ENPHASE

DATA SHEET

IQ8M and IQ8A Microinverters

Our newest IQ8 Microinverters are the industry's first microgrid-forming, software defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application specific integrated circuit (ASIC) which enables the microinverter to operate in grid-tied or off-grid modes. This chip is built in advanced 55nm technology with high speed digital logic and has superfast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.

Part of the Enphase Energy System, IQ8 Series Microinverters integrate with the IQ Battery, IQ Gateway, and the Enphase App monitoring and analysis software.

Enphase 25 year limited warranty

IQ8 Series Microinverters redefine reliability standards with more than one million cumulative hours of power-on testing, enabling an industry-leading limited warranty of up to 25 years.

Connect PV modules quickly and easily to IQ8 Series Microinverters using the included Q-DCC-2 adapter cable with plug-n-play MC4 connectors.

UL CERTIFIED SAFETY

IQ8 Series Microinverters are UL listed as PV Rapid Shutdown Equipment and conform with various regulations, when installed according to manufacturer's instructions.

*Only when installed with IQ System Controller 2, meets UL 1741.
**IQ8M and IQ8A support split-phase, 240V installations only.

Easy to install

- Lightweight and compact with plug-n-play connectors
- Power Line Communication (PLC) between components
- Faster installation with simple two-wire cabling

High productivity and reliability

- Produce power even when the grid is down*
- More than one million cumulative hours of testing
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

Microgrid-forming

- Complies with the latest advanced grid support**
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) and IEEE 1547:2018 (UL 1741-SB 3rd Ed.)

Note:

IQ8 Microinverters cannot be mixed together with previous generations of Enphase microinverters (IQ7 Series, IQ6 Series, etc) in the same system.

IQ8M and IQ8A Microinverters

INPUT DATA (DC)		IQ8M-72-2-US	IQ8A-72-2-US
Commonly used module pairings[1]	W	260 – 460	295 – 500
Module compatibility		54-cell / 108 half-cell, 60-cell / 120 half-cell, 66-cell / 132 half-cell and 72-cell / 144 half-cell	
MPPT voltage range	V	30 – 45	32 – 45
Operating range	V	16 – 58	
Min. / Max. start voltage	V	22 / 58	
Max. input DC voltage	V	60	
Max. continuous input DC current	A	12	
Max. input DC short-circuit current	A	25	
Max. module I_{sc}	A	20	
Overvoltage class DC port		II	
DC port backfeed current	mA	0	
PV array configuration		1 x 1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	

OUTPUT DATA (AC)		IQ8M-72-2-US	IQ8A-72-2-US
Peak output power	VA	330	366
Max. continuous output power	VA	325	349
Nominal (L-L) voltage / range[2]	V	240 / 211 – 264	
Max. continuous output current	A	1.35	1.45
Nominal frequency	Hz	60	
Extended frequency range	Hz	47 – 68	
AC short circuit fault current over 3 cycles	Arms	2	
Max. units per 20 A (L-L) branch circuit[3]		11	
Total harmonic distortion		<5%	
Overvoltage class AC port		III	
AC port backfeed current	mA	30	
Power factor setting		1.0	
Grid-tied power factor (adjustable)		0.85 leading – 0.85 lagging	
Peak efficiency	%	97.8	97.7
CEC weighted efficiency	%	97.5	97
Night-time power consumption	mW	60	

MECHANICAL DATA	
Ambient temperature range	-40°C to +60°C (-40°F to +140°F)
Relative humidity range	4% to 100% (condensing)
DC Connector type	MC4
Dimensions (H x W x D)	212 mm (8.3”) x 175 mm (6.9”) x 30.2 mm (1.2”)
Weight	1.08 kg (2.38 lbs)
Cooling	Natural convection – no fans
Approved for wet locations	Yes
Pollution degree	PD3
Enclosure	Class II double-insulated, corrosion resistant polymeric enclosure
Environ. category / UV exposure rating	NEMA Type 6 / outdoor

COMPLIANCE	
Certifications	CA Rule 21 (UL 1741-SA), UL 62109-1, IEEE 1547:2018 (UL 1741-SB 3rd Ed.), FCC Part 15 Class B, ICES-0003 Class B, CAN / CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shutdown Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer’s instructions.

