NEP RSD System Installation Quick Guide

"Quick Guide" for NEP RSD MLPE devices to assist installers during installation.
Prerequisites include; NEP site design review, Formal online field installer personnel training

For NEP NEPTUNE inverter implementations see inverter product manual and connect with NEP product team.

Rev. 3/20/25

Summary of Steps

Part 1 – Hardware

1. Mount PVG
2. Collect, Build S/N Sticker Map
3. Connect PVG to PV Modules
4. Mount Gateway Hardware
5. Connect Homeruns
6. Test String Voltages
7. Turn System On
8. Test System Voltages/RSD On/Off

Part 2 – Gateway, Data, Connectivity

9. Connect to Internet
10. Scan Barcodes
11. Pair PVGs and transmitters
12. Create Account
13. Build New NEPViewer Site
14. Commissioning and Mapping

Welcome to NEP!
If any questions, call NEP Hotline for Technical Support: **888-598-9901**

Procedures

- **T0-7**
  - ✓ Internet is ready
  - ✓ Gateway and PVG transmitter are powered on
  - ✓ Installation has passed preliminary test (string voltage) and PVs are connected
  - ✓ Provide NEP a map of PVG barcodes, transmitter box photos
  - ✓ Input all PVG barcodes into gateways and pair PVG transmitters with PVGs (from remote through internet)*
  - ✓ Generate a preliminary communication report before T0*

* NEP can provide these services with a small fee

Procedures

- **T0**
  - ✓ Installers get on roof and troubleshoot
  - ✓ Installers can check/recheck real time troubleshoot result through **NEPViewer**
  - ✓ <mark>NEP provides real time consultation if needed</mark>

- **Post commissioning**
  - ✓ If inverter/string output is abnormal, maintenance team can check individual PVG/PV module trough NEPViewer remote monitoring
  - ✓ Individual PVG can be checked through **PVG-S** scanner on site
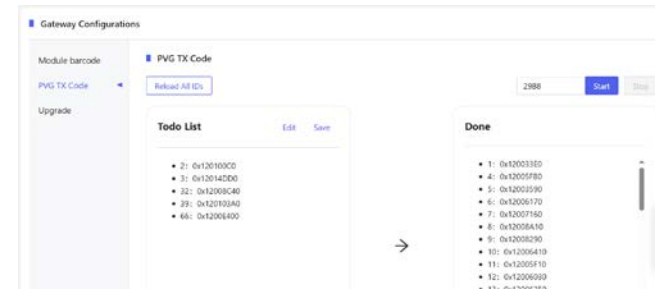 - ✓ <mark>NEP provides real time consultation if needed</mark>

Tools for Troubleshooting
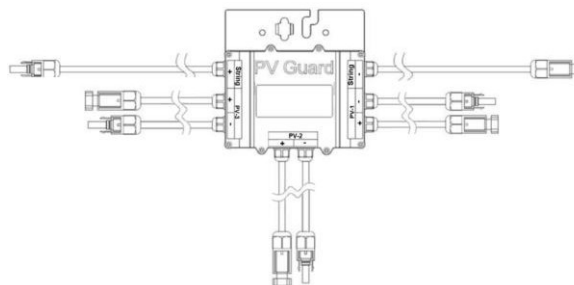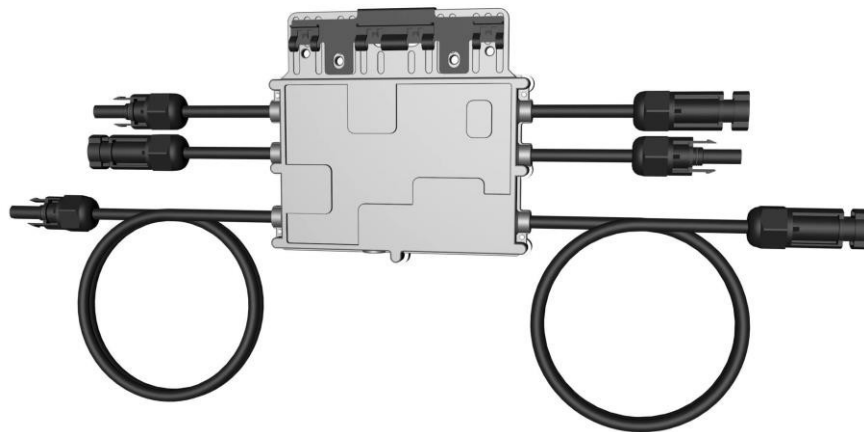

PVG-S: scan/pair individual PVG

PVG-T: check individual string

NEPViewer: remote check/scan for whole site

Part 1 | Hardware

Example shown: PVG-2 15Amp and 20Amp, PVG-3-20Amp

1: Mount PVG

Option 1: Frame Mount

- Carefully remove PVG from packaging. DO NOT pull on MC4 head leads by hand, carefully cut the zip ties without damaging wiring (do not pull wires)

- Attach module frame mount to PVG Mounting Bracket

- Friction fit the frame mount to the rear of the module frame

- A minimum 0.5 inch MUST be kept between any portion of PVG to the backside of a PV panel, and label must face AWAY from module.

