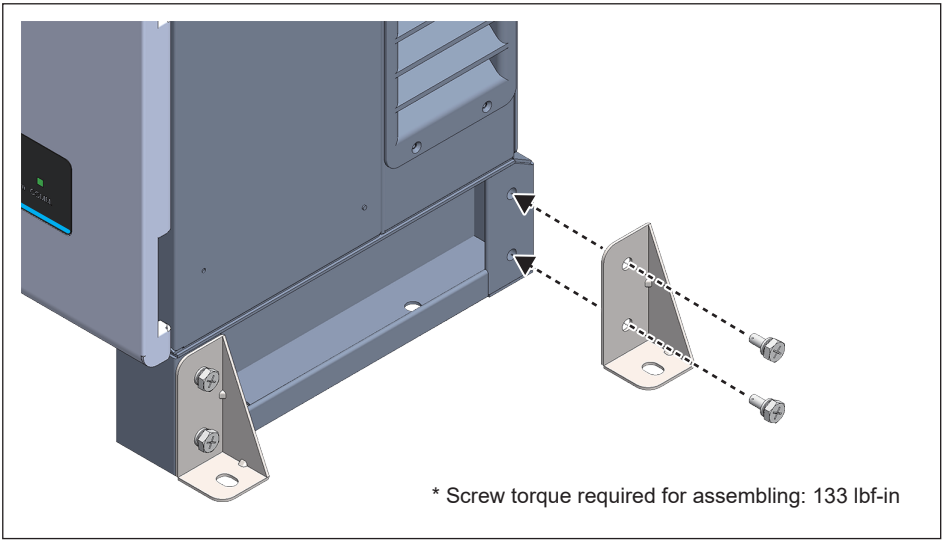
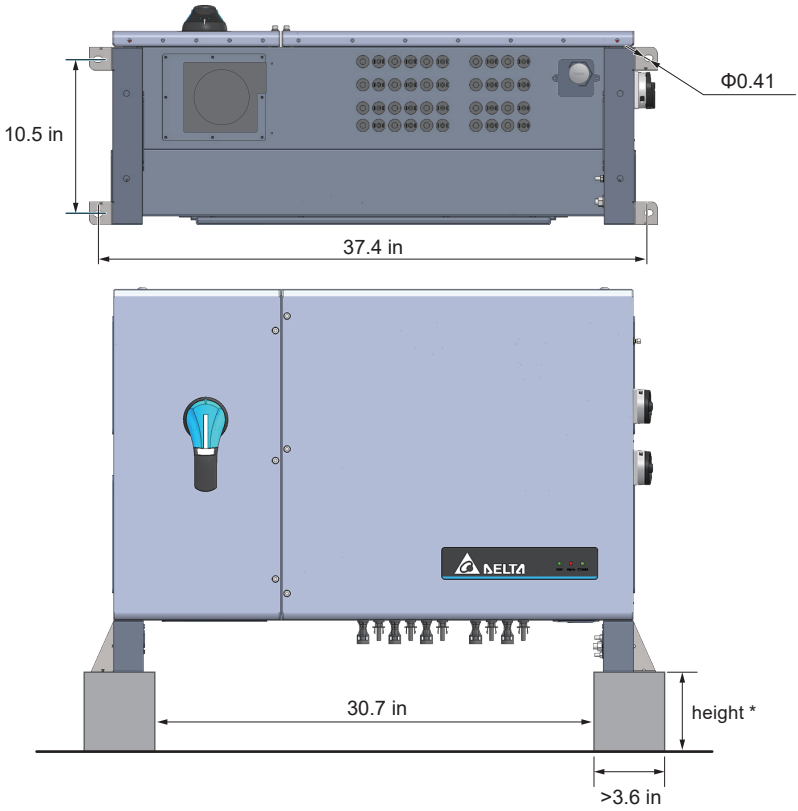


Figure 3-12 : Lock the grounded brackets to foots



* 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 11.81 in for using 70mm^2 XLPE cable)

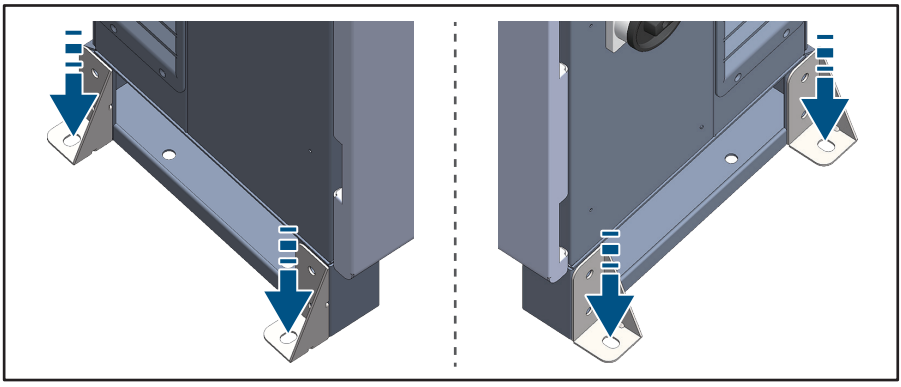


Figure 3-13: To secure inverter grounded brackets to ground-mounting base

3.3 M125HV Door

For first time opening/closing M125HV door, in order to guarantee proper long-term operation of the inverter, procedures in **Section 5.1** must be followed. For first time install M125HV, just open the AC side (left) door to wire AC conductors. Refer to ***Figure 3-14***.

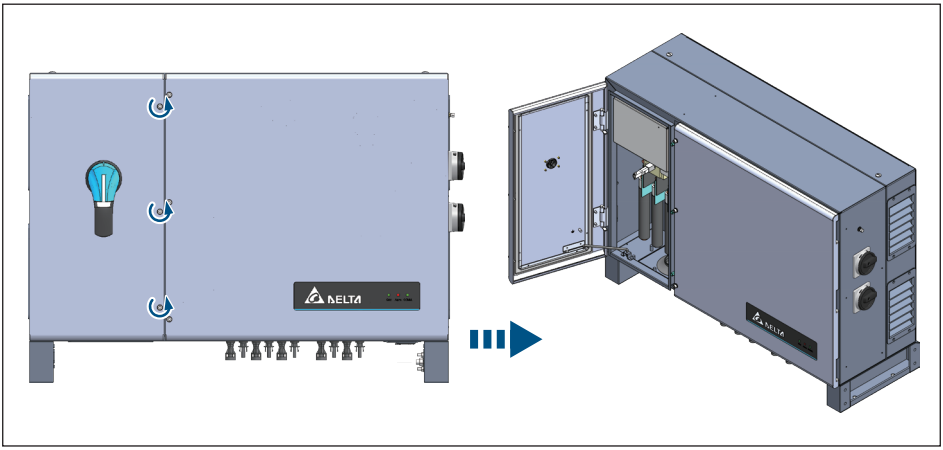


Figure 3-14: First installation of M125HV just open the AC side (left) door

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.

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 !

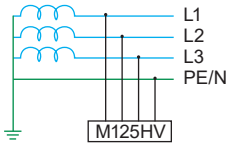
- In order not to damage the components in the inverter, ensure the correct conductor is connected to the appropriate AC terminal on the inverter.

3.4.1 AC Grid Types and Connections

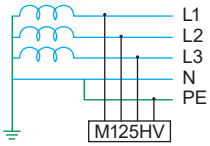
ATTENTION

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:

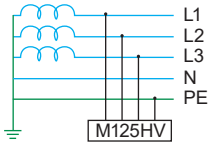
TNC system
347/600V



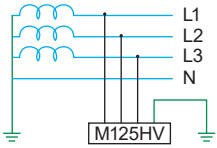
TNC-S system
347/600V



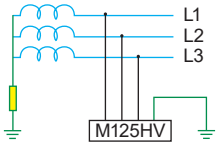
TNS system
347/600V



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	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 70~150 mm^2 for Cu. (95~150 mm^2 for Al)
- The maximum width of each terminal lugs should be within 1.57 in, the diameter of screw hole should be within Φ0.41 in, as shown in ***Figure 3-16.***
- Terminal can use for Cu lug or Al lug based on the wires material.

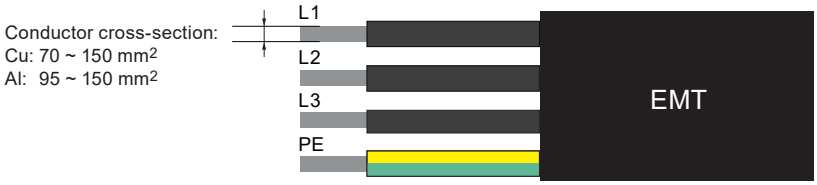


Figure 3-15: Size of AC conductors

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*

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

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***.

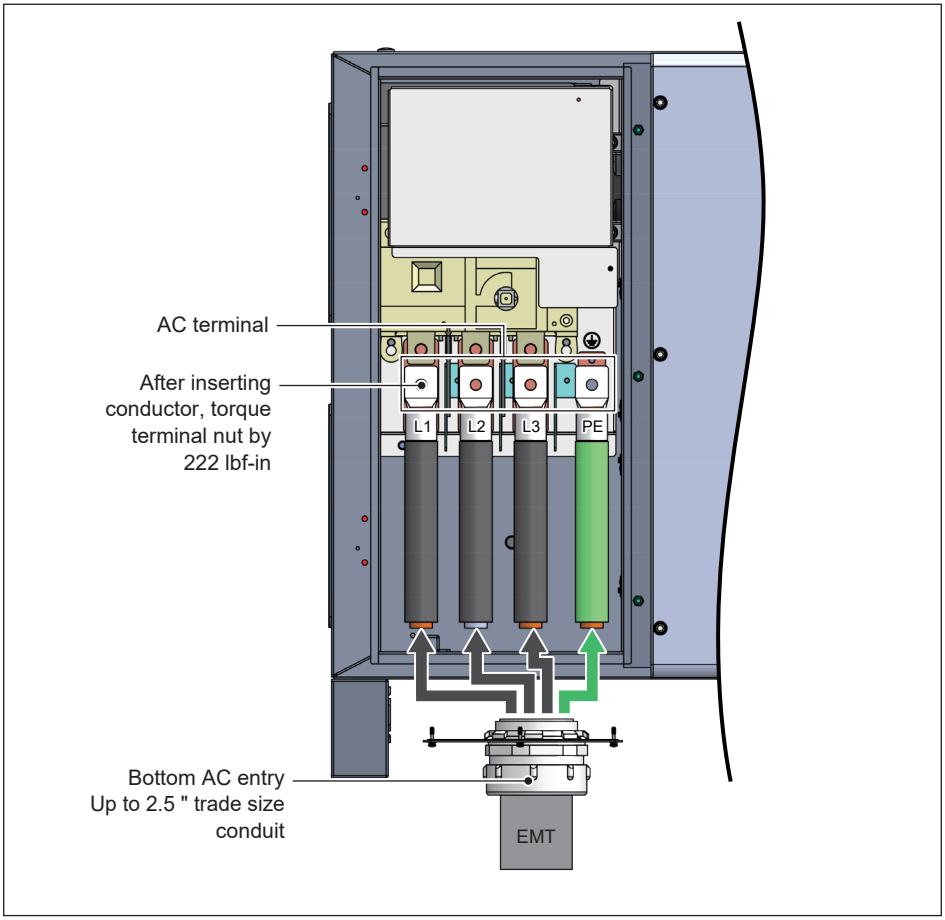


Figure 3-17: Location for AC terminal

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 222 lbf-in

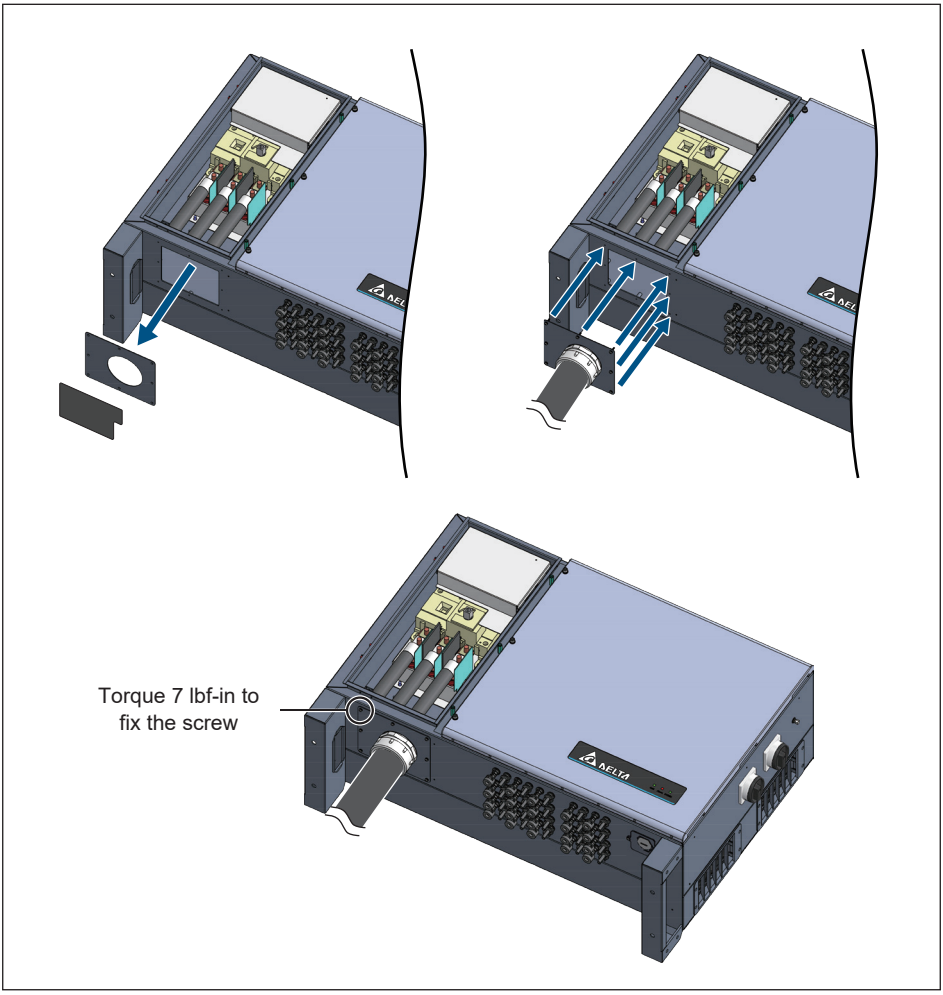
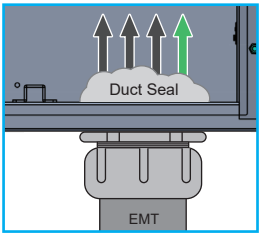


Figure 3-18 : AC chassis access assembling for M125HV

ATTENTION

Please seal the conduit from inside the wiring box 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 SWICH 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 minute 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 negitive 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 0.25~0.29 in.
- The cross-sectional area for each DC conductor is 12/10 AWG.

M125HV use bulkhead mounted UTX type connectors for interconnecting string wiring to the inverter. Mating connectors (See ***Figure 3-19***) are provided within the hardware bag.

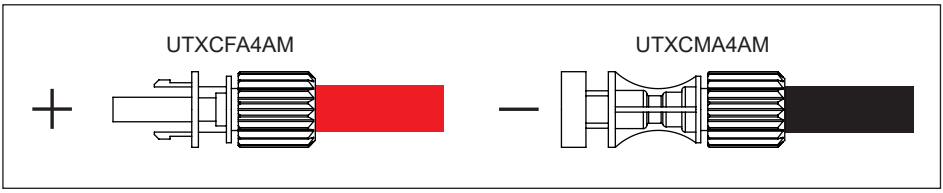


Figure 3-19: DC Wiring illustration

- Choose the DC string wire size based on NEC requirements
- The cross-sectional area for each internal cable is 12/10 AWG (4/6mm^2) .

