

**ENVERTECH**

# User Operating Manual

Model Number: EnverBridge



**Zhejiang Envertech Corporation Ltd.**

Tel: +86 579 8926 6326

Email: info@envertec.com

Add: 24th Floor, Jintong Mansion,  
Center of Headquarters, Yongkang City,  
Zhejiang Province, China

This manual is an integral part of the unit. Please read the instruction manual carefully before installation, operation or maintenance. Keep this instruction manual for future reference. This document is not to be reproduced in any manner, nor are the contents to be disclosed to anyone, without the express authorization of Envertech.



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## 1 Read This First

Thank you for selecting Envertech— a leading supplier of micro-inverter products for the solar PV market. Envertech’ s new product “EnverBridge” acts as the power interface (PI) to the utility grid. It is an information gateway for the Envertech Microinverter. The data of real-time performance information of energy harvest for all Envertech micro-inverter systems can be collected by EnverBridge, and be transmitted to Envertech Monitoring Device called EnverPortal to achieve a global data monitoring for PV power plant.

The user manual includes EnverBridge overview, installation, operation instruction and technical parameters. To assure properly installation and operation, please carefully read this user manual before installation, and pay attention to the caution symbol affixed on the product.

Please hand the user manual to the end user.

## 2.Symbols in the manual

### 2.1 Safety symbols

Warnings and cautions tell you about the dangerous conditions that can occur if you do not follow all instructions in this manual.

Please read following safety symbols to indicate dangerous conditions and important safety instruction.

	<p><b>DANGER</b> The DANGER symbols in this manual and on the EnverBridge. Indicate a hazard with a high level of risk which if not avoided, will result in death or serious injury.</p>
	<p><b>WARNING</b> The WARNING symbols in this manual and on the EnverBridge indicate a hazard with a medium level of risk which if not avoided, could result in death or serious injury.</p>
	<p><b>CAUTION</b> The CAUTION symbols in this manual and on EnverBridge indicate a hazard with a low level of risk which if not avoided, could result in minor or moderate injury.</p>



	<p><b>NOTE</b> The NOTE symbols in this manual indicate the important product information.</p>
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### 2.2 Other Symbols

Some Symbols replace words on the equipment, on a display, or in manuals.

SEEYES	Trademark
	<p>No access for unauthorized personal</p>
	<p>Caution, risk of danger</p>
	<p>Symbol for the marking of electrical and electronics devices according to Directive 2002/96/EC. Indicates that the device, accessories and the packaging must not be disposed as unsorted municipal waste and must be collected separately at the end of the usage Please follow Local Ordinances or Regulations for disposal or contact an authorized representative of the manufacturer for information concerning the decommissioning of equipment.</p>
	<p>Direct curren</p>
	<p>Alternating current</p>
<p>PE</p>	<p>Protective conductor</p>
	<p>Earth(ground)TERMINAL</p>
	<p>Protective conductor Terminal</p>
	<p>Fuse</p>
	<p>Refer to the operating instructions</p>



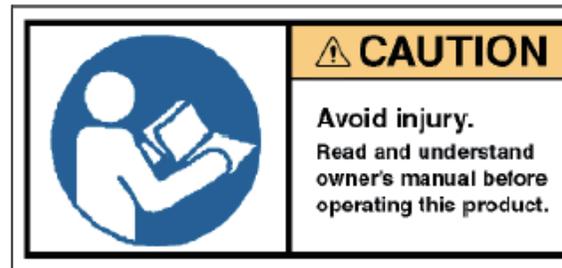
	Caution, risk of electric shock
	CE mark is attached to the solar EnverBridge to verify that the unit follows the provisions of the European Low Voltage and EMC Directives
PV	Photovoltaic
	DC terminal, indicating the polarity of the connections, positive, all positive connections shall be made with Redinsulated wire
	DC terminal, indicating the polarity of the connections, negative, all negative connections with black insulated wires
PCS	Power conversion equipment, hereby is our DC/AC inverter
SERVICE PERSONNEL	A person having appropriate technical training and experience necessary to be aware of hazards to which that person may be exposed in performing a task and of measures to minimize risks to that person or other persons
Qualified personnel	Person adequately advised or supervised by an electrically skilled person to enable him or her to perceive risks and to avoid hazards which electricity can create. For the purpose of the safety information of this manual, a "qualified person" is someone who is familiar with requirements for safety, refrigeration system and EMC and is authorized to energize, ground, and tag equipment, systems, and circuits in accordance with established safety procedures. The EnverBridge and endues system may only be commissioned and operated by qualified personnel.
DVC	Decisive voltage class
Closed Electrical Operating Area	Room or location for electrical equipment to which access is restricted to skilled or instructed persons by the opening of a door or the removal of a barrier by the use of a key or tool and which is clearly marked by appropriate warning signs

