



# Neostar 2S Mono-Glass Module

## 440W-460W

Second Generation  
Comprehensive Upgrade:

 **Partial Shading Optimisation**

 **Better Temperature Coefficient**

 **High Temperature Restriction**

 **Micro-crack Resistance**

 **Higher Power**

 **Lower BOS**

 **Full Black Design**



Product  
Warranty



Performance  
Warranty



reddot winner 2023



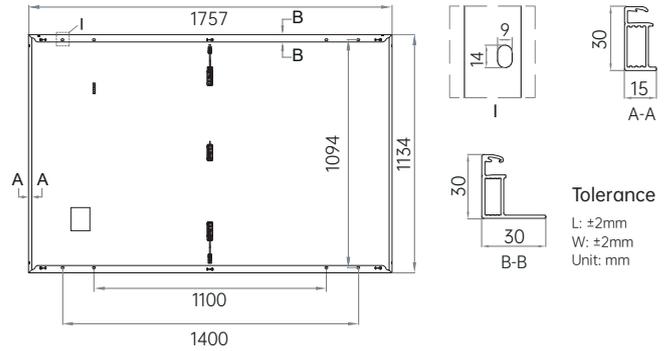
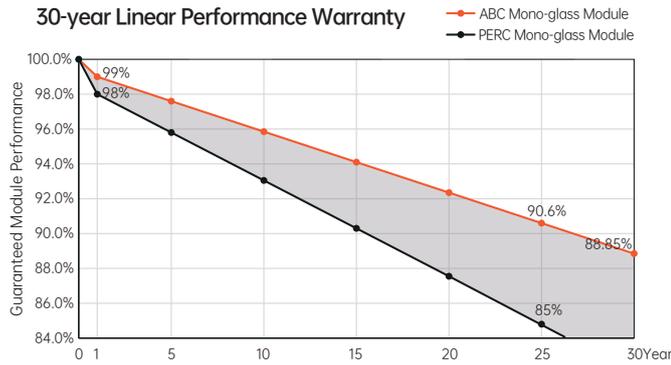
Munich RE 

**460W**  
Output

**23.1%**  
Efficiency

**≤1%**  
First-year Degradation

**≤0.35%**  
Annual Degradation from Year 2-30



Electrical Characteristics (STC: AM1.5 1000W/m <sup>2</sup> 25°C NOCT: AM1.5 800W/m <sup>2</sup> 20°C 1m/s)										Power Tolerance: 0~ + 3%	
Module Type	AIKO-A440-MAH54Mb		AIKO-A445-MAH54Mb		AIKO-A450-MAH54Mb		AIKO-A455-MAH54Mb		AIKO-A460-MAH54Mb		
	STC	NOCT									
P <sub>max</sub> [W]	440	331	445	335	450	339	455	343	460	346	
V <sub>oc</sub> [V]	40.49	38.24	40.59	38.33	40.69	38.43	40.79	38.52	40.89	38.62	
V <sub>mp</sub> [V]	33.50	31.64	33.60	31.73	33.70	31.83	33.80	31.92	33.90	32.02	
I <sub>sc</sub> [A]	13.91	11.25	14.02	11.33	14.12	11.42	14.22	11.50	14.32	11.58	
I <sub>mp</sub> [A]	13.14	10.49	13.25	10.57	13.36	10.66	13.47	10.75	13.57	10.83	
<b>Module Efficiency</b>	<b>22.1%</b>		<b>22.3%</b>		<b>22.6%</b>		<b>22.8%</b>		<b>23.1%</b>		

Mechanical Specification	
Cell Type	N-Type ABC
Front Cover Mono glass	3.2 mm tempered glass
Frame	Black anodized aluminum
Cable	4mm <sup>2</sup> (IEC) 12AWG(UL) 1200mm
No. of Cells	108(6*18)
Junction Box	IP68,3 bypass diodes
Connector	MC4-Evo2
Weight	21.5kg
Dimension	1757*1134*30mm
Package Detail	36pcs per pallet / 216pcs per 20'GP / 936pcs per 40'HC