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

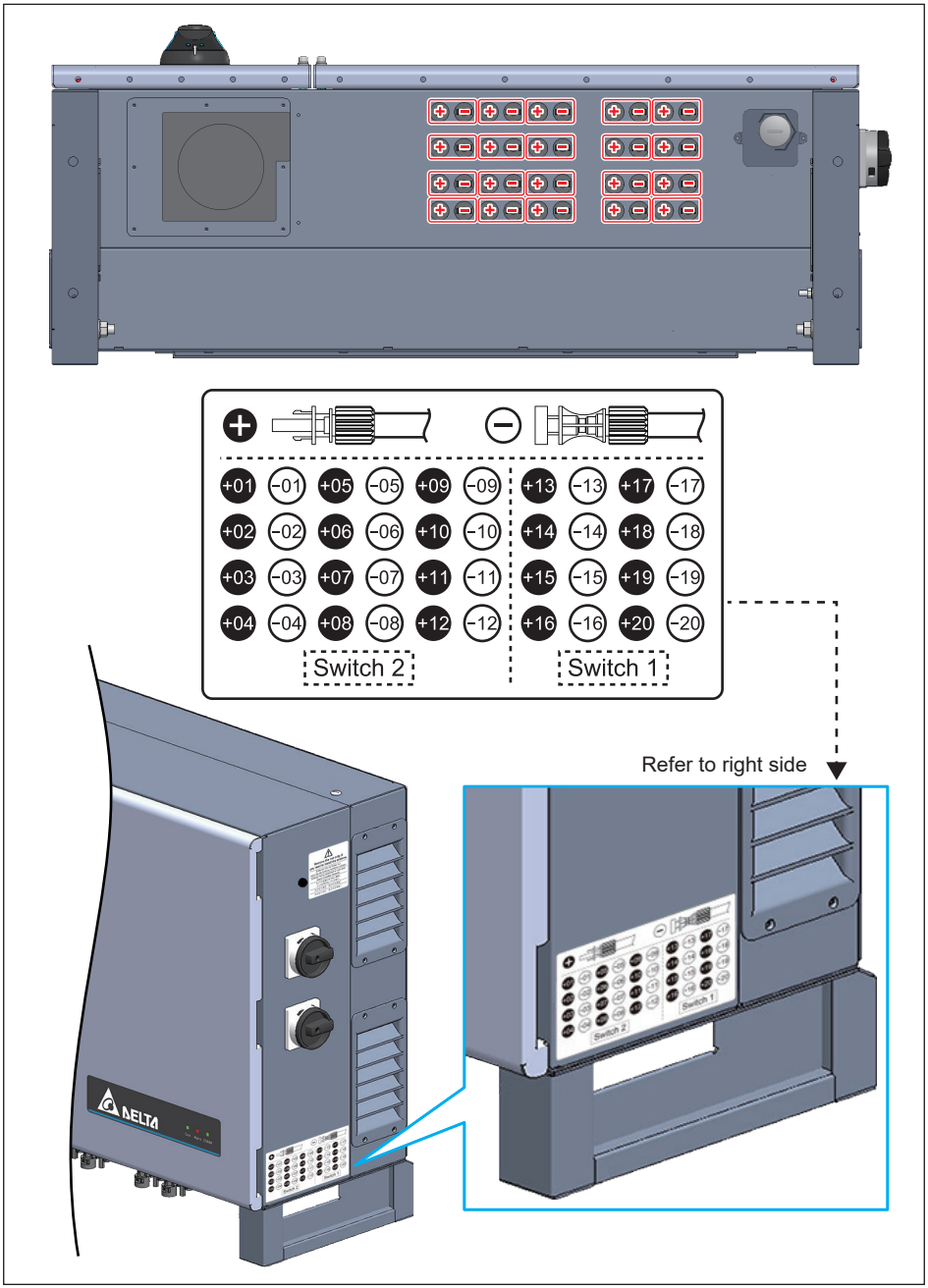


Figure 3-20: M125HV bottom view of inverter chassis showing location of UTX connectors used to connect array wiring (DC)

3.5.2 Equipment Grounding

After installing the unit, locate the ground bar and associated screws in accessory bag. Be sure to orient the ground bar as shown in ***Figure 3-21***. Torque the mounting nuts to: M6/ 62 lbf-in
M10/ 222 lbf-in

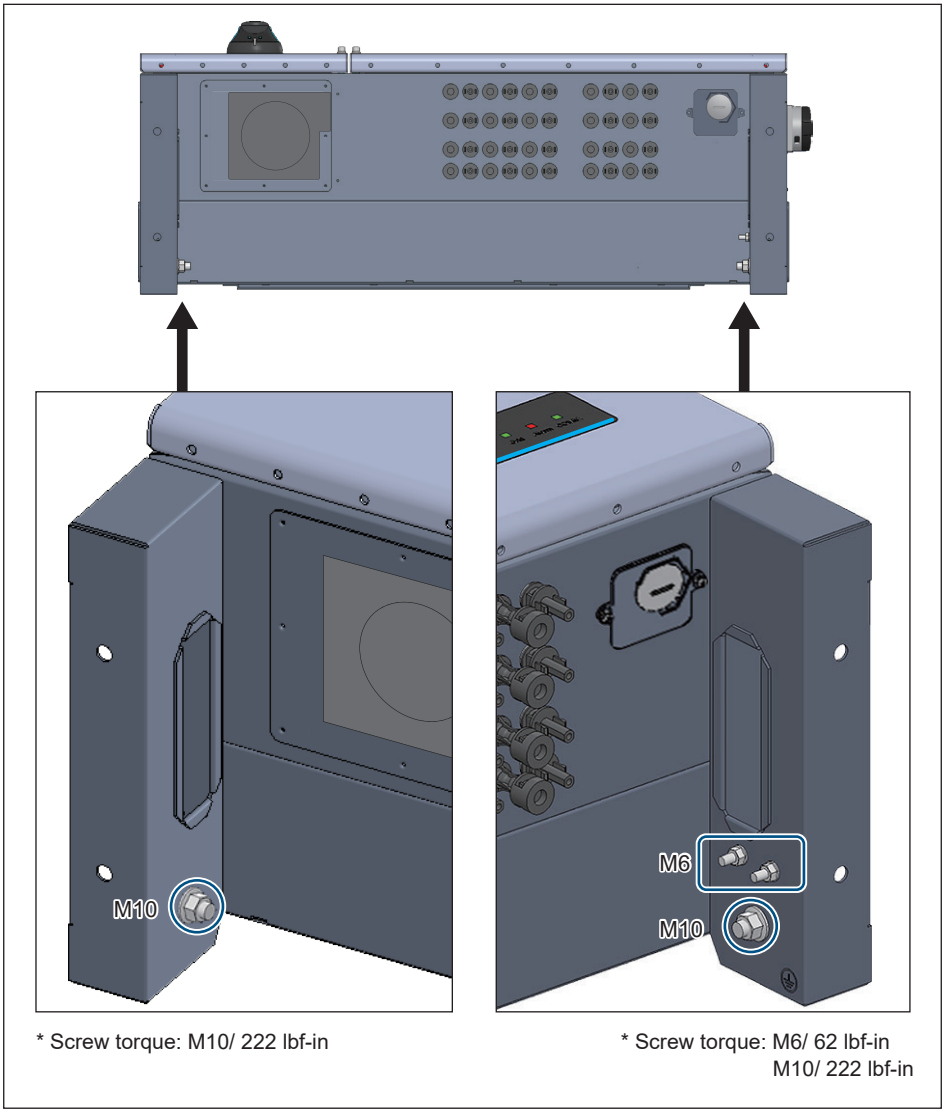


Figure 3-21: Mount the equipment grounding

3.6 Communication Module Connections

The communication module of M125HV is shown in ***Figure 3-22***. 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.

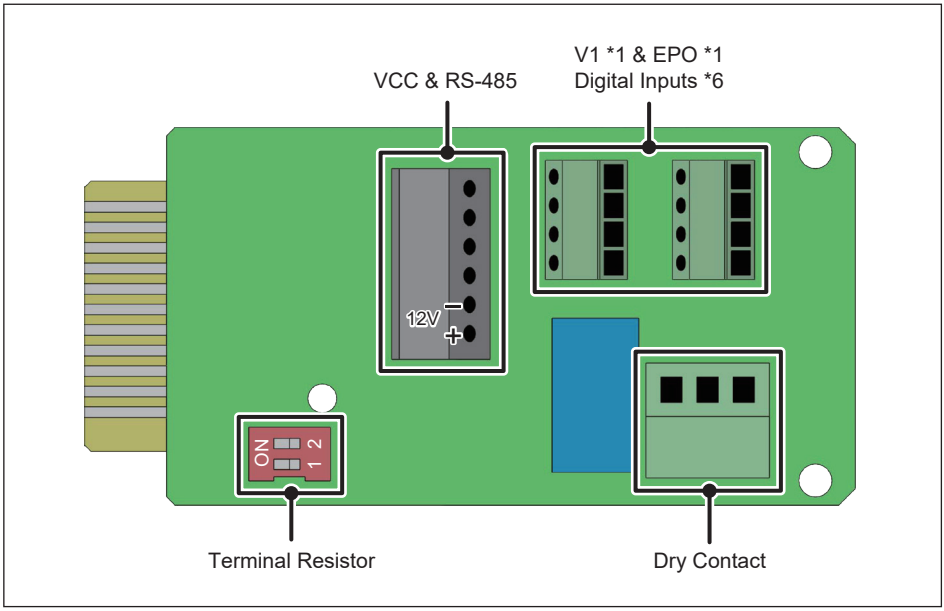
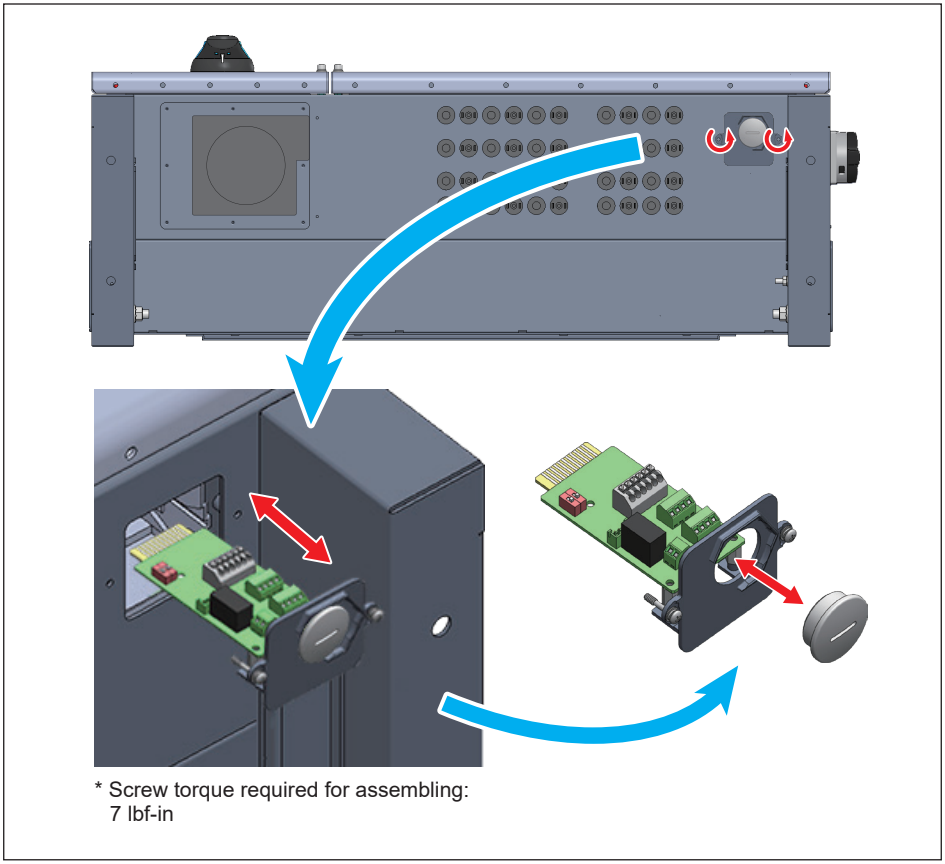


Figure 3-22: Communication Module Layout

3.6.1 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 M125HV 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 3-23***.
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 chassis access 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.



* Screw torque required for assembling:
7 lbf-in

Figure 3-23: Location and access to Communication Module

3.6.2 RS-485 Connection

The pin definition for the RS-485 terminal block is shown in ***Table 3-1.***

- 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 3-24***) The switch function is as shown in ***Table 3-2***.

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

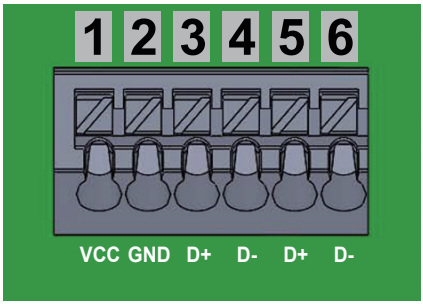
- When several inverters are cascaded (i.e., "daisy-chained") only the last inverter in the chain must have its bus termination resistor switched ON. Refer to ***Figure 3-24***.
- If the length of any RS-485 bus is greater than 2001ft, the use of Belden 3105A cable (or eq.) is recommended to insure communication quality.
  (When using R3 Monitor, a 4-wire cable is required; Belden 3108A (or eq.) is recommended.)

ATTENTION

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

Table 3-1: RS-485 Terminal block wiring

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



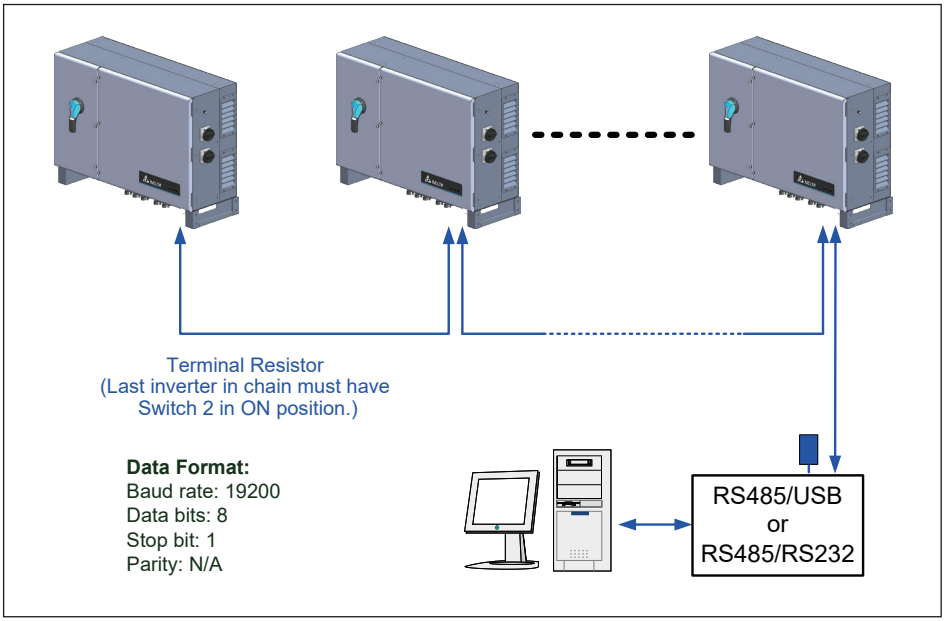


Figure 3-24: Multiinverter connection illustration

Table 3-2: Vcc and Bus Termination switch settings

	Switch 1	Switch 2
ON	VCC ON	Terminal Resistor ON
OFF	VCC OFF	Terminal Resistor OFF

3.6.3 EPO Function & Digital Input

The communication Module has an emergency power off function (EPO), and EPO enable can be found in the Install Settings page.

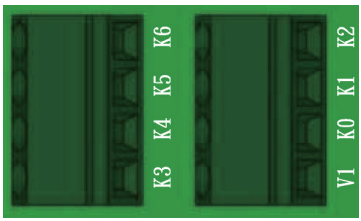


Figure 3-25: EPO function terminal block

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 3-3***, below.

Table 3-3: 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

3.6.4 Dry Contact Connection

M125HV 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 3-26***. 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.

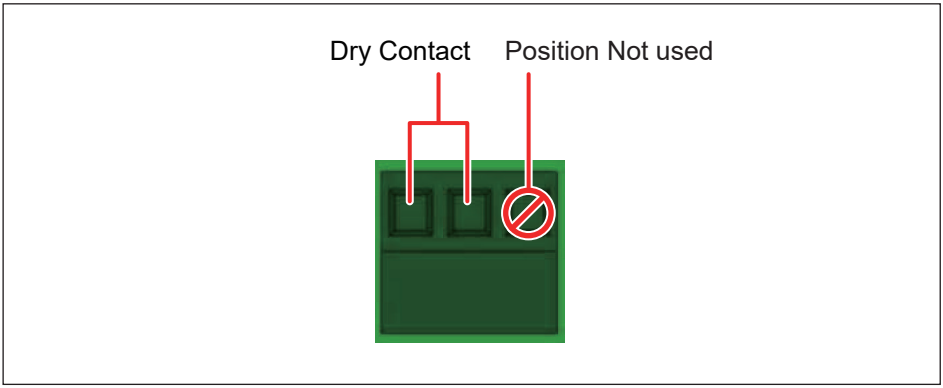
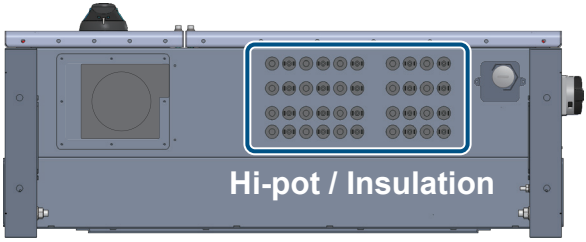
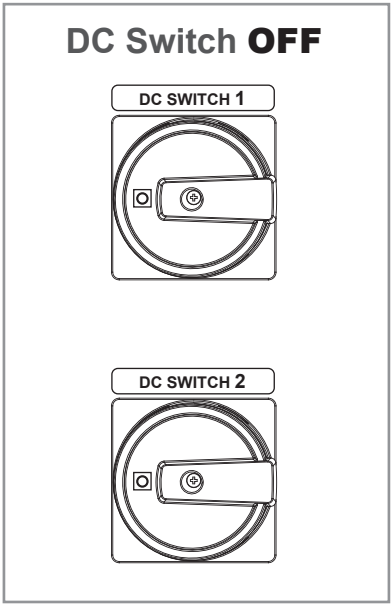


Figure 3-26: Dry Contact connection

3.7 On-Site Insulation Test

For customers who want to do on-site insulation test, please make sure:
1. The DC switches are in “OFF” position.
2. Apply one probe to the positions shown in ***Figure 3-27***, the other to the ground. It might cause damages to the inverter if probes are applied to inappropriate positions.