2.3 Technical competence

The procedures described in this manual should be performed by trained and authorized personnel only. Maintenance should only be undertaken by competent individuals who have a general knowledge of and experience with devices of this nature. No repairs should ever be undertaken



or attempted by anyone not having such qualifications.



Compliance with safety regulations depends upon installing and configuring system correctly, including using the specified wirings. Only professional assemblers who are familiar with requirements for safety, Photovoltaic system and EMC must install the system. The assembler is responsible for ensuring that the end system complies with all the relevant laws in the country where it is to be used. Envertech require using only genuine replacement parts, manufactured or sold by Envertech for all repair parts replacements.

Compliance with safety regulations depends upon installing and configuring system correctly, including using the specified wirings. Only professional assemblers who are familiar with requirements for safety, Photovoltaic system and EMC must install the system. The assembler is responsible for ensuring that the end system complies with all the relevant laws in the country where it is to be used. Envertech require using only genuine replacement parts, manufactured or sold by Envertech for all repair parts replacements.

Read completely through each step in every procedure before starting the procedure; any exceptions may result in a failure to properly and safely complete the attempted procedure.

Servicing of this product in accordance with this manual should never be undertaken in the absence of proper tools, test equipment and the most recent revision to this manual, which is clearly and thoroughly understood.

2.4 Safety Instructions

This chapter contains the safety instructions that you must follow when installing, operating and servicing the unit. If ignored, physical injury or death may follow, or damage may occur to the unit. Read the safety instructions before you commence work on the unit. If you are unable to understand the Dangers, Warnings, Cautions or Instructions, contact the manufacturer or an authorized service dealer before installing, operating and servicing the unit.

To ensure your personal safety and the proper use of EnverBridge, please carefully read this manual before installation. If the product is damaged when installation not comply with this manual, Envertech do not respond for any quality assurance and other risks.

For Envertech EnverBridge Warranty Terms and Conditions, see the appendix of this manual.

- Be aware that only qualified personnel should install and /or replace Envertech EnverBridge.
- Perform all electrical installations in accordance with all local electrical codes.
- Comply the rules of correctly use of tools and personal protective equipment (PPE) for insuring



the EnverBridge safe running.

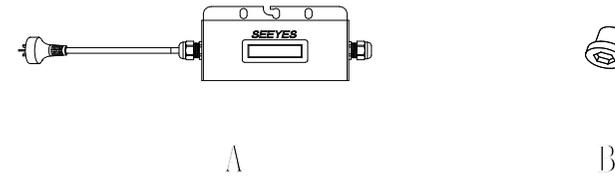
- Connection of any photovoltaic system to the electrical utility grid should only commence after receiving prior approval from the utility company.
- The EnverBridge MUST be installed and debugged complying with this manual by the professional authorized by Envertech.
- All electrical installation MUST meet the local standard.
- To assure the safe running, must comply with the relative standard for using the tool properly and Personal Protective Equipment (PPE). Away from the chemical and reagent.
- The EnverBridge must installed environments suitable for its IP rating.
- CAUTION! The device is intended for fixed installation, Located on a part that is not removable without impairing the operation of the unit.
- CAUTION! Visible and legible to the operator during the normal operation of the device.
- WARNINGS - Risk of electric shock- Do not open cover. No user serviceable parts inside. Servicing limited to qualified service personnel.
- WARNINGS - The printed circuit boards contain components sensitive to electrostatic discharge. Wear a grounding wrist band when handling the boards. Do not touch the boards unnecessarily.
- WARNINGS - Do not operate any device which is damaged, lacking parts or dented. Failure to observe this warning may result in an electric shock, injury, fire or accident.
- WARNINGS - Before installing the unit, agree with the customer the site.
- WARNINGS - The output connection with AC grid shall be protected by a max. 20A circuit breaker.
- The EnverBridge shall be connected with the Envertech EVT248 or EVT500 inverter as a system. It cannot operate as a stand-alone unit or in case of AC grid disruption

