

# Installing Enphase microinverters at higher altitudes: Considerations for optimal performance

## Overview

When installing Enphase microinverters at higher altitudes above the mean sea level, it is crucial to consider the potential impact of ambient weather changes on the operation of electrical and electronic devices.

As altitude increases, the density of air decreases. This reduction in air density directly affects the cooling capacity of the air, making heat removal through air less efficient. In most electronic devices, “air” is the electric insulating medium or dielectric. While air at sea level exhibits excellent density and dielectric strength, the thinner air at higher altitudes experiences a decline in its dielectric strength, necessitating compensation measures.

The following are the thermal considerations for higher altitude installations:

- The power devices must be derated or equipped with larger heat sinks to mitigate the effects of higher altitudes.
- Alternatively, increased forced airflow can be employed, or a combination of these approaches can be utilized to ensure proper cooling.



**NOTE:** The power supply design must consider appropriate conductor and component clearances.

The decreased air density at high altitudes reduces convective capability and heat transfer capacity. Therefore, electronic devices relying on natural or forced convection to dissipate heat encounter greater temperature rises for the same power output at high altitudes.

## Enphase microinverters: No derating at higher altitudes

All Enphase microinverters, including the IQ7s, IQ8s, IQ8P, and IQ8 Commercial Series, can be safely installed at altitudes up to 2600 m (8530 ft) without additional cooling requirement or experiencing any loss of output power and efficiency.

## Conclusion

Enphase microinverters operate safely at higher altitudes. There is no special requirement to reach out to Enphase Support before installing the inverters at higher altitudes and powering up the inverter to start production.

## Revision history

Revision	Date	Description
TEB-00072-2.0	November 2023	Editorial changes. Removed IP67 enclosure information.
TEB-00072-1.0	September 2023	Initial release.