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Important Safety Notification

General
This user manual contains important instructions and notifications for the Eaton grid-tie PV Inverter which must be followed during installation and maintenance of the inverters.

The Eaton grid-tie PV Inverter is designed and tested in order to meet international safety requirements, but as with all electrical and electronic equipment, certain precautions must be observed during the installation and operation of the Eaton grid-tie PV Inverter.

In order to avoid personal injury during installation and daily operation of the Eaton grid-tie PV Inverter, users must read and follow all instructions, cautions and warnings that are described within this manual.

Electrical Code
For all electrical installation within the United States, Eaton grid-tie PV Inverters must follow National Electrical Code regulation in addition to any other localized regulations. For all electrical installation in Canada, inverter installation must be completed in accordance with applicable Canadian standards.

Safety Instructions
This manual contains various warnings in order to minimize the hazards to personnel and equipment. Not following the procedures correctly or abnormal practices could result in damage to the Eaton grid-tie PV Inverter and/or other equipment(s) that is connected to the Eaton Inverter, plus personal injury.

Preventive Regulation of Product
Inverter shall be installed by authorized personnel who have read and understand the operation instructions. Authorized/qualified personnel are defined in the National Electric Code. Moreover, Eaton grid-tie PV Inverters are provided with fixed trip limits and shall not be aggregated above 30kW on a single point of common connections.
Safety Symbols

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
</table>
| ⚡   | ELECTRICAL SHOCK  
Electrical shock indicates a potential for an electrical shock if not avoided. |
| ⚠️  | WARNING  
Warning indicates a potentially hazardous situation that could result in death or serious injury if not avoided. |
| ⚠️  | CAUTION  
Caution indicates a hazardous situation that could result in minor injury if not avoided. |
| 🔥  | HOT SURFACE  
Hot surface indicates a hot surface during operation that could result in a burn injury if not avoided. |
| 📩  | IMPORTANT  
Important indicates specific important/useful information that the user should know of the system. |
| 🧲  | ESD Protection  
Risk of electrical shock can occur when qualified service personnel are dealing with the electrical components within the PV Inverter such as wiring box. An ESD glove should be worn during the wiring operations, replacing the fuses and installing the components. |

Tool Equipment Symbols

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
</table>
| 📀  | Multi-Meter  
Multi-meter symbol indicates a multi-meter should be used for measuring in order to ensure the proper functionality of measured components. |
| 🔛  | Tools  
Tools symbol indicates some specific tools are required during the installing procedure. |
1. Introduction

This manual describes all the information needed to install and operate an Eaton PV240, PV250, PV260 and PV270 grid-tie PV Inverter (“PV Inverter”).

Any improper usage may result in damage to the unit. Therefore, it is important that all installing procedures shall be completed by qualified personnel that are trained to install and operate PV Inverters. Moreover, this user manual only describes the information that needed for the Eaton grid-tie PV Inverter and does not cover any installation information relating to other equipment installed in the PV system. The following safety instruction shall be followed:

**IMPORTANT**
In order to avoid problems during the install procedure, it is recommended to read the entire user manual before starting any install procedures.

Any improper usage may result in damage to the unit. Therefore, it is important that all installing procedures shall be completed by qualified personnel that are trained to install and operate PV Inverters. Moreover, this user manual only describes the information that needed for the Eaton grid-tie PV Inverter and does not cover any installation information relating to other equipment installed in the PV system. The following safety instruction shall be followed:

**WARNING**
It is necessary that only qualified personnel conduct the installation and operation of the Eaton grid-tie PV Inverter. Otherwise, risk of damage could occur to the unit or connected property due to improper installation and/or electrical shock due improper actions.

**ELECTRICAL SHOCK**
Alternating Current (AC) and Direct Current (DC) sources are terminated in this device. In order to prevent risk of electrical shock during maintenance or installation, it is necessary to ensure that all AC and DC terminals are disconnected.

**HOT SURFACE**
Although inverter is designed to meet international safety standards, the surface of the inverter can become hot during operation. Therefore, do not touch the heat sink or peripheral surfaces during or shortly after operation.

**ELECTRICAL SHOCK**
Risk of electrical shock from energy stored in capacitors. Do not remove the cover until three minutes after disconnecting all sources of supply power and the service shall be done by qualified personnel.
2. Limited Warranty

Eaton grid-tie PV Inverter comes with a 10-year warranty. This warranty covers all defects due to design, manufacturing and components.

This warranty does not cover damages resulting from:
- Seal on the product is broken
- Improper transportation and delivery
- Unqualified persons opening the unit
- Improper installation and result unit damaged
- Unauthorized modification, test or repairing
- Insufficient ventilation of the unit
- Use and application beyond the definition in this manual
- Application beyond the scope of relevant safety standards
- Acts of nature such as lightning, fire, storm etc.

Repairs and/or replacement of parts or the device are made at the manufacturer’s discretion. Defective parts or malfunction discovered during installation should be presented in a written report for confirmation before applying for replacement or repair. The damage report must be issued within seven working days after receiving the PV Inverter. Manufacturer is not responsible for damages beyond the scope of this warranty.

3. Features Overview

- Max energy yield CEC efficiency of 97%
- Transformer-less Design
- Field selectable voltage out: 208/240/277 Vac
- Wide MPPT voltage operating range: 105-500V
- Integrated NEC compliant wire raceway
- Integrated PV system AC / DC disconnect switch
- (4) branch circuit-rated Neg and Pos fused inputs
- Performance Monitoring Package
- LCD display with side pushbutton for nighttime monitoring
- NEMA 3R enclosure
- Meets UL1741 standard
4. Product Overview

4.1 Introducing the Grid PV System

The grid-connected PV system is mainly composed of four parts: the PV-modules, the grid-tied PV Inverter, the AC-Connection Unit (the connection Interface) and a connection to the Public Utility. When a PV-panel is exposed to sufficient irradiation and connected to an inverter, it generates DC power. The PV Inverter converts DC to AC and feeds in to the Public Utility via the AC-Connection unit.

The following figure shows the general configuration for a PV Inverter a grid PV System:
4.2 Introducing Eaton Grid-Connected PV Inverter

Eaton grid-tied PV Inverter converts direct current (DC) power generated by a PV panel into alternating current (AC), which is compatible with the local electrical distribution network; also called the public utility, or grid system. The Eaton grid-tied PV Inverter is designed with a transformerless topography. Therefore, Eaton grid-tied PV Inverters will not be suitable with PV modules that are required to have the negative (–) or positive (+) polarity of the PV module connected to ground. For such application, please contact the supplier before proceeding.
4.3 Dimensions and Weight

Measuring Weights:

<table>
<thead>
<tr>
<th>Model</th>
<th>PV238</th>
<th>PV240</th>
<th>PV250</th>
<th>PV260</th>
<th>PV270</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Weight (lbs)</td>
<td>86</td>
<td>86</td>
<td>90.4</td>
<td>101.4</td>
<td>101.4</td>
</tr>
</tbody>
</table>

Figure 4.3: Dimension and Weight of PV Inverter
4.4 Control and Display Overview

A. LCD Display
   LCD screen displays all measured values and parameters.

B. LED Indicators
   There are three indicators used to indicate the operating status.

C. Control Keys
   They are three control keys available to switch between each display menu and configure the settings for the LCD.

D. DC/AC Switch
   It is a built-in disconnect switch that is used to disconnect both the DC input and AC output power from the PV inverter.

E. Night Backlight Button
   When the inverter has stopped operating at night, a night backlight momentary button provides startup power to the PV inverter in order to active the LCD screen with LED backlight during the night. Therefore, user will be able to obtain the operating information in the night.

   **However, the button should be immediately release pressed.**

F. Handling Area
   It is a carrying area that is used to lift off PV Inverter. For the lifting, two people are required due to the size and weight of PV Inverter.
4.5 LED Indicators

Eaton grid-connected PV Inverter has three built-in LED indicators which will provide information of the operational status:

![Diagram of LED Indicators]

**Figure 4.5: LED Indicators**

A) **Power-On LED Indicator**
   It is a green LED indicator which will light up in *green* when the feed-in DC voltage from PV array has reached to the minimum operating voltage for PV Inverter.

B) **Fault LED Indicator**
   It is a red LED indicator will light in *red* when the PV Inverter had a fault during startup or operating period.

C) **Communication LED Indicator**
   Green LED indicator light and flash in *green* color when there is communication device connected and work with PV inverter via the RS232 or RS485 interface.
4.6 Control Keys and LCD Displays

Eaton grid-connected PV Inverters are equipped with three control keys which could be used to switch between each display menus.

