

How IQ microinverters stand up to extreme heat

Enphase microinverters generate less heat than other inverters. And they do a better job of protecting internal parts from heat. When designing the IQ microinverters, our product engineers applied a decade of reliability lessons learned from over 17 million microinverter shipments. IQ uses proven components, and it passes all measures of Enphase’s rigorous, million-hour reliability test. IQ has also been successfully field tested on rooftops in Australia and Arizona, two of the hottest places in the world in summer.

MICRO SERIES	HOTTEST DAY and LOCATION	SERIAL NUMBER	INTERNAL MICRO TEMPERATURE in °C	DAYTIME PEAK AMBIENT in °C	TEMPERATURE DELTA in °C
	Sydney, Australia				
IQ7+	18/3/2018 @ 13:15	121751020715	61	41	20
IQ7+	18/3/2018 @ 13:20	121751020673	60	41	19
	Geelong, Australia				
IQ7+	19/1/2018 @ 11:03	121743026543	59	42.8	17
IQ7+	19/1/2018 @ 12:02	121743026545	59	42.8	17
	Melbourne, Australia				
IQ7+	19/1/2018 @ 14:05	121743026612	59	42.8	17
IQ7+	19/1/2018 @ 14:05	121743026567	59	42.8	17
	Peoria, Arizona, United States				
IQ6+	20/6/2017 @ 14:52	121708055080	70	47	23
IQ6+	20/6/2017 @ 14:47	121709001451	68	47	21

IQ microinverters generate less heat and do a better job of protecting internal parts from heat.

Would the hottest temperature on Earth stop the IQ microinverter?

IQ has a double-insulated, corrosion-resistant enclosure made of Noryl V0150B, a modified polymeric resin that meets the same performance standards as a genuine Multi Contact MC4 solar connector. It also has patented potting to conduct heat away from microinverter electronics, auto-grade parts to resist cracking under thermal cycling, and no moving parts that could generate heat inside the microinverter. Our engineers say these features help IQ perform in the most extreme heat on Earth. We decided to put IQ to the test.

Enphase checked IQ performance in our hottest locations

We looked at performance data for four IQ systems on the hottest days of the year, three in Australia and one in Arizona. The system in Arizona recorded the highest daytime peak ambient temperature of 47° C. There, internal microinverter temperature reached a high point of 70°, well below IQ’s 85° maximum operating temperature. The systems in Australia, where daytime peak temperatures never topped 43°, reached peak internal temperatures of 59-61°.

IQ internal temperature never rose more than 23° above ambient temperature

Field data shows that extreme heat does not shut down IQ microinverters. In Australia, internal microinverter temperature stayed within 17-20° of peak ambient temperature. In Arizona, the difference was 23°. IQ can withstand this much heat gain anywhere on Earth.

Half a million IQ microinverters can't be wrong

The IQ Series, including the IQ6 microinverter that ships worldwide, has been successfully deployed in some of the hottest regions on earth, including the southwestern US and Australia, where peak temperatures top 47°C, and India, where record highs have exceeded 50°C. While these conditions are uncomfortable for most of us, none of the 500,000+ IQ microinverters in the field have shut down due to extreme heat.

High ambient temperatures don't harm IQ microinverters

The 85°C maximum operating temperature is a conservative setting. In the lab, microinverters continuously withstand this level of heat. In the field, nighttime and periods of low power production bring routine relief from high heat. That's why Enphase is confident our microinverters can stand the highest heat in Arizona, Australia, India, and elsewhere.

No heat-related failures

For solar inverters that use cooling fans for internal temperature control, extreme heat introduces risks of service disruption and failure. Microinverters are different. As long as outside temperatures don't break world records for extreme heat, they will operate without fail throughout a solar energy system's lifetime.