	<p><b>WARNING:</b> Be aware that the input AC voltage of the Envertech EnverBridge shall not exceed the rated voltage; higher voltage may cause permanent damage to the device. It contains no user serviceable and Envertech-EnverBridge Warranty parts.</p>
	<p><b>CAUTION:</b> SAVE THESE INSTRUCTIONS- This manual contains important instructions for EnverBridge that shall be followed during installation and maintenance.</p>
	<p><b>Warning:</b> Only authorized persons can be allowed for installation of inverter</p>



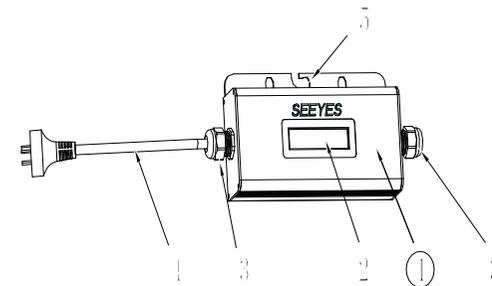
### 3 Packing and Feature

#### 3.1 Assembly parts



Object	Quantity	Description
A	1	EnverBridge
B	1	Screw

#### 3.2 Structure of EnverBridge



Object	Description
1	Cover
2	LCD Screen
3	Cable gland
4	AC Cable
5	Frame



### 3.3 Main functions

Use the Power Line Carrier Communication (PLCC) technology within Photovoltaic power plant

By PLCC technology, EnverBridge collects generation data from the PV power plant, and transmits to the EnverPortal database by its built in EnverBridge.

### 3.4 Technical Parameters

Model	EnverBridge
<b>Interface</b>	
Power Line Communication	Envertech Proprietary
LCD	LCD Screen
Ethernet	RJ45
<b>Capacity</b>	
Numbers of devices connected	Monitor up to 20 units of EVT248 (or 10 units of EVT500)
<b>Power Requirements</b>	
AC Supply	220V/230V/240V;50Hz/60Hz
Power Consumption	3W
<b>Mechanical Data</b>	
Dimensions	225mm*50mm*107mm
Weight	700g
Cooling	Natural convection- no fans
Ambient Temperature Range	-40°C~65°C
Enclosure Environment Rating	IP65
<b>Features</b>	
Compliance	CE
Warranty	5 Years

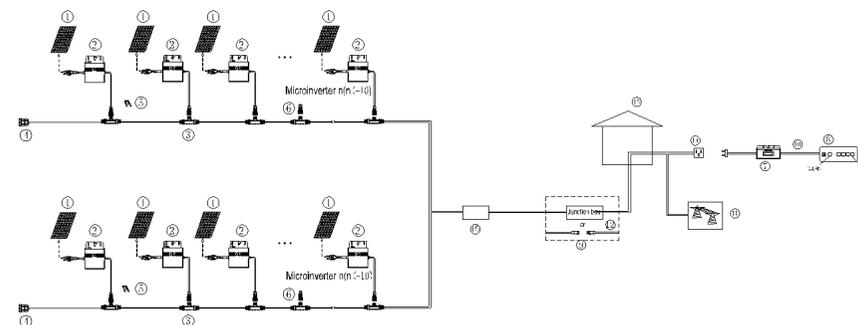


Figure 4.2 System diagram

### 4.3 Installation Procedure

Dimension See below Figure 4.3.1.

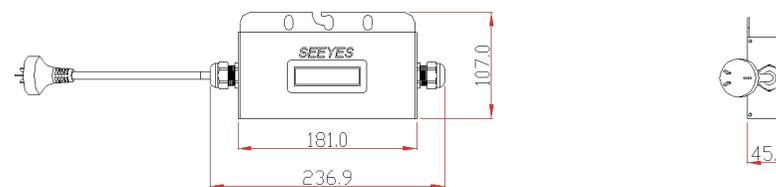


Figure 4.3.1 Dimension of EnverBridge

## 4 Installation

### 4.1 Operating Condition

Operating Temperature Ambient temperature: -40 C ~65 C

Operating Humidity Air Relative Humidity <=90%

Rated Input AC230V/50Hz

### 4.2 System diagram

### Installation Diagram

See below Figure 4.3.2.

