آریاترانسفوشرق
ARYA TRANSFO SHARGH

Solar power plant transformer

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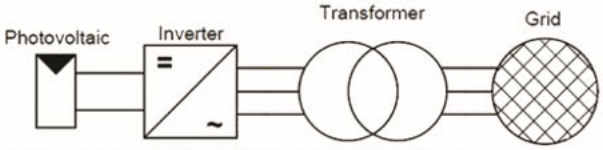
SCAN FOR VIDEO

In recent years, the growing requirement for electricity energy, the non-renewability of fossil fuels, and the rise of environmental pollution have created intensives for researchers and investors to provide electrical power from renewable, clean, and reliable sources. Regarding solar radiation potential in large areas of Iran, solar energy is one of the most reliable renewable sources for supplying electricity. Transformers are one of the significant components of a solar power plant. Solar inverters of photovoltaic systems transform DC power generated from the solar modules into AC power and feed this power into the network by transformers.



The main components of the solar power plant

These transformers are primarily used as step-up transformers but can also be used as step-down transformers. The input voltage of solar transformers has a DC component and high-order harmonics due to its connection to solar inverters.

In the design process, technical considerations should be taken into account for long-term and stable operation because of the specific application of these transformers. Some of the upcoming challenges in designing solar transformers can be introduced as follows:

- **Insulation Coordination:** Regarding the transient over-voltages caused by switching operation, insulation coordination shall be considered in the winding design of the solar transformers. In addition, a technique should be adopted to prevent the transmission of harmonic components between the primary and secondary windings.
- **Non-symmetrical load and voltage:** Malfunction of inverters connected to the transformer could create unbalanced winding loading. The unbalanced voltage and current can create excessive leakage flux, stray loss, and overheating of the winding and tank.
- **Thermal considerations:** Effects of harmonics, reactive loads, ambient temperature fluctuations, etc, should be considered in the cooling design of the solar transformers.
- **Optimal design in terms of the losses:** Due to the different operating cycles of a solar power plant during day and night, no-load and load losses should be adjusted in such a way as to achieve maximum efficiency.

Arya-Transfo Shargh Co. can meet all the requirements related to the design of solar power plant transformers with the best performance using experienced experts and advanced software programs. According to customer feedback, the Arya-Transfo Shargh Co. has introduced two standard transformers with the following specifications for the solar power plant to accelerate the process of designing, producing, and delivering. Moreover, it is possible to change these specifications based on the customer's requirements.Solar transformer manufactured by Arya Transfo Shargh Co. have been utilized in Hamedan, Yazd, Kerman, Urumieh, Mahallat, Damghan, Jovein, Bam,... solar power plants ,recently.


Hamedan Solar Power Plant

Technical Data of Standardized Solar Power Plant Transformer

Rated Power	2500 kVA (1)	Load Loss	26500 W
Rated Voltage	0.4/20 kV	No-Load Loss	3200 W
HV Tapping Range	±2×2.5%	Impedance voltage	6%
No. of Phases	3 Phases	Winding Material	Cu & Al
Rated Frequency	50 Hz	Cooling Medium	Mineral Oil
Cooling Type	ONAN	Vector Group	Dyn5

(1): At Site Condition of 45°C and 1000 m

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