---

**A) Upper Arrow Control Key**

Arrow control key is used to advance the display menu. Once the button has been pressed, the display menu appears pressing again advances the display to the next menu.

**B) Enter Control Key**

The enter control key is used to configure the setting such as parameters or is used to active the lock function of display menu.

To pause the display menu, the user can hold the enter control key for more than two seconds until LCD displays a “Lock” text. To release, the user can presses the same control key for another two seconds again in order to release menu from the “lock” mode.

**C) Down Arrow Control key**

The down arrow control key is used to advance the display menu in the opposite direction than the upper arrow control key

**D) Liquid Crystal Display (LCD)**

A green color LCD screen is used to display the text messages of the operating status, monitoring parameters, PV inverter failures and inverter faults. Moreover, the LCD screen will be automatically turn off after ten seconds if LCD is not manually operated using the above control keys or nighttime button.
4.7 Night backlight Button

Eaton grid-connected PV Inverter will switch-off during the evening as nightfall approaches. During the switch-off period, the LCD no longer displays any information since there is not feed-in DC (input) power. Therefore, users will not be able to check the daily operation data nor information of the current day in night time. This is the reason why a night backlight button.

The night backlight button is located in the right-hand side of the unit. When the button is pressed during night time, it converts the AC power to DC power for the LCD screen, while a “No Utility” will be shown on the LCD screen as a normal condition. This feature allows users to retrieve the information such as daily energy production (E-today value) and any other cumulative value of production from the LCD screen.

The night backlight button must be released after user has retrieved the information, otherwise PV Inverter may have an abnormal condition.

**IMPORTANT**

It is important to release the night backlight button immediately after it is pressed.
5. Installation of Eaton Grid-Tied PV Inverter

5.1 Open the packing

A. 1 x Eaton Grid-Connected PV Inverter
B. 1 x Mounting Bracket
C. 1 x Accessories Box
   i. 1 x User Manual
   ii. 6 x M4 Mounting screws
   iii. 6 x Mounting anchors
   iv. 2 x M4 Safety-lock screws
   v. 1 x Female fault signal connector
   vi. 2 x PV238 Name Plate (Only available for PV240 model)

IMPORTANT
For PV240 model, user will be able to use manual function of dip switch in order to modify power the PV240 into 3800W output. This is why there are 2 additional rating labels included in the accessories box for the PV240 model.

5.2 Visual check the PV Inverter

It is important to check the Eaton grid-tied PV Inverter for any visible damage, including the LCD screen. If there are visible damages can be found, please contact the dealer or supplier immediately.

WARNING
Due to the weight of the inverter, it is recommended at least 2 people lift the PV Inverter from the packing and also for the mounting the PV Inverter on the wall.

CAUTION
It is important to use the correct lifting point to lift the PV Inverter from the packing, as any improper carrying and moving could result in serious injury or damage the unit.

Warning
Any modification of the PV Inverter is not permitted. Risk of damage can be caused by any improper modification.
5.3 Identify the Eaton Grid-Tied PV Inverter

The structure of the Eaton grid-tied PV Inverter can be divided into two parts, main housing and wiring box shown in figure 5.3.1. The main housing contains the electrical components that are used for power conversion and the wiring box contains the electrical components that are used as the connection points for DC input voltage and AC output voltage as required by the NEC.

Eaton grid-tied PV Inverter can be identified by the name plate. The name plate indicates general electrical information of the product as below figure shown:

Figure 5.3.1: PV Inverters Structure

Figure 5.3.2: Main Housing Name Plate
An additional electrical name plate is attached in the bottom plate of the wiring box as shown in figure 5.3.3.

**IMPORTANT**

For the PV240 model, the user will be able to use the manual function of a dip switch in order to down power the PV240 model into 3800W output. After adjusting is finished, the name plate should be replaced since the defaulted settings of inverter have been changed.

The adjusting procedure for down powering a PV240 model grid-connected PV Inverter should be done by qualified and authorized service personnel only. Ensure the removal of the original name plate of unit in order to attach a new name plate at the same location after unit is adjust to 3800W output power.
A warning label plate is located in the left-hand side of PV Inverter as indicated in figure 5.3.4. This warning label is used to indicate all important notices that shall be known. When you are dealing with the general utility system and DC generator, read and follow all notifications from the warning label as a reminder in order to prevent any electrical shock that can happen during the configuration period.

Figure 5.3.4: Warning Label Plate
5.4 Mounting Inverter

A) Select a dry location, out of direct sunlight with ambient temperature between -20 and 45°C.

<table>
<thead>
<tr>
<th>IMPORTANT</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is Important to not install the Eaton grid-tied PV Inverter under direct sunlight. This is because the exposure of direct sunlight my cause an internal heating and also result in a reduction of output power, which is known as derating protection.</td>
</tr>
</tbody>
</table>

B) Select a wall or solid vertical surface which is strong enough to support the inverter.

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV Inverter’s surface and housing can become hot during operation. Ensure not to install PV Inverters in a location that contains any flammable material.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensure selected location has a sufficient space for air flow.</td>
</tr>
</tbody>
</table>

C) The Eaton grid-tied PV Inverter requires an adequate cooling space for heat dispersal. Therefore, the PV Inverter must have sufficient clearance for the air flow as illustrated below:
D) Installing Position

Selecting a proper installation position for the PV Inverter is very important. The PV Inverter shall be installed in a vertical position. In order to avoid heat dissipating issues, it is also ensure there are no any obstacles located or installed near by the PV Inverter.

Figure 5.4.3: Installing Position and Location
CAUTION

Do not install PV Inverter horizontally and tilt-forward direction as illustrated above. The PV Inverter is designed only for the vertical installation position. **Do not place any obstacles on the top of PV Inverter.**

Moreover, PV Inverter may make noise during operation. As a consideration, install the PV Inverter away from living or working areas where noise could be a concern.

E) Fix the bracket by using outer mounting holes

i) A rectangular-shaped mounting bracket that shipped with the Eaton grid-tied PV Inverter is able to be used with all types of walls such as stone wall, brick wall or wooden wall, but it is more important to ensure the wall that is selected will be able handle with the weight of PV Inverter, specifically the installations that are wooden walls. Figure 5.4.3 described the required dimension of drilling locations:

![Figure 5.4.4: Dimension of Drilling Point for the Wall](image-url)

Figure 5.4.4: Dimension of Drilling Point for the Wall
ii) There are 2 types of handling modes to install the mounting bracket on a wall. The user can use the different screwing points as appropriate. The corner screwing points or the central screwing point as illustrated in the figures, below. To secure the mounting bracket, mark 6 outer holes on the wall, drive in the 6 mounting anchors, then screw in the 6 M4 screws to each screwing point as illustrated below:

Type A handling mode

Figure 5.4.5: Corner screwing fixing mode

Type B handling mode

Figure 5.4.6: Central Point Fixing Mode
WARNING
It is important to ensure the drilling location are not located on any electrical wiring within the wall.

F. Mount the PV Inverter into the mounting bracket as illustrated below.

i) Hook up the PV Inverter by aligning the opening of rear-side enclosure and place the PV Inverter into each targeted wedge points of the mounting bracket as illustrated below:

Figure 5.4.7: Install PV Inverter into mounting bracket

IMPORTANT
Check the mounting bracket again before the PV Inverter is hung on the bracket. It is recommended to have least 2 service personnel for this procedure due to the weight of unit.
ii) Secure the edge point of mounting bracket

In order to avoid the wiring box swaying due to weather, the safety screws for the wiring box must be tightening. There will be two pieces of the M4 size screws found within accessories box. The tightening location of mounting bracket was indicated in figure 5.4.8. Follow the below instructions in order to complete the tightening procedures:

![Figure 5.4.8: The edge point of mounting bracket](image)

### WARNING
The wiring box shall not be opened under dusty or moist weather. Working with the exposed electrical components under in moist weather is very dangerous, which might cause an electrical shock easily. In dusty weather, electrical components of the wiring box might be damaged if there is heavy dust floating within air during serving period. Please be aware and avoid.

### CAUTION
It is necessary to disconnect the DC generator and AC Utility if the wiring box is already wired with any DC or AC connection. It is necessary to wait 5 minutes in order to ensure all the electrical components are discharged.