Temperature Ratings (STC)	
Temperature Coefficient of I <sub>sc</sub>	+ 0.05%/ °C
Temperature Coefficient of V <sub>oc</sub>	- 0.22%/ °C
Temperature Coefficient of P <sub>max</sub>	- 0.26%/ °C

Installation Guide	
Operation Temperature	-40°C - +85°C
Maximum Series Fuse Rating	25A
Protection Class	Class II
V <sub>oc</sub> and I <sub>sc</sub> Tolerance	±3%
Maximum System Voltage	DC1500V
Maximum Static Loading	Front 5400Pa Back 2400Pa
Hail Test	25 mm diameter hail at 23 m/s
Fire Rating	IEC Class C





# IQ8 Series Microinverters

The high-powered, smart grid-ready IQ8 Series Microinverters are designed to match the latest generation high output PV modules. The IQ8 Series Microinverter has the highest energy production and reliability standards in the industry, and with rapid shutdown functionality, it meets the highest safety standards. The brain of the semiconductor-based microinverter is our proprietary, application-specific integrated circuit (ASIC) that enables the microinverter to operate in a grid-connected mode.



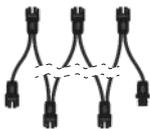
## IQ Gateway

The IQ Gateway is the platform for energy management and integrates with the IQ Microinverters to provide complete control and insights into the Enphase Energy System.



## IQ8 Series with integrated MC4 connectors

Connect PV modules quickly and easily to the IQ8 Series Microinverters that have integrated MC4 connectors.



## IQ Cabling

Install microinverters quickly and safely with IQ Cabling. With multi-phase IQ Cabling, the installed capacity is automatically distributed evenly across all three phases.



IQ8 Series Microinverters redefine reliability standards with more than 1 million cumulative hours of power-on testing, enabling an industry-leading limited warranty of up to 25 years.\*

### Compatible with latest generation high-output PV modules

- Supports the latest high-current PV modules
- Supports all common PV module powers and cell architectures

### Easy to install and commission

- Lightweight and compact with integrated Stäubli MC4 connectors for easy installation
- Fast installation with simple AC cabling
- Faster firmware upgrades enabled by the new integrated circuit technology

### High energy production, reliability, and safety

- More than 1 million power-on hours of reliability testing
- Patented Burst Mode technology provides increased energy production
- Low-voltage DC and rapid shutdown for the ultimate fire safety

#### Note:

- Commissioning of IQ8 Series Microinverter systems requires Enphase Installer App version 3.31.0 or higher.
- IQ8 Series Microinverters cannot be mixed together with previous generations of Enphase microinverters (IQ7 Series, IQ6 Series and so on) on the same IQ Gateway.

\*25-year warranty is valid, provided an internet-connected IQ Gateway is installed.

