

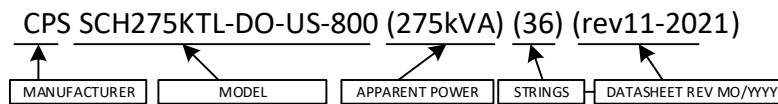


**Chint Power Systems America**  
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**Date:** 27 May 2022

**Subject:** CPS OND Files and PVSYST application

**Background:** Some CPS Inverters have different Apparent and Active Power ratings (aka KVA Overhead). This feature allows the inverter to produce rated active power within a range of fixed Power Factor settings. In addition, some project designs require the inverters to limit active power to meet the interconnect limit. Both exceptions require project level modification in PVSYST and thus allow the OND file to be used “as published” to fulfill the integrity concerns of project financiers. Multiple versions of OND files are created to accommodate the various iterations of a particular base model inverter – without modifying the OND file – maintaining “as published” integrity. The OND file name structure is defined below. The datasheet version is included for configuration management.



**OND File Selection:** It is important to select the correct OND file for the particular application of a specific Inverter. For Example: the SCH275KTL-DO-US-800 has the following variations to be selected according to the project application:

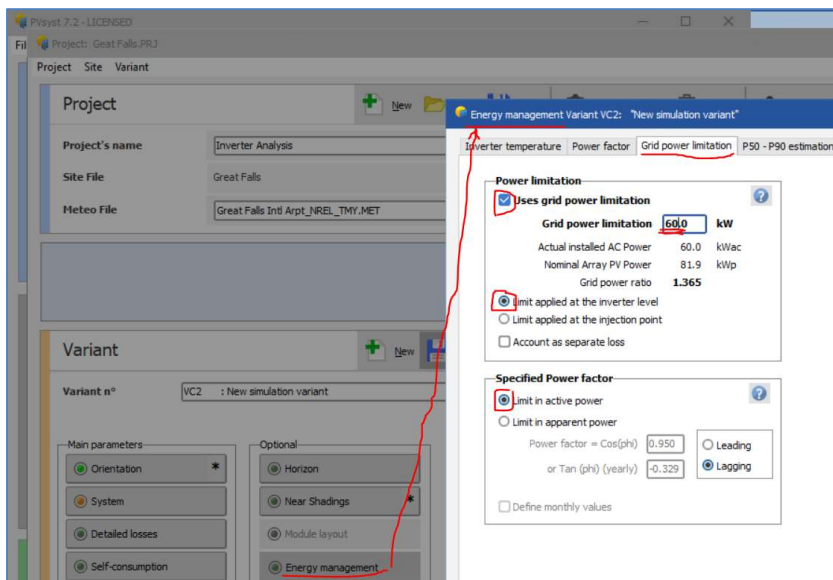
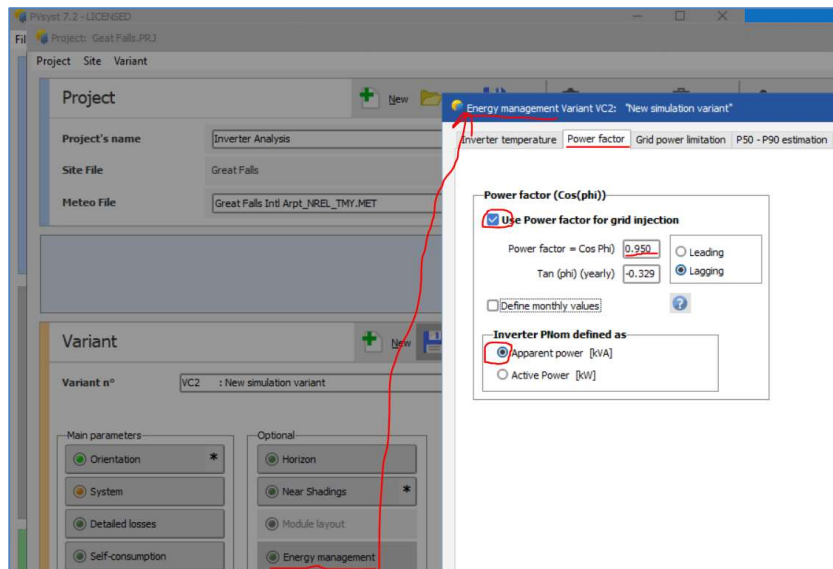
- 275kW with 275kVA and 36 String Inputs (12- MPPTs)
- 275kW with 275kVA and 24 String Inputs (12- MPPTs)
- 250kW with 275kVA and 36 String Inputs (12- MPPTs)
- 250kW with 275kVA and 24 String Inputs (12- MPPTs)

The legacy 60kW inverter has 2 variations and thus two different OND Files to be used according to the project application.