### ESD Protection
An ESD glove should be worn during the cable wiring, replacing the fuses and installing the components.

iii) Turn off DC/AC switch from the wiring box as illustrated below:

![Figure 5.4.9: Turn off DC/AC Switch](image)
iv) Unfasten 4 M5 screws from the top cover of wring box as illustrated below:

Figure 5.4.10: Remove the screws of DC/AC Wiring Box

A *M5 hexagon head screwdriver* is required for the procedure.

v) Remove the top cover of disconnect box and then find the highlighted location from the below figure and then insert 2 M4 size screws:

Figure 5.4.11: Screwing Location for the Safety Screws
6. Wiring Box Overview

6.1 Hardware Structures

Figure 6.1: Wiring Box Structures

A. Protection MOV for DC Input side
B. DC bypass terminal
C. Fault Signal Terminal
D. DC/AC Disconnect
E. 2 fuse holder for AC Output Side (Shipped with dummy fuses)
F. Super RS485 Interface Card
G. 8 fuse holders for DC Input (Shipped with dummy fuses)
H. DC input terminal
I. Protection MOV for AC Output side
J. AC output terminal
K. AC Utility configuration dip switch
L. RS232 Interface Port
6.2 Hardware Functioning

A. Protection MOV for DC Input Side
It is the surge protection that is equipped and used to protect input circuit against excessive voltage on the DC connections.

B. Bypass Terminal block for DC Input Side
It is the bypass terminal block for solar (+) and solar (–) polarity that used to co-operate with an external combiner box and external fuses. The maximum current of this DC input bypass terminal block is 38A and the required torque of the screws is 20 Kgf-cm.

When the PV Inverter is connected to the PV module through an external combiner and external fuses are used, the configuration of DC input cable can be connected with the bypass terminal block directly.

![Figure 6.2.1: Connecting DC Cables with Bypass Terminal](image)

Positive (+) Polarity Position

Negative (–) Polarity Position

C. DC/AC Disconnect
It is the disconnect switch that is used to turn-on and turn-off the power of the PV Inverter. The switch disconnects both the DC and AC voltage to the PV Inverter.
D. Fault Signal Terminal

The Eaton grid-tied PV Inverter has a built-in fault signal terminal, which can be connected simultaneously with an error indicator besides the LCD screen. A female connector is included within the accessories box. System installers or servicer personnel are able to use this female connector to connect with an LED error indicator. Figure 6.2.2 indicates the correct configuration for the fault signal terminal. Figure 6.2.3 indicates the LED light will be lit up when an error occurs on one of inverters connected in the network. The voltage and current limit of external LED indicator lamp is at 277Vac, 3A.

![Diagram of Normal Operating Mode](image)

Figure 6.2.2: Normal Operating Mode
Figure 6.2.3: Failure Operating Mode
E. AC Protection

I) If an external AC breaker or fuse protector is installed, it is not necessary to implement AC protection fuses within the wiring box. The specification of external breakers or fuses shall meet the recommended ratings listed in the following table.

II) If there is no external AC breaker or fuse protector installed, it is recommended to have AC protection fuses installed to the AC side. And the AC fuse that can be selected from the recommended list as below table indicates.

To ensure the rating of the fuses that are used for the each model is correct, it is strongly recommended the installer purchase the AC fuses that have already been tested by Eaton.

The recommended list for the AC Fuses:

<table>
<thead>
<tr>
<th>Model</th>
<th>Manufacturer</th>
<th>Part Numbers</th>
<th>Fuses Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV270</td>
<td>Littelfuse</td>
<td>LS50S 50</td>
<td>50A / 500V\textsubscript{AC}</td>
</tr>
<tr>
<td>PV260</td>
<td>Littelfuse</td>
<td>LS50S 40</td>
<td>40A / 500V\textsubscript{AC}</td>
</tr>
<tr>
<td>PV250</td>
<td>Littelfuse</td>
<td>KLKD 30</td>
<td>30A / 600V\textsubscript{AC}</td>
</tr>
<tr>
<td>PV240</td>
<td>Littelfuse</td>
<td>KLKD 25</td>
<td>25A / 600V\textsubscript{AC}</td>
</tr>
</tbody>
</table>
F. Super RS485 Card

The RS485 interface card is located in the right-hand side position of the wiring box and integrated and shipped with the PV Inverter.

Figure 6.2.4: Integrated RS485 Interface Card

A) Link LED Indicator: When an Ethernet cable is inserted in any RJ-45 port; the Link LED will light up in yellow color and blink at 2Hz during signal transferring.

B) Power LED indicator: It indicates the connectivity of Super 485 card and it will be lit-up in green when the inverter is active.

C) TRX LED indicator: It indicates when the firmware is uploading from Ez Logger Lite to Super RS485 card. It will be lit-up in red and blink at 2Hz during signal transferring.
D) Update LED indicator: It indicates when the firmware is uploading from Super-485 card to the inverter; the LED will light up in red.

E) Definition of RJ-45 PoE Ports

![RJ-45 PoE Ports Diagram]

<table>
<thead>
<tr>
<th>PIN</th>
<th>NAME</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tx+</td>
<td>±400mVp-p~±15Vp-p</td>
</tr>
<tr>
<td>2</td>
<td>Tx-</td>
<td>±400mVp-p~±15Vp-p</td>
</tr>
<tr>
<td>3</td>
<td>Rx+</td>
<td>+400mVp-p~+15Vp-p</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Rx-</td>
<td>-400mVp-p~15Vp-p</td>
</tr>
<tr>
<td>7</td>
<td>VCC</td>
<td>11V~12V</td>
</tr>
<tr>
<td>8</td>
<td>VCC</td>
<td></td>
</tr>
</tbody>
</table>

**WARNING**

Power on socket Pin 7 & Pin 8 are DC powered. Do not connect other devices to this port as it may damage your device.

F) Setting DIP switch for Terminating Resistor (SW1 DIP switch)

![DIP Switch Diagram]

Press the pin 1 and pin 2 to set the DIP Switch into “on” mode for card in the terminal inverter (farthest from Data Logger or PC). For all the others, set it to “off”. A 5 inverter example setup is pictured below.
Figure 6.2.6: Terminal Switch ON Model

Figure 6.2.6 illustrates the proper connection model that used for the 5 Eaton grid-connected PV Inverters with Ez Logger Lite. For Inverter 1, 2, 3, 4, set DIP Switch “off”; for last inverter (inverter 5), press pin 1 and pin 2 to set DIP Switch “on”. 20 Eaton grid-connected PV inverters are the maximum number that can be connected with an Ez Logger Lite.

**CAUTION**

Ensure the configuration of the Terminating Resistor is set per section 6.2. An incorrect setting of the DIP Switch will lead to unstable data transferring.

G) Setting DIP switch for Communication Mode (SW1 DIP switch)

Press the pin 1 and pin 2 of SW1 Dip switch in order to set the “ON” mode for the RS-485 mode or the “OFF” mode for the RS-232 mode.
H) Multiple Connections: Usage of Ethernet cable

Ethernet cable can be used to connect either port to another Super-485 card. The cable must be a “Straight Through cable” as shown in figure 6.2.8. And it is important to ensure the pin position of Ethernet cable is configured by the same way as shown in figure 6.2.9.

![Connection Type A](image1)
![Connection Type B](image2)

Figure 6.2.8: Connecting Mode of Ethernet cable

**Straight through Cable**

![RJ-45 Plug Pin 1](image3)

Figure 6.2.9: Pin Definition of Ethernet cable

I) Multiple Connections - Combination Usage

The combined connection of RJ-45 PoE port and terminal block can be implemented, but it is not recommended. However, figure 6.2.10 describes an example of a mixed configuration use.
J) Multiple Connections: Terminal Block Usage
The terminal block that designed for the SUPER RS485 card is used with twisted wire pairs to establish the connection between each PV Inverter as shown in figure 6.2.11.

K) Connect to Data Logger
When wiring the Super-485 card from PV Inverter to PV Inverter, please connect the same pin of the Super-485 card (Receive Pin to Receive Pin and Transmit Pin to Transmit Pin) as figure shown in 6.2.12:
Figure 6.2.12: Connecting mode for data logger

I) Connect to PC via Super-485 to RS-232 converter  
When wiring Super-485 card from Inverter to Super-485 to RS-232 Converter, connect opposite pins of Super-485 (Receive Pin to Transmit Pin, and Transmit Pin to Receive Pin). See framed area below.

Figure 6.2.13: Connecting Mode for RS485 with RS232

IMPORTANT
For further instructions, a SUPER-RS485 manual is available with a detailed configuration that can be used by qualified service personnel or system installer. Please contact the supplier in order to obtain this user manual as the reference.
G. DC Protection

This is the over current and over voltage protection that is used for the Direct Current (DC) side. According the NEC 690.15-18, fuse holders can be used to disconnect the PV modules for serving.