# IQ8 Series Microinverters

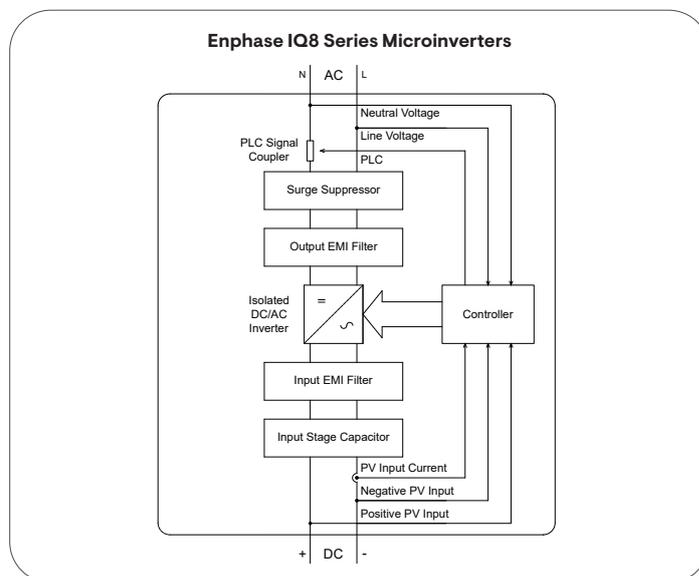
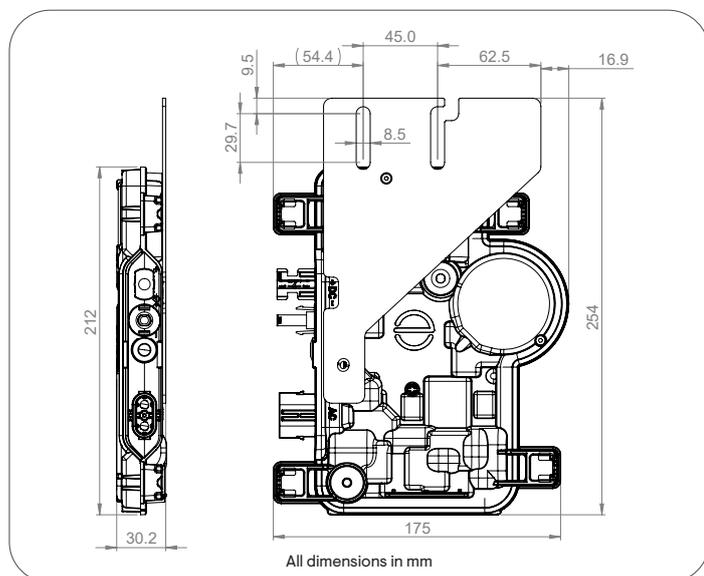
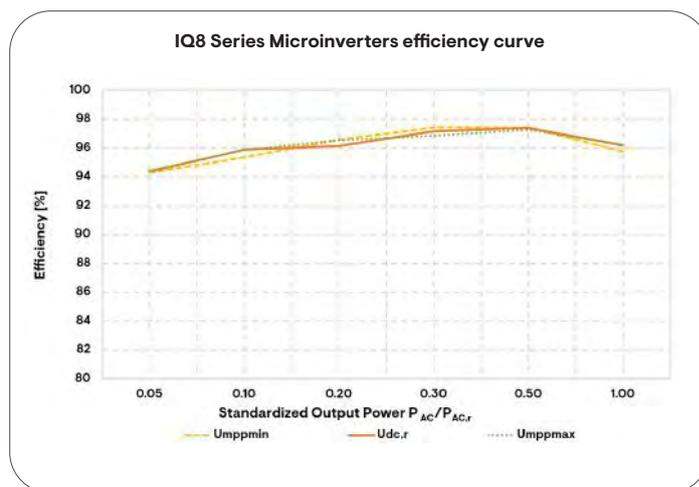
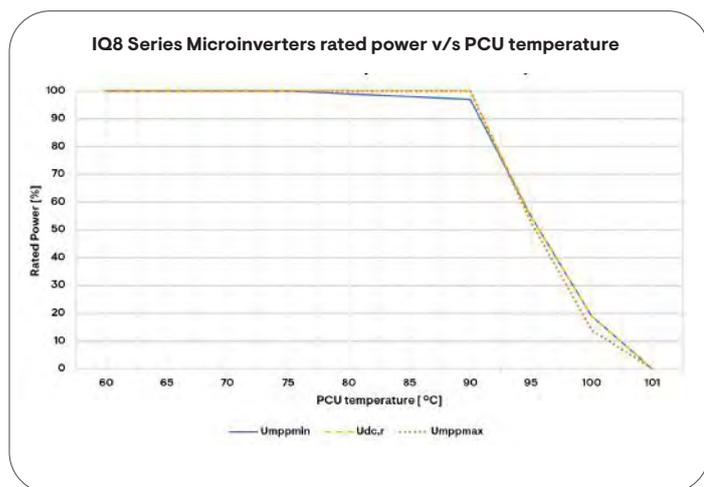
INPUT DATA (DC)		UNITS	IQ8MC-72-M-INT	IQ8AC-72-M-INT	IQ8HC-72-M-INT
Typical module compatibility			54-cell/108-half-cell, 60-cell/120-half-cell, 66-cell/132-half-cell, 72-cell/144-half-cell		
Minimum/Maximum input voltage	$U_{dcmin}/U_{dcmax}$	V	18/60		
Start-up input voltage	$U_{dcstart}$	V	22		
Rated input voltage	$U_{dc,r}$	V	35.0	36.5	37.0
Minimum/Maximum MPP voltage	$U_{mppmin}/U_{mppmax}$	V	25/45	28/45	29.5/45
Minimum/Maximum operating voltage	$U_{opmin}/U_{opmax}$	V	18/49		
Maximum input current	$I_{dcmax}$	A	14		
Maximum short-circuit DC input current	$I_{scmax}$	A	25		
Maximum input power <sup>1</sup>	$P_{dcmax}$	W	480	530	560
Maximum short circuit current for modules ( $I_{sc}$ ) allowed to be paired with IQ8 Series Microinverters: 20 A (calculated with 1.25 safety factor as per IEC 62548).					
OUTPUT DATA (AC)		UNITS	IQ8MC-72-M-INT	IQ8AC-72-M-INT	IQ8HC-72-M-INT
Maximum apparent power	$S_{ac,max}$	VA	330	366	384
Rated power	$P_{ac,r}$	W	325	360	380