- 60kW with 60kVA
- 60kW with 66kVA

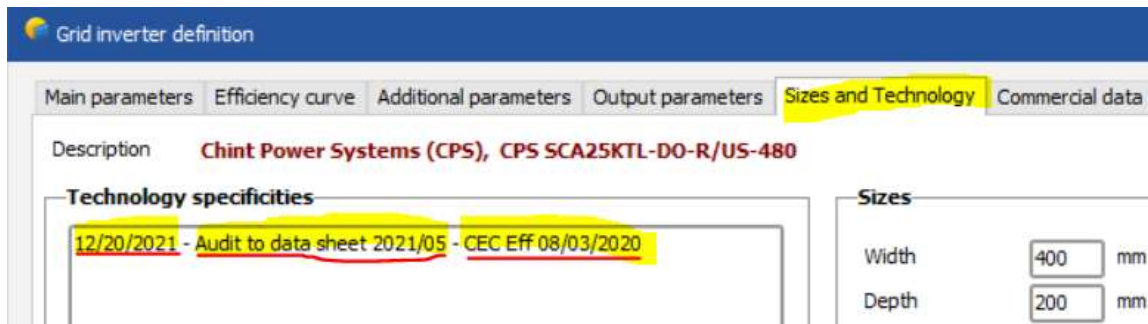
**KVA Overhead Simulation:** If a particular project has an interconnect Fixed Power Factor requirement, it is prudent to enable the KVA overhead in the inverter to maximize production – but only if allowed by the Interconnect Agreement. PVSYST simulation should be performed using the Model with the apparent power (kVA) greater than the active power (kW) to take advantage of the KVA Over Head feature. Once the proper model is selected, the “Energy Management” function is used to define the Power Factor and the Inverter limitations used in the simulation as shown below.

**NOTE:** If the inverter power is not limited the simulation will occur assuming the Active Power is limited at the same value as the Apparent Power. That will result in over production predictions.



**Configuration Management:** Under the “Sizes and Technology” tab in the Inverter model, the “Technology Specifics” dialog box contains configuration management information indicating:

- The date latest Audit was performed.
- The datasheet revision used for the audit. The datasheet version is also in the file name.
- The latest update from CEC listing data on the CEC web site. The date is the latest of either the original list date or the latest update columns.



**The 250kVA Inverter Simulation:** If using the 250kW Inverter OND File – EVEN if Power Factor is Unity – the project level output power must be limited to the number of inverters times 250kW. Otherwise, PVSYST will perform the simulation using 275kW per inverter. The figures below illustrate a configuration of 8 x 250kW Inverters.

1. The Project contains 8x 250kW inverters with 12 MPPTs per inverter (96MPPTs).
2. The “Use multi-MPPT feature” because there is no method to combine or parallel MPPTs.
3. The number of strings is the total number – not per inverter or per MPPT.
4. After the string configuration is complete. The “Energy Management” and “Grid Power Limitation” must be used to limit the active power from the 250kW/275kVA Inverter. This setting should be used to derate the active power output when required by interface agreement.
5. IN ALL CASES “Apparent Power” must be selected as illustrated below.
6. The appropriate Power Factor is entered as shown in “6” below.
7. For cases where inverters are derated to meet the interconnection active power limit, use the entry described in #4 above.

### Sub-array

**Sub-array name and Orientation**  
 Name: PV Array  
 Orient.: Fixed Tilted Plane  
 Tilt: 30°  
 Azimuth: 0°

**Pre-sizing Help**  
 No sizing  
 Enter planned power: 0.0 kWp  
 ... or available area(modules): 0 m²

**Select the PV module**  
 Available Now: [v]  
 Filter: All PV modules [v]  
 Astronergy [v] 455 Wp 35V Si-mono CHSM72M-HC-455 Since 2020 Datasheets 2020 [v] Open  
 Use optimizer  
 Sizing voltages : Vmpp (60°C) 36.3 V  
 Voc (-10°C) 54.4 V

**Select the inverter**  
 Available Now: [v] Output voltage 800 V Tri 60Hz  
 50 Hz  
 60 Hz  
 Chint Power Systems (t [v] 250 kW 500 - 1300 V TL 60 Hz CPS SCH275KTL-DO/US-800 (250kW) (36) Since 2021 [v] Open  
 Nb of MPPT inputs: 96  
 Operating voltage: 500-1300 V Inverter power used: 2000 kWac  
 Use multi-MPPT feature Input maximum voltage: 1500 V **inverter with 12 MPPT**

**Design the array**  
**Number of modules and strings**  
 Mod. in series: 27 between 14 and 27 [v]  
 Nb. strings: 192 [v]  
 Overload loss: 0.0%  
 Pnom ratio: 1.18 Show sizing [v]  
 Nb. modules: 5184 Area: 11452 m²

**Operating conditions**  
 Vmpp (60°C): 981 V  
 Vmpp (20°C): 1142 V  
 Voc (-10°C): 1469 V

Plane irradiance: 1000 W/m²  
 Impp (STC): 2106 A  
 Isc (STC): 2196 A  
 Isc (at STC): 2196 A

Max. operating power (at 1000 W/m² and 50°C): 2152 kW  
 Array nom. Power (STC): 2359 kWp

Project Site Variant

**Project**  
 Project's name: Inverter Analysis  
 Site File: Great Falls  
 Meteo File: Great Falls Intl Arpt\_NREL\_TMY.MET

**Variant**  
 Variant n°: VCO : 275kW - 310 Strings without Multiple MPPT Feature selected

Energy management Variant VCO: "275kW - 310 Strings without Multiple MPPT Feature selected"

Inverter temperature: Power factor: Grid power limitation: P50 - P90 estimation

**Power limitation**  
 Uses grid power limitation  
 Grid power limitation: 2000 kW  
 Actual installed AC Power: 2000 kWac  
 Nominal Array PV Power: 2359 kWp  
 Grid power ratio: 1.179  
 Limit applied at the inverter level  
 Limit applied at the injection point  
 Account as separate loss

The Grid Pnom Ratio (PnomPV / PLimGrid) has a low value of 1.18. The Grid limitation will probably not be effective.

Energy management Variant VC5: "S-250-N-95"

Inverter temperature Power factor Grid power limitation P50 - P90

**Power factor (Cos(phi))**

Use Power factor for grid injection

Power factor = Cos Phi)   Leading

Tan (phi) (yearly)   Lagging

Define monthly values

**Inverter PNom defined as**

Apparent power [kVA]

Active Power [kW]

5

6

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