The Eaton grid-tied PV Inverter is shipped with dummy fuses (solid aluminum cylinders in the shape of the proper fuses). Since there are four pairs of DC input ports, four fuse holders shall be equipped for the four positive (+) polarity ports and others fuse holders are equipped for the four negative (-) polarity ports. Therefore, there are supports to have eight fuse folders, total, to the DC-side as shown in figure 6.2.14.

![Figure 6.2.14: Location of DC Fuses Holders](image)

**IMPORTANT**
The Eaton grid-tied PV Inverter is shipped with a dummy fuse in the fuse holder. It is necessary to select the proper series fuse depending with the solar modules that are used. Remove all dummy fuses prior to installation and operation.

The installer or qualified service personnel should select the required DC fuses during the installing procedure. The rating selection of the DC protection fuses should be selected based on the amount of solar modules connected in the PV system.

The criterion of fuse selection can be calculated by a standard formula in order to help the installer or service personnel to select the correct rating of fuse to use.
The standard formula for DC Fuse Selection:
Nominal Voltage of fuse must be 600V\textsubscript{DC}. Rating and the fuse should be selected between $1.25 \times \text{Isc} < I_N < 1.6 \times \text{Isc}$

Assume the maximum short circuit current (Isc) of the solar module used is 4.85A. The rating of the selected fuse must have a nominal current greater than 1.25 times but less than 1.6 times the short circuit current as $1.25 \times \text{Isc} < I_N < 1.6 \times \text{Isc}$.

Calculated by Standard Formula:
A) $4.85A \times 1.25 = 6.06A$ and $4.85A \times 1.6 = 7.76A$

B) Implemented the above result within $1.25 \times \text{Isc} < I_N < 1.6 \times \text{Isc}$.

C) The calculation result will be $6.06A < I_N < 7.76A$. That means installer must to select a fuse rating that is greater than 6.06 A, but must lesser than 7.76 A. Refer to the products information provided from Littlefuse factory, we are able to select KLK D7, 7A, 600V\textsubscript{DC} DC protection fuse.

**IMPORTANT**
To ensure trouble-free fuse protection, Eaton recommends using fuses that have been tested by Eaton. The specifications for fuses from Littelfuse and KLKD series can be downloaded from [www.littlefuse.com](http://www.littlefuse.com).

It is important to follow the standard formula in order to select the proper rating of fuse for DC protection. And the size of the DC and AC wiring must to meet with the required size of cables as description at chapter H) DC input terminal block and chapter J) AC output terminal block in the section 6.2.
H. DC Input Terminal Block

It is the terminal block used to connect the DC cables from the PV modules. In order to have a trouble free connection, it is recommended to connect PV modules of the same type, same quantity, with an identical configuration of strings. The size of DC cables shall be followed with the standards in the following table.

<table>
<thead>
<tr>
<th>Terminal block</th>
<th>Model</th>
<th>PV240 (PV238)</th>
<th>PV250</th>
<th>PV260</th>
<th>PV270</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-string</td>
<td>Terminal block</td>
<td>8 AWG</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Internal Combiner)</td>
<td>labeled with (+)×4, (−)×4</td>
<td>(Max. current per DC input terminal: 20 A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Torque</td>
<td>12 Kgf-cm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single string / Bypass fuse TB /</td>
<td>Terminal block</td>
<td>4 AWG</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(External Combiner)</td>
<td>labeled with (+), (−)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Torque</td>
<td>20 Kgf-cm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground</td>
<td>(G)</td>
<td>6 AWG</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Torque</td>
<td>12 Kgf-cm</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I. Protection MOV for AC Output Side

It is the surge protection that is used to protect the output circuit against excessive voltage of the AC connections.

J. AC Output Terminal Block

It is the terminal block that is used to connect AC cables from the utility system, also known as the public grid. Each model of the Eaton grid-tied PV Inverter requires different sizes of AC cables. Please refer to the following table for information to select acceptable sizes of AC cables:
<table>
<thead>
<tr>
<th>Terminal block labeled with (1), (2), (3)</th>
<th>Model PV240 (PV238)</th>
<th>PV250</th>
<th>PV260</th>
<th>PV270</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admissible conductor size</td>
<td>10 AWG</td>
<td>8 AWG</td>
<td>6 AWG</td>
<td></td>
</tr>
<tr>
<td>Torque</td>
<td>12 Kgf-cm</td>
<td>20 Kgf-cm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Terminal block labeled with (G)</th>
<th>Model PV240 (PV238)</th>
<th>PV250</th>
<th>PV260</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admissible conductor size</td>
<td>10 AWG</td>
<td>8 AWG</td>
<td></td>
</tr>
<tr>
<td>Torque</td>
<td>12 Kgf-cm</td>
<td>20 Kgf-cm</td>
<td></td>
</tr>
</tbody>
</table>

K. Utility Configuration DIP Switch

It is a utility configuration dip switch that is embedded within DC/AC wiring box. This dip switch allows the user to do different configurations of the PV Inverter in order to let it connect to the different public grid systems using the same inverter. The dip switch is located at the right-bottom side of wiring box, which just under RS485 interface card and nearby the RS232 interface port as below shown in figure 6.2.15:

![Utility Configuration DIP Switch](image)

Figure 6.2.15: Utility Configuration DIP Switch
L. RS232 Interface (for service purpose)

The Eaton grid-tied PV Inverter is equipped with a versatile communications interface and can be used with a stand-alone monitoring software called “Pro Control” to monitor the operating status of a single PV inverter or multiple PV Inverters through RS485 or RS232 interface. To active the RS232 interface, the RS485 interface card should be disabled manually by switching off the SW2 DIP switch as below figure 6.2.16 indicates. Therefore, it is important to know the status of SW2 DIP switch when service personnel are dealing the communication interfaces.

![Figure 6.2.16: Enable model for the RS232 interface](image)

Firmware upgrades are also available and can be done via RS232 interface. All PV Inverters are integrated with a DB9 socket for the RS-232 interface as a built-in interface within wiring box. The pin assignment of DB9 socket is stated as below table shown:

<table>
<thead>
<tr>
<th>PIN</th>
<th>Signal Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N.C.</td>
</tr>
<tr>
<td>2</td>
<td>TxD</td>
</tr>
<tr>
<td>3</td>
<td>RxD</td>
</tr>
<tr>
<td>4</td>
<td>N.C.</td>
</tr>
<tr>
<td>5</td>
<td>Common</td>
</tr>
<tr>
<td>6</td>
<td>N.C.</td>
</tr>
<tr>
<td>7</td>
<td>N.C.</td>
</tr>
<tr>
<td>8</td>
<td>N.C.</td>
</tr>
<tr>
<td>9</td>
<td>N.C.</td>
</tr>
</tbody>
</table>

![Figure 6.2.17: RS-232 Interface Pin Assignment](image)
6.3 Maximum AC Short-Circuit Current

According to requirements for safety protection, PV Inverters shall have a short circuit test on the AC output circuit. The following table describes the test result of the AC Short-Circuit Current that the PV Inverter had.

<table>
<thead>
<tr>
<th>Maximum Short-Circuit Current and Duration Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ipeak</td>
</tr>
<tr>
<td>306A</td>
</tr>
</tbody>
</table>

6.4 Knockouts for the AC and DC wiring

PV Inverters is equipped with different size of knockouts in the wiring box which can be used for the cable configuration of DC-side and AC-side. For the convenience to the installer or system integrator, knockouts can be utilized in four different directions and there are two different sizes of the knockouts can be selected as shown in figure 6.4.2 and figure 6.4.3. The total quantity of knockouts of PV Inverter is listed in a table as reference for installing.

![Knockout Directions of Wiring Box](Image)

Figure 6.4.1: Knockout Directions of Wiring Box
Open the knockouts for the wiring

PV Inverters are able to accept the different configuration of wiring from the different direction with conduits. For the knockouts, two different size can be used and the diameter of these knockouts were mentioned in figure 6.4.2. Each knockout has two different levels of opening area that can be used, inner level area and outer level area, as figure 6.4.3 indicates.
Tools

A M4 size slotted screwdriver and hammer are required for the opening procedure of knockouts.
In order to utilize an opening hole in the inner level area, it is necessary to use the required tools such as a slotted screwdriver with a hammer to knock at the certain point repeatedly as figure 6.4.6 indicated:

![Figure 6.4.6: Knocking point of inner level](image)

1st Step: Use tools to target upper strike point and to knock once.
2nd Step: Use tools to target bottom strike point and to knock again.
Last Step: Repeat the 1st and 2nd step until the hole of inner level is opened.