I : Switch is ON
O : Switch is OFF

Figure 3-27: Precautions for on-site insulation test

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 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.

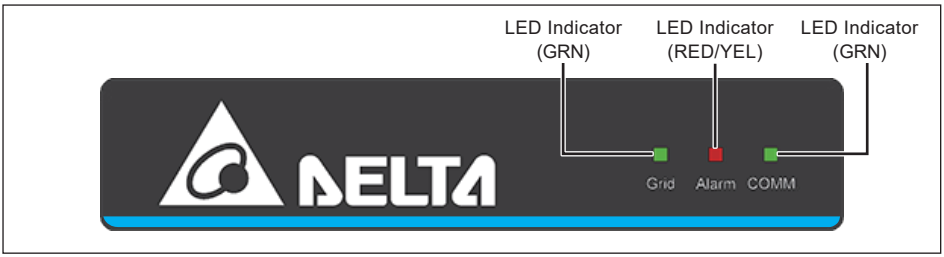


Figure 4-1: Front Panel Display

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	OFF	OFF / FLASH FAST
Inverter Lock	OFF	FLASH / FLASH

*FIASH: ON 1s / OFF 1s
**FIASH FAST: ON 0.25s / OFF 0.25s
***FIASH 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
(Download requires installer permissions, please ask for permission from service.)

4.2.1 Auto ID Setting

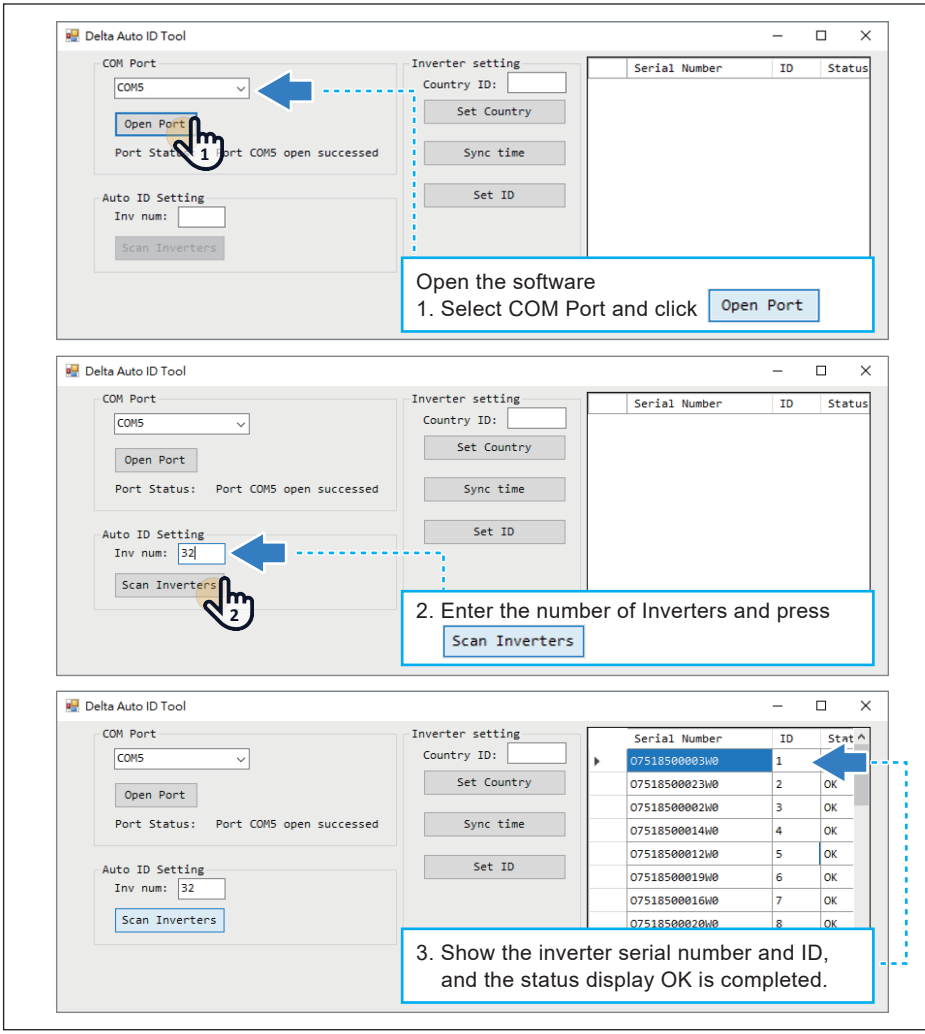
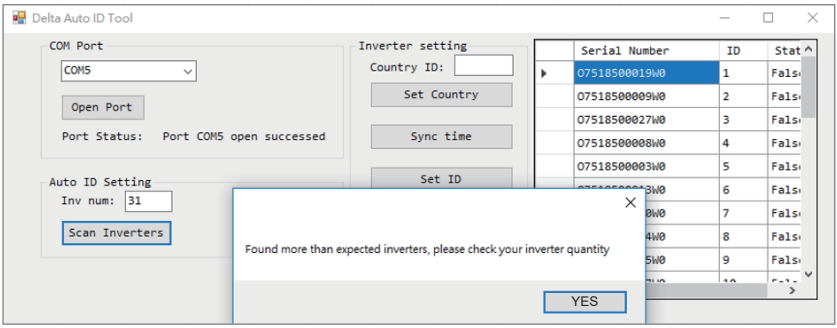


Figure 4-2: Steps of auto ID setting by tool

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.

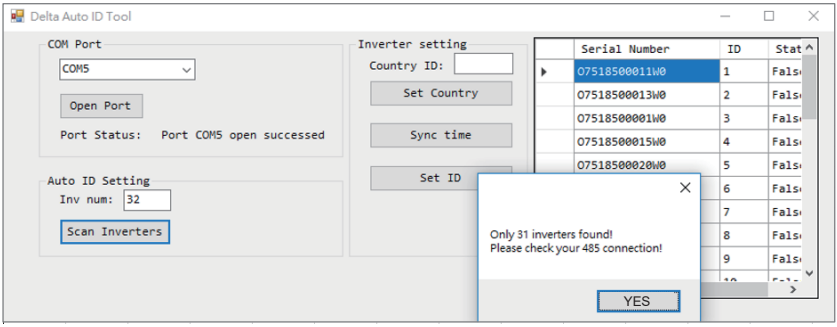


Figure 4-3: False of auto ID setting by tool

4.2.2 Set ID

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

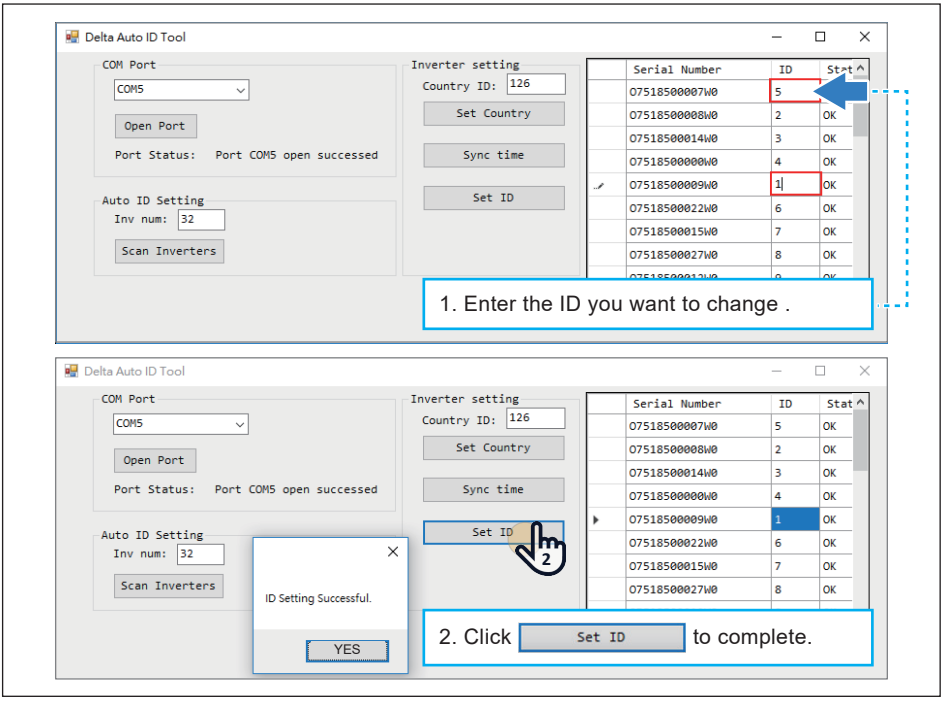


Figure 4-4: Steps of set ID

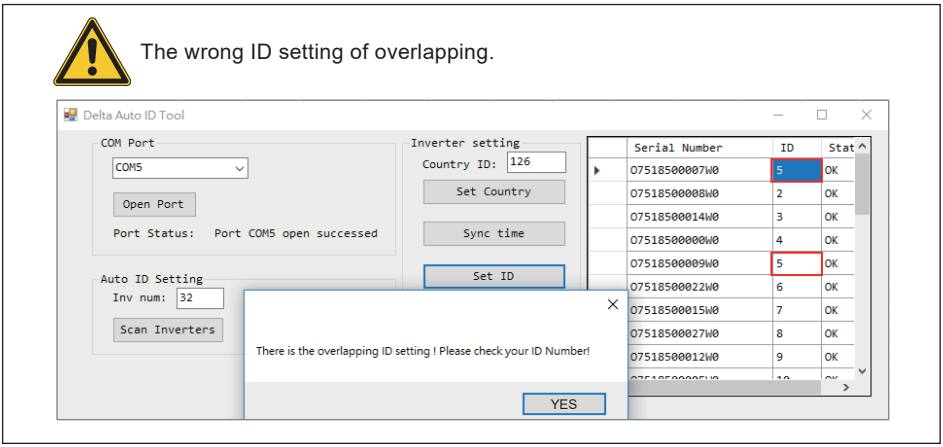


Figure 4-5: False of set ID

4.2.3 Set Country

Set country by the AUTO ID.

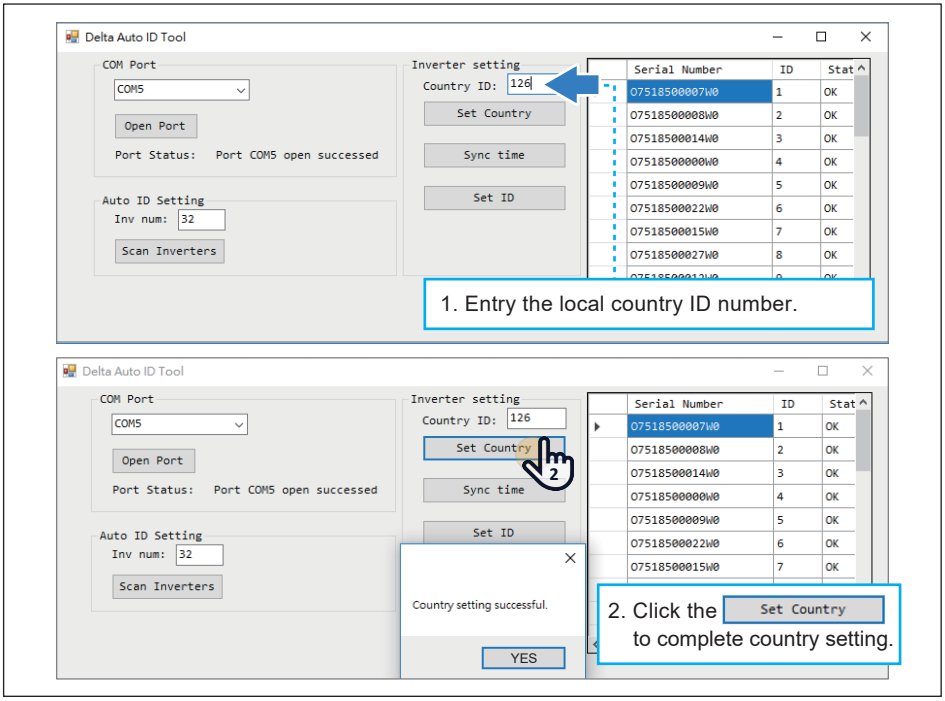


Figure 4-6: Steps of set country

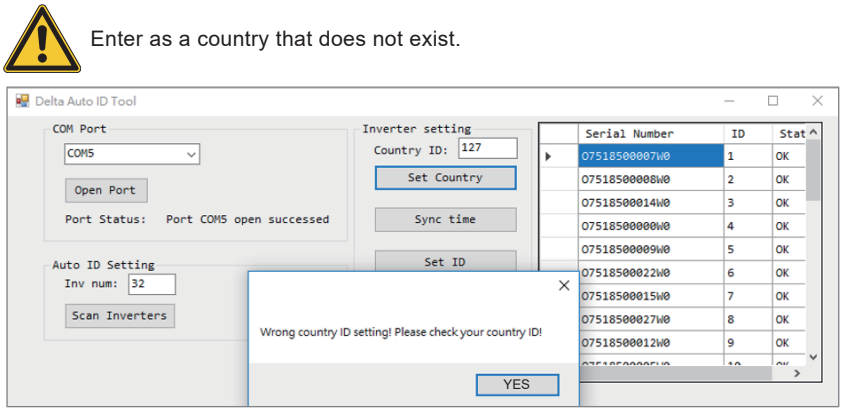


Figure 4-7: False of set country

4.2.4 Synchronize Time

Synchronize time by Auto ID tool.

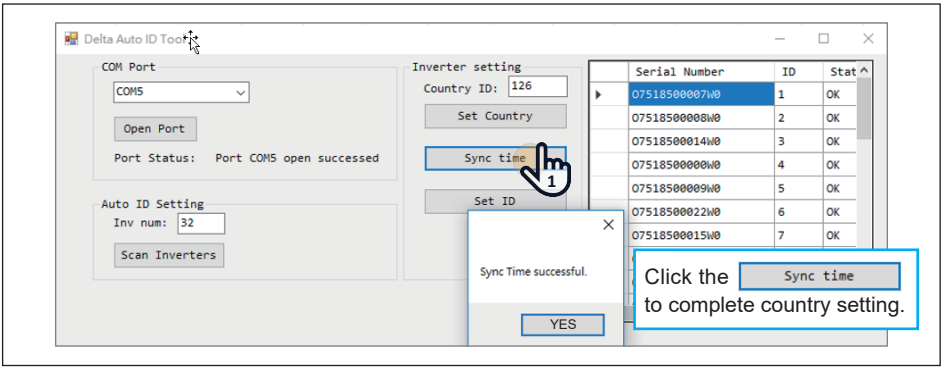


Figure 4-8: Steps of synchronize time

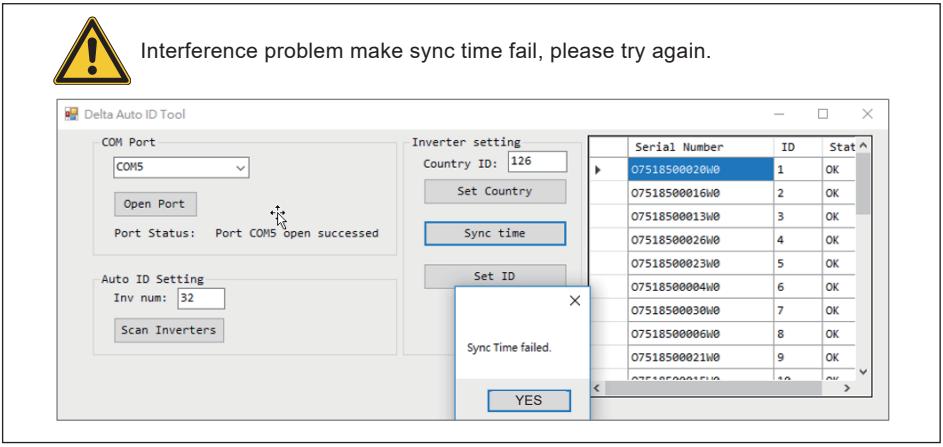


Figure 4-9: False of synchronize time

4.3 Delta Function Setting

Delta offers two settings: DSS and APP (MyDeltaSolar)

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

DSS:

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

APP (MyDeltaSolar):

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

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 !

