

Technical Note: SolarEdge TerraMax™ Inverter Medium Voltage Transformer Connection

Introduction

Utility PV systems require a transformer in order to connect to a medium voltage (MV) power grid. This application note provides guidelines for selecting, designing, and connecting a medium voltage transformer to PV systems with SolarEdge TerraMax inverters. The transformer shall be designed per ANSI/IEEE requirements.

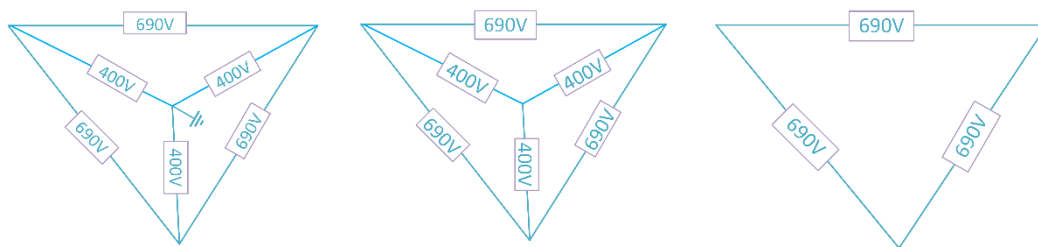


NOTE:

Transformer procurement, installation, maintenance and support are the responsibility of the installer. Damage to the inverter due to incorrect transformer installation or use of a transformer that is incompatible with the SolarEdge

Guidelines

- System design should ensure that the voltage drop from the transformer to the inverter will not be excessive, as voltage drop may result in inverter disconnection from the grid, as required by grid connection regulations. The voltage drop should also be limited in order to minimize power losses. SolarEdge recommends a voltage drop <3% of nominal AC voltage at maximum power production between the inverter and the transformer.
- The transformer's primary connection must match that of the grid at the site (voltage and topology), and its secondary connection must match the inverter being used (voltage and topology). The Inverter has output voltage of 690V line to line and does not require neutral wire. SolarEdge TerraMax Inverter can be connected to Delta, WYE grounded or WYE ungrounded transformer. A PE connection must be supplied.



SolarEdge TerraMax Inverter Supported AC Topologies

- For stable PV system operation, total AC system impedance seen by the inverter should be as small as possible. The total system impedance is the sum of the AC collection system (especially the LV cables), the MV transformer, the HV interconnect cabling, and the grid impedances:

$$Z_{\text{Total}} = Z_{\text{LV cables}} + Z_{\text{transformer}} + Z_{\text{HV cable}} + Z_{\text{grid}}$$

The total impedance can be decreased by minimizing any of these impedances. The MV transformer short circuit impedance (often marked as Uk% in the transformer datasheet).

- The transformer must be protected from overloading and short circuiting using an appropriate over-current device.
- Each inverter should be protected by a current protection device, which will protect the inverter from the transformer's fault current.
- The load curve of the transformer and the ambient conditions at the installation site must be considered when defining the required transformer thermal rating.
- Up to 13 inverters can be connected in parallel to the same LV winding of the transformer.
- SolarEdge recommends the transformer be designed with an Electrostatic Shield.