Nominal grid voltage	$U_{acnom}$	V	230		
Minimum/Maximum grid voltage	$U_{acmin}/U_{acmax}$	V	184/276		
Maximum output current	$I_{acmax}$	A	1.43	1.59	1.67
Nominal frequency	$f_{nom}$	Hz	50		
Minimum/Maximum frequency	$f_{min}/f_{max}$	Hz	45/55		
Maximum units per single/ Multi-phase 20 A circuit	$16 A/I_{acmax}$		11 (L+N)/33 (3L+N)	10 (L+N)/30 (3L+N)	9 (L+N)/27 (3L+N)
Maximum units per single/ Multi-phase IQ Cable section			8 (L+N)/18 (3L+N)	8 (L+N)/18 (3L+N)	8 (L+N)/18 (3L+N)
Protective class (all ports)			II		
Total harmonic distortion		%	< 5		
Power factor setting			1.0		
Power factor range	$\cos\phi$		0.8 leading – 0.8 lagging		
Inverter maximum efficiency	$\eta_{max}$	%	97.5	97.3	97.4
European weighted efficiency	$\eta_{EU}$	%	96.7	96.6	96.8
Inverter topology			Isolated (HF transformer)		
Nighttime power loss		mW	50		
MECHANICAL DATA			IQ8MC-72-M-INT	IQ8AC-72-M-INT	IQ8HC-72-M-INT
Ambient air temperature range			-40°C to 65°C (-40°F to 149°F)		
Relative humidity range			4% to 100% (condensing)		
Overvoltage class AC port			III		
Number of input DC connectors (pairs) per single MPP tracker			1		
AC connector type			IQ Cabling (refer to the cable accessories datasheet)		