In order to dash an opening hole at outer level area, it is necessary to use the required tools to strike (knock) at the certain points repeatedly in order to open a hole for wiring as shown in figure 6.4.7.

![Figure 6.4.7: Knocking point of outer level](image)

1st Step: Use tools to target left-hand side strike point and to knock once.
2nd Step: Use tools to target right-hand side strike point and to knock again.
Last Step: Repeat 1st and 2nd step until the hole of outer level is opened.

**IMPORTANT**

Be sure to follow all instructions to strike/knock-out the opening hole by the proper procedures. Otherwise, the opening area of knockout can be easily damaged if improper tools are used or any improper procedures are done for the opening, please beware.
7. Connecting the PV Inverter

7.1 DC Wiring Connections

A) Since the wiring box has been opened during mounting procedures, used the necessary tools to knockout an opening hole in the desired location on the wiring box for AC cables and insert a conduit as shown in figure 7.1.1. If the top cover of the wiring box is not removed yet, please remove the top cover of wiring box before this procedure started.

![Figure 7.1.1: Implement a conduit to the wiring box](image)

**IMPORTANT**

Conduit is not the part of accessories supplied with the Eaton grid-tied PV Inverter. Therefore, it is important to ensure to use the water tight conduits.

B) Check the status of the DC input side (PV modules), as it is necessary to have a circuit fuse switch installed between PV modules and PV Inverter. Find the fuse switch and turn it off in preparation of making the DC wiring connection.

C) Refer to the following table to select the correct size of DC cables. It is recommended to implement the terminal head (furrel) with the cables to ensure the quality of conducting between cables and terminal as shown in figure 7.1.2.

![Figure 7.1.2: Terminal head is required for DC Cables](image)
<table>
<thead>
<tr>
<th>Terminal block</th>
<th>Model</th>
<th>PV240 (PV238)</th>
<th>PV250</th>
<th>PV260</th>
<th>PV270</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-string</td>
<td>PV240</td>
<td>8 AWG</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Internal</td>
<td></td>
<td>(Max. current per DC input terminal: 20 A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combiner)</td>
<td></td>
<td><strong>Torque</strong></td>
<td>12 Kgf-cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground</td>
<td>(G)</td>
<td>6 AWG</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Torque</strong></td>
<td>12 Kgf-cm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

D) Check the polarity of the PV modules from the fuse switch to ensure the input power from the modules will not exceed the permission setting of the PV Inverter, $600V_{DC}$ Power as the maximum allowance.

**IMPORTANT**

The Eaton grid-tied PV Inverter is designed with a transformerless topography. It is not recommended to connect with the PV modules that require positive (+) or negative (-) polarity to ground.

E) Selecting the DC cables connected with the PV modules, use a multi-meter to confirm the voltage that will feed-in with the PV Inverter, it is important to ensure each string of connection shall be less than $600V$ and the maximum DC input current be less than $20A$ for each string of modules.

**IMPORTANT**

Configuration of the PV modules should be done by qualified service personnel with the instructions that are provided from the manufacturer of the PV modules. Ensure the configuration for each string of the PV-system meets the specifications required by the Eaton grid-tied PV Inverter.
F) Connect the DC + and DC – cables to the correct polarity ports of the DC input terminal block as shown in figure 7.1.3. Ensure to secure the screws of the DC input terminals by tightening them to the torque of 12 Kgf-cm.

![Image: DC Input Terminal]

**Figure: 7.1.3: DC Input Terminal**

<table>
<thead>
<tr>
<th><strong>WARNING</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not mix the connection with the wrong polarity. This may cause damage to the PV Inverter; therefore it is important to check the polarity again before connecting the DC power to the wiring box. Do not startup the PV Inverter while the fuse cover is removed. The dummy fuses must be kept within fuse holder if no protection fuse is planned to be installed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>CAUTION</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Each port (terminal) of the multi-string DC input terminal is only able to connect with a maximum 20A connection. It is important to ensure the correct configurations of the PV module connection are within the electrical specification.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>IMPORTANT</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>It is important to follow the standard formula for the DC fuse selection if string fuses are planned to be used.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Insulation Protection</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>An insulation glove should be worn during the servicing period.</td>
</tr>
</tbody>
</table>

G) Use a multi-meter to check the DC input voltage that could be generated from the PV modules before delivering the DC power to the wiring box.

<table>
<thead>
<tr>
<th><strong>Multi-Meter</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>It is important to use a multi-meter to measure the DC input voltage that is generated from the PV modules. It must not exceed $600V_{\text{DC}}$.</td>
</tr>
</tbody>
</table>
H) When the DC power is delivered from an external combiner to the wiring box of the PV Inverter, use a multi-meter to measure the DC voltage on the connected polarity port of the DC input terminal.

I) Last, turn off the circuit breaker for the DC Input module and then continue with the procedures in next section to complete the configuration for the AC side.

7.2 AC Wiring Connections

Configuration of Utility Grid

Eaton grid-connected PV Inverter can be installed with the following type of utility grid systems by 2 wire or 3 wire AC cables, and with a ground cables as illustrated in the table below.

Acceptable Grid System for Eaton grid-tie connection PV Inverter:

<table>
<thead>
<tr>
<th>GRID STANDARD</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>208V~/240V~3PH-Δ</th>
<th>240V~3PH-SPLIT-PHASE</th>
<th>277V~3PH-Y</th>
<th>208Y~/120V~3PH-Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>TERMINAL</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>1 2 3</td>
<td>1 2 3</td>
<td>1 2 3</td>
<td>1 2 3</td>
</tr>
<tr>
<td>WIRE</td>
<td>L1</td>
<td>L2</td>
<td>-</td>
<td>G</td>
<td>L1 L2 N G</td>
<td>L1 L2 N G</td>
<td>L1 L2 N G</td>
</tr>
</tbody>
</table>

For 208V and 240V 3PH-delta grid system, a 3-PH delta configuration can be used by the 2 AC wires connected to the Point of Common Coupling (PCC) L1 and L2 location and a ground cables connected to the L2 location as figure in above table indicated.

For 240V split grid system, a split-phase configuration can be used by 3 AC wires connected to the PCC's L1, L2 and N location and a ground cables connected to the N location as illustrated in above table.

For 277V 3PHASE-Y grid system, a wye type configuration can be used by 2 AC wires connected to L1 and N locations with a ground cables connected to the N location as illustrated in above table.

For 208Y~/120V 3PH-Y grid system, a wye type configuration can be used by 3 AC wires connected to L1 · L2 · and N with a ground cables connected to the N location as illustrated in above table.
WARNING
Configuration of utility grid connections is required and to be completed by a licensed engineer or electrical contractor ensure the correct sized AC cables is used.

DANGER
Alternating Current (AC) is terminated in PV Inverter. All connections between public utility and the PV inverter's Alternating Current (AC) terminals must to be configured and service by a licensed technician.

In order for the PV Inverter to be used with the different utility grid systems, the utility-configuration dip switch embedded within wiring box. The configuration setting of this dip switch is described in figure 7.2.1. The following tables described the functions that can be enabled through the PIN configuration on the utility configuration dip switch. It is recommended that a qualified service personnel to complete the configuration of this DIP switch during the installing period.

![Utility configuration setting diagram](image)

Figure 7.2.1: Utility Configuration Setting DIP Switch

**IMPORTANT**
It is important to complete the DIP switch settings before starting the AC wiring connections.
<table>
<thead>
<tr>
<th>DIP switch Setting</th>
<th>Description</th>
<th>AC Terminal</th>
<th>LCD Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin 1, Pin 2, Pin 3</td>
<td>DIP switch</td>
<td>L1, L2, N</td>
<td><em>PV2XX</em> 208 Delta: Corner grounded</td>
</tr>
<tr>
<td>Pin 1, Pin 2, Pin 3</td>
<td>DIP switch</td>
<td>L1, L2, N</td>
<td><em>PV2XX</em> 240 Delta: Corner grounded</td>
</tr>
<tr>
<td>Pin 1, Pin 2, Pin 3</td>
<td>DIP switch</td>
<td>L1, L2, N</td>
<td><em>PV2XX</em> 277Vac System</td>
</tr>
<tr>
<td>Pin 1, Pin 2, Pin 3</td>
<td>DIP switch</td>
<td>L1, L2, N</td>
<td><em>PV2XX</em> 240Vac Split</td>
</tr>
</tbody>
</table>

1. *PV2XX*: Model Name (PV238, PV240, PV250, PV260 and PV270)
Configuration for the AC Wiring:
A) After the DC wiring connection is finished, start to dash an opening hole for the AC cabling, and insert the conduit.