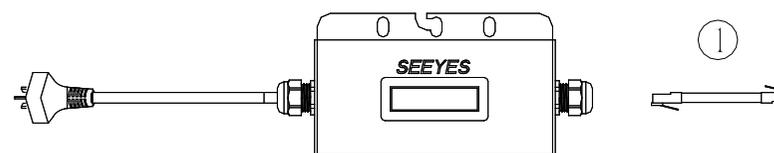
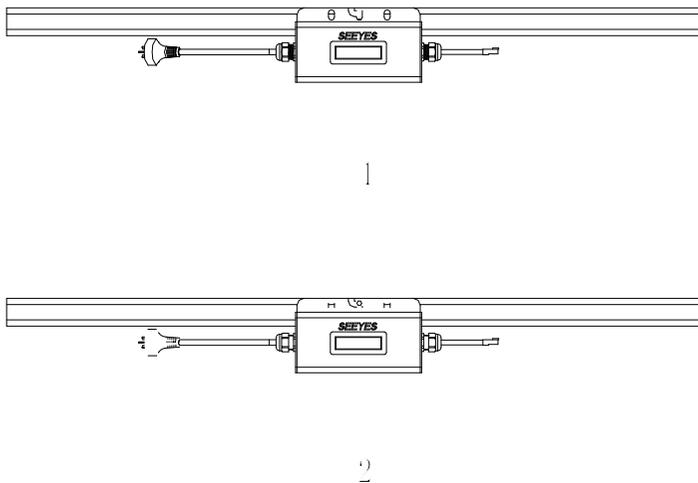


Figure 4.3.2 Installation Diagram



- Step 1: Use the screwdriver to open on the right side of the cover plate  
 Step 2: Get through the cable to the connector  
 Step 3: And then plug the RJ45 on the PCB  
 Step 4: Fasten the cable on the casing of Translate

Installation diagram



## 5 Operating Static

Monitoring Device EnverBridge is the core component created by Envertech, it realizes the connection between solar power plant and internet. As an intelligent communication gateway, EnverBridge uses Envertech's Power Line Communication (PLC) technology to continuously monitor the data of energy harvest of solar power plant such as power, voltage, current and frequency; it can also transmit the real-time data of energy harvest to EnverPortal to realize the monitoring around the world.

Set aside a minimum functionality of the EnverBridge module, you can optional this EnverBridge modules to achieve the connection between PV power plant and the Internet. RJ45 cable should be simultaneously matching with EnverBridge module.

### 5.1 Working Mode

The working modes of an Envertech EnverBridge are:

- Start up
- Active
- Fault
- Standby

The detailed working mode descriptions are as below:

Start up

Start up mode is for a newly installed EnverBridge. This startup mode must base on the proper AC, micro-inverter, Ethernet cables connecting.

Active

When the EnverBridge is in normal operation process, this insures that the power available from micro-inverter array is exported to the utility grid.

Fault

If the system does not operate correctly, Envertech EnverBridge will stop automatically and enter into Disable mode. The Envertech EnverBridge system keeps detecting the disable information, it will be in disable mode until fault release. If the inoperative EnverBridge has been repaired and match to the electrical utility grid, the whole system would enter operation mode after 60 seconds to 5 minutes. Be aware that only qualified personnel should maintain the ENVERTECH Micro-Inverters.

Standby

When the EnverBridge is in operation process but keeps with low voltage and current in micro-inverter side for a certain time. The EnverBridge manages transition from "Active" to "Standby". In "standby" mode, Micro-Inverters keep detecting the energy output of each micro-inverter. When the output energy reaches the power generation conditions, the inverter would enter into "Active" from the "Standby" state.



- The equipment maintenance only can be carried through by service department of Envertech, or the service centre or professional authorized by Envertech. Maintenance personnel should be familiar with all the warnings in this manual and the proposed steps.
- Must be sure to disconnect the input and output power before removal of equipment for maintenance.