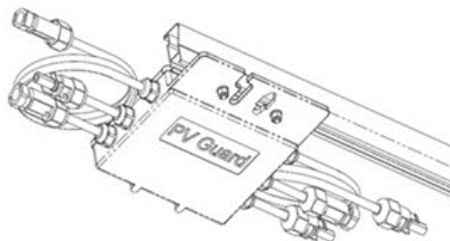Attach clip
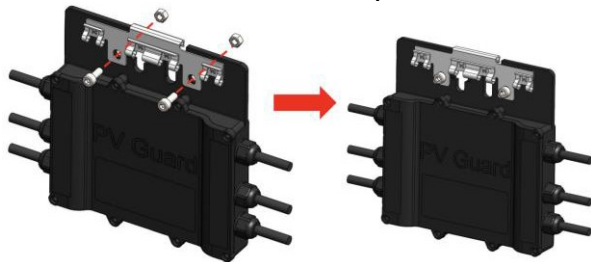
Press onto PV frame
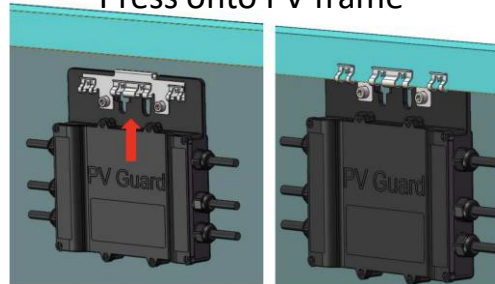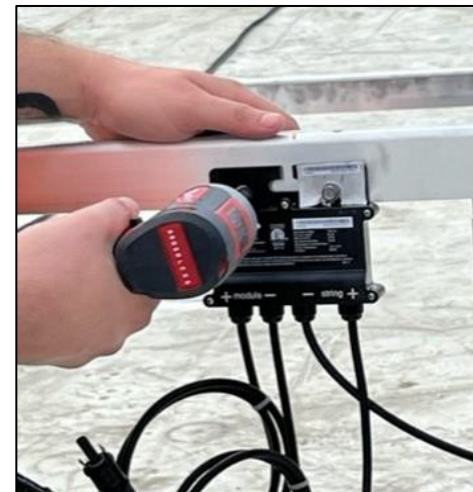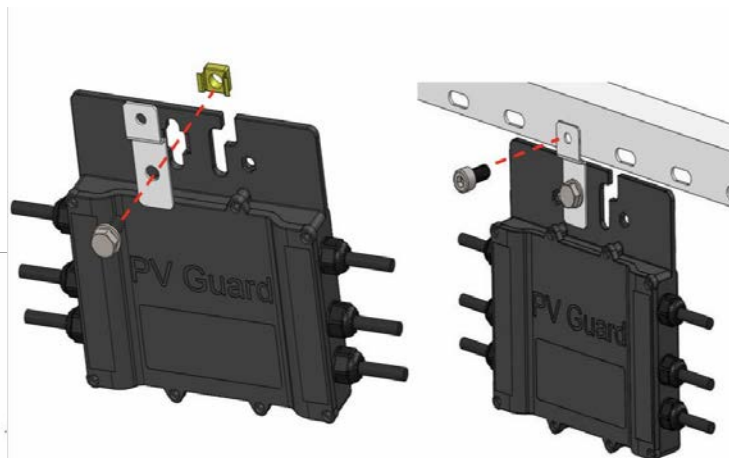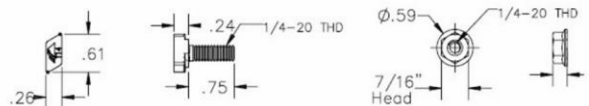
Ensure air gap

1: Mount PVG

Option 2: Rack Mount

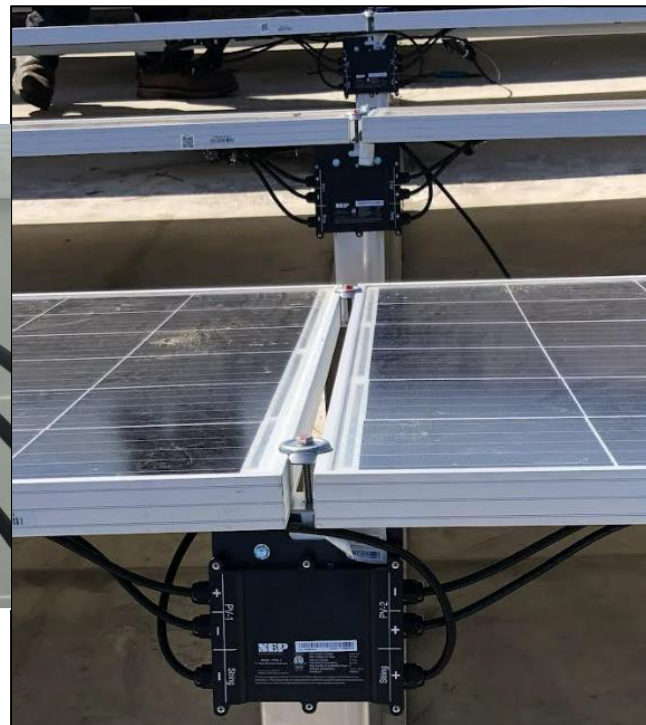- Mount PVG to rail using standard rail mounting hardware available from the racking supplier

