



**Government of Nepal**  
**Ministry of Energy, Water Resources and Irrigation**  
**Alternative Energy Promotion Centre**

**NEPAL**  
**PHOTOVOLTAIC**  
**QUALITY ASSURANCE**  
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**Amendment -1**



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## 1.4 PV Inverter or Grid Connected Inverter

### 1.4.1 General Requirements

The PV Inverter or Grid connected Inverter should match voltage, frequency, phase angle and phase sequences of National Grid or Mini Grid System. The PV Inverter shall also inhouse MPPT (Maximum Power Point Tracker), an interface between Solar PV array & the Inverter. The MPPT quality standard should match with the requirements applicable to Section 1.3.3.

The Inverter generated total harmonic distortion (THD), flicker, DC injection limits, Voltage Range, Frequency Range, Power Factor Range and Anti-Islanding measures at the point of connection to the utility services should follow the latest Grid Code of Nepal Electricity Authority.

### 1.4.2 Required Documents

- i. The PV Inverter test certificates from IEC accredited laboratory must be provided according to:
  - a) IEC 61727:2004 - Photovoltaic (PV) Systems: Characteristics of Utility Interface
  - b) IEC 62116:2014 - Utility-Interconnected photovoltaic inverters - Test procedure of islanding prevention measures
  - c) IEC 62891:2020: Maximum power point tracking efficiency of grid-connected photovoltaic inverters (Voluntary)
  - d) IEC 61683:1999 (Photovoltaic systems - Power conditioners - Procedure for measuring efficiency)
  - e) IEC 61000 (International standards for Electromagnetic Compatibility-EMC)
  - f) IEC 62109-1:2010 & IEC 62109-2:2011 - Safety of power converters for use in photovoltaic power systems - Part 1: General requirements and Part 2: Particular requirements for inverters

The Inverter must be certified by Certification Body Testing Laboratory (CBTL) or Renewable Energy Testing Laboratory (RETL) or National Certification Body (NCB) or Renewable Energy Certification Body (RECB) enlisted in the IECEE website or IECRE website. The enlisted CBTL or RETL or NCB or RECB must have Scope of PV Inverter Testing.

- ii. A local importer must provide a document of agreement between the local importer and the principal inverter manufacturer, signed and stamped by authorized persons stating the warranty period and after sales services for their PV inverter.
- iii. Catalogue and technical datasheet of PV Inverter.

### 1.4.3 Technical Requirements

- i. The Inverter must have a rated AC output voltage of
  - a) Three Phase  $400 \pm 10\%$  VAC (L-L),
  - b) Single Phase  $230 \pm 10\%$  VAC (L-N)
- ii. The output frequency of the inverter must be  $50\text{Hz} \pm 2.5\%$ .