### 5.2 Grid-Connection

EnverBridge system connects grid automatically. It detects and monitors the performance of each PV module through each micro-inverter. When the output energy reaches the power generation conditions, the EnverBridge system begin to collect the data from Microinverters.



5.3 Grid Disconnect

If the state grid cannot match the following situations (table 5.3.1), it bring the Envertech EnverBridge to the rest mode.

Type	Rated	Variation Range
Voltage	230V	205V - 265V
Frequency	50Hz	47Hz - 51Hz

Table 5.3.1 Parameter of European state power grid

Start EnverBridge after checking all below steps:

	<p><b>WARNING</b> Connect the EnverBridge to the electrical utility grid only after receiving prior approval from the utility company.</p>
	<p><b>WARNING</b> Only qualified personnel could connect Envertech EnverBridge to the electrical utility grid.</p>

5.4 Installation checklist

To ensure the safe operation of the devices, they may be installed and commissioned only by qualified personnel in full compliance with the warnings referred to in this manual.

Checklist

Check the mechanical and electrical installation of the unit before startup. Go through the checklist below together with another person. Read the Safety instructions and EC directives on the previous pages of this manual before you work on the unit.

Mechanical Installation

Check screw connections on the EnverBridge for tightness. The ambient operating conditions are allowed. (See Technical parameter); The unit is fixed properly on a nonflammable wall or the combiner box or the rack. (See Mechanical installation.) The cooling air will flow freely. The unit is fixed tightly and support is enough. (See Mechanical installation.)

Electrical Installation

Check all screws of the connection terminals in the installation system before and after the EnverBridge for tightness.

The AC input voltage matches the unit nominal voltage. Assure EnverBridge AC cable's connections and their tightening torques are OK. There are no tools, foreign objects or dust from drilling inside the unit. Unit, connection box and other covers are in place. The Ethernet cable connections are OK. The external cords and cables are fixed tightly, and strain relief clamp is provided for external accessible cords and cables. Cord and cable inlets are sealed completely after cord/cable installation.

5.5 Start-Up– Checks

The device has been checked at the factory and adjusted so that it can be commissioned immediately after being installed.

Following Section Installation checklist, for your personal safety and to avoid damage, the following safety checks should be performed before start by a qualified person who has adequate training, knowledge, and practical experience to perform these tests. The data should be recorded in an equipment log. If the device is not operating properly or fails any test, the device has to be repaired.

1. Inspect the equipment and accessories for mechanical and functional damage.
2. Inspect the safety relevant labels for legibility.
3. Inspect the fuse to verify compliance with rated current and breaking characteristics.
4. Measurement of insulation resistance
5. Measurement of earth resistance
6. Mounting structures: Verify tightness and integrity of bolts and other fastening devices, also check if there is significant corrosion.

6 LCD Abstracts

6.1 Brief introduction

The purpose of the manual for LCD of EnverBridge is to help users to know the function quickly and guide them to use LCD to perform how it works.

6.1.1 Function of LCD

Monitoring the system and Showing the real-time working status  
 Helping installation personnel to confirm the system operation status  
 Making the system failure checking up more convenient for the maintenance and debugging personnel

6.2 LCD 1602 interface

6.2.1 Start-up interface

The start-up logo shows on the LCD screen interface once the power of EnverBridge equipment is on and starts to work. The first line shows the company name Envertech and the second line shows the company website [www.envertec.com](http://www.envertec.com) (as shown below).





Then the **network unlocking** starts and on the screen of LCD "All MI LID clear" shows on the first line and "... "on the second line, which indicates the overall **network unlocking** process is taking place (as shown below).



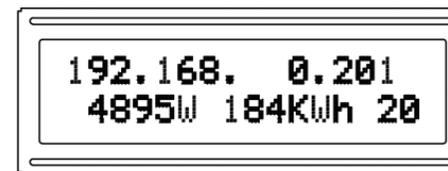
Upon the completion of the overall network **unlocking** the **network construction** between EnverBridge and MI starts. On the first line of the LCD 1602 screen "MI connecting" indicates the connection to MI has started and "x MI connected" on the second line shows how many MI units have been connected with x indicating the numbers of MI units connected.



After the completion of network construction the EnverBridge start-up process finishes and EnverBridge is in normal monitoring working status. It will take a relatively long period of time before the monitoring interface information shows up on the LCD screen. EnverBridge will **unlock** and **construct the network** again automatically if there is a failure of network construction.