B) Ensure the AC utility system that selected is able to use with Eaton grid-connected PV Inverter. After utility system confirmed, to select the correct setting of utility configuration setting DIP switch with the following instructions that mentioned in section 7.2.1 before to start procedures for the AC connection.

<table>
<thead>
<tr>
<th>DIP switch Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin 4 DIP switch</td>
<td></td>
</tr>
<tr>
<td>3.8kW Limitation</td>
<td>Output power limit at 3.8kW</td>
</tr>
<tr>
<td>(4kW model only)</td>
<td>Rated output power</td>
</tr>
</tbody>
</table>

**IMPORTANT**
For the 3800W down powered mode, it is important to adjust the setting of the Utility configuration setting by turning on the number 4 Dip switch.

When the number 4 DIP switch is turned on, the output power is limited at 3.8kW. This is only available with the PV240 model. It is necessary to change all the name plates if this change conducted.
C) Use a multi-meter to measure the AC voltage from the combiner box for AC utility. It is important to confirm the AC voltage that being used is matching with the correct configuration of utility configuration dip switch used.

D) Refer to the information in the following table to select and use the proper size for the AC cables. It is necessary to apply the terminal head to the cables in order to ensuring the conducting quality between the cable and terminal is good.

<table>
<thead>
<tr>
<th>Terminal block labeled with (1), (2), (3)</th>
<th>Admissible conductor size</th>
<th>PV240</th>
<th>PV250</th>
<th>PV260</th>
<th>PV270</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque</td>
<td></td>
<td>10 AWG</td>
<td>8 AWG</td>
<td>6 AWG</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Terminal block labeled with (G)</th>
<th>Admissible conductor size</th>
<th>PV240</th>
<th>PV250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque</td>
<td></td>
<td>10 AWG</td>
<td>8 AWG</td>
</tr>
</tbody>
</table>

E) Connect the AC cables with PV inverter by inserting them through the conduits into wiring box as figure 7.2.2.2 shown:

![Figure 7.2.2.2: Insert the AC cables through conduit](image)

F) AC terminal connections: connect the L-Phase cable to the positions 1 and 2 terminals port. N-Phase cable to terminal 3 and the ground cable to terminals 4 and 5, the grounding points, as shown in figure 7.2.2.3:

![Figure 7.2.2.3: Connect the AC Cables to Correct Position](image)
G) Tighten the screws for the AC cables by the required torque as listed in the Section D table, above. Then, turn on the circuit breaker at the utility panel or switchboard and measure the AC voltage that exists between the Line-phases, Line to Neutral, Line to Ground, and Neutral to ground to confirm the AC utility voltage meets with the requirement of the power system before PV Inverter is turned on.

H) After the AC voltage is confirmed, please check the condition of the conduits again in order to ensure all conduits are tightly locked and secure for the protection against rain.

I) Last, reinstall the top cover of wiring box by tightens 4 M5 screws as illustrated below:

Figure 7.2.2.4: Secure the wiring box
8. LCD Displays Function Tree

8.1 First Level Display Menu

Definition of Level 1 display menu
Operating and Output power Status
Display the operation status and the instant-output power of the unit.

Model Name and Grid System Menu
Display the model name of the PV Inverter and voltage of the AC utility system.

Etoday and Energy Menu
Display the output energy that is produced on the current day and the total energy that is produced since the PV Inverter was installed.

Date and Hour Menu
Display date and time of the current day.

DC Voltage and DC Current Menu
Display the DC voltage and DC current from the PV array.

AC Voltage and AC Current Menu
Display the output AC voltage and AC current.

Frequency and Output Power
Display the AC frequency and the instant-output power of the unit.

Version and Output Power Menu
Display the firmware version and the instant-output power of the unit.
8.2 Second Level Display Menu

8.2.1 Daily, Weekly and Monthly Energy Display Menu

**E-Day Display Menu**
It is a menu that will display the output energy for the past 30 days.

**E-Week Display Menu**
It is a menu that will display the output energy for the past 52 weeks.

**E-Month Display Menu**
It is a menu that will display output energy for the past 12 months.

**EXIT Display Menu**
It is a menu that used to return back to Etoday menu, a level 1 display menu.
8.2.2 Date and Hour Display Menu

Date Adjusting Menu

It is the date and hour setting menu that is used to change date and time of the PV Inverter. The Enter key is used to change between different units of time and the direction keys are used to adjust the value of the unit such as year, month, day, hour, minute and second.

IMPORTANT
Operational data will be recorded by the date and hour. Therefore, it is important to ensure the time of inverter is adjusted correctly.

IMPORTANT
The Enter key is the control key that used to enter into subdirectory for the configurations and the direction arrow control keys are used to rotate between each menu.
9. Maintenance

9.1 Replacement of the external cooling fan

For PV240 and PV250 models, there is no cooling fan designed for the external housing, but an internal fan designed within PV inverter for the thermal management. Therefore, “FAN Lock” is the only failures message that user will retrieve from the LCD if the operation of internal cooling fan has failed. If this situation happens, please contact the Eaton service personnel for further instructions.

For PV260 and PV270 models, there is an external cooling fan and the internal cooling fan designed within PV inverter for the thermal management. The external fan is located on the top-front side of PV Inverter as shown in figure 9.1.2. When the cooling fan is not working properly, user will be able retrieved three different kinds of failure messages from the LCD. “FAN Lock” is the first failure message that user can retrieved from the LCD when both external and internal cooling fan are not working properly. “FAN1 Lock” is the second kind of failure message the user can be retrieved from the LCD when the external cooling fan is not worked properly. “FAN2 Lock” is the last kind of failure message the user can be retrieved from then LCD when the internal cooling fan is not worked properly.

If there is “FAN1 Lock” on the PV260 and PV270 model, please check if there is any obstacle which (stopped) blocked the external fan. When no obstacle can be found, user can follow the below procedures to change the external cooling fan to see if cooling fan problem can be fixed by changing to a new cooling fan. If the “FAN Lock” or “FAN2 Lock” happened on the PV260 and PV270 model, please contact the Eaton service personnel for further instructions since the internal cooling fan is not working properly.

**IMPORTANT**

If the error code on the LCD display reads “FAN2 LOCK” with a PV260/PV270 model or “FAN LOCK” with a PV240/PV250 model, then this means the interior cooling fan located inside the main housing of PV Inverter is defective and will needs to be replaced. Please contact system installer or qualified service personnel to make change the interior cooling fan.
If the cooling fan is dirty, a vacuum cleaner can be used to clean from the top of the PV Inverter. If the cleaning procedure does not fixed the problem, service personnel can determine the status of the cooling fan and make a replacement. The following procedures described how to change the cooling fan, please read and understand all procedures before doing so.

A) Switch off the DC/AC disconnect switch and wait for three minutes to discharge the stored energy for the PV inverter.

![Figure 9.1.1: Turn off DC/AC switch](image)

B) Unfastening all screws located in each corner as highlighted in figure 9.1.2. After the screws are removed, lift out the top cover of the cooling fan from PV Inverter as indicated the figure below:

![Figure 9.1.2: Screws for the external cooling fan](image)
C) After cooling fan is already lifted out, disconnect the power cable of the cooling fan as shown in Figure 9.1.3.

![Figure 9.1.3: Disconnects the power cables of the cooling fan](image)

D) Install a new cooling fan by connecting its power cable to PV Inverter. Then re-tighten the 4 screws at the top cover.

E) Switch on the DC/AC disconnect in order to complete the fan replacement procedure.
9.2 Cleaning the LCD Display

If the screen of the LCD display and the LED indicators are dusty and not readable, please use a piece of damp cloth to clean the surface.

9.3 Install or Replace the DC/AC fuse

<table>
<thead>
<tr>
<th>Insulation Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>An insulation glove should be worn during the configuring and replacing the fuse or installing the components.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ELECTRICAL SHOCK</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is risk of electrical shock from the energy stored in the capacitors. Therefore, it is necessary not to remove the top cover of wiring box until 3 minutes after DC/AC switch is turned off.</td>
</tr>
<tr>
<td>It is necessary to turn off the external DC switch and external AC breaker if these are present. Otherwise, it is important to disconnect all the DC modules and AC utilities connections before service of the fuse replacement is started. The PV Inverter must be disconnected from all sources of power supply. Refer service to only qualified service personnel.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IMPORTANT</th>
</tr>
</thead>
<tbody>
<tr>
<td>The selection of the DC fuses must follow the instructions outlined in chapter g. DC protection of section 6.2 within the manual.</td>
</tr>
</tbody>
</table>

A) Removed the fuse cover from the fuse holders as shown in figure 9.3.1:

![Figure 9.3.1: Remove the fuse cover]
B) Next, take off the broken fuse or dummy fuse from the fuse cover as shown in figure 9.3.2:

![Figure 9.3.2: Take off the broken fuse](image)

C) Insert a new fuse into the fuse cover. Ensure the fuse is selected from the recommended list of brands and rating as discussed in the DC and AC protection chapters in section 6.2 of this manual.