1: Mount PVG

Mounting Examples

2: Collect and Build S/N Sticker Map

- Create a s/n sticker map showing each PV Sting and the PVG devices on each string.
- Identify the transmitter code, note on s/n sticker map (eg. "5DCA")
- This practice ensures accurate mapping of the system during the commissioning step.

https://northernep.com/products/rapid-shutdown-solutions/

Serial number stickers for each PVG unit

Template from NEP Website

3: Connect PVG to Modules

- PVG's PV-lead pairs must be connected to PV modules <u>before</u> connecting homerun cables between RSD device
- CAUTION – incorrectly connecting the home run and PV wires WILL damage the unit
- When there is an odd number of modules in a string, there must be a module connected to "PV-1" and any other inputs must be shorted to itself as shown below left.
- While plugging or unplugging PVGs in a system, the inverter must be turned off (no current flow in the string)

Unused port shall be shorted

PV-1 port must be connected to a PV panel to power the unit
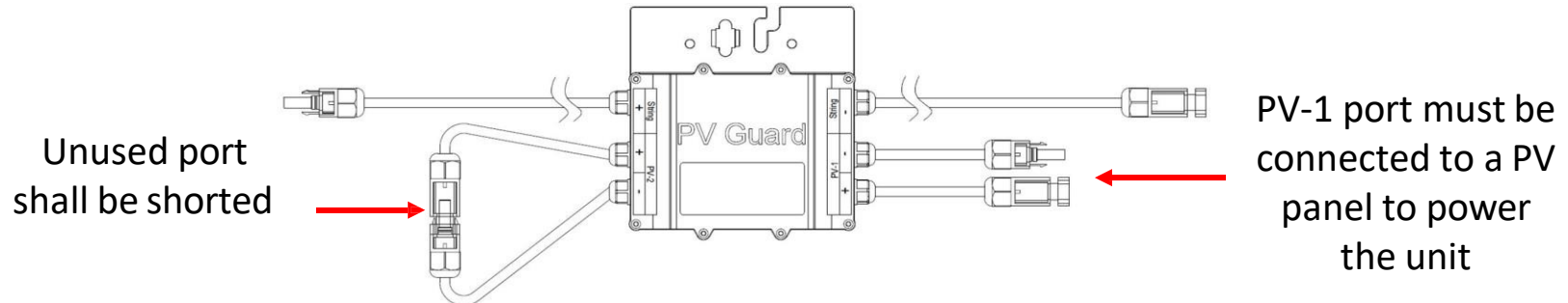
4: Mount Gateway and Extra Hardware

Option 1: PVG-O

- Enclosure must be mounted within 10' of the string inverter, and each string inverter must have its own dedicated PVG-O or PVG-M.

- Consider input voltage range (208Vac to 277Vac) when mounting PVG-M/O on the roof or ground. Power should be supplied through "double lugging" the AC output in the string inverter wiring box or using a dedicated 2 pole breaker in the load center.

- Do not penetrate the enclosure top to avoid warranty voidance due to water intrusion.

- Some string inverters only require a 480V AC output without a neutral wire. In such cases, if the string inverter is the only power source available for PVG-M/PVG-O, installation of a step-down transformer (NEP part #NC0143-US) is necessary to lower the input voltage to the Gateway.

PVG-O Gateway + Transmitter Enclosure
For Rapid Shutdown Implementation with Non-NEP Inverters
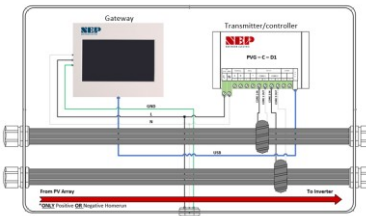
Features:
- NEP Rapid Shutdown Transmitter/Controller
- NEP Gateway installed
- Outdoor IP65 enclosure
- PLC Data communications system with two CT's
- Data collection from RSD devices (to Gateway)
- RSD activation and control via transmitters
- Two cores for more DC conductor capacity
- One PVG-O per inverter, recommended
- For C&I and Residential applications