- 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, either the DC side (right) door can only be opened on the right side.
- **It is forbidden to open both doors at the same time.**

5.1 Opening and Closing M125HV Door

In order to guarantee proper long-term operation of the inverter, the following procedures must be followed to open and close M125HV door, refer to ***Figure 5-1 ~ Figure 5-3.***

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

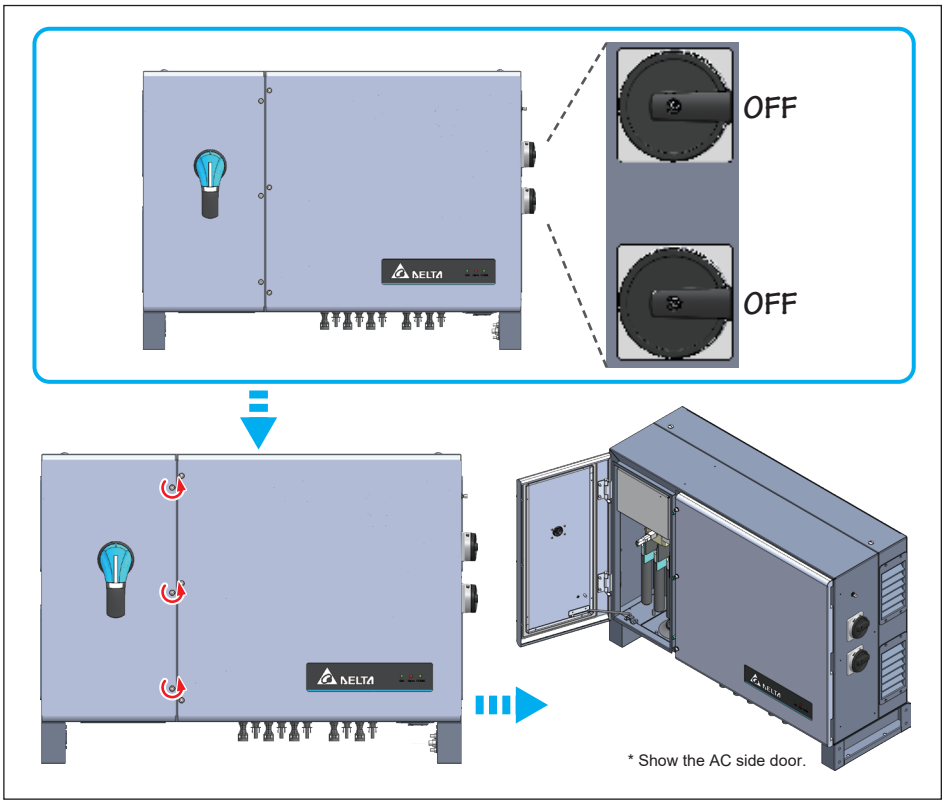
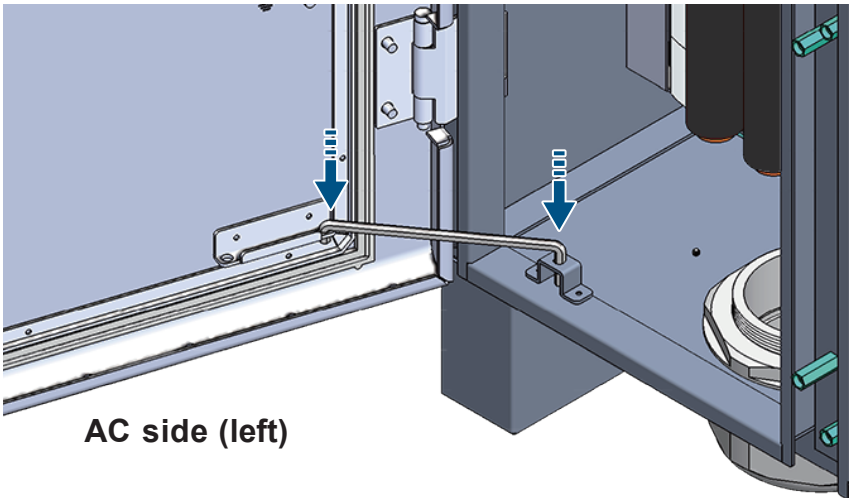
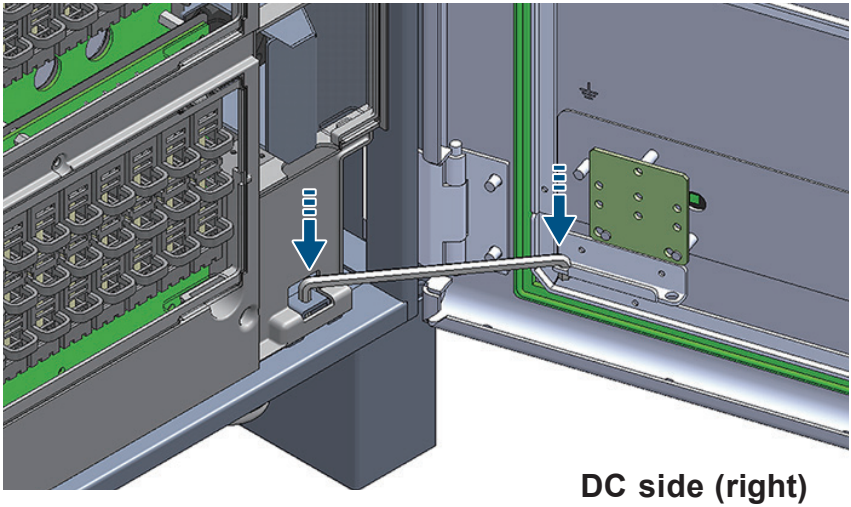


Figure 5-1: Opening and closing M125HV door



or



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.

5.1.1 Opening M125HV Door

- Never attempt to open M125HV door in rainy damp weather without weather protection around the inverter.
- 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.

After opening the door, do not leave the door opened for long periods of time.

5.1.2 Closing M125HV Door

Before closing the M125HV door:

1. Ensure mating surfaces and gasket are clean.
2. The gasket is properly located and aligned in its mounting slot.

When closing the door:

1. Hand tighten screws cross wise and equally.
2. Fully tighten the door screws to 39 lbf-in of torque.

After closing the door:

1. Use care to ensure the door screws are started properly and not cross-threaded.
2. After tightening, check that screw heads are flush with door.

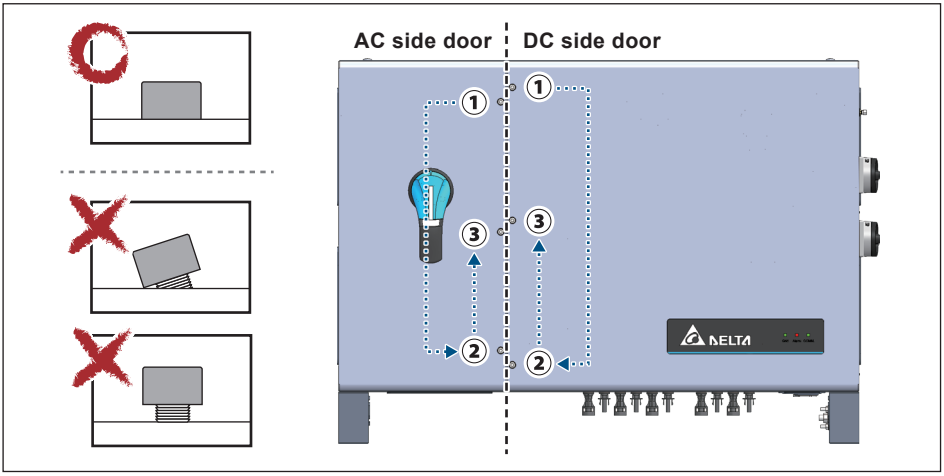


Figure 5-3: Closing process for M125HV door

5.2 Replacement of Surge Protection Devices (SPD)

M125HV 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.

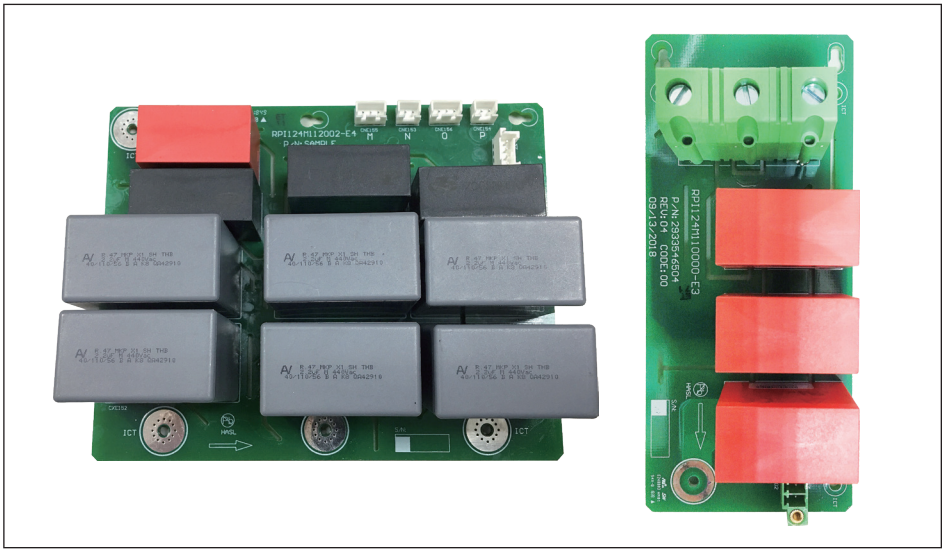


Figure 5-4: AC and DC SPD modules

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 display panel, follow the procedure below to replace the SPD.

• Determine which SPD unit is damaged. See ***Figure 5-5.***
AC SPD/DC SPD: Show on the corner of the LED panel.

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

The SPDs is detect by inverter to show which SPD is fail. SPD fail with warning shows by DSS and APP.

• Accessing M125HV 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 5-6)*

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 5-7)*

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

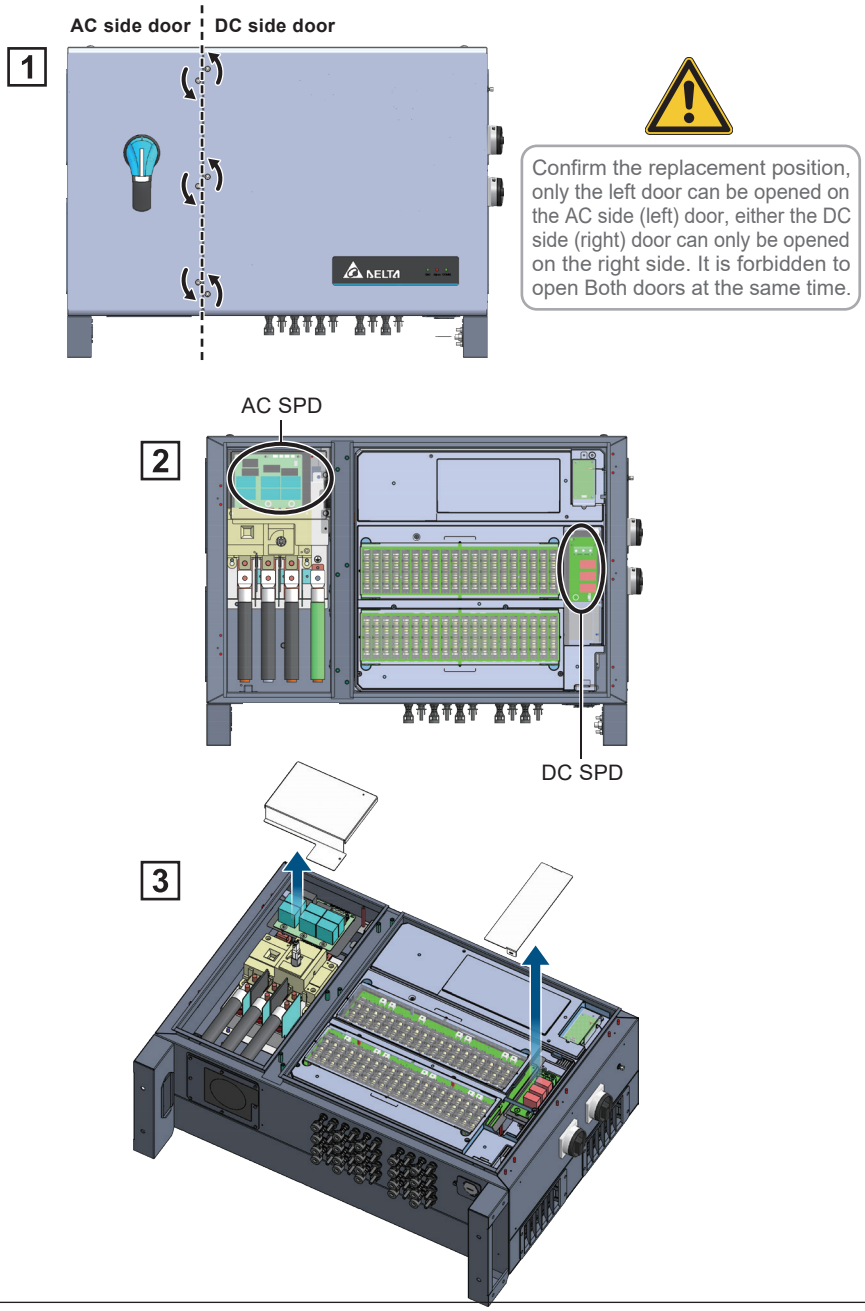


Figure 5-6: Steps of changing SPDs

AC SPDs

* L1/L2/L3/G: Screw torque 7 lbf-in

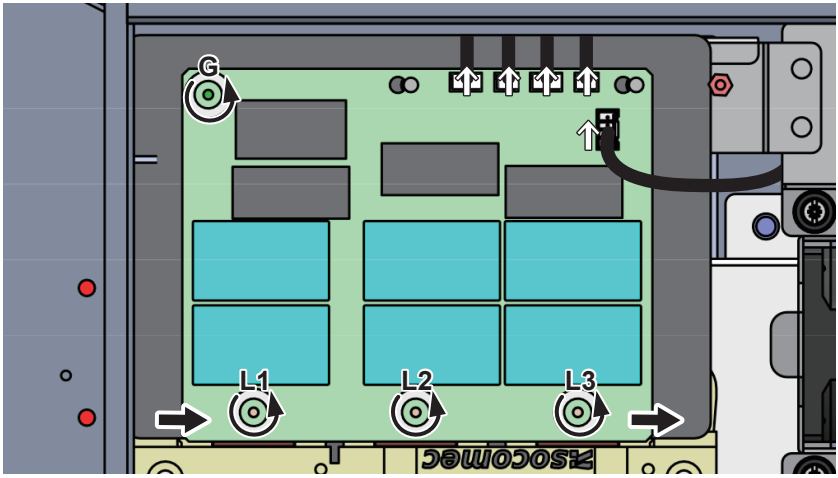


Figure 5-7: Remove wirings as connectors of AC SPD

DC SPDs

* A/G: Screw torque 7 lbf-in

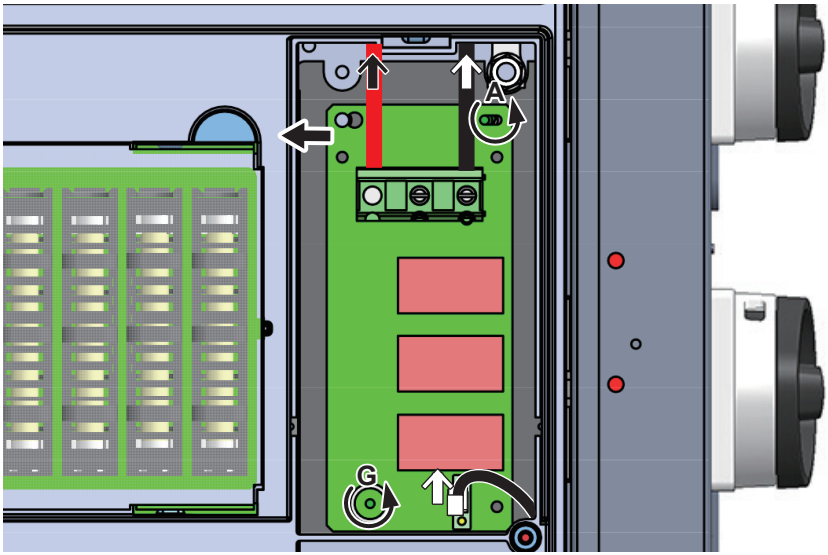


Figure 5-8: Remove wirings as connectors of DC SPD

5.3 Replace Internal String Fuse

M125HV 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 builded in M125HV 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.