(1) Pairing PV modules with wattage above the limit may result in additional clipping losses. See the compatibility calculator at <https://enphase.com/en-gb/installers/microinverters/calculator>.

MECHANICAL DATA	IQ8MC-72-M-INT	IQ8AC-72-M-INT	IQ8HC-72-M-INT
DC connector type	Stäubli MC4		
Dimensions (H x W x D)	212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2") (without mounting brackets)		
Weight (with mounting plate)	1.1 kg (2.4 lbs)		
Cooling	Natural convection – no fans		
Enclosure	Class II double-insulated, corrosion-resistant polymeric enclosure		
IP rating	Outdoor - IP67		
Altitude	< 2600 m		
Calorific value	37.5 MJ/unit		
STANDARDS	IQ8MC-72-M-INT	IQ8AC-72-M-INT	IQ8HC-72-M-INT
Grid compliance	G98, G99, G100		
Safety	EN IEC 62109-1, EN IEC 62109-2		
EMC	EN IEC 61000-3-2, 61000-3-3, 61000-6-2, 61000-6-3, EN IEC 50065-1, 50065-2-1, EN55011 <sup>2</sup>		
Product labelling	CE		
Advanced grid functions <sup>3</sup>	Power export limiting (PEL), phase imbalance management (PIM), loss of phase detection (LOP), power factor control Q (U), cos (phi) (P)		
Microinverter communication	Power line communication (PLC) 110 – 120 kHz (Class B), narrow band 200 Hz		

(2) At STC within MPP range.

(3) Some of these functions require IQ Gateway Metered with current transformers and/or IQ Relay installed.



Assembled in China, India, or Romania.

Manufacturer: Enphase Energy Inc. 47281 Bayside Pkwy, Fremont, CA 94538, United States of America, Tel: +1 (707) 763-4784

Importer: Enphase Energy NL B.V., Het Zuiderkruis 65, 5215MV, 's-Hertogenbosch, Netherlands, Tel: +31 73 3035859

IQ8SE-14A-DSH-00198-2.0-EN-INT-2023-09-04

# Revision history

Revision	Date	Description
DSH-00198-2.0	September 2023	Initial release
DSH-00198-1.0	August 2023	Preliminary release



# IQ Battery 5P

The IQ Battery 5P all-in-one AC-coupled system is powerful, reliable, simple, and safe. It has a total usable energy capacity of 5.0 kWh and includes six embedded IQ8D-BAT Microinverters with a 3.2 kVA continuous power rating.

## Components of the Enphase Energy System



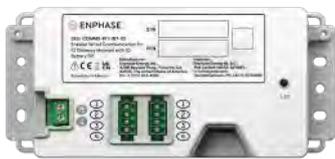
### IQ Gateway and current transformers (CTs)

Provides complete control and insights into the Enphase Energy System. IQ Gateway is shipped with two CTs to enable production and consumption monitoring with an accuracy of  $\pm 1\%$ .



### IQ Microinverters

IQ Series Microinverters pack more power into less space than other rooftop solar systems and make rooftop solar more productive, reliable, smart, and safe.



### Communications Kit 2 INT

The Enphase Communications Kit 2 INT enables wired communication between IQ Gateway Metered and IQ Battery 5P using Control cables.



### IQ Battery 5P accessories

The IQ Battery 5P lifting handles are reusable and ease the installation process. The IQ Battery 5P pedestal enables floor mounting of the IQ Battery 5P.

### Powerful

- Provides 3.2 kVA continuous power
- Includes six embedded IQ8D-BAT Microinverters

### Reliable

- 15-year limited warranty - IQ Battery 5P
- Cools passively with no moving parts or fans
- Uses wired communication for fast and consistent connection
- Updates software and firmware remotely

### Simple

- Fully integrated AC-coupled battery system
- Installs and commissions easily
- Supports Self-Consumption mode of operation
- Offers homeowners remote monitoring and control from the Enphase App
- Field replaceable components

### Safe

- Meets UL 9540A, the highest industry standard for battery safety
- Uses lithium iron phosphate (LFP) chemistry for maximum safety and longevity