Revision: March 1, 2024

Option 1: PVG-O

CT connections polarity is important

Option 1: PVG-O Install Examples

4: Mount Gateway and Extra Hardware
Option 2: PVG-M

**Only for CPS and Solectria when the
NEP-Transmitter is Inside the inverters**
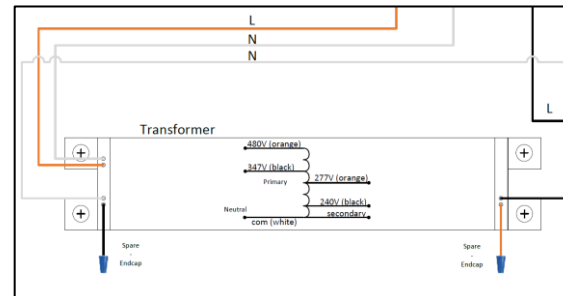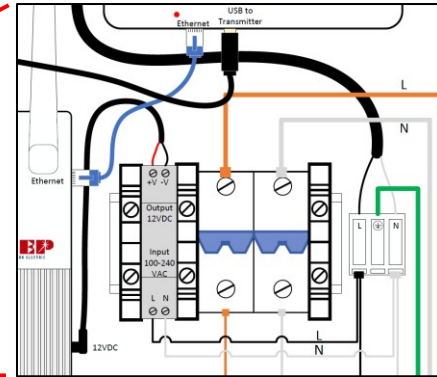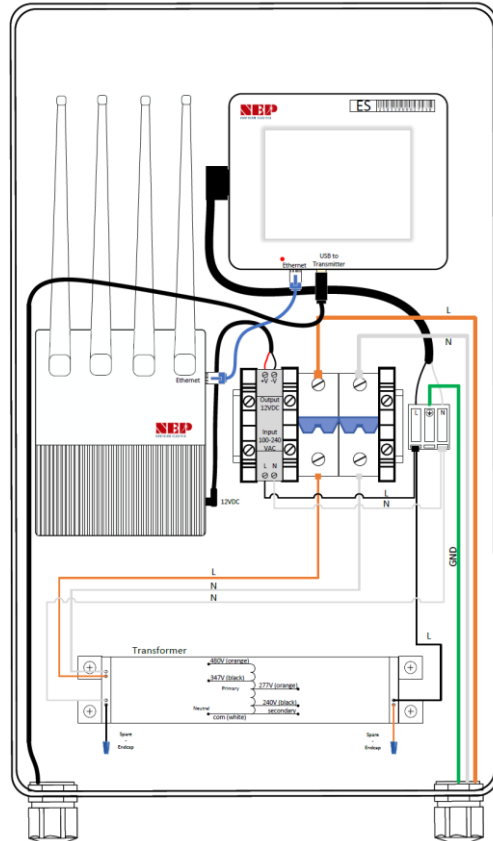
PVG-M Diagram with

Cellular Option
(if not wifi, or Ethernet)

Optional transformer
(if only 480Vac source to
Drop to 277Vac for
Gateway)

4: Mount Gateway and Extra Hardware
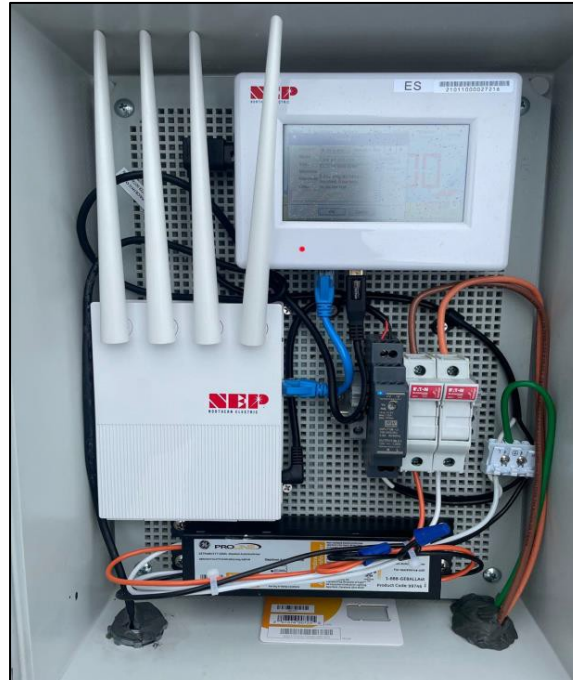
Option 2: PVG-M

PVG-M Diagram with

Cellular Option
(if not wifi, or Ethernet)

Optional transformer
(if only 480Vac source, no neutral,
to drop to 277Vac for
Gateway)

5: Connect Home Runs

- RSD's must be connected to PV modules before connecting home runs to avoid damage

  CAUTION! – RSD device damage may occur if home runs are connected prior to PV connections

- The positive and negative conductors of homeruns belonging to the same PV string shall be *in the same raceway*, ideally within a twisted pair configuration in cable tray

  CAUTION! – Shall comply with NEC 690.31(B)

- Ensure little-to-no tension at the terminals of the PVGs and the PV modules. Implement 2" radius bends

PVG and PVG controllers use advanced signaling to eliminate cross-talk interference between adjacent systems. Separate raceways add an extra layer of signal protection, but does not affect NEP crosstalk mitigation.
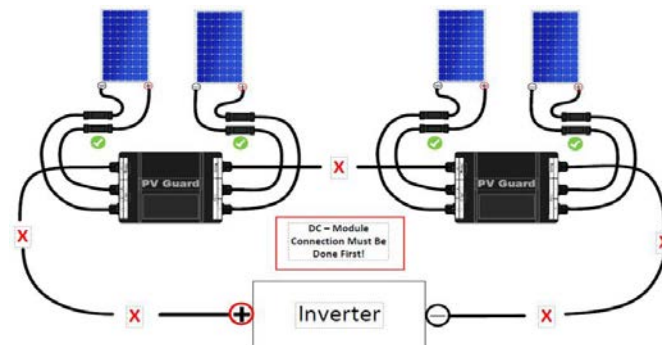
6: Test String Voltages