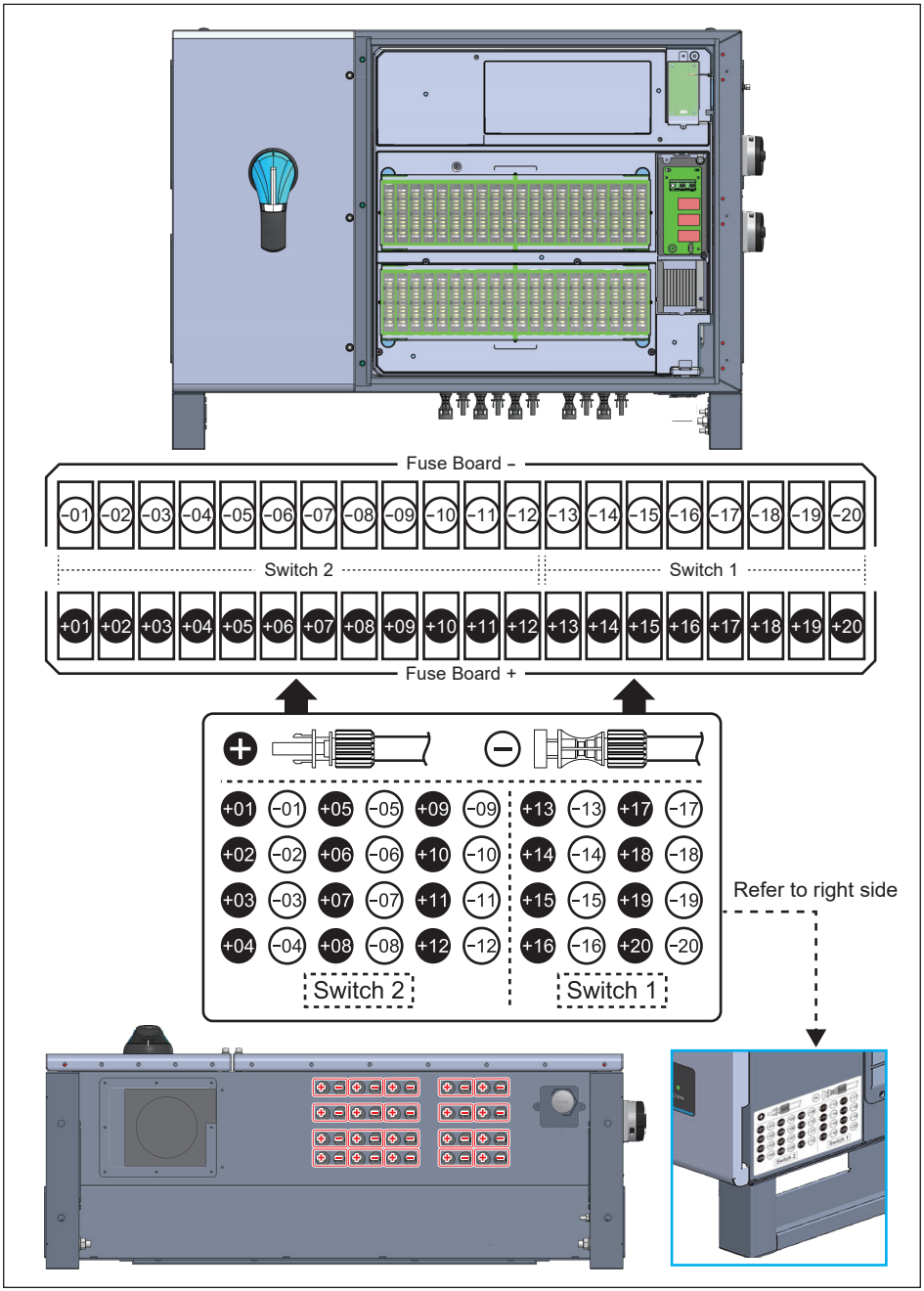


Figure 5-9: M125HV layout and bottom view of inverter chassis showing location of UTX connectors

M125HV 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.

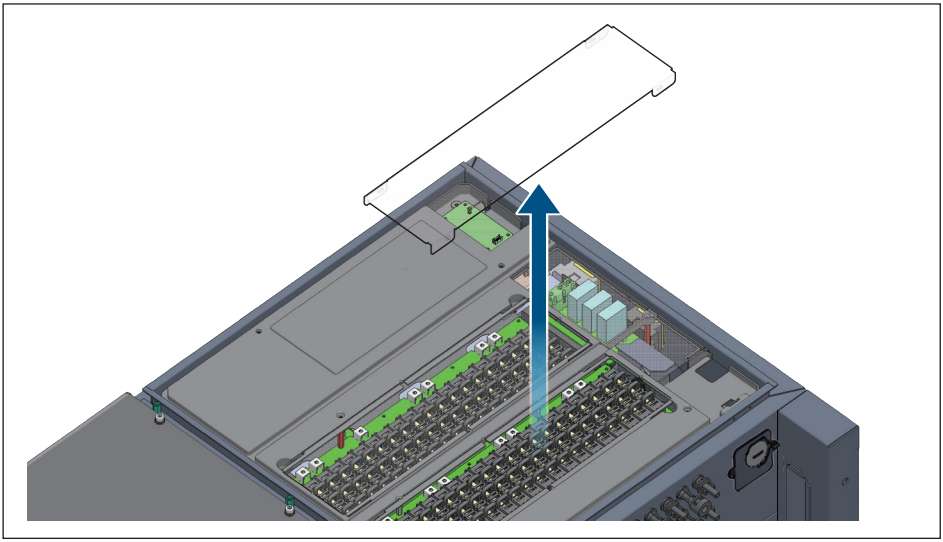


Figure 5-10: Fuse holder locations

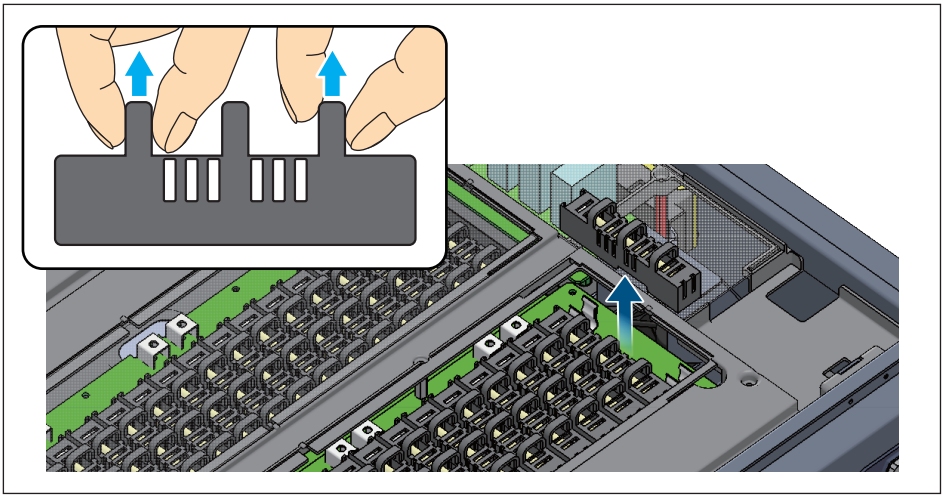


Figure 5-11: Accessing the individual fuses

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.

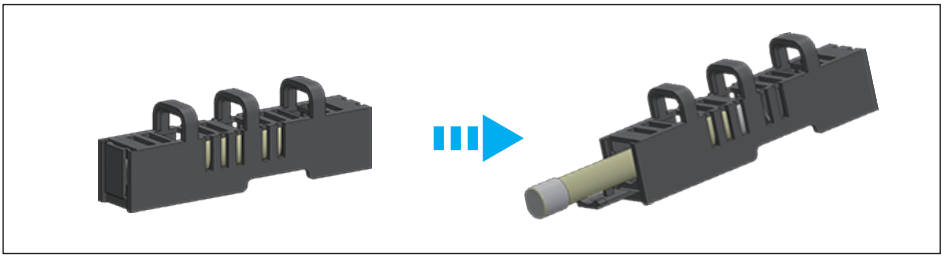


Figure 5-12: Replace the fuse

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 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 5-13, 5-14, 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.

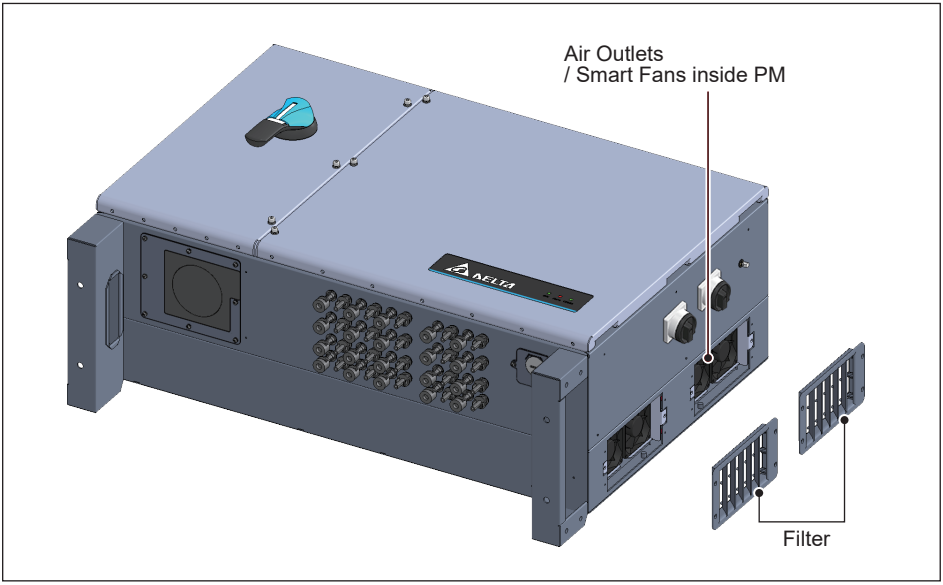


Figure 5-13: Smart Fans location on Power Module chassis

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.

WARNING !

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

5.4.1 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 warrning "Fan Fail_X" 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.***

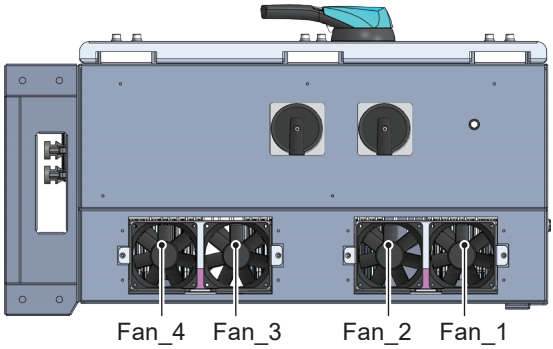


Figure 5-14: Order of fan

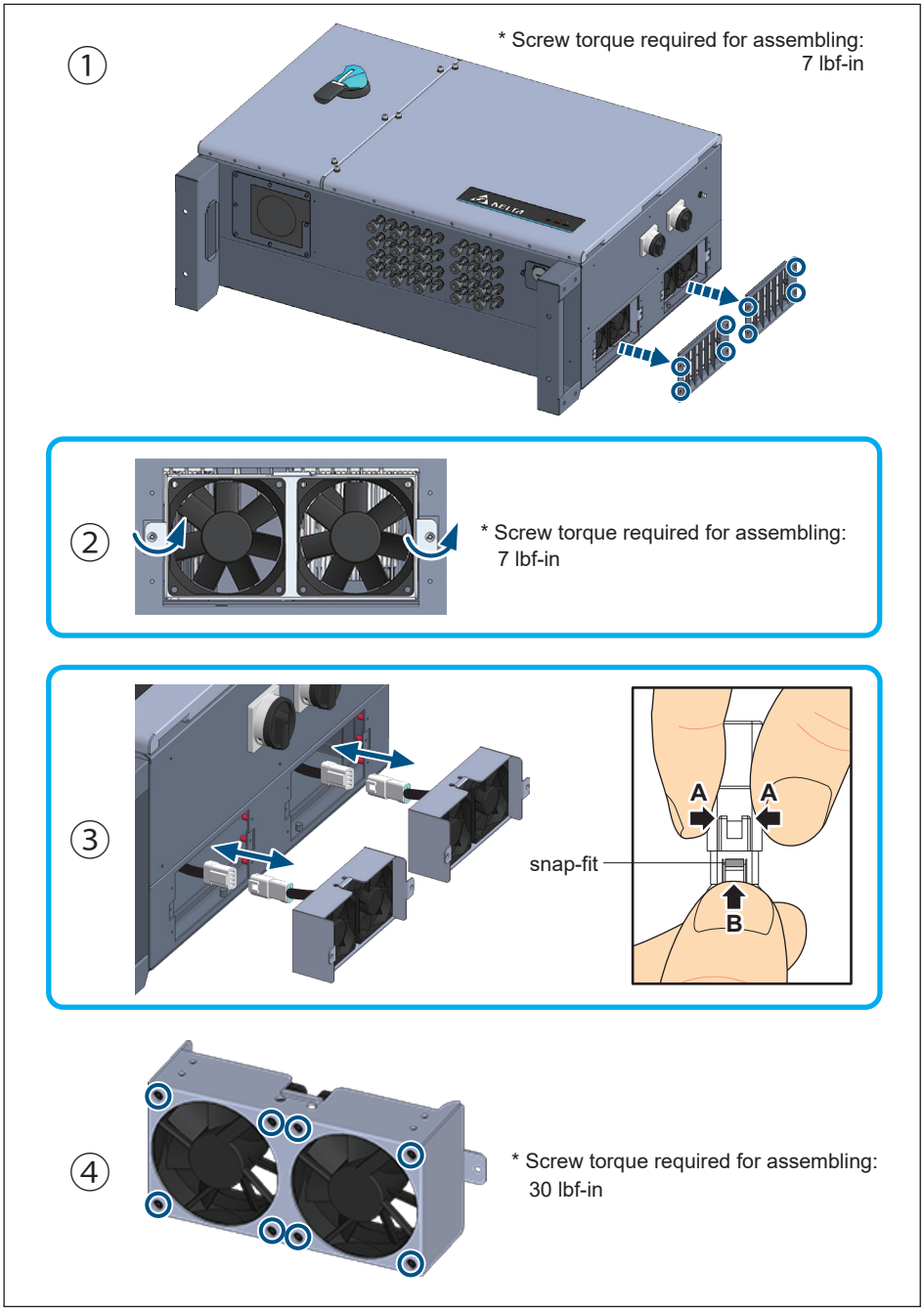


Figure 5-15: Disassembling fan tray from PM chassis

5.4.2 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***)

Procedure 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.