### Grid compliance

- EREC G98, G99, and G100 Issue 2 Amd 2



# IQ Battery 5P

PRODUCT DETAILS	UNITS	IQBATTERY-5P-1P-INT
Name		IQ Battery 5P
Description		The IQ Battery 5P with integrated IQ8D-BAT Microinverters and battery management system (BMS) with battery controller
<b>OUTPUT (@230 VAC<sup>1</sup>)</b>		
Rated (continuous) output apparent power <sup>2</sup>	kVA	3.2
Nominal voltage	VAC	230
Nominal voltage range	VAC	195–253
Nominal frequency	Hz	50
Nominal frequency range	Hz	47.5–51.5
Rated output current <sup>2</sup>	A	13.9
Power factor (adjustable)		0.8 leading...0.8 lagging
Interconnection		Single-phase
AC round-trip efficiency <sup>3</sup>	%	90
Optimum operating temperature range	°C	0 to 30
Operating modes		Self-Consumption and Charge from the grid
<b>BATTERY MODULE</b>		
Usable capacity	kWh	5.0
DC round-trip efficiency	%	96
Nominal DC voltage	V	76.8
Ambient operating temperature (charging)	°C	-20 to 50 (non-condensing)
Ambient operating temperature (discharging)	°C	-20 to 55 (non-condensing)
Chemistry		Lithium iron phosphate (LFP)
<b>MECHANICAL DATA</b>		
Dimensions (H × W × D)	mm	980 × 550 × 188
Lifting weight	kg	66.3
Total installed weight	kg	78.9
IQ Battery enclosure		Outdoor-IP55
IQ8D-BAT Microinverter enclosure		Outdoor-IP67
Cooling		Natural convection
Altitude	m	2500
Mounting		Wall mount (included) or pedestal mount (sold separately)
<b>COMMUNICATION INTERFACES</b>		
Communication		Wired control communication
Monitoring		Enphase Installer Platform and Enphase App monitoring options; API integration
<b>STANDARDS</b>		
Grid compliance		G98, G98 NI, G99, G99 NI, G100-2
Safety		UN 38.3, EN 62040-1, IEC 62619 2022, EN IEC 62109-1 & 2, IEC/EN 62116
EMC		EN 61000-3, EN 61000-6 EMC, EN 55011:2016+A11:2020, IEC 61326-1, EN 50065-1, EN 50065-2-2
EC Declaration of Conformity <sup>4</sup>		Electro Magnetic Compatibility (EMC) Directive 2014/30/EU, Low Voltage Directive (LVD) 2014/35/EU, Restriction of Hazardous Substances (RoHS), 2011/65/EU, and Battery Directive 2006/66/EC
Product labelling		CE
<b>LIMITED WARRANTY</b>		
Limited warranty - IQ Battery 5P		>60% capacity, up to 15 years or 6000 cycles <sup>5</sup>

(1) Supported in grid-tied operation

(2) Limited by software

(3) AC to the battery to AC at 50% power rating at 25°C

(4) The full text of the EU Declaration of Conformity (DoC) is available at <https://enphase.com/en-gb/installers/resources/documentation>

(5) Whichever occurs first. Restrictions apply. The full text of the warranty is available at <https://enphase.com/en-gb/warranty/uk>

# IQ Battery 5P

## WHAT'S IN THE BOX

ORDER CODE: IQBATTERY-5P-1P-INT

IQ Battery 5P	Base battery unit of IQ Battery 5P with integrated six IQ8D-BAT Microinverters
ID cover and conduit cover	IQ Battery 5P cover with two conduit covers for the left and right sides of the unit
Bottom mounting bracket and top protective shield	Bottom mounting bracket for mounting the battery on the wall and one top protective shield
M5 locking screws	Two M5 locking screws for securing the battery unit on the bottom mounting bracket
M4 grounding screws	Two M4 grounding screws for securing the top protective shield on the bottom mounting bracket
M5 ID cover grounding screws	Two M5 ID cover grounding screws for the EMI/EMC requirement
Cable ties	Six cable ties for securing field cables to the unit
Control (CTRL) connector	One pre-installed and one spare CTRL connector without resistor for CTRL wiring
Control (CTRL) connector with resistor	One pre-installed and one spare CTRL connector with resistor for CTRL wiring
Quick Install Guide (QIG)	QIG for IQ Battery unit installation instructions
Drill template	Two drill templates for marking drilling locations on the mounting surface