- Plug string to test into String + and -
- Push button in
- Test Voltage across Test Port + and -
- Turn on PVG-T with red rocker switch (green LED Blinks)
- Voltage should not change
- Turn Button clockwise to pop it out (Red LED blinks)
- Voltage should increase as string activates
- Push in button
- String should drop to safety voltage within
- 30 seconds
- Turn off tester
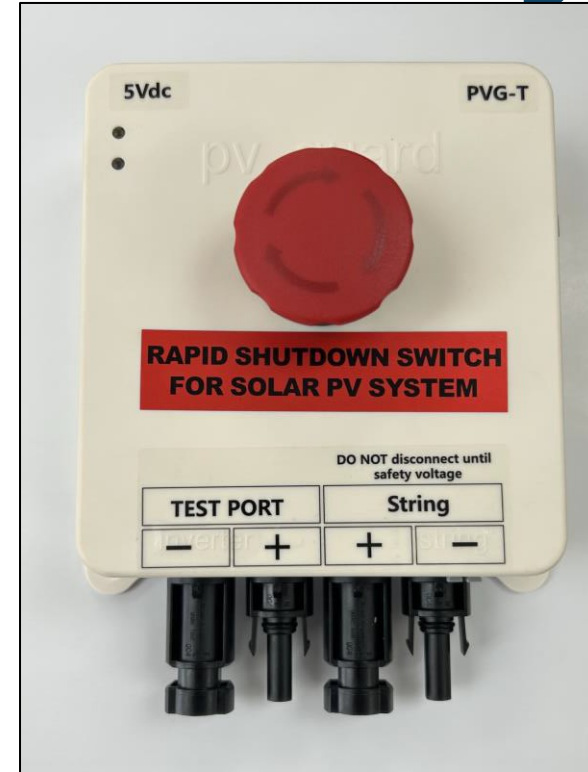
7: Turn on System

- After all strings of the site have been tested inverters may be turned on

- String current should be checked to confirm correct operation after commissioning

- RSD's must be "ON" in order to test string voltages, and the correct operation of the Inverters

- Configure PVG Tx code through BDG-256 gateway
  - ➢ It can be done on site through local IP on BDG-256 gateway
  - ➢ It can be done remotely if the BDG-256 gateway is connected to internet and registered on NEPViewer

Configure PVG Tx Code

Not secure 192.168.0.141/pvgtxcode/

Administrator   Lenovo Recommen...   Favorites   Technical Informatio...   nepviewer.net:5000/...   http--nepviewer.co...   Heart Sounds: Over...   nepviewer
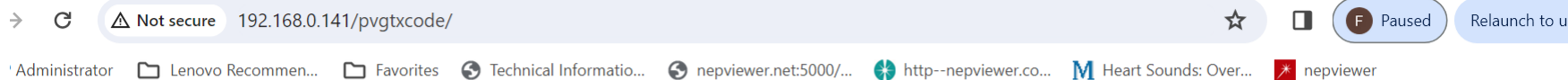
Reload All IDs

4-digit PVG Tx code on PVG-C-D1 transmitter ➔   1234   Start   Stop

Todo List

- 2: 0x111EA950
- 3: 0x111EA3A0
- 4: 0x111E8EF0
- 5: 0x111B26A0
- 6: 0x111EAC20
- 7: 0x111AE270
- 8: 0x111E68E0
- 9: 0x111E90D0

➔

Completed

Done

No data

8: Test voltages/RSD on/off For entire system

- Test each string one by one at the inverter. This may be done while the RSD's are connected

- Since PVG's are activated, string voltage should be: (Voc of PV module * # of panels in the string)

- If voltage is reading low, check connections with rapid shutdown devices

Part 2 | Gateway, Data, and Connectivity

www.northernep.com
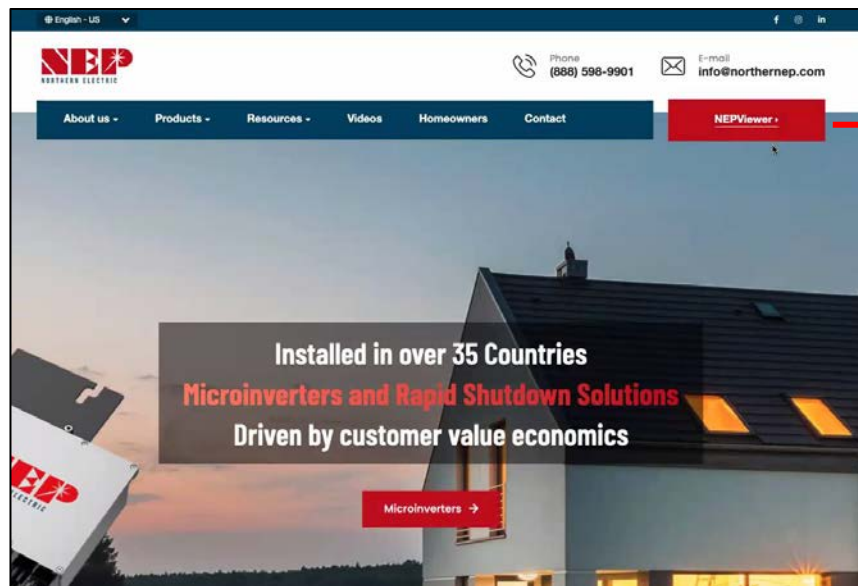
"NEPViewer"
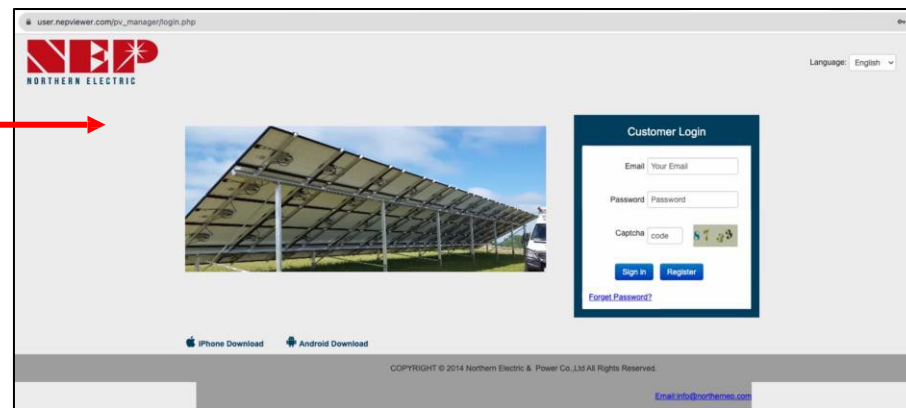
9: Connect to Internet