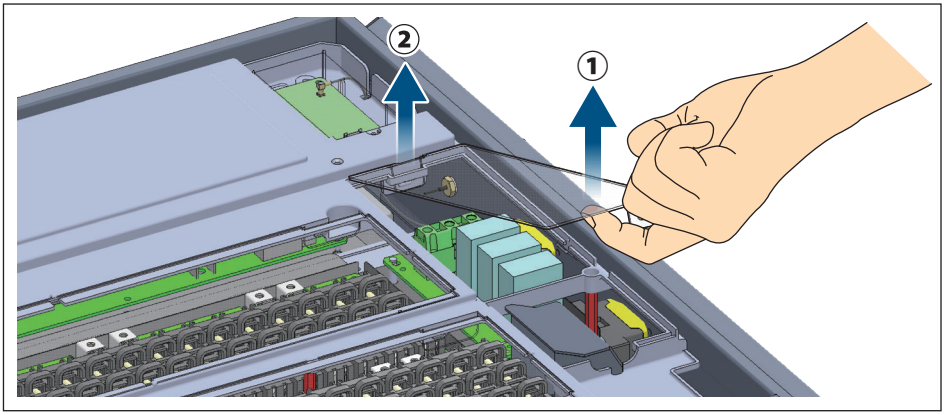


Figure 5-16: Remove the internal fan 1 shield cover

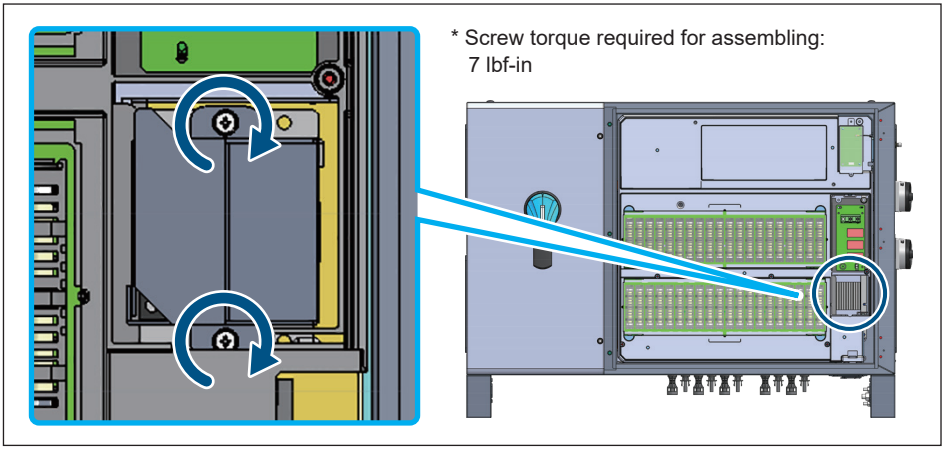


Figure 5-17: Internal fan 1 location

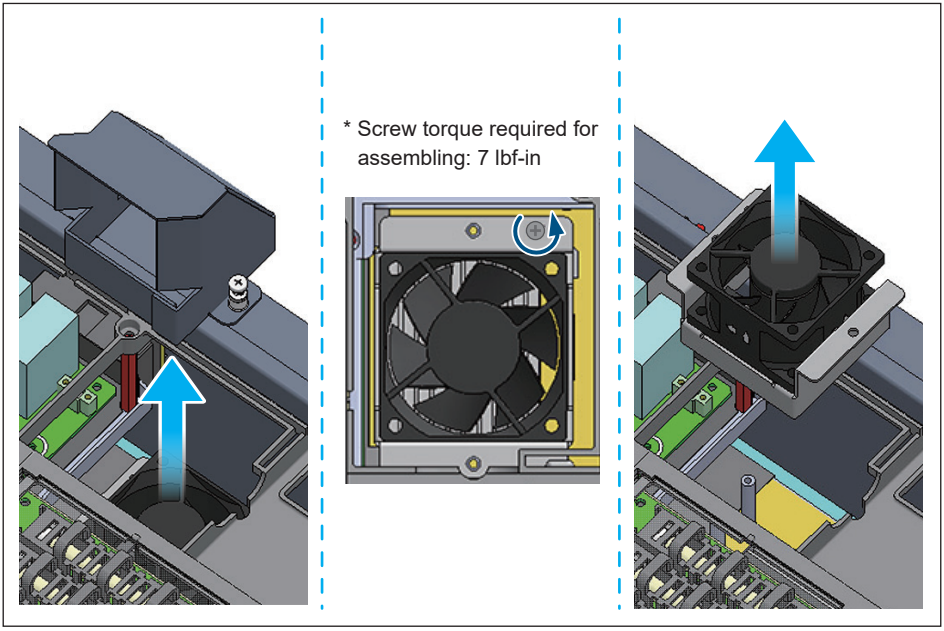


Figure 5-18: Take off the internal fan 1

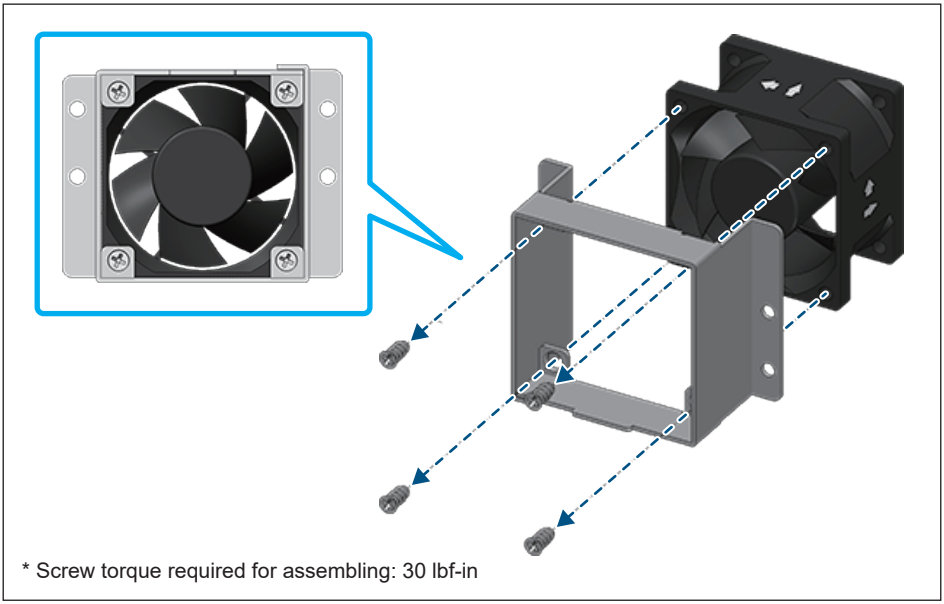


Figure 5-19: Replace with a new fan

5.4.3 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***)

Procedure 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.

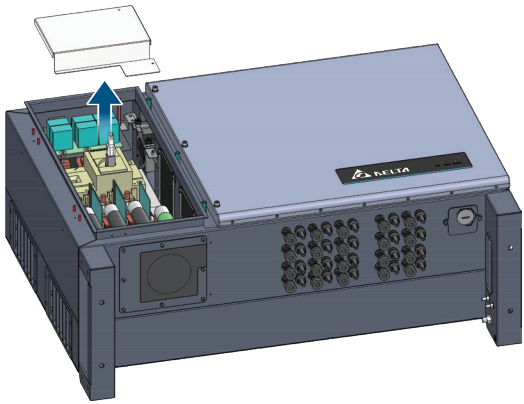


Figure 5-20: Remove the internal fan 2 shield cover

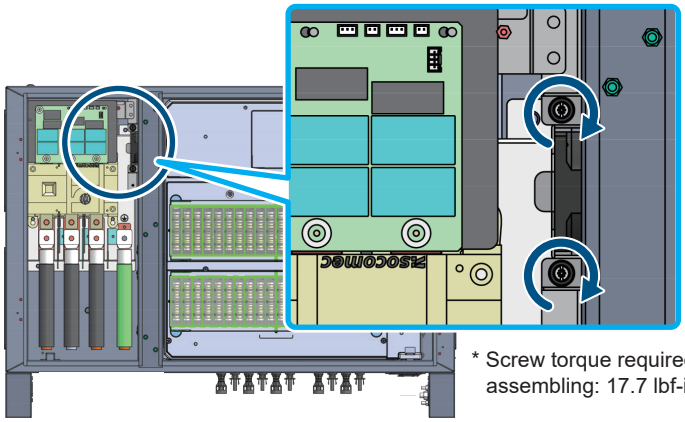


Figure 5-21: Internal Fan 2 location

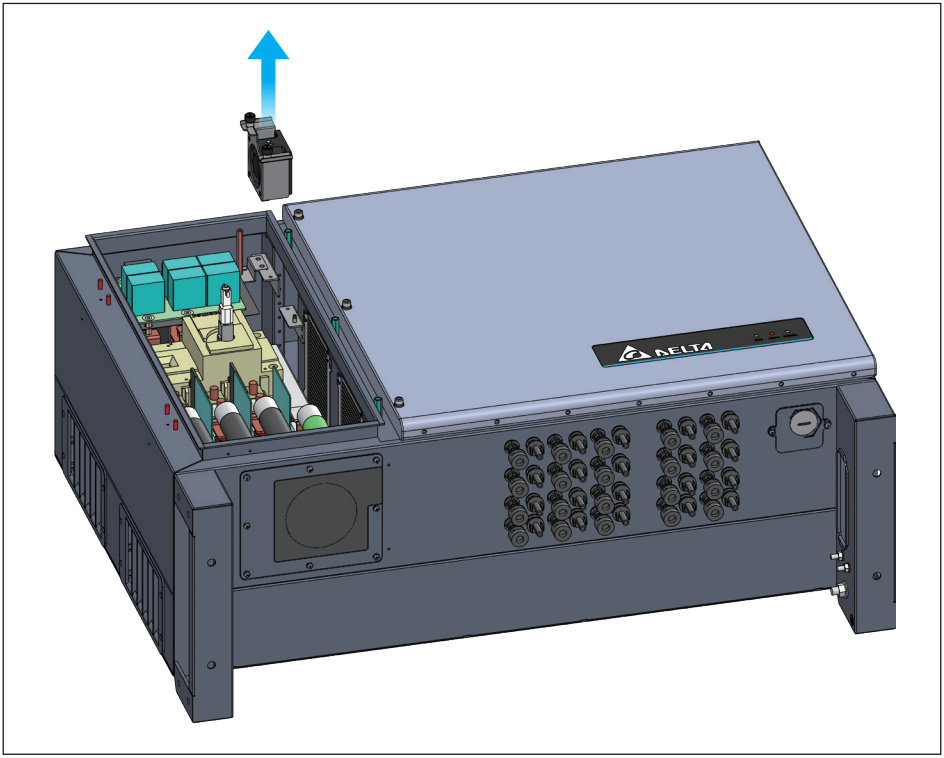


Figure 5-22: Take off the internal Fan 2

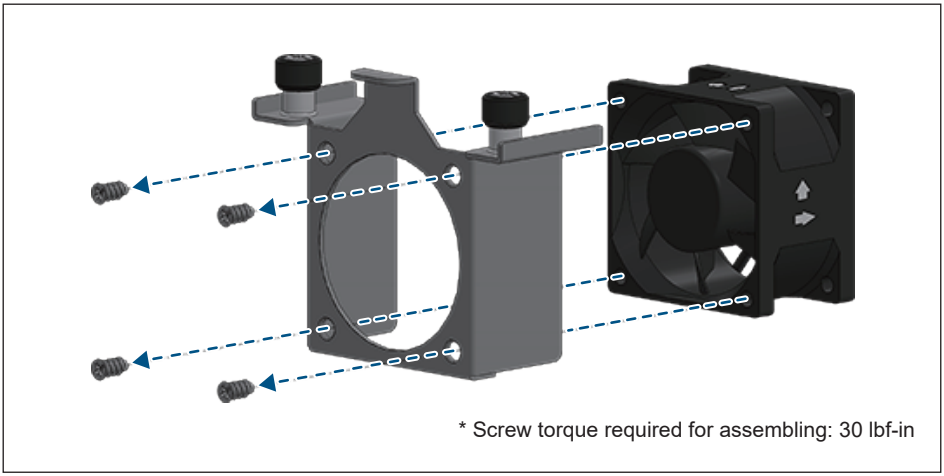


Figure 5-23: Replace with a new fan

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 follow the procedure

- 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.
- Remove array DC from chassis requires opening string level UTX connectors in order to break string continuity at the inverter UTX 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.

■ M125HV

Use UTX tool to open and disconnect each string from the chassis mounted UTX terminals at the inverter.

■ RS-485 Communication module

1. Remove communications module from inverter
2. Disconnect all communications wiring from the module terminals
3. Remove wiring from communications board assembly
4. Re-install communications board assembly in inverter

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 : POSSIBILE INJURY !

The inverter weighs more than 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

Use care when handling mounting hardware
Do not leave loose screws and nuts inside the AC side (left) compartment.

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.

As kinds of grid fault such as islanding, over/under voltage, over/under frequency...etc, the inverter would gate block to cut the output current to open ac relay. Show the fault refer to ***Table 6-1A.***

6.1 Error Codes (Field Fault)

Table 6-1A: Error Codes (Field Fault) and Messages

Message	Description	Action
AC Freq High (E01)	Grid frequency high	1. Check the utility frequency 2. Check Grid code setting
AC Freq Low (E02)	Grid frequency low	1. Check the utility frequency 2. Check Grid code & Grid setting
Grid Quality (E07)	Non-linear load in Grid and near to inverter	***If repeated occurrence, contact customer service for technical support***
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,E15, E20)	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, E13, E16, E18, E21, E23)	Grid voltage high	1. Check the utility voltage within the suitable range 2. Check Grid code & Grid setting 3. Check the connection in AC terminal
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 conpletely 2. Check if inverter ground conpletely 3. Check if the DC breakers get wet
Temperature High (F05)	One of inner ambient NTC and inverter module NTCs is over high temperature limit	Check the installation ambient and environment
Temperature Low (F07)	One of inner ambient NTC and inverter module NTCs is under low temperature limit.	Check the installation ambient and environment

* Islanding is the same as NO Grid.

6.2 Fault Codes (Inverter Fault)

Table 6-2A: Fault Codes (inverter fault) & Messages		
Message	**Description**	**Action**
DC Injection (F01,F02,F03)	Utility waveform is abnormal	***Contact customer service for technical support***
Amb Temp Fault (F06)	The ambient NTC temperature >105 ℃ or < -40 ℃	***Contact customer service for technical support***
Inveter Temp Fault (F10)	The inverter NTC temperature >125 ℃ or < -40 ℃	***Contact customer service for technical support***
AC Sensor Fault (F15)	DSP Iac or Vac sensor circuit defective	***Contact customer service for technical support***
Vdc Sensor Fault (F16)	DSP Vdc sensor circuit defective	***Contact customer service for technical support***
Idc Sensor Fault (F17)	DSP Idc sensor circuit defective	***Contact customer service for technical support***
AC Sensor Fault (F18)	Red Iac or Vac sensor circuit defective	***Contact customer service for technical support***
Idc Sensor Fault (F19)	Red Idc or Vdc 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	***Contact customer service for technical support***
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 < 20uF. Install external transformer if necessary
Iac Unbalance (F26)	1. Power line is disconnected inside the inverter 2. Current feedback circuit is defective	Check the connection in AC terminal

Table 6-2B: Fault Codes (inverter fault) & Messages		
Message	**Description**	**Action**
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,F33,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
Thermal Fuse Fault (F55)	Thermal Fuse Open	***Contact customer service for technical support***
Arc Circuit Fault (F58)	1. AFCI is not installed. 2. AFCI self-test is fail.	Check the AFCI detection circuit board to insure proper connections ***Contact customer service for technical support***
Arc Fault (F59)	The inverter detects Arcing occurs.	Check PV array cables for replacement

6.3 Warning Codes (Field Warning)

Table 6-3A: Warning Codes (Field warning) & Messages		
Message	**Description**	**Action**
De-rating (W07)	1. Over temperature 2. Power Limit function 3. Power vs. Frequency function 4. P(V) function 5. Grid Voltage low 6. Solar Voltage low 7. Solar Voltage High 8. Ramp up function	1. Check the installation ambient and environment 2. Check Grid Code & Grid setting 3. Check the utility frequency on the inverter terminal 4. 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

6.4 Warning Codes (Inverter Warning)

Table 6-4A: Warning Codes (inverter warning) & Messages		
Message	**Description**	**Action**
Fan Fail (W11)	1. One or more fans are locked 2. One or more fans are defective 3. One ore more fans are disconnected	**Ext Fan Fail** 1. Remove the object that stuck in the fan(s) 2. Check the connections of all fans 3. Replace the defective fan(s) --- **Int Fan Fail** ***Contact customer service for technical support***
DC SPD Fault (W17) AC SPD Fault (W18)	1. One or more SPD are defective 2. One or more SPD are disconnected	1. Replace the defective SPD 2. Check the connections of SPDs

7 Technical Information

7.1 Technical of M125HV

Table 7-1A: Specifications	
Model	**M125HV**
DC Input	
Occasionally Max. voltage	1500V
Operating voltage range	860 – 1500V
MPP voltage range	860 – 1450V *1
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 UTX connectors
Surge protection	Type 2 SPD
DC switch	YES
String current monitoring	YES
AC Output	
Rated output power	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	384V~690V
Operating frequency range	50/60Hz ±5Hz
Power factor	0.8 ind ~ 0.8 cap adjustable (1~0.9 at maximum power)
Surge protection	Type 2 SPD
THD	<3%
Connection	Ring terminal lug with Terminal busbar (Max. 150mm^2 Cu or Al wire)
Night time consumption *2	< 3.5W

*1 Ambient < 0°C : 860~1450V ; Ambient < 77°F : 860~1350V ; Ambient < 104°F : 860~1250V

*2 Night time consumption with standby communication.