### 6.3 Monitoring interface

EnverBridge gets into monitoring working status following the starting-up of EnverBridge. The monitoring information will be displayed on LCD, which includes four parts, namely, IP address, the current power, power production and the numbers of MI units (as shown below).



IP address shows on the first line of LCD screen. For example, 192.168.0.201 indicates a normal network connection and 192.160.0.254 indicates an abnormal network connection.

The figure of power efficiency which shows at the beginning of the second line indicates the real-time power efficiency. For example, 4895W.

The figure of power generation output which shows at the middle of the second line indicates the overall amount of power generation. For example, 184KWh or 100MWh. The power generation output is calculated to the accuracy of KWh. If the output rises up to MWh, the number displayed is **rounded off automatically**. (Please refer to the long distance or local server to get a detailed information.)

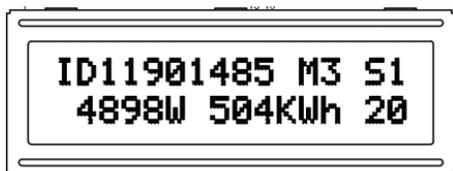
### 6.4 Making-up network construction status



20 minutes after data collection, a making-up network construction will take place in case there is any missing connection of MI. "MI connecting" which shows on the first line of LCD 1602 screen indicates the connection to MI is taking place and "x MI connected" on the second line indicates how many MI units have been connected with x referring to the numbers of MI units connected.

6.5 Fault display

If there is a system malfunction, FAILURE shows on the displaying interface. The ID number(s) of failed MI can be seen on the first line of the interface with the information of failure following it. Please refer to 2.5 to get a detailed explanation of failure. What shows on the second line of LCD interface is the same as the monitoring interface of LCD.



categories	failure identification symbols	Explanation of failure
M	0	failure-free
M	1	the original boundary malfunction
M	2	inverter failure
M	3	ailure caused by over voltage or under voltage of power grid
M	4	failure caused by over frequency or under frequency of power grid
M	5	inner communication failure
M	6	other failures
M	0	malfunction-free
S	1	malfunction caused by over voltage or under voltage of power grid
S	2	malfunction caused by over frequency or under frequency of power grid
S	3	phase-locked failure
S	4	other failures

6.5 Application

The monitoring status can be seen by users through LCD screen. The installation is completed once the monitoring interface shows up on LCD screen. According to what shows on the LCD screen, the maintenance personnel can see where the problem comes from when they are fixing the equipment.

- 1.If the LCD screen stays at the interface of **unlocking** and **constructing network**,it means the network construction fails. Then MI should be checked to make sure it is connected properly and the MI power is on.
- 2.If it shows on LCD screen for a long time that the the number of MI units is less than that of MI units connected to EnverBridge, it's time to check whether there is a failure on a certain MI equipment.(As to which one is not working, please get information form long-distance or local server.)
- 3.According to the displaying interface of failure, maintenance personnel can locate the failure and start the maintenance work.

7 Disconnecting a EnverBridge from the system

To ensure safe disconnection of the EnverBridge from the solar power plant, it must NOT be carried out under load conditions. Ensure the following disconnection steps are carried out in the order shown:

1. Disconnect the AC by isolating the branch via the circuit breaker.  
Or Disconnect the plug from the wall socket.
2. Disconnect the Ethernet cable.
3. Remove the EnverBridge from the system.

8 Monitoring and Troubleshooting and Maintenance

	<p>No use-serviceable parts inside, if the EnverBridge has any malfunctions, send it to authoriz ed representative or manufacturer. Never open and try to repair it by yourself</p>
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Only trained and authorized professional personnel WHO ARE FAMILIAR WITH THE REQUIREMENTS OF SAFETY is allowed to perform servicing and maintenance work.

8.1 Safety checks

Safety checks should be performed at least every 12 months by manufacturer's qualified person who has adequate training, knowledge, and practical experience to perform these checks. The data should be recorded in an equipment log. If the device is not functioning properly or fails any of tests, the device has to be repaired.



For safety check details, refer to this manual, section 3 Safety instruction and EC Directives.

