Power Optimizer

S650A



POWER OPTIMIZER

Especially designed for small and multifaceted rooftops with compatible SolarEdge inverters*

- Small and multifaceted rooftop segment solution that reduces the number of modules per inverter
- Improved design flexibility of multifaceted, complex roofs enabled by extended output voltage that reduces yield factor losses across the entire system
- Mitigates diverse types of module mismatch loss, from manufacturing tolerance to partial shading
- Compatible with a wide range of modules, including high-powered and bifacial PV modules
- Superior efficiency (99.5%)
- Advanced safety:
  - Patented Sense Connect technology – designed to automatically detect and prevent potential electric arcs at the connector level before an arc is created**
  - Patented SafeDC™ – module-level voltage shutdown, for installer and firefighter safety

* For compatible inverter information, see the Installation Specifications section in the specification table on the next page.
** Functionality subject to inverter model and firmware version.

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		UNIT
INPUT		
Rated Input DC Power(1)	650	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	80	Vdc
MPPT Operating Range	12.5 – 80	Vdc
Maximum Continuous Input Current	15	Adc
Maximum Short Circuit Current (Isc) of Connected PV Module for SolarEdge Home Hub Inverters / SolarEdge Nexis Inverters 3ph	16.5	Adc
Maximum Short Circuit Current (Isc) of Connected PV Module for SolarEdge Home Wave Inverters	15	Adc
Maximum Efficiency	99.5	%
Weighted Efficiency	98.6	%
Overvoltage Category	II	
OUTPUT DURING OPERATION		
Maximum Output Current	15	Adc
Maximum Output Voltage	110	Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM INVERTER OR INVERTER OFF)		
Safety Output Voltage per Power Optimizer	1 ± 0.1	Vdc
STANDARD COMPLIANCE(2)		
EMC	FCC Part 15 Class B; IEC 61000-6-2; IEC 61000-6-3; CISPR11; EN 55011	
Safety	IEC 62109-1 (class II safety); UL 1741	
Material	UL 94 V-0, UV Resistant	
RoHS	Yes	
Fire Safety	VDE-AR-E 2100-712:2018-12	
INSTALLATION SPECIFICATIONS		
Compatible SolarEdge Inverters	SolarEdge Nexis Inverter 3ph SolarEdge Home Hub Single Phase Inverter SolarEdge Home Wave Single Phase Inverter SolarEdge Home Hub Inverter – Three Phase (SExxK-RWB48BFN4) SolarEdge Home Wave Inverter – Three Phase (SExxK-RW0TEBxN4)	
Maximum Allowed System Voltage	1000	Vdc
Dimensions (W x L x H)	129 x 165 x 45	mm
Weight	790	gr
Input Connector	MC4	
Input Wire Length	0.1	m
Output Connector	MC4	
Output Wire Length	(+) 2.3, (-) 0.10	m
Operating Temperature Range(3)	-40 to +85	˚C
Protection Rating	IP68	
Relative Humidity	0 – 100	%

(1) The rated power of the module at STC will not exceed the Power Optimizer Rated Input DC Power. Modules with up to +5% power tolerance are allowed.
(2) For details about CE compliance, see Declaration of Conformity – CE.
(3) Power derating is applied for ambient temperatures above +70°C for S650A.

