

# IV Curve Measurement for PVG Systems

Application Note: PVGIV-20200619  
Version: 4.0

**WARNING:**

PVG is a device with memory. If the last state of a PVG is unknown, please test and confirm it is at OFF state before wiring. ON state PVGs may result in high voltage on the PV strings.

While plugging or unplugging PV connections in a system, inverter should be fully disconnected or deactivated and there should be no current on PV cables.

## 1 Executive Summary

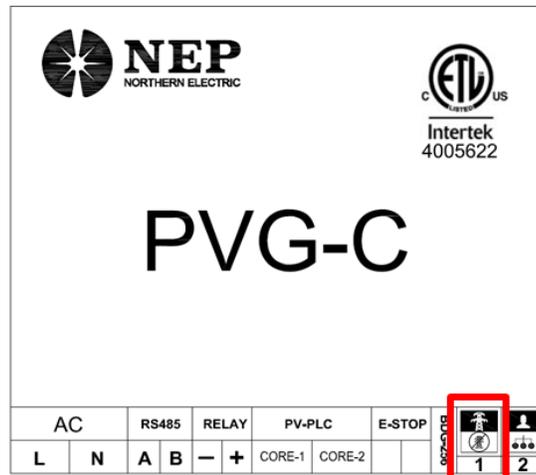
After installing a PV system with string inverters, it is important to measure IV curves of each string and verify all PV panels function correctly. With RSD installed, all RSDs on the string need to be at ON stage so that the PV panel outputs can be measured. This conventional PV string test thus becomes challenging if an RSD controller has to be inside the loop and powered on in order to turn on the RSDs (such as SunSpec).

Taking advantage of built-in memory function of NEP PVG, the IV curve measurement can be done easily with NEP PVG systems. This application note describes the simple steps of measuring IV curves for a PV system with NEP PVGs.

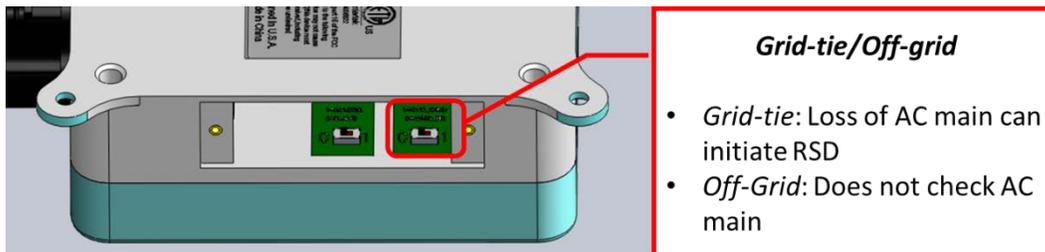
## 2 IV Curve Testing with PVG-C and PVG-C-D1 Controller

### 2.1 Step-1: configure the PVG controller to the OFF-GRID mode

#### 2.1.1 PVG-C-D1



#### 2.1.2 PVG-C



### 2.2 Step-2: Power on the PVG controller

At step-2, string voltages can be measured and make sure all PVGs have been turned on. After determining all the PVGs have been turned on, the PVG controller can be powered off or removed from the string.

Since PVG controller and inverter are controlled by the same AC switch, inverter needs to be turned off while the AC switch is on. Please refer to the inverter manual on turning off the inverter.



**At any time, the power supply of the PVG controller shall not be unplugged while the inverter is outputting power.**

### 2.3 Step-3: Measure the IV curves

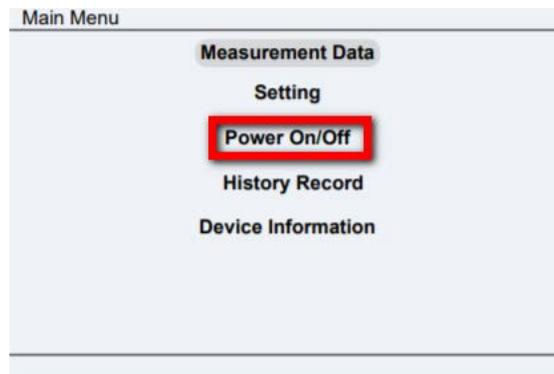
Since each PVG has a built-in memory function, it stays ON even the PVG controller is not present. Thus each string or individual panels IV curves can be measured with the PVGs connected.

**2.4 Step-4: After measurement, the PVG controller should be reset to ON-GRID mode for normal operations.**

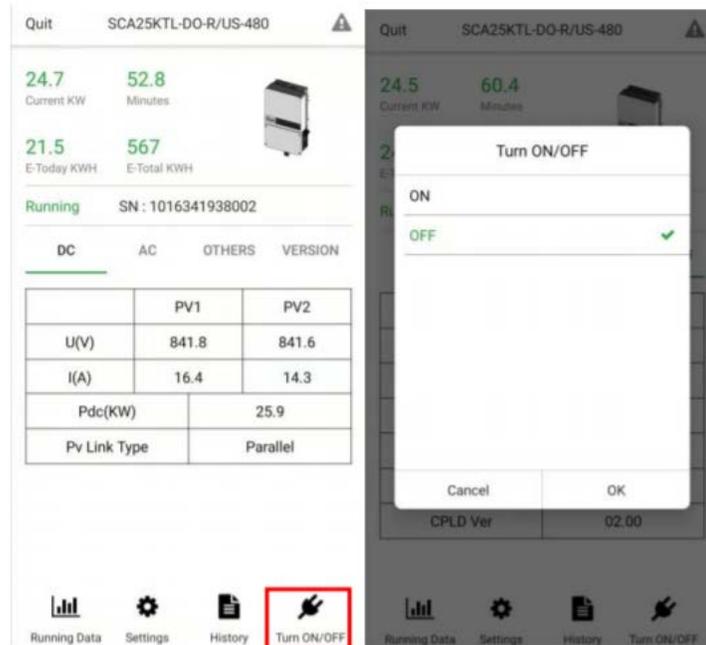
### 3 IV Curve Testing with Inverter Built-in Controller (PVG-C-D2)

**3.1 Step-1: Turn on AC Switch and DC Switch of the Inverter. Tune off inverter output power**

For CPS-50/60K, CPS-25k-208V, Solectria PVI-50/60TL, Solectria 25TL-208, this can be done on the LCD:



For CPS-25K-480V and Solectria PVG-25K-480, this can be done through a mobile device connected to the inverter



LED light on PVG-C-D2 flashes indicating it receives power. Wait for 1 minute to make sure all PVGs have received "ON" command and connect.



### 3.2 Step-2: Open the fuse on the corresponding string, run IV curve test on that string

Please refer to the IV tracer manual on interpreting IV curves generated. Since PVG is powered by the PV panel, and may disconnect when the PV panel voltage is very low, the IV curves may drop to zero (disconnect) when the string voltage is very low. This is normal, and does not affect the IV tracer to detect the critical parameters such as  $V_{mpp}$ ,  $I_{mpp}$ ,  $V_{oc}$

### 3.3 Step-3: After test, enable inverters (refer to Step-1) and close all fuses