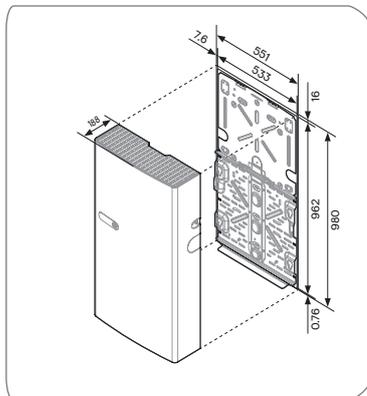
## ACCESSORIES AND REPLACEMENT PART

IQ8D-BAT-RMA	IQ8D-BAT Microinverter for field replacement
B05-T02-INT00-1-2-RMA	IQ Battery 5P Battery unit for field replacement
B05-CX-0550-O	IQ Battery 5P cover for field replacement
B05-PM-0550-O	IQ Battery 5P pedestal mount
B05-CP-096-O	IQ Battery 5P conduit plates for field replacement. Includes one left-side and one right-side conduit plate
B05-WB-0543-O	IQ Battery 5P wall bracket for field replacement. Includes one bottom mounting bracket and one top protective shield
IQBATTERY-HNDL-5	IQ Battery 5P lifting handles. Includes one left-side and one right-side lifting handle
B05-ACFB-080-O	IQ Battery 5P AC filter board for field replacement
B05-BMSRA-0490-O	IQ Battery 5P BMS board for field replacement
B05-CANBR-063-O	IQ Battery 5P control communication board for field replacement
B05-IICS-0524-O, B05-IUCS-0524-O	IQ Battery 5P control switch pre-installed on the wiring cover for field replacement

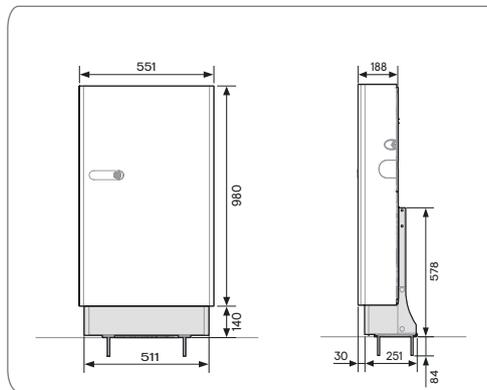
## COMPATIBILITY

IQ Battery	IQ Battery 5P
IQ Gateway	IQ Gateway Metered
Communications Kit	Communications Kit 2 INT
Solar inverters	IQ Series Microinverters, third-party PV string inverters

## Dimensions in mm



Wall-mounted



Floor mounted with Pedestal

### Note for third-party products:

Any third-party manufacturer or importer of product(s) used to install or commission Enphase product(s) shall comply with the applicable EU Directive(s) and requirements in the European Economic Area (EEA). It is the responsibility of the installer to confirm that all such products are labeled correctly and have the required compliant supporting documentation.

### Manufacturer:

Enphase Energy Inc., 47281 Bayside Pkwy., Fremont, CA, 94538, The United States of America, PH: +1 (707) 763-4784

### Importer:

Enphase Energy NL B.V., Het Zuiderkruis 65, 5215MV, 's-Hertogenbosch, The Netherlands, PH: +31 73 3035859

Assembled in China

# Revision history

Revision	Date	Description
DSH-00166-2.0	September 2023	Final release. Editorial updates, updated images and added warranty webpage link.
DSH-00166-1.0	August 2023	Initial release

# INCLUDES FREE BIRD PROTECTION



MRS BROWN

We already had solar panels installed but we're very troubled with pigeons. Deege installed the netting, the men were efficient extremely polite and tidy workers. Delighted to say we have no constant cooing now. Would highly recommend.



**PROTECT BOTH YOUR INVESTMENT & WILDLIFE**



**ENHANCE THE AESTHETICS OF YOUR SYSTEM**



**MINIMISE CLEANING AND MAINTENANCE COSTS**