

Residential Power Optimizer

For North America

U650



POWER OPTIMIZER

PV power optimization at the module level

- Specifically designed to work with SolarEdge residential inverters
- Superior efficiency (99.5%)
- Module-level voltage shutdown for installer and firefighter safety
- Mitigates all types of module mismatch loss, from manufacturing tolerance to partial shading
- Faster installations with simplified cable management and easy assembly using a single bolt
- Flexible system design for maximum space utilization
- Compatible with a wide range of modules, including high-powered and bifacial PV modules
- 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
 - Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)

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| | U650 ⁽¹⁾ | Units |
|--|---|---------|
| INPUT | | |
| Rated Input DC Power ⁽²⁾ | 650 | W |
| Absolute Maximum Input Voltage (Voc) | 60 | Vdc |
| MPPT Operating Range | 8 – 60 | Vdc |
| Maximum Input Current (Maximum Isc of Connected PV Module) | 15 | Adc |
| Maximum Input Short Circuit Current ⁽³⁾ | 18.75 | Adc |
| Maximum Efficiency | 99.5 | % |
| Weighted Efficiency | 98.6 | % |
| Overvoltage Category | II | |
| OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREEDGE INVERTER) | | |
| Maximum Output Current | 15 | Adc |
| Maximum Output Voltage | 60 | Vdc |
| OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREEDGE INVERTER OR INVERTER OFF) | | |
| Safety Output Voltage per Power Optimizer | 1 ± 0.1 | Vdc |
| STANDARD COMPLIANCE | | |
| Photovoltaic Rapid Shutdown System | CSA C22.2#330, NEC 2014 – 2023 | |
| EMC | FCC Part 15 Class B, IEC 61000-6-2, IEC 61000-6-3 | |
| Safety | CSA C22.2#107.1, IEC 62109-1 (Class II safety), UL 1741 | |
| Material | UL 94 V-0, UV Resistant | |
| RoHS | Yes | |
| Fire Safety | VDE-AR-E 2100-712:2013-05 | |
| INSTALLATION SPECIFICATIONS | | |
| Maximum Allowed System Voltage | 1000 | Vdc |
| Dimensions (W x L x H) | 129 x 155 x 30 / 5.07 x 6.10 x 1.18 | mm / in |
| Weight | 720 / 1.6 | gr / lb |
| Input Connector | MC4 | |
| Input Wire Length | 0.1 / 0.32 | m / ft |
| Output Connector | MC4 | |
| Output Wire Length | (+) 2.3, (-) 0.10 / (+) 7.54, (-) 0.32 | m / ft |
| Operating Temperature Range ⁽⁴⁾ | -40 to +85 | °C |
| Protection Rating | IP68 / NEMA6P | |
| Relative Humidity | 0 – 100 | % |

(1) Power optimizer model U650, when installed with a qualified inverter, manufactured with the intent to be eligible for 35.6% under the elective safe harbor in calculating the Domestic Cost Percentage under the "Rooftop (MLPE)" category (under Notice 2024-41)*

* SolarEdge does not provide tax and/or legal advice. The statements in this datasheet are accurate as of the date of this letter and are subject to change. You should consult with your own legal and/or tax advisor(s) regarding the eligibility of your project for the ITC, including the 10% domestic content bonus, to determine how the applicable rules apply to your particular project.

(2) The Rated Power of the module at STC will not exceed the power optimizer's Rated Input DC Power. Modules with up to +5% power tolerance are allowed.

(3) The Maximum Input Short Circuit Current is adjusted for worst case conditions of ambient temperature, irradiance, bifacial gain, and so on, in accordance with NEC and CSA.

(4) Power derating is applied for ambient temperatures above +85°C / +185°F. Refer to the [Power Optimizers Temperature Derating](#) technical note for details.

| PV System Design Using a SolarEdge Inverter ⁽⁵⁾ | | SolarEdge Home Wave / Hub Single Phase | Three Phase for 208V Grid | Three Phase for 277/480V Grid | Units |
|--|--|--|---|-------------------------------|-------|
| Minimum String Length (Power Optimizers) | | 8 | 10 | 18 | |
| Maximum String Length (Power Optimizers) | | 25 | | 50 ⁽⁶⁾ | |
| Maximum Usable Power Delivered per String | | 5700 | 6000 | 12,750 | W |
| Maximum Allowed Connected Power per String ⁽⁷⁾⁽⁸⁾ | Inverters with Rated AC Power ≤ 5700W | Per the inverter's maximum input DC power ⁽⁹⁾ | One string: 7200 Two strings or more: 7800 | 15,000 | W |
| | Inverters with Rated AC Power of 6000W | 5700 | | | |
| | Inverters with Rated AC Power ≥ 7600W | 6800, only when connected to at least two strings | | | |
| Parallel Strings of Different Lengths or Orientations | | Yes | | | |

(5) It is not allowed to mix S-series and P-series Power Optimizers in new installations in the same string.

(6) A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement.

(7) For the 208V grid, the maximum is permitted only when the difference in connected power between strings is 1,000W or less.

(8) For the 240V or 277/480V grids, the maximum is permitted only when the difference in connected power between strings 2,000W or less.

(9) Refer to the [Single String Design Guidelines](#) application note for more details.

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RoHS

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U650 (Flat Bracket)