![Figure 9.3.3: Install a new fuse](image)

D) Install the fuse cover with the new fuse into the correct fuse holder as shown in figure 9.3.4. It is important to ensure the fuse cover is inserted tightly into fuse holder in order to complete the fuse replacement and re-installation procedure.

![Figure 9.3.4: Install the fuse cover](image)
## 10. Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>PV238</th>
<th>PV240</th>
<th>PV250</th>
<th>PV260</th>
<th>PV270</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input (DC)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal DC Voltage</td>
<td>360V</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. PV Open Voltage</td>
<td>600V</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start-up Voltage</td>
<td>150V</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shutdown Voltage</td>
<td>Typical 80V</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working Voltage Range</td>
<td>100 ~ 515 V</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full Rating Voltage Range</td>
<td>225 ~ 500V</td>
<td>200 ~ 500 V</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPPT Working Range</td>
<td>105 ~ 500 V</td>
<td>105 ~ 500 V</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPPT Efficiency</td>
<td>&gt; 99%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPPT Tracker(s)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max DC Current</td>
<td>19A</td>
<td>26A</td>
<td>32A</td>
<td>37A</td>
<td></td>
</tr>
<tr>
<td><strong>Output (AC)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal AC Power @ 240Vac / 277Vac</td>
<td>3800W</td>
<td>4000W</td>
<td>5000W</td>
<td>6000W</td>
<td>7000W</td>
</tr>
<tr>
<td>Nominal AC Power @ 208Vac</td>
<td>3800W</td>
<td>3800W</td>
<td>4600W</td>
<td>6000W</td>
<td>7000W</td>
</tr>
<tr>
<td>Max. AC Power @ 240Vac / 277Vac</td>
<td>3800W</td>
<td>4000W</td>
<td>5000W</td>
<td>6000W</td>
<td>7000W</td>
</tr>
<tr>
<td>Max. AC Power @ 208Vac</td>
<td>3800W</td>
<td>3800W</td>
<td>4600W</td>
<td>6000W</td>
<td>7000W</td>
</tr>
<tr>
<td>Nominal Voltage</td>
<td>Defaulted: 240 Split phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optional: 208V, 240V or 277V single phase (setting required)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operational Voltage Range</td>
<td>186V ~ 225V for 208Vac system</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>215V ~ 260V for 240Vac system</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>248V ~ 300V for 277Vac system</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal Frequency</td>
<td>60Hz</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Operational Frequency Range</td>
<td>59.32Hz ~ 60.48Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model</td>
<td>PV238</td>
<td>PV240</td>
<td>PV250</td>
<td>PV260</td>
<td>PV270</td>
</tr>
<tr>
<td>------------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td><strong>Output (AC)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal AC Current @ 208V</td>
<td>18.3A</td>
<td>18.3A</td>
<td>22.1A</td>
<td>28.9A</td>
<td>33.7A</td>
</tr>
<tr>
<td>Nominal AC Current @ 240V</td>
<td>15.8A</td>
<td>16.7A</td>
<td>20.8A</td>
<td>25A</td>
<td>29.2A</td>
</tr>
<tr>
<td>Nominal AC Current @ 277V</td>
<td>13.7A</td>
<td>14.4A</td>
<td>18.1A</td>
<td>21.7A</td>
<td>25.3A</td>
</tr>
<tr>
<td>Max. AC Current @ 208V</td>
<td>18.3A</td>
<td>18.5A</td>
<td>22.5A</td>
<td>30A</td>
<td>35A</td>
</tr>
<tr>
<td>Max. AC Current @ 240V</td>
<td>15.8A</td>
<td>18.5A</td>
<td>22.5A</td>
<td>28.5A</td>
<td>33.2A</td>
</tr>
<tr>
<td>Max. AC Current @ 277V</td>
<td>13.7A</td>
<td>16.4A</td>
<td>20.5A</td>
<td>24.6A</td>
<td>28.7A</td>
</tr>
<tr>
<td>THD %</td>
<td></td>
<td>&lt; 3%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Factor</td>
<td></td>
<td>&gt; 0.99</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Efficiency</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak Efficiency</td>
<td>97.5%</td>
<td>97.5%</td>
<td>97.5%</td>
<td>97.5%</td>
<td>97.5%</td>
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<tr>
<td>CEC Efficiency</td>
<td>97%</td>
<td>97%</td>
<td>97%</td>
<td>97%</td>
<td>97%</td>
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<tr>
<td><strong>General</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topology</td>
<td>Transformer less</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Protection Degree</td>
<td>Type 3R</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Consumption: Standby / Night</td>
<td>&lt; 7W / &lt; 0.2W</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heat Dissipation</td>
<td>Force Air Cooling</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operational Temperature</td>
<td>- 25 ~ + 50°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication Interface</td>
<td>RS232 / Super-485</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humidity</td>
<td>0 to 95%, Non-Condensing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground Fault Protection</td>
<td>Internal GFCI and Isolation diction function (UL1741)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC Disconnect</td>
<td>DC &amp; AC Switch</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC Surge Protection</td>
<td>4kV</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model</td>
<td>PV238</td>
<td>PV240</td>
<td>PV250</td>
<td>PV260</td>
<td>PP270</td>
</tr>
<tr>
<td>--------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td><strong>General</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AC Surge Protection</td>
<td>6kV</td>
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</tr>
<tr>
<td>Safety</td>
<td>UL1741 (2010), CSA C22.2 No.107.1-01</td>
<td></td>
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</tr>
<tr>
<td>EMC</td>
<td>FCC Part 15 Class B</td>
<td>IEC 61000-6-2</td>
<td>IEC 61000-6-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mechanical</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wall Mounted</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimension</td>
<td>17.1 x 33.4 x 8.4 in</td>
<td>(434 x 847 x 212 mm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W x H x D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Weight approx.</td>
<td>86 lbs 39 kg</td>
<td>90.4 lbs 41 kg</td>
<td>101.4 lbs 46 kg</td>
<td>101.4 lbs 46 kg</td>
<td></td>
</tr>
</tbody>
</table>
11. Trouble Shooting

11.1 Display Message Table

It is important to understand all operational and error messages that could appear on the LCD display. The error messages that appear are especially important because service personnel will need this information reported in order to help them to define the failure and correct it.

I) Working Status Messages

<table>
<thead>
<tr>
<th>Operation Condition</th>
<th>Messages</th>
<th>Descriptions</th>
</tr>
</thead>
</table>
| Power Off           | No Display | 1. Initial condition: Before system startup voltage (150V)  
|                     |          | 2. PV Inverter is totally shutdown, Vpv < 80V |
| Initialization and Waiting | Waiting | 1. Initial condition: After PV voltage is higher than 150V, inverter is waiting for feeding to grid  
|                     |          | 2. After Startup: Input voltage range is at 80 ~ 100V |
| Check Grid         | Checking xxxS | When PV voltage > 150V, inverter is checking feeding conditions |
| Feeding Grid       | Normal | Inverter is feeding power to the grid |
| FLASH              | FLASH | FLASH Firmware |

II) Monitoring Parameter Messages

<table>
<thead>
<tr>
<th>Operation Condition</th>
<th>Messages</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instantaneous Output Power</td>
<td>Pac=xxxx.xW</td>
<td>The real time output power in xxxx.xW</td>
</tr>
<tr>
<td>Accumulated energy information</td>
<td>Energy=xxxxxxxkWh</td>
<td>Total energy to has been fed to the grid since inverter was installed</td>
</tr>
<tr>
<td>Today's energy information</td>
<td>Etoday=xxx.xkWh</td>
<td>Total Energy that has been fed to the grid</td>
</tr>
<tr>
<td>Grid Voltage</td>
<td>Vac=xxx.xV</td>
<td>Grid Voltage in xxx.x VAC</td>
</tr>
<tr>
<td>Grid Frequency</td>
<td>Frequency = xx.xHz</td>
<td>Grid frequency in xx.xHz</td>
</tr>
<tr>
<td>Feeding Current</td>
<td>Iac=xx.xA</td>
<td>Feeding current amount in xx.xA</td>
</tr>
<tr>
<td>PV Array Voltage</td>
<td>Vdc=xxx.xV</td>
<td>Input voltage from PV array, xxx.xVDC</td>
</tr>
<tr>
<td>PV Array Current</td>
<td>Idc=xx.xA</td>
<td>Input current from PV array, xx.xA</td>
</tr>
</tbody>
</table>
### III) System information Messages