Plug in Booster near router, and connect an ethernet cable between them.

Connect an ethernet cable between your router and the bottom of the BDG-256

Optional cellular is pre-configured out of the box.
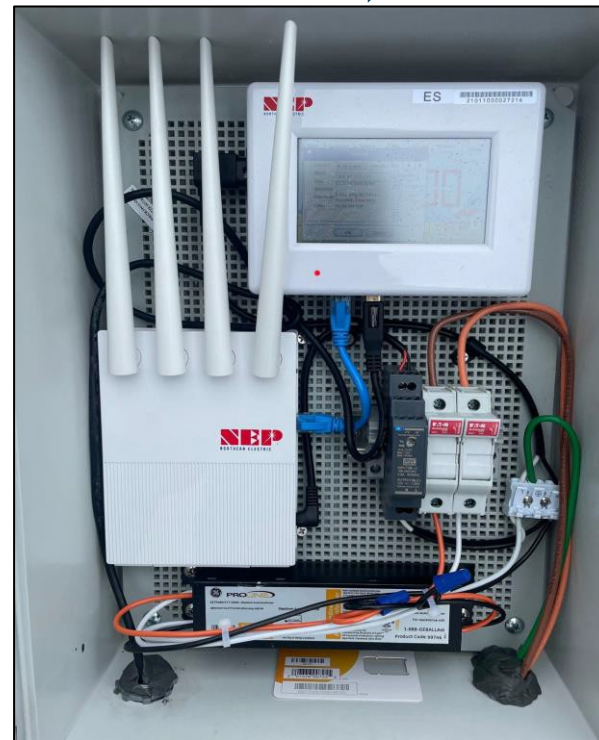
9: Connect to Internet (3 methods)

3 Methods – see details in following pages

Connection via Ethernet – hard wire ethernet connection directly to bottom of NEP gateway

Connection via Wifi – primary method is via the NEP wifi booster

Connection via Cellular – optional, preconfigured cellular modem from NEP

9: Connect to Internet (methods)

Connection via Ethernet

- Make sure that the TP Dongle device is removed from the bottom of the Gateway

- Plug The ethernet cord in the bottom of the gateway and the other end into the Router

9: Connect to Internet (methods)

Connection via Wifi Booster

1. To pair the Wi-Fi Booster to the gateway both devices need to be plugged into the same outlet or within a few feet of each other.

2. The gateway must have a TP dongle (USB) installed on the bottom of the gateway unit.

3. In Settings on the gateway, go to **System Config** – Select "**Engineer Mode**" and type the following password in "1234"

4. Then click the **Ethernet tab** and select "WPS". The screen should have a pop-up that says "**looking to connect**"

5. Go to the Wi-Fi booster and click the white button on the bottom of the unit. Button is located next to the ethernet port (click and release)

6. Within two minutes the gateway should say Connected.

7. Before disconnecting click "**okay**" to start a **reboot** and save the changes that were just made.

(MAKE SURE TO NOT UNPLUG THE BOOSTER UNTIL THE GATEWAY TURNS BACK ON)

8. After the reboot is finished, unplug the booster and plug it in to the outlet next to the router.

9. Once the Wi-Fi Booster is plugged into an outlet near the router, connect an ethernet cord from the Wi-Fi Booster into the Router.

10. Make sure all 3 blue lights are showing on the Wi-Fi Booster.

11. Go to the Gateway and click **Settings** then select **Network Test**. Run the network Test to make sure the devices have communication to each other. Should say "**Good**" after the test is run.

12. Then scroll to the left of the screen and make sure the time is synced to the internet's date/time.

9: Connect to Internet (methods)

Connection via Wifi (With NO Booster, AP Mode)

You MUST HAVE an Apple device such as an iPad, MacBook, or iPhone

1. In Settings go to System Config – Select "**Engineer Mode**" and type the following password in "1234"

2. Next go to "**Settings**" then click "**Ethernet**", then select "**AP mode**". You will then get a pop-up asking "Do you want to restart now?" Choose "OK".

