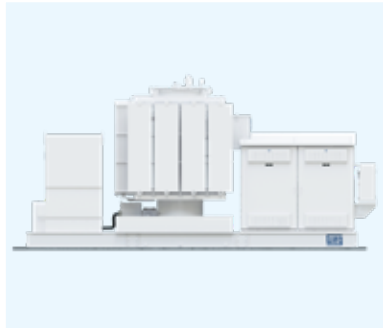


WEG Solar Transformers



Driving efficiency and sustainability



Specific characteristics in transformers for solar applications

Step-up transformers for solar energy applications are subject to very specific operating conditions when compared to transformers in the electrical system in general.

Such conditions demand a robust design that meets the minimum requirements to ensure nominal operation of transformers under different load situations.





Behavior of the inverter output power as a function of ambient temperature

Inverter power rating in numbers

Depending on the ambient temperature, the inverter has different output power levels:

- 110% output power 25 °C
- 100% output power 50 °C
- Linear power derating between 25 and 50 °C
- Significant power derating above 50 °C

Discover the most common challenges associated with transformers in solar applications and the solutions offered by WEG.

How to correctly specify a transformer for solar generation applications?

All technical requirements must be defined at the time the customer places the order.

Item	Requirement	Question	Options	Required information
1	Power with derating	Should the transformer be designed for full power or for an equivalent power with a given equivalent load?	<input type="checkbox"/> Full power	Rated power value
			<input type="checkbox"/> Equivalent power	Loading curve or power value with derating
2	Reactive power compensation	Will there be reactive power compensation during the night?	<input type="checkbox"/> Yes	Maximum level (in relation to the rated power) for reactive power compensation
			<input type="checkbox"/> No	
3	Installation environment	What is the type of transformer installation?	<input type="checkbox"/> Skid	Maximum dimensions
			<input type="checkbox"/> Outdoor installation	
			<input type="checkbox"/> Sheltered installation	Maximum dimensions Temperature inside the shelter
4	Atmosphere	Is there salinity or chemical agents in the atmosphere?	<input type="checkbox"/> Yes	What is the level to be considered?
			<input type="checkbox"/> No	
5	Shipment	Are there any dimensional limitations for shipment?	<input type="checkbox"/> Yes	Maximum dimensions for shipment
			<input type="checkbox"/> No	
		Will it be shipped assembled?	<input type="checkbox"/> Yes	Hire it commissioned?
			<input type="checkbox"/> No	
6	Transient overvoltages	What is the type of internal lines on the site?	<input type="checkbox"/> Overhead <input type="checkbox"/> Underground	
7	Current harmonics	What is the level of expected current harmonics?		Harmonic spectrum measured or provided by the inverter manufacturer up to order 150 (minimum up to order 50)
8	Voltage harmonics	What is the expected level of voltage harmonics between the LV terminals and earth?		Spectrum measured or provided by the inverter manufacturer dV/dt level
9	Continuous components	Is the negative pole of the panels grounded?	<input type="checkbox"/> Yes	
			<input type="checkbox"/> No	
10	Electrostatic shield	Is it necessary to use electrostatic shielding?	<input type="checkbox"/> Yes	
			<input type="checkbox"/> No	
11	Asset management	Is it necessary to use an online transformer monitoring solution?	<input type="checkbox"/> Yes	
			<input type="checkbox"/> No	
12	dT/dt	Is there fluctuation in power throughout the day?	<input type="checkbox"/> Yes	Phenomenon of intermittency in solar radiation
			<input type="checkbox"/> No	

Pay attention to the details!



The photovoltaic charging cycle presents abrupt variations (power fluctuation) due to the phenomenon of intermittency in solar radiation, caused by the uneven passage of clouds over the photovoltaic panels. Abrupt increases in load in a short period of time cause physical-chemical instability at the interface between conductor and oil, which in turn generates microbubbles that can result in dielectric failure.



High ambient temperatures around the transformer must be monitored and not only obtained from a monitoring center located far from the equipment. This is because the ambient temperature must also take into account the temperature radiated by the transformer itself.