<table>
<thead>
<tr>
<th>Operation Condition</th>
<th>Messages</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model Display</td>
<td>PV2XX</td>
<td>Inverter Model</td>
</tr>
<tr>
<td>LCD Display Lock</td>
<td>Lock</td>
<td>Hold the present display message</td>
</tr>
<tr>
<td>Waiting for reconnect to</td>
<td>Reconnect in</td>
<td>The time for reconnect to the grid</td>
</tr>
<tr>
<td>the grid</td>
<td>xxx S</td>
<td></td>
</tr>
</tbody>
</table>

### IV) System Fault Messages

<table>
<thead>
<tr>
<th>Operation Condition</th>
<th>Messages</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isolation Failure</td>
<td>Isolation Fault</td>
<td>Ground-fault of the PV-modules or failure of surge voltage protection</td>
</tr>
<tr>
<td>Grid Failure</td>
<td>Grid Fault</td>
<td>Grid measured data is beyond the specification (voltage &amp; frequency)</td>
</tr>
<tr>
<td>No Utility</td>
<td>No Utility</td>
<td>Utility is not available</td>
</tr>
<tr>
<td>Input Voltage too High</td>
<td>PV over voltage</td>
<td>Input voltage higher than the 600V</td>
</tr>
<tr>
<td>Ground I Fault</td>
<td>Ground I Fault</td>
<td>Leakage current on ground conductor is too high</td>
</tr>
</tbody>
</table>

### V) Inverter Fault Messages

<table>
<thead>
<tr>
<th>Operation Condition</th>
<th>Messages</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consistent Fault</td>
<td>Consistent Fault</td>
<td>The readings of 2 microprocessors are not consistent. It could be caused by CPU and/or other circuit not functioning properly.</td>
</tr>
<tr>
<td>Fan Lock</td>
<td>Fan Lock</td>
<td>All the cooling fans of the unit are locked and not functional (All model)</td>
</tr>
<tr>
<td>Fan1 Lock</td>
<td>Fan1 Lock</td>
<td>External Cooling fan of the unit is locked and not functional (PV260, PV270 Model)</td>
</tr>
<tr>
<td>Fan2 Lock</td>
<td>Fan2 Lock</td>
<td>Internal cooling fan of unit is locked and not functional (PV260, PV270 Model)</td>
</tr>
<tr>
<td>Temperature too high</td>
<td>Over temperature</td>
<td>The internal temperature is higher than normally allowed value</td>
</tr>
<tr>
<td>Output Relay Failure</td>
<td>Relay failure</td>
<td>The relay between the inverter and grid is not functional</td>
</tr>
<tr>
<td>Output DC Injection too high</td>
<td>DC Inj high</td>
<td>Output DC injection too high</td>
</tr>
<tr>
<td>EEPROM Problem</td>
<td>EEPROM failure</td>
<td>EEPROM inside has data access problem</td>
</tr>
</tbody>
</table>
### Operation Condition

<table>
<thead>
<tr>
<th>Operation Condition</th>
<th>Messages</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication failure</td>
<td>SCI failure</td>
<td>Communication between MCU inside is abnormal</td>
</tr>
<tr>
<td>between microprocessors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC bus voltage is too high</td>
<td>High DC bus</td>
<td>The DC BUS inside is higher than expected</td>
</tr>
<tr>
<td>GFCI detection abnormal</td>
<td>GFCI Failure</td>
<td>The GFCI detection circuit is abnormal</td>
</tr>
<tr>
<td>Resistance stick abnormal</td>
<td>Damp Failure</td>
<td>The function of resistance stick is abnormal</td>
</tr>
</tbody>
</table>

### 11.2 Trouble Shooting Actions

**Trouble shooting action for System Faults Messages**

**A) Isolation Fault**

Conditions: The resistance between the PV + or PV – and grounding is outside the permissible range, <4MΩ.

Corrective Actions:

- Restart the inverter again.
- If fault still occurs after the unit is restarted, contact the system installer immediately.
- Ask the system installer to check if the PV Inverter and PV Modules are properly insulated throughout the solar system.

**B) Grid Fault**

Conditions: The grid voltage or grid frequency of the PV Inverter is not within the permissible range. This can be caused by improper connection of the AC side; wrong setting of the utility dip switch or the local grid condition is out of acceptable range.

Corrective Actions:

- Check the grid voltage and frequency reading from the LCD displays.
- If the detected grid voltage is within permissible range, restart the PV Inverter and try again. If fault remains, contact the system installer to check the grid voltage and cable connections between PV Inverter and Utility system.
- If detected grid voltage is out of permissible range, contact the system installer to check the feed-in AC voltage and contact the utility operator for further action.
C) No Utility
   Conditions: Utility is not available. This can occur if the AC fuse is broken, No AC connections from utility system, or broken AC cables.

   Corrective Actions:
   ✓ Check the Utility system and the AC connections of the PV Inverter
   ✓ Check the AC fuses of the PV Inverter
   ✓ If failure remains, disconnect the PV Inverter and contact the system installer.

D) PV Over Voltage
   Conditions: DC voltage fed by the PV module is higher than permissible range, 600Vdc.

   Corrective Actions:
   ✓ Disconnected PV modules immediately.
   ✓ Check the configuration of the strings for the PV modules in order to ensure the maximum input voltage is lower than 600V.

E) Ground I Fault
   Conditions: Leakage current on ground conductor is too high.

   Corrective Actions:
   ✓ Check the AC Cables Connections, especially the grounding cables. Ensure all the cables are connected properly.
   ✓ Restart the PV Inverter.
   ✓ If fault remains, disconnect the PV Inverter and contact the system installer.
Trouble Shooting Actions for Inverter Faults Messages

A) Consistent Fault
Conditions: The readings between two microprocessors of control board are not consistent. It could be caused by the DSP and/or other circuits not functioning properly.

Corrective Actions:
✓ Restart the PV Inverter.
✓ If fault remains, disconnect the PV Inverter and contact the system installer.

B) FAN1 Lock (PV260/PV270)
Conditions: The external cooling fan of PV Inverter is not working properly.

Corrective Actions
✓ Visually check the front cooling fan. If any obstacle is found, clean it.
✓ If the top fan is not functioning it may be replaced per the instructions described in section 9.1.
✓ If fault remains, disconnect the PV Inverter and contact the system installer.

C) Over Temperature:
Conditions: The internal temperature is higher than normal value

Corrective Actions:
✓ Disconnect PV Inverter for a period (>30 minutes) and then restart the PV Inverter.
✓ If fault remains, disconnect the PV Inverter and contact the system installer. Select a new location for the installation when if it is necessary.
✓

D) Relay Fault:
Fault Conditions: The relay between inverter and grid is not functional

Corrective Actions:
✓ Restart the PV Inverter.
✓ If fault remains, disconnect the PV Inverter and contact the system installer.
E) DC Inj. high
Fault Conditions: Input DC injection too high.

Corrective Actions:
✓ Check the connection of the DC Input.
✓ Restart the PV Inverter.
✓ If fault remains, disconnect the PV Inverter and contact the system installer.

F) EEPROM Failures
Conditions: EEPROM inside has data access problem.

Corrective Actions:
✓ Restart the PV Inverter.
✓ If fault remains, disconnect the PV Inverter and contact the system installer.

G) SCI failure
✓ Conditions: Communication between MCU inside is abnormal.

Corrective Actions:
✓ Restart the PV Inverter.
✓ If fault remains, disconnect the PV Inverter and contact the system installer.

H) High DC bus
✓ Conditions: The DC BUS inside is higher than expected.

Corrective Actions:
✓ Restart the PV Inverter.
✓ If fault remains, disconnect the PV Inverter and contact the system installer.
I) GFCI Failure  
Conditions: The GFCI detection circuit is abnormal.

Corrective Actions:
✓ Check the PV string grounding cable from the PV Inverter
✓ Restart the PV Inverter.
✓ If fault remains, contact the system installer to check the grounding of the PV Inverter.
✓ If the fault cannot be fixed, disconnect the PV Inverter and contact the system installer.

J) Damp Failure  
Condition: The resistance stick is working outside the permissible range.

Corrective Actions:
✓ Restart the PV Inverter.
✓ If fault remains, disconnect the PV Inverter and contact the system installer.