(1) Pairing PV modules with wattage above the limit may result in additional clipping losses. See the compatibility calculator at https://link.enphase.com/module-compatibility. (2) Nominal voltage range can be extended beyond nominal if required by the utility.
(3) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

Competitive Analysis

	Enphase Microinverter Systems	Competition Microinverter Systems	Optimizer based String Inverter Systems	String Inverter Systems
Base Inverter Warranty	**25 Years**	10 Years[1]	12 Years[1]	5 Years[1]
Reliability[2]	**HIGHLY RELIABLE**	LESS RELIABLE	LESS RELIABLE	LESS RELIABLE
System Architecture	**AC-coupled**	AC-coupled	DC-coupled	DC-coupled
Fire Safety	**SAFE[3]**	NOT-AS-SAFE[4]	NOT-AS-SAFE[5]	NOT-AS-SAFE [6]
Communication Gateway Limited Warranty	**5 Years**	3 Years	5 Years	5 Years
No Single Point of Failure	✓	✓	✗	✗
Burst-Mode Technology[7]	✓	✗	✗	✗
DC to AC efficiency	**97%**	96%	97%[8]	97%
Maximum Power Point Tracking	✓	✓	✓	✗
Energy Optimization per Panel	✓	✓	✓	✗
Panel level Monitoring	✓	✓	✓	✗
Shading and Soiling Losses	**NIL**	NIL	NIL	HIGH
Ease of Installation	**AC-ONLY DESIGN**	AC-ONLY DESIGN	DC + AC DESIGN	DC + AC DESIGN
Modular/ Scalable	✓	✓	✗	✗
Rapid Shutdown Compliant	✓	✓[9]	✓	✗
No Moving Parts[10]	✓	✗	✗	✗
Storage Portfolio	✓	✗	✓[11]	✗
Product Rating	**IP67**	IP67	IP67 (Optimizer) NEMA3R (Inverter)	NEMA3R
System Downtime for Replacement	**NIL**	POSSIBLE[12]	YES[13]	YES
High Voltage DC Arc Mitigation	✓	✓	✓	✗
Low Voltage DC Arc Mitigation	✓	✓	✗	✗
App Store Rating of the SW Application[14]	**HIGH (4.6 / 5)**	LOW (<2.5 /5)	HIGH (> 4/ 5)	LOW (<3/ 5)
Min # of PV Modules Required	**1**	2	8	8
System Configuration	**Parallel**	Parallel	Series	Series
Weight	**LIGHT WEIGHT**	HEAVIER[15]	HEAVIER	HEAVIER
Noiseless Inverter	**YES**	RELAY INSIDE	RELAY INSIDE	RELAY & FAN INSIDE
DC Design	**NOT REQUIRED**	NOT REQUIRED	REQUIRED	REQUIRED
Module Mismatch Losses	**NIL**	NIL	YES	YES
Light Induced Degradation	**LESSER IMPACT**	LESSER IMPACT	YES	YES
Potential Induced Degradation	**LESSER IMPACT**	LESSER IMPACT	YES	YES
Thermal Dissipation Issues	**NIL**	YES	YES	NIL

1 May be extended for an additional cost
2 Assuming base inverter warranty period indicative of reliability
3 Capable of mitigating low voltage DC arc; no thermal dissipation issues
4 Thermal dissipation issues make it prone to fire hazards
5 Failure of even one Optimizer will deteriorate the safety factor of the system because the DC will leak through when the inverter is not functioning/ has failed. This invariably increases the risk of DC arc fault
6 High Voltage DC in the string. Highly susceptible to DC arc fault
7 Power generation under low light condition. No inverter wakes up as early as an Enphase microinverter and sleeps as late as an Enphase microinverter
8 DC to AC Efficiency = OE * IE, where, OE = Optimizer Efficiency = 99% (Not verified by any agency), and IE = Inverter Efficiency = 98%
9 Requires an external device. Not built-in
10 Moving parts lead to higher chances of failure (Ex: Fan, Switches, Relays, ...)
11 Do not have batteries of their own. Compatible with 3rd party DC storage solution
12 In a 1kW system, if one microinverter fails, the entire system is down. This plays a major role in case of Social Housing applications
13 When the Inverter fails, not when Optimizer fails
14 As of Jan. 29, 2020
15 Heavier microinverters add substantial stress on the mounting frames

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IQ Microinverter advantages

Enphase Energy's pioneering microinverter technology made rooftop solar more productive, reliable, smart, and safe when it was introduced 15 years ago. Today, more than 1.7 million homes across 130 countries rely on 39 million Enphase microinverters—and counting—to gain access to solar energy.

Microinverter vs. string inverter

	Enphase (Micro)	Others (String)	Why Enphase
Continuous power during a daytime outage	Yes, with IQ8	No	With IQ8, power essential appliances—lights, fans, and phones— during daytime outages, even without a home battery.
Single point of failure	No	Yes	Independently functioning microinverters remove the single point of failure resulting in a more reliable solar system.
Limited warranty	25 years	10–15 years	A longer limited warranty means a better customer experience
Rapid Shutdown compliance	No additional equipment needed	Additional equipment needed	Enphase microinverters simplify safety by including built-in Rapid Shutdown capabilities.
Module-level monitoring	Yes	No	Easily track production and quickly pinpoint issues with module-level monitoring.
Design flexibility	High	Low	Maximize rooftop space and adapt to design challenges with microinverters.
Electrical safety	Safe AC on the roof	High-voltage DC on the roof	We virtually eliminate the risk of an arc-fault fire on your roof by running only safe AC on the roof.
Modular	Yes	No	The modular microinverter design means you can quickly and easily expand your system as your needs grow.

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