

**INVERTER APPROVAL FOR INSTALLATION IN ISRAEL****STANDARDS APPLIED FOR SAFETY EVALUATION OF INVERTERS:**

AS/NZS 3100  
*Approval and test specification – General requirements for electrical equipment*

SI 4777 Part 2 / AS/NZS 4777.2: 2005  
*Grid connection of energy system via inverters – Part 2: Inverter requirements*

SI 4777 Part 3 / AS/NZS 4777.3: 2005  
*Grid connection of energy system via inverters – Part 3: Grid protection requirements*

IEC 62109-1: 2010 / EN 62109-1: 2010  
*Safety of power converters for use in photovoltaic power systems – Part1: General requirements*

IEC/EN 62109-2: 2011 / VDE 0126-14-2:2012  
*Safety of power converters for use in photovoltaic power systems – Part2: Particular requirements for inverters*

EN 50178  
*Electronic equipment for use in power installations*

UL1741  
*Inverters, Converters, Controllers and Interconnection System equipment for Use with Distributed Energy Resources*

**OPTION 1**

The SII Test Report and the certificate issued based on the review of provided test reports and basic safety tests

**Required documentation:**

1. Full test reports according to any of the applied standards / set of standards (see the list below) issued by an accredited laboratory and the laboratory accreditations including the scope covering the applicable standards.  
**Note:** provided test reports shall include the list of critical components.
2. A sample of the inverter to be evaluated.
3. User / Installation Manual.
4. Manufacturer declaration regarding an integrated Residual Leakage Current Protection device (RCM / RCD).
5. Manufacturer declaration stating that the inverter shall be adjusted according to the Israeli requirements for grid-tied photovoltaic inverters regarding the overvoltage/undervoltage, overfrequency/underfrequency protection (see pages 4-5 of this document).

**Cost:** NIS 8,600

**Timeline:** 12-15 working days

Applicable Standards
AS / SI 4777 Parts 2, 3: 2005 + AS 3100
EN 50178
UL 1741
VDE 0126-14-2
IEC 62109-2 + IEC 62109-1: 2010

**OPTION 2**

The SII certificate issued based on the review of provided test reports

**Required documentation:**

1. Full test reports according to any of the relevant standards / set of standards and issued by any of the SII approved laboratories listed in the table below and the laboratory accreditations including the scope covering the applicable standards.

**Note:** provided test reports shall include the list of critical components.

SII Approved Testing Labs	Applicable Standards
Bureau Veritas, Germany	AS / SI 4777 Parts 2, 3: 2005 + AS 3100 EN 50178 UL 1741 VDE 0126-14-2 IEC 62109-2 + IEC 62109-1: 2010
UL	
TUV RH	
TUV SUD	
INTERTEK	
SGS Spain, Madrid	

2. Manufacturer declaration regarding an integrated Residual Leakage Current Protection device (RCM / RCD).
3. Manufacturer declaration stating that the inverter shall be adjusted according to the Israeli requirements for grid-tied photovoltaic inverters regarding the overvoltage/undervoltage, overfrequency/underfrequency protection (see pages 4-5 of this document).
4. No sample is required.

Cost: NIS 2,500

Timeline: 3-5 working days



State Of Israel  
Ministry of National Infrastructure, Energy and Water Resources  
Electricity Administration

14 Sivan, 5773  
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**Guidelines for Importers, Installers and Owners of Electricity Generating Systems Using Photo-Voltaic Technology, Regarding Adjustment of Photo-Voltaic Inverters**

In an effort to ensure the reliability and resiliency of the national electric grid, the following guidelines are required for the adjustment of Photo-Voltaic Inverters:

1. The system for protecting against an irregular frequency, which is present in every inverter, shall be adjusted such that it shall disconnect the inverter from the electricity grid after 0.2 seconds, in case the grid frequency at the connection point increases to above 51.5 Hertz (Hz), and it shall disconnect the inverter after a period of 1 second, in case the grid frequency falls below 47 Hz. The inverter shall operate continuously within the frequency range of 47 Hz and 51.5 Hz.
2. A photo-voltaic system with a capacity of over 50 kilowatts, and which is connected to the distribution grid, shall be capable of regulating the power generated according to the grid frequency; for this purpose it shall be equipped with a load/frequency regulator or a similar regulator, which will enable the generated power to respond to the variation of the grid frequency. The power provided to the grid, which shall be generated in accordance with the grid frequency change, shall be calculated relative to the available power output, as follows:

$$\Delta P = - \frac{P_{available}}{R} \cdot \frac{f - 50.2 Hz}{f_{base}}$$

Where:

- F – The actual grid frequency, provided it is within the range of 50.2 Hz and 51.5 Hz;  
f<sub>base</sub> – Nominal grid frequency (50 Hz);  
P<sub>available</sub> – The Photo-Voltaic generation system's available power;  
R – A regulation constant (Droop), about 3%;

$\Delta P$  – The power variation required, due to the actual change of the grid frequency:

$$\Delta P = P_{\text{generated}} - P_{\text{available}};$$

$P_{\text{generated}}$  – The power generated by the Photo-Voltaic system according to the change of the grid frequency within the 50.2 Hz to 51.5 Hz frequency range.

3. Care must be taken to ensure that the abnormal voltage protection system will disconnect the inverter from the electricity grid when the voltage at the connection point deviates from the limits in the following table (table 2 from Israeli Standard 4777 part 3).

Table 2 – Response to abnormal voltages

Voltage (at point of utility connection)	Maximum trip time*
$V < 0,5 \times V_{\text{nominal}}$	0,1 s
$50 \% \leq V < 85 \%$	2,0 s
$85 \% \leq V \leq 110 \%$	Continuous operation
$110 \% < V < 135 \%$	2,0 s
$135 \% \leq V$	0,05 s

\* Trip time refers to the time between the abnormal condition occurring and the inverter ceasing to energize the utility line. The PV system control circuits shall actually remain connected to the utility to allow sensing of utility electrical conditions for use by the "reconnect" feature.

4. Every inverter, whether imported, sold, replaced or tested, shall be marked by a document or label specifying the inverter's adjustment ranges in terms of response to voltage or frequency irregularities, including a declaration of the adjustment ranges of each inverter in accordance with these guidelines.
5. In order to ensure compliance with these guidelines, the Israeli Electric Corporation may be provided with all technical information regarding these matters upon request.

Signed: Dr. Yehuda Niv, Commissioner, Electricity Administration