

# Photovoltaic (PV) Modules – LA Series

## Positive Grounding

LORENTZ PV modules – LA series – use all-back contact solar cells for high efficiency. This technology can lead to a temporary decrease in performance if installed according to common methods without grounding or with negative grounding. This effect is due to a surface polarization effect caused by a small amount of leakage current from the module. While all modules experience some amount of leakage current, the surface polarization effect seems to be unique to thin-film and back-contact solar cells.

If the frame of the module is on a low potential compared to the cells voltage, the leakage current flows from the cells through the glass to the frame. This causes a negative effect in the cells which decreases the performance of the module.

This surface polarization effect is normally reversible by positive grounding. It usually does not cause any damage to the module. The performance of a system that has been installed according to common methods (without grounding or with negative grounding) and is suffering from decreased performance can normally be restored by wiring it as a positive-grounded system.

If an off-grid AC stand alone inverter is used and the system is positive-grounded, an isolated type must be applied. Most standards forbid using a non-isolated (trafoless) stand alone inverter in a system grounded on the DC side, as it can be dangerous. There must be a real electrical separation between DC and AC.

To avoid a negative charge on the frame and thus on the surface of the modules, the system has to be grounded on the most positive voltage in the system, which is the positive pole of a single module or the whole string. In every case, ground has to be connected to the frame of the modules.

If real grounding is not possible, at least the frame has to be connected to the most positive in the system. Basically, ground has to be connected only at one single point to the most positive voltage of the system.

Make sure to follow the local standards and codes.



**For PV generators, for which positive grounding is not possible and which have an open circuit voltage of up to 48V DC (up to 2 pieces LAXX-12S connected in series or one LAXX-24S), a positive grounding is not required. The PV modules can be grounded to minus.**

Figure 1:  
Connecting a single module

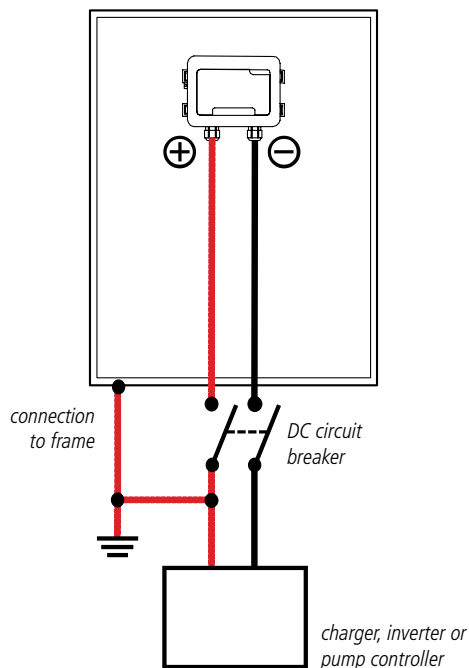


Figure 2:  
Connecting two or more modules in series