8.2 Maintain periodically

Only qualified person can carry out the following works.  
During the process of using the EnverBridge, the manage person shall examine and maintain the machine regularly. The concrete operations are as follow.

1. Check the EnverPortal website to confirm if the screen in the EnverBridge is normal or not. This check should be performed at least every 6 months.
2. Check if the cables are damaged or aged. This check should be performed at least every 6 months.
3. Check for dust or debris. If there's dust and or debris on EnverBridge, clean it lightly by brush or vacuum the unit to remove dust particles, which may cause components inside overheat.



**Before cleaning the EnverBridge:**

Wear gloves and safety glasses.  
Disconnect the EnverBridge from the Grid – Isolating device.  
Clean the EnverBridge with wet cloth carefully.

<p><b>NOTE</b></p>	<p><b>NOTE</b> The NOTE symbols in this manual indicate the important product information.</p>
	<p><b>WARNING</b> Be aware that only qualified personnel should troubleshoot the PV array or the Envertech Micro-Inverter.</p>
	<p><b>WARNING</b> Never disconnect the DC wire connectors under load. Ensure that no current is flowing in the DC wires prior to disconnecting and turn off the AC breaker.</p>

8.3 Internet WEB

Introduction

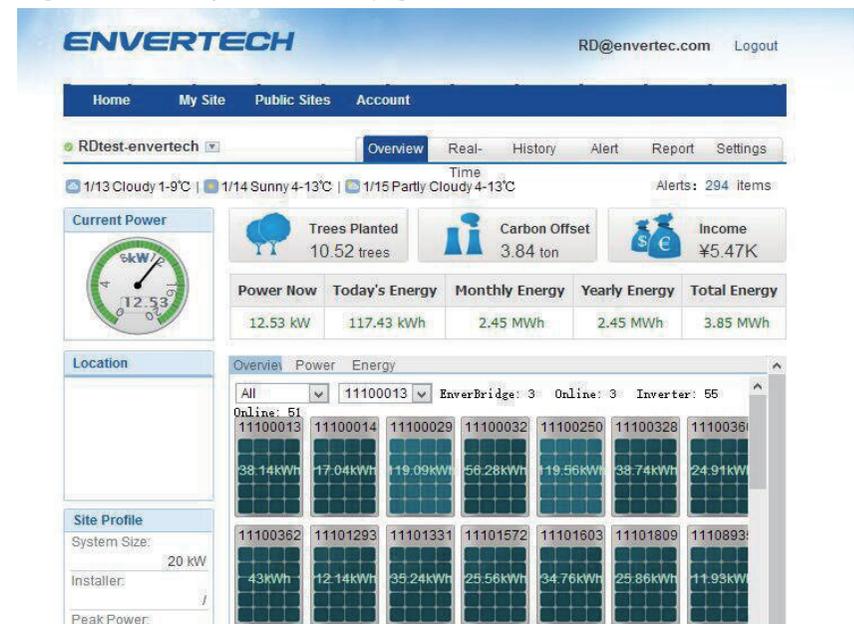
Use the monitoring website EnverPortal developed by Envertech to monitor the statistics information of the energy harvest for all Envertech micro-inverter system and monitor per-module's performance which is integrated into the Envertech micro-inverter system.

Register address : <http://www.envertecportal.com/LoginPage.aspx>



Account Registration

Register Successfully, enter into the page below :



click“settings”,and enter into the page below :

click“device”

	Datalogger S/N	Datalogger Type	Inverter S/N	Inverter Type	Status	Last Updated
1			11100013	Envertech	●	2016-01-13 09:41:54
2			11100014	Envertech	●	2016-01-13 09:41:54
3			11100029	Envertech	●	2016-01-13 09:41:54
4			11100032	Envertech	●	2016-01-13 09:41:54
5			11100250	Envertech	●	2016-01-13 09:41:54
6			11100328	Envertech	●	2016-01-13 09:41:54

At the last part of the page, click“add”,fill the EnverBridge serial Number in the blank space,for example:“90000001”,click “OK”and finish the registration.

## 9.Contact

### Zhejiang Envertech Corporation Ltd.

Tel: +86 579 8926 6326

Email: info@envertec.com

Add:24th Floor, Jintong Mansion, Center of Headquarters, Yongkang City, Zhejiang Province, China