3. Go to "Settings", "Ethernet", and check to make sure "AP mode" is now RED.

4. On the mobile device, go to "Settings", "Wi-Fi", and connect to "**NEP NETWORK**." Enter the following password- "12345678".

5. Launch Safari on your phone and enter the IP address "**192.168.99.1/wifi**" then click "go".

6. The loaded website will say "**Wireless Network Setup**."

7. Click **PASSWORD** and type in the following "gateway" then press "NEXT."

8. On the line that says **Wireless Network Setup-WLAN Settings <SSID>** :Click on the pull-down menu, select the customer's Wi-Fi network name

9. Make sure the security type is "**WPA-WPA2**" and enter the Customer's Wi-Fi password then click "Save".

10. Go back to the gateway, and "**AP mode**" should still be RED. Click on AP mode again, then click "OK" for a reboot.

11. Once the gateway turns back on go back to **Settings** and select **Network Test**. Run the network Test to make sure the connection is good.

12. Then scroll to the left of the screen and make sure the **time** is synced to the internet's date/time.

9: Connect to Internet (methods)

Connection via Cellular

- Optional, pre-configured NEP cellular modem

10: Scanning Barcodes

Ensure gateway is in RSD mode, not Microinverter mode in "settings"

- To use the scanner, plug it into the gateway's USB port and

- navigate to the COM ID screen in the setting menu.

- Scan the barcode of the desired module into the Inverter1 cell, and repeat until all serial numbers have been input.

- Make sure to note which module corresponds to each serial number for easier identification later on.

- Once all serials have been input, the gateway will prompt for a reboot.

northernep.com

Ensure gateway is in RSD mode, not Microinverter mode in "settings"

- Barcode can also be input through NEPViewer webpage from remote

11: Create Account

From NEP homepage www.nothernep.com, NEPViewer link
Using Internet connected PC is recommended

- If you are new to using NEP products, please visit our registration page at https://user.nepviewer.com/pv_manager/register.php?lang=en to create an account for yourself or your company.

- If consumer access needed, send the client to the same site and create an account as well.

- If installer, contact NEP Tech Support to activate installer features on portal. Call; 888-598-9901

Register New User

Please fill in the following information.

Email

Password

Confirm Password

Street

City

Country
select

State / Province
select

Zip Code

Contact Person

Contact Number

Save

12: Build New NEPViewer Site
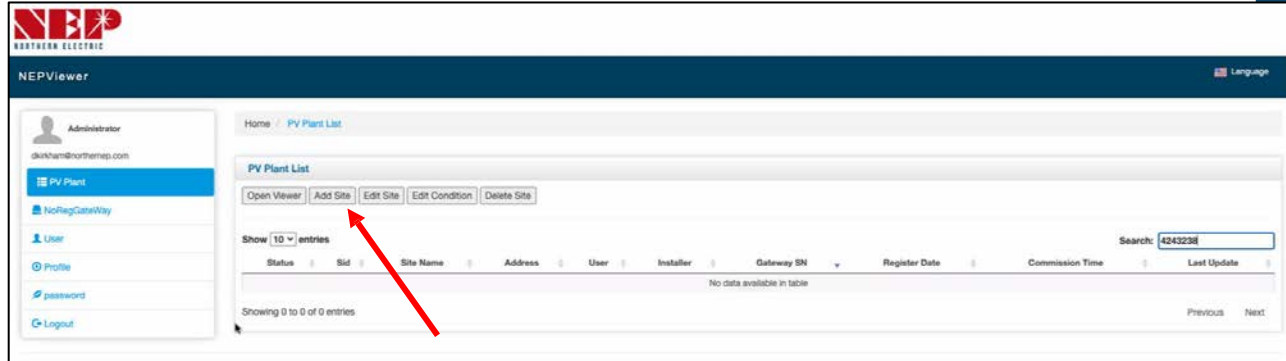
- Access your installer account on the NEP website using your registered email and log in to your account.

- Click on the "Add Site" button to create a new site.

- Fill out all the necessary fields in the site creator, including the serial number of the gateway, which can be found on the top-left of the gateway bezel or by navigating to Menu > Software on the gateway.

- If you have multiple gateway serial numbers, click the "Add" button above the serial number field to add more.

12: Build New NEPViewer Site

Step 1 / 3

* **User Email**

CustomerEmail@gmail.com

* **Installer Email**

SolarInstaller@gmail.com

* **Country_Name**

United States

* **State / Province**

Utah

* **City**

City of Install

* **Street**

Street of Install

* **SN/Address**
  ○ Gateway ○ BDM-WiFi

* **Gateway S/N** [Add] [Remove]

21011-000513278

00000-000000000

11111-111111111

[Next]

Client/user email

Company installer, shared email address within company, generally not an individual email address.

Company location, usually the installer company.

Project installation location.

Add all gateway S/N for this site.
3 placeholder examples are shown.

12: Build New NEPViewer Site

Step 2 / 3

* Name of Your Plant

WALLMART MAIN STREET

* Latitude

N   39.3209801

* Longitude

W   111.0937311

* Timezone

(GMT-06:00) America, Denver

Preview   Next

Name the plant for unique listing in portal.

Coordinates populate automatically.

Plant location time-zone populates automatically.