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RoHS CE

/ Power Optimizer

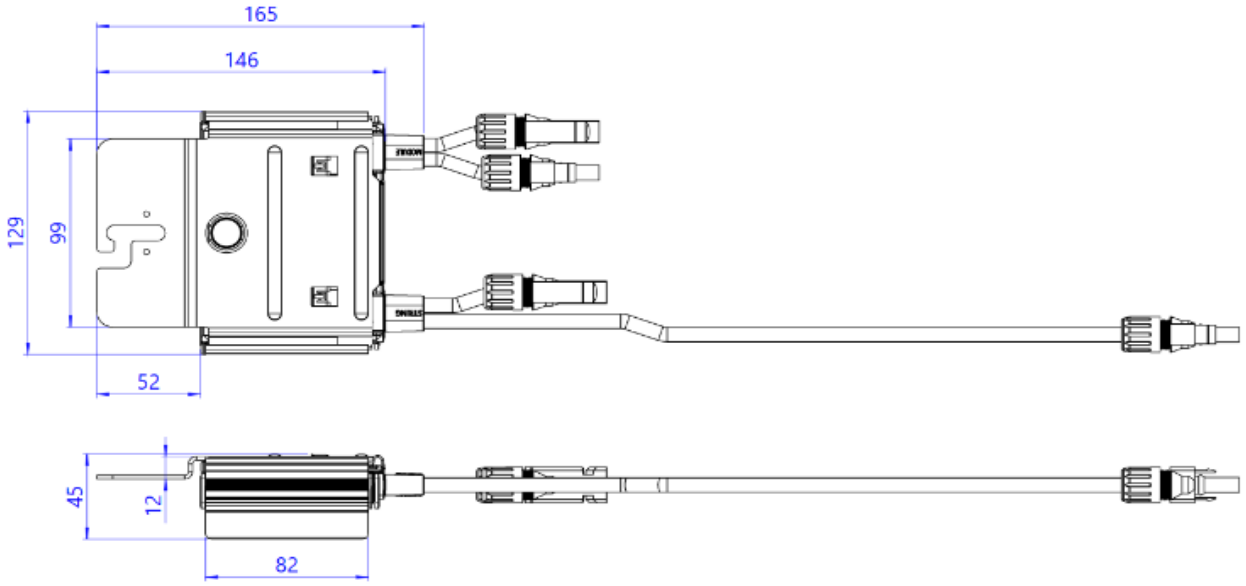
S650A

PV System Design Using a SolarEdge Inverter[4]		Single Phase[5]	Three Phase for 230/400V Grid[6]	Units
Minimum String Length (Power Optimizers)		6	10	
Maximum String Length (Power Optimizers)		25	38[7] / 50[8]	
Maximum Continuous Power per String		5700	11,250	W
Maximum Allowed Connected Power per String	Inverter's Rated AC Power ≤ Maximum Continuous Power per String	Per the inverter's maximum input DC power[9]		W
	Inverter's Rated AC Power > Maximum Continuous Power per String	Single string: 6000 At least two strings: 6800 for inverters with Rated AC Power ≥ 8000 W	13,500	W
Parallel Strings of Different Lengths or Orientations		Yes		
Maximum Difference in Number of Power Optimizers Allowed Between the Shortest and Longest Parallel Strings		5 Power Optimizers		

(4) When connected to a SolarEdge Home Wave/Hub Inverter – Three Phase, the S650A Power Optimizer cannot be mixed with other Power Optimizers on the same inverter.
(5) For single phase inverters, S650A is only compatible with SolarEdge Home Wave Single Phase inverters and SolarEdge Home Hub Single Phase inverters.
(6) For three phase inverters for the 230/400V grid, S650A is compatible with:
- SolarEdge Nexis Inverter 3ph from firmware version 6.25.67 and above.
- SolarEdge Home Hub Inverter – Three Phase (SExxK-RWB48BFN4) from firmware version 4.23.XX and above.
- SolarEdge Home Wave Inverter – Three Phase (SExxK-RW0TEBxN4) from firmware version 4.23.XX and above, for inverters produced after WW42/2020. You can find the production date in the serial number on the inverter label (S/N: SJWWYY-xxxxxxxxx-xx).

(7) For the SolarEdge Home Hub Inverter – Three Phase.
(8) For the SolarEdge Nexis Inverter 3ph with a Backup Interface, up to 33 Power Optimizers per string are allowed.
(9) If the inverter's rated AC power ≤ maximum nominal power per string, then the maximum power per string will be able to reach up to the inverter's maximum input DC power. Refer to the Single String Design Guidelines application note.

S650A (Bent Bracket)



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SolarEdge is a global leader in smart energy technology. By leveraging world-class engineering capabilities and with a relentless focus on innovation, SolarEdge creates smart energy solutions that power our lives and drive future progress.

SolarEdge developed an intelligent inverter solution that changed the way power is harvested and managed in photovoltaic (PV) systems. The SolarEdge DC optimized inverter maximizes power generation while lowering the cost of energy produced by the PV system.

Continuing to advance smart energy, SolarEdge addresses a broad range of energy market segments through its PV, storage, EV charging, UPS, and grid services solutions.



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CE

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