High-frequency transient voltages generated on the low voltage side due to the switching of thyristors present in the inverters and the overvoltages generated on the medium voltage side due to the frequent switching of vacuum circuit breakers and capacitor banks in this type of application can result in internal resonance and dielectric failures of the transformers. Therefore, it is recommended to install protective equipment in low and medium voltage circuits, such as lightning arresters and capacitive surge suppressors.



Transformers for photovoltaic power stations can also present high current harmonics if the inverters are not designed with specific filters to minimize such currents. Harmonic currents are normally measured up to the 50th order. However, orders above 50th may present harmonic currents of considerable levels, which can cause heating in certain regions of the transformer, increasing the probability of some internal failure and reducing its service life.

WEG advantages

Fully engineered project according to the customer's technical specification requirements.

Products developed by an engineering team specifically dedicated to this transformer sector due to its particularities and requirements to solve each application, offering high-performance solutions that meet different needs.



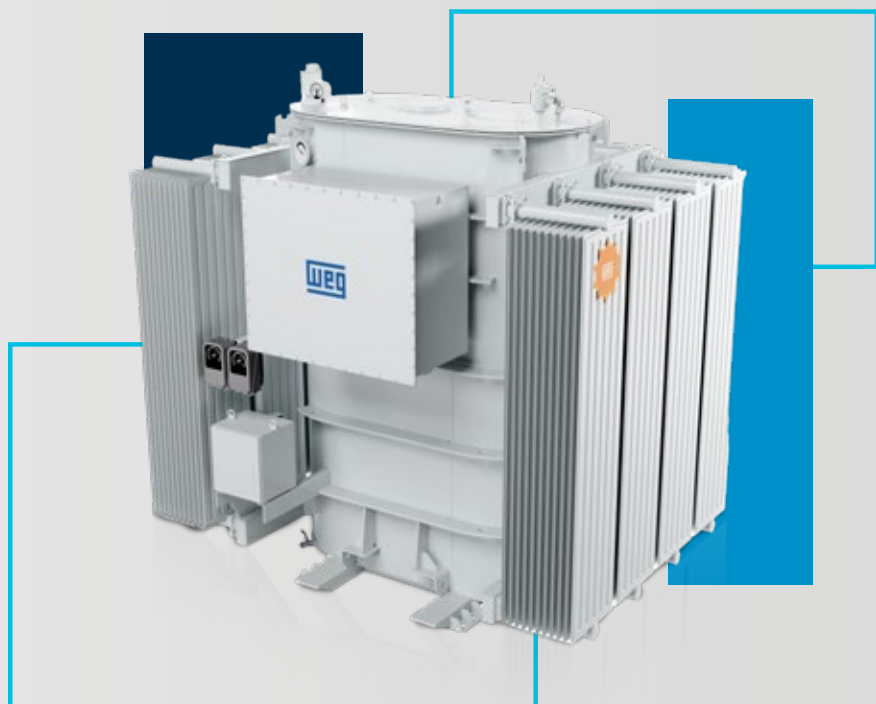
WEG is the main manufacturer of this line of transformers in Brazil

Transformer with environmentally friendly insulating fluid, with a high level of safety in relation to flammability, considering its fire point is twice as high as that of mineral oil, and because it is self-extinguishing, thus reducing both the risk of fire starting and spreading.

The verticalization of manufacturing processes (in-house manufacturing of electrical conductors, radiators, tanks, insulator kits, paints etc.) is a striking feature and an advantage of WEG, allowing broad quality control at the various stages of production, as well as flexibility in lead times.

A wide network of accredited Service Technicians is present all over Brazil, ensuring fast, local technical service and support to WEG's customers.

Ensuring a transformer meets the specific needs of a solar application is essential to the system reliability and efficiency.



The energy of the
FUTURE
starts with **reliable**
transformers today.

Driving efficiency and sustainability



Cod: 50144443 | Rev: 00 | Date (m/y): 11/2024.

The values shown are subject to change without prior notice.
The information contained is reference values.