Table 7-1B: Specifications	
Model	**M125HV**
Efficiency	
Peak efficiency	99.2 %
CEC efficiency	99.0 %
Information	
Communication	RS-485 (Delta / Sunspec)
Indicator	LED (Grid, Alarm, COMM.)
Regulation	
	UL 1741 SA, UL1741, UL1998, UL 1699B IEEE1547, IEEE1547.1, CSA C22.2
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 busbar (Max. 150mm^2 Cu or Al wire)
Operating temp. range	-13°~140°F, >122°F de-rating
Protection level	NEMA 4X
Relative humidity	0% – 100% non-condensing.
Operating elevation	<9800 ft, Outdoor, wet locations
Cooling	Forced air cooling with Smart Fan control
Noise	<70 dB
Dimension (W x H x D, in)	35.4 x 26.1 x 14.5
Weight (lb)	176

If the input voltage is higher than 1450V, the inverter may derate the output power. The relationship between the input voltage and the output power derating is shown in ***Figure 7-1***.

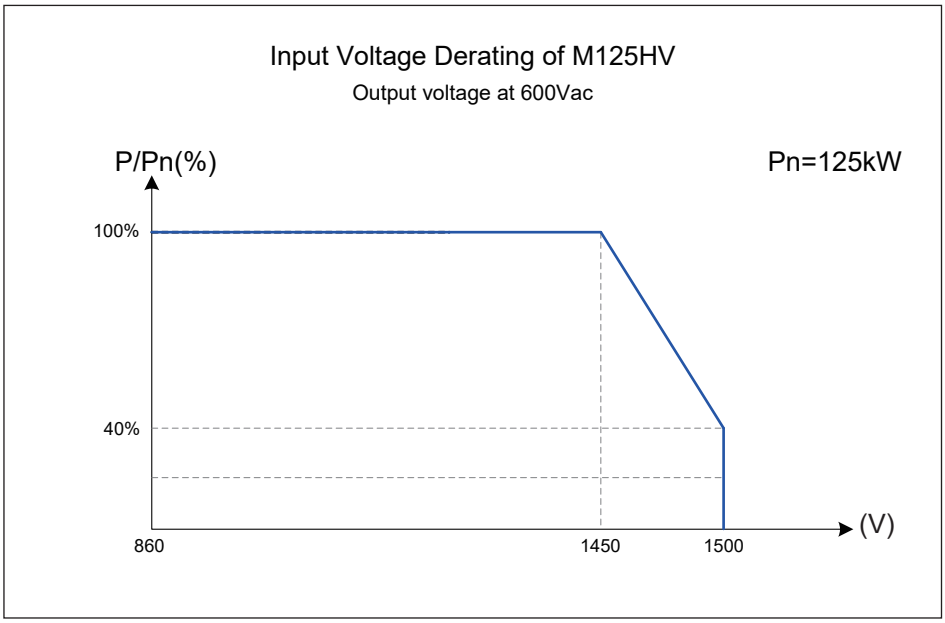


Figure 7-1: Input Voltage Derating Curve

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.***

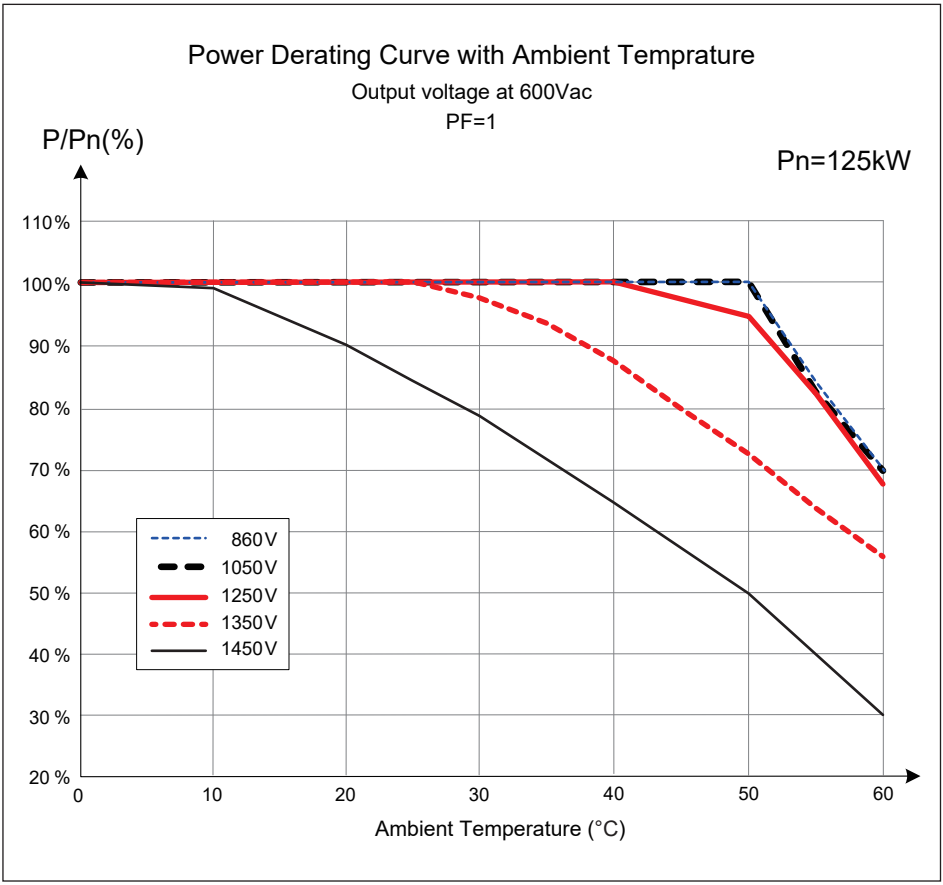


Figure 7-2: Power Derating Curve with Ambient Temprature (PF=1)

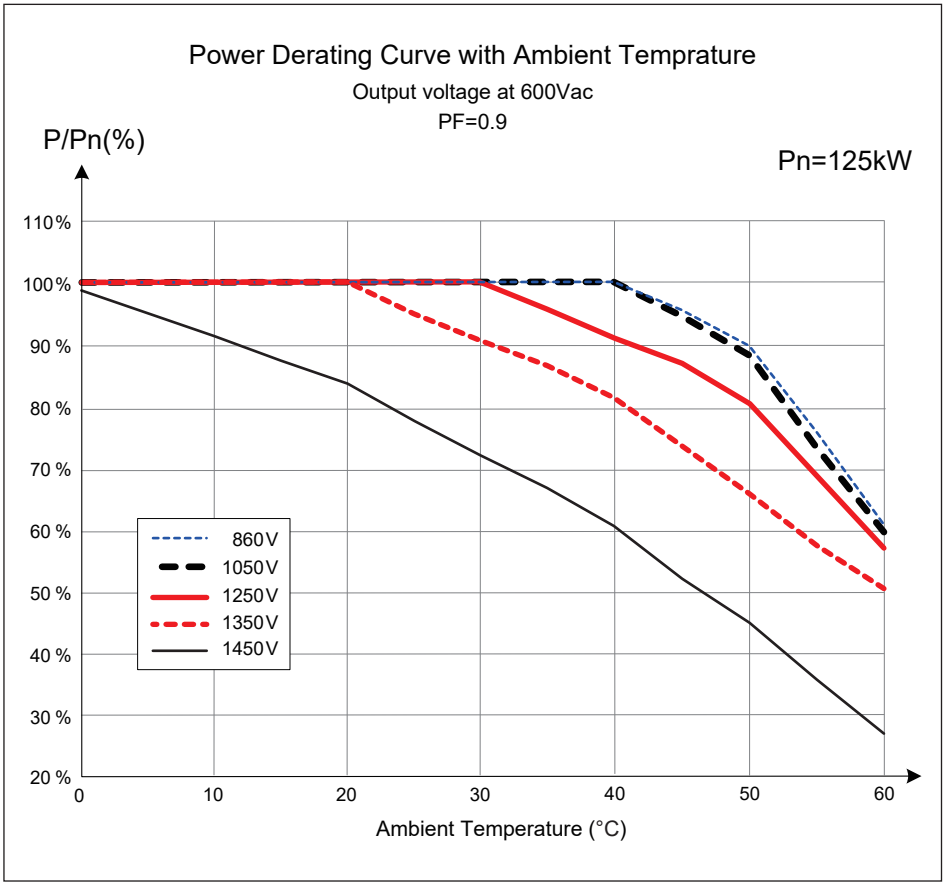


Figure 7-3: Power Derating Curve with Ambient Temprature (PF=0.9)

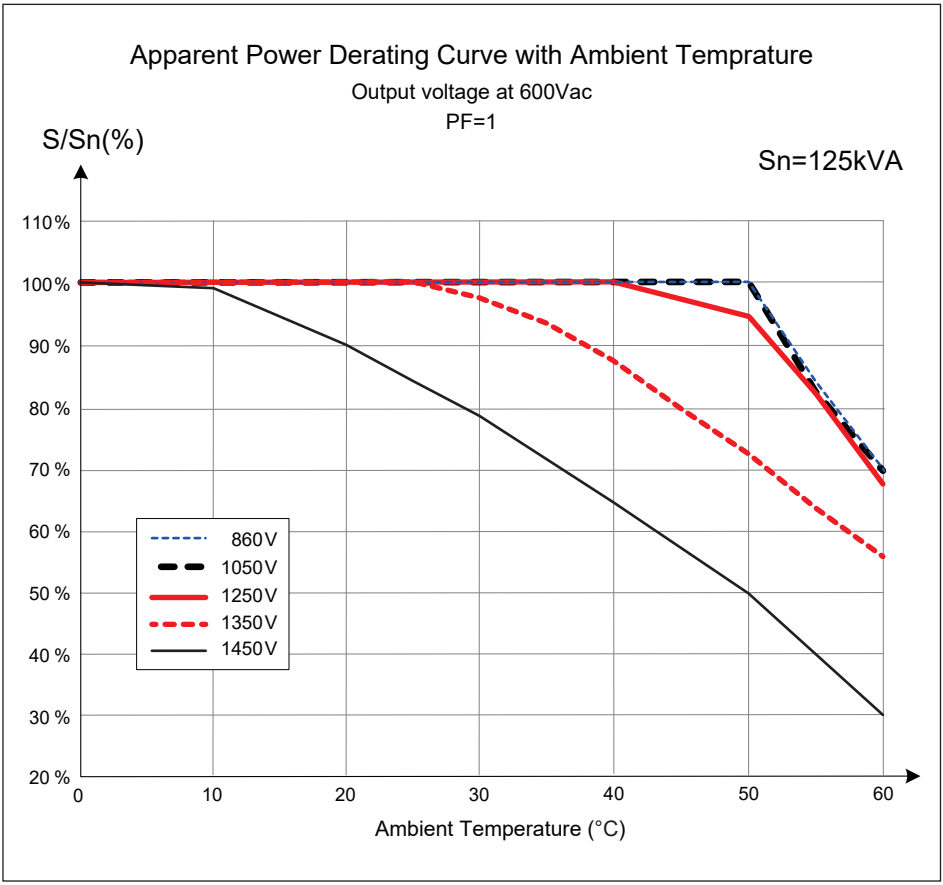


Figure 7-4: Apparent Power Derating Curve with Ambient Temprature (PF=1)

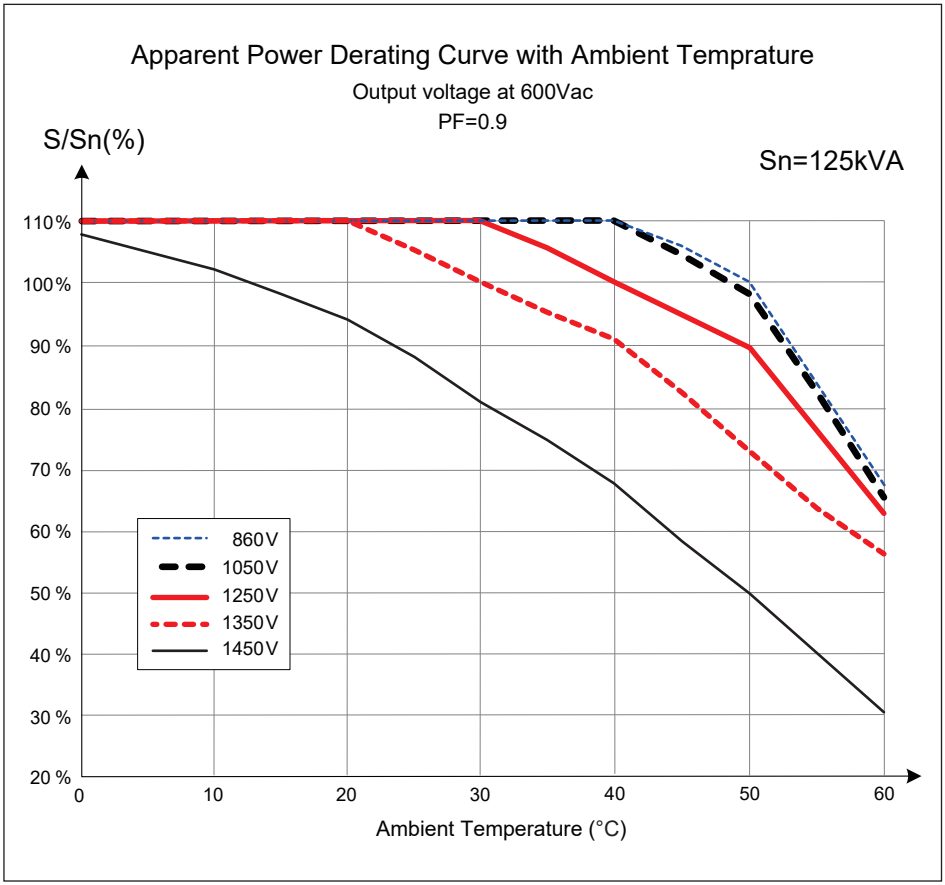


Figure 7-5: Apparent Power Derating Curve with Ambient Temprature (PF=0.9)

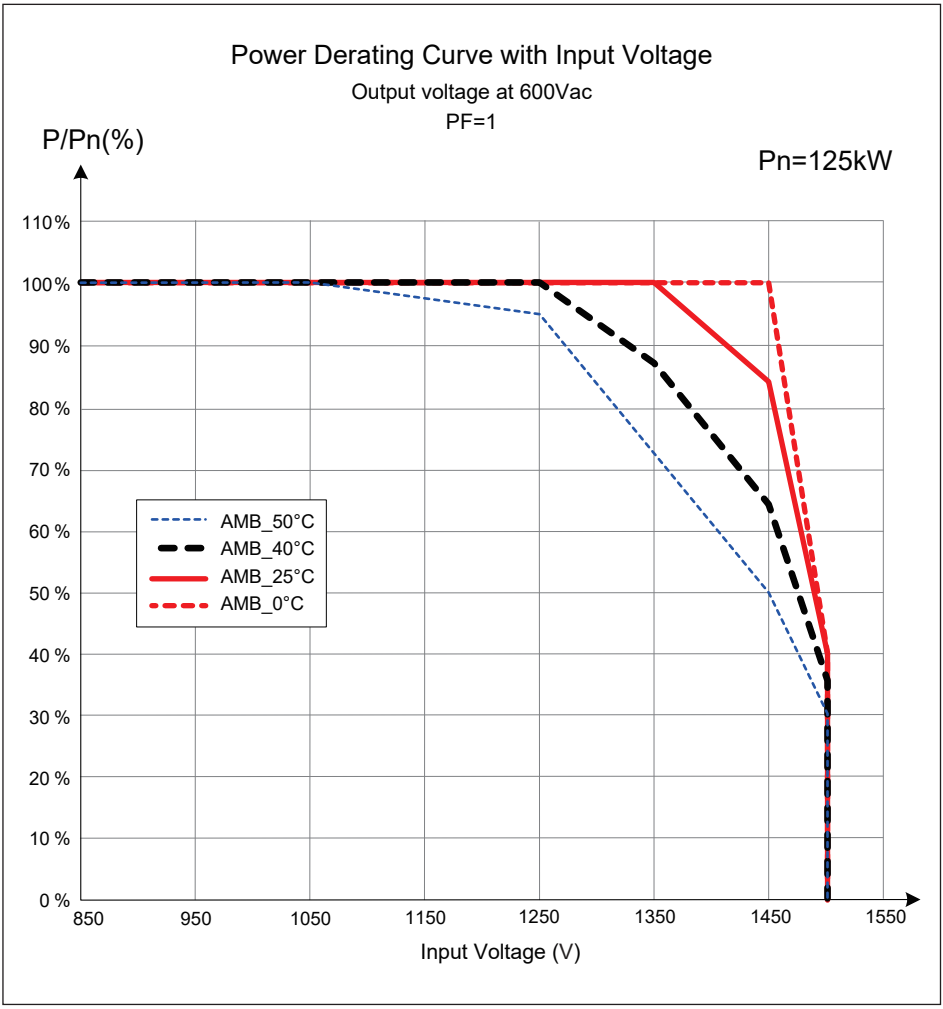


Figure 7-6: Power Derating Curve with Input Voltage (PF=1)