12: Build New NEPViewer Site

- Provide a name for the site and enter its accurate coordinates to receive precise weather data on the following page

- If multiple sites with the same company, it is recommended to name them "CompanyName_xxx" to keep the sites organized

- On the last page of the site creator, provide any additional additional information about the site that you wise to add such as currency and module manufacturer

- If more users are needed to view the site, add their account email in the "other viewer" field

12: Build New NEPViewer Site

Step 3 / 3

Temperature Unit
Fahrenheit

Power of Plant (kW)
100

Currency Unit
USD | .05 | /1 kWh

Module Manufacture & Type
ZNSHINE 400

Location
SYSTEM LOCATION

Upload Image of Your Plant
solcius
Change | Remove

Other Viewer
user@gmail.com
user2@yahoo.com

Preview | Create

Select and add plant parameters.

Identify module.

System city location.

Add image.
As preferred on portal.
Plant photo or logo.

Add other 'viewer' email accounts.
For sharing data by not admin rights.

user.nepviewer.com says
create success
OK

Temperature Unit
Fahrenheit

Power of Plant (kW)
100

Currency Unit
USD | .05 | /1 kWh

Module Manufacture & Type
ZNSHINE 400

After press 'create'
See 'success' pop-up'

Be sure to enable pop-ups.

13: Commissioning and Mapping

- Click on the site to access its information and then click on "Open Viewer." The site's production data should now be visible on the first page. Data population may take up to a few hours for the gateway and inverters to fully register with the website.
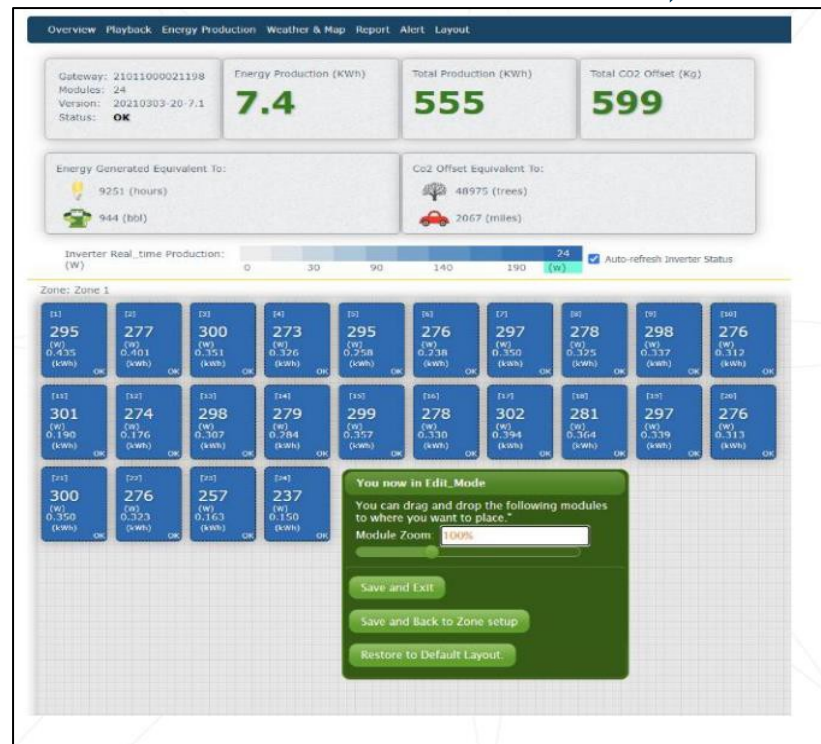
- To access the module view, click on the dial. Here, you should see each microinverter listed. If you cannot see them, verify that the microinverters are listed on the device's ComID menu or allow more time for them to register.
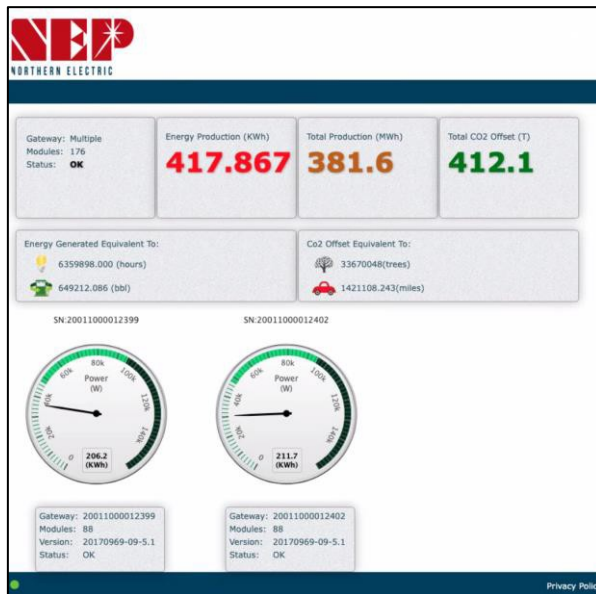
13: Commissioning and Mapping

- Verify all modules are reporting and operating normally

- You can customize and map the site layout by navigating to Layout > Manage Layout.

- From here, you can drag modules as needed and change their orientation.

- You can also add different zones for various roofs or sections of the same roof from the Layout tab.

- NEP Hotline for Technical Support: **888-598-9901**

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