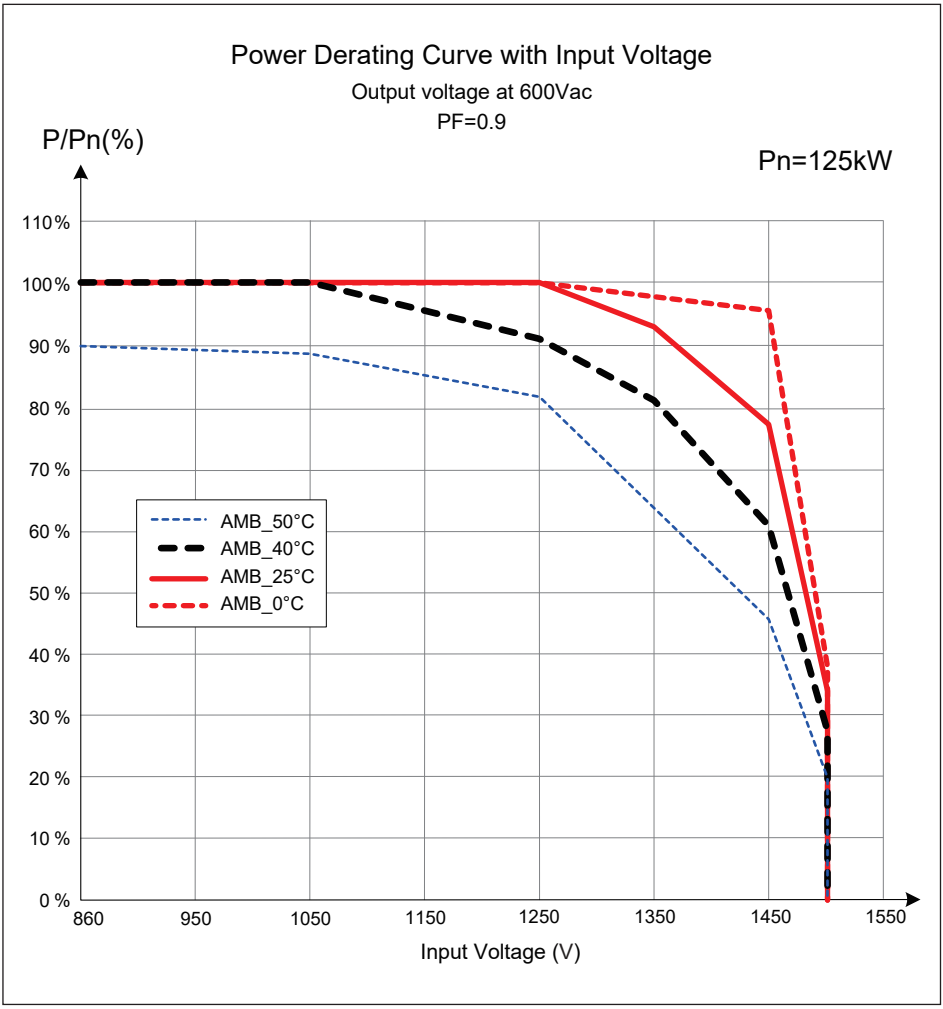


Figure 7-7: Power Derating Curve with Input Voltage (PF=0.9)

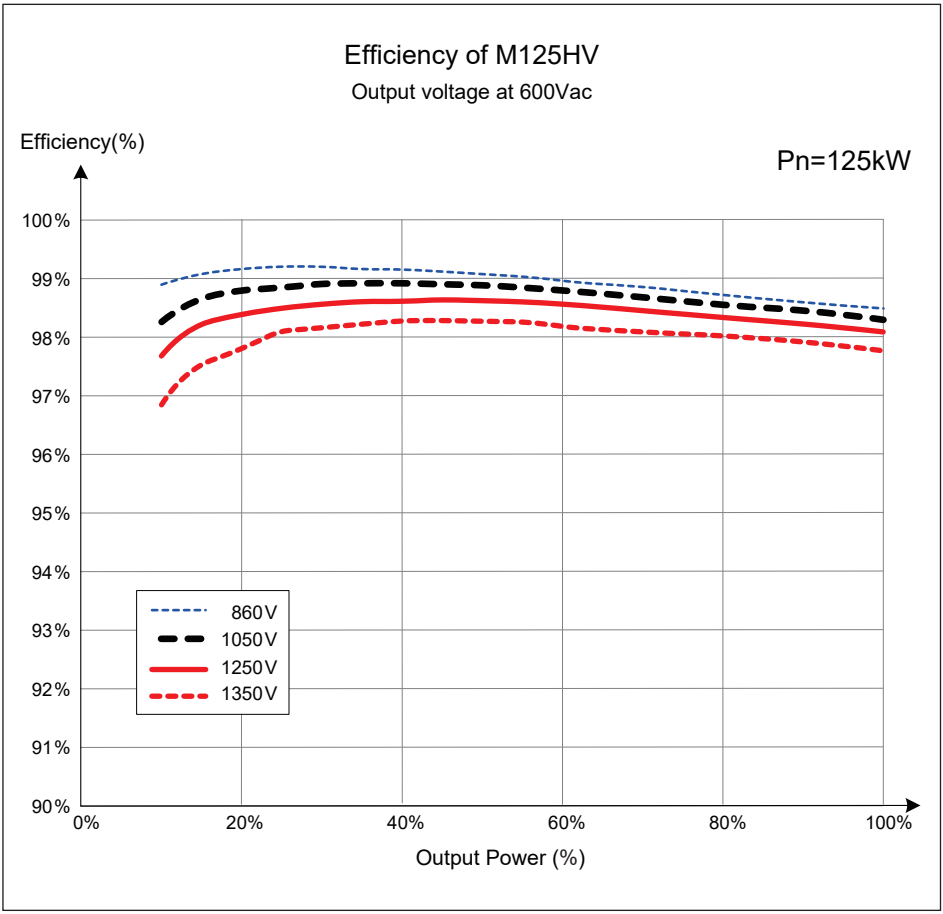
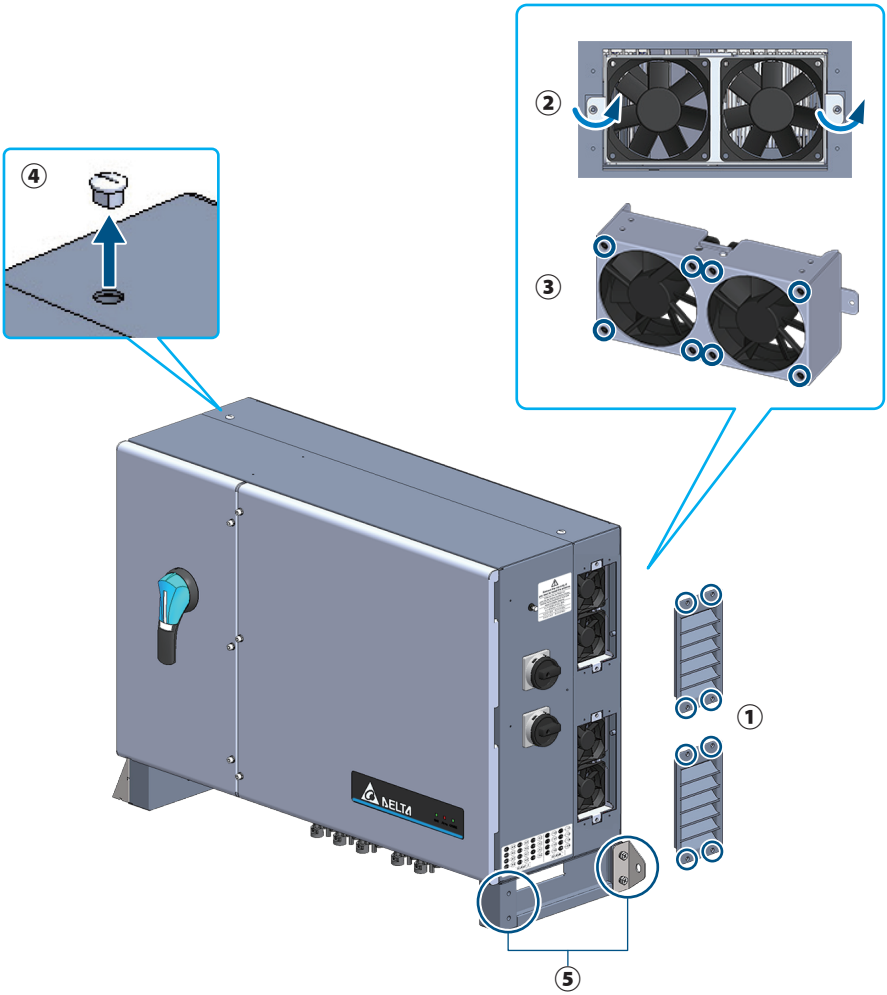


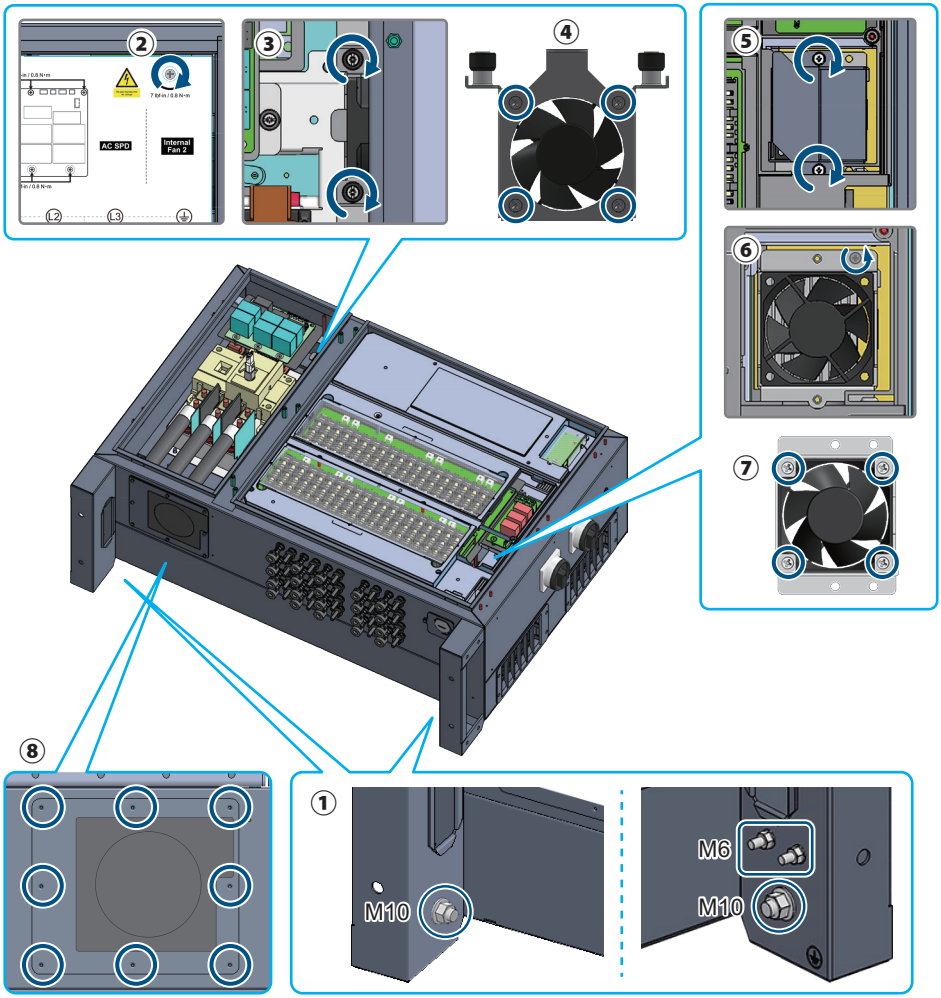
Figure 7-8: Efficiency Curve

Appendix: Assembly Note



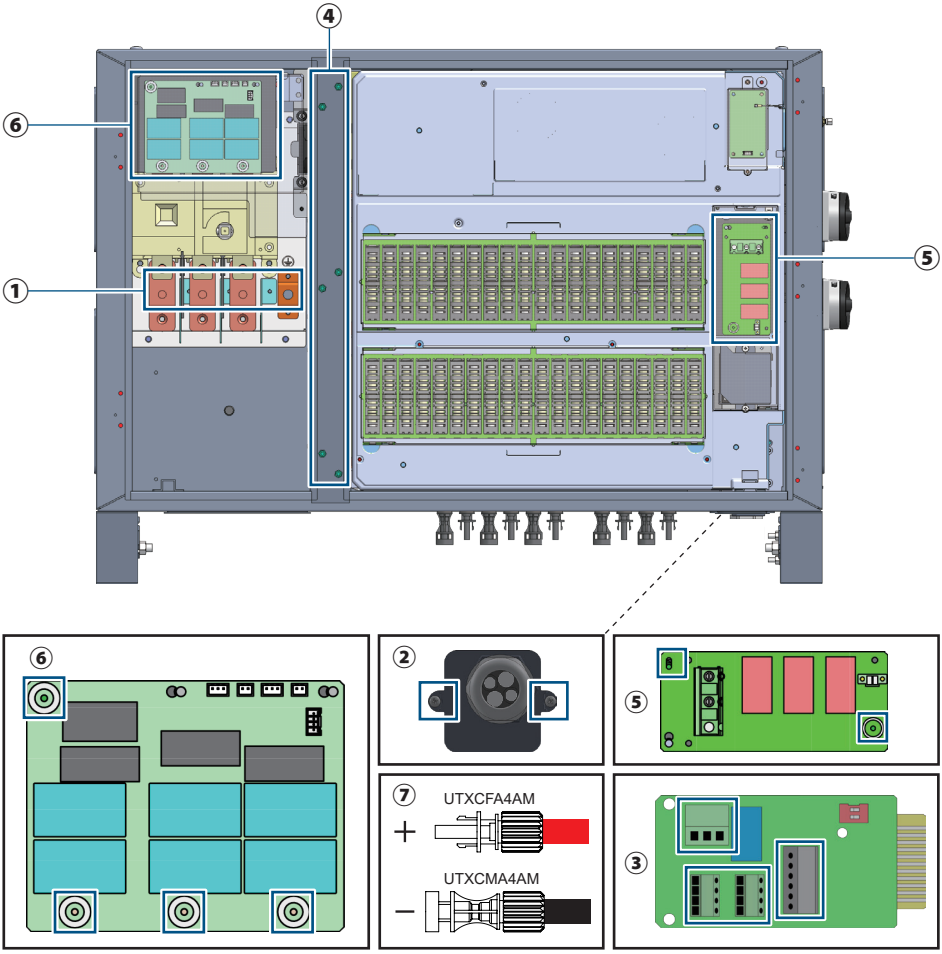
Appendix-1: Assembly Note-1

NO	Location	Screw torque
1	Filter	7 lbf-in (0.8N·m)
2	Fan Tray	7 lbf-in (0.8N·m)
3	Fan	30 lbf-in (3.4N·m)
4	Screw Plug	4.3 lbf-in (0.5N·m)
5	Reinforce Bracket / Grounded Bracket	133 lbf-in (15N·m)



Appendix-2: Assembly Note-2

NO	Location		Screw torque
1	Grounding	M6	62 lbf-in (7.0N·m)
		M10	222 lbf-in (25N·m)
2	AC Cover		7 lbf-in (0.8N·m)
3	Internal Fan 2 Cover		17.7 lbf-in (2.0N·m)
4	Internal Fan 2 Tray		30 lbf-in (3.4N·m)
5	Internal Fan 1 Cover		7 lbf-in (0.8N·m)
6	Internal Fan 1 Tray		7 lbf-in (0.8N·m)
7	Internal Fan 1 Tray		30 lbf-in (3.4N·m)
8	AC Chassis Access		7 lbf-in (0.8N·m)



Appendix-3: Assembly Note-3

NO	Location	Screw torque	Conductor cross-section
1	AC terminal	222 lbf-in (25N·m)	4/0 AWG (95mm²)
2	Communication cover	7 lbf-in (0.8N·m)	–
3	Communication port	–	20 AWG (0.5mm²)
4	Crossbeam	39 lbf-in (4.4N·m)	–
5	DC SPD board	7 lbf-in (0.8N·m)	–
6	AC SPD board	7 lbf-in (0.8N·m)	–
7	UTX wire	–	12/10 AWG (4/6mm²)

5013269901

Version 02190729