

## Power Xpert Solar

Utility-scale photovoltaic inverters—1500 kW and 1650 kW

# Harvest the power of the sun



The Eaton Power Xpert™ Solar 1500 kW and 1650 kW inverters are the largest in the utility-scale class. A robust, reliable, efficient and fault-tolerant design minimizes the plant levelized cost of electricity, while meeting stringent grid requirements.

### A bankable, trustworthy partner

With over 100 years of experience in the electrical space, Eaton brings a solid and proven product portfolio with world-class engineering and manufacturing.

A robust and diversified balance sheet guarantees that warranty and financial commitments will be honored for the long term.

Eaton also offers turnkey solutions and balance of system equipment, making it a one-stop shop for designers and developers.

### The best solution to ensure the lowest LCOE (Levelized Cost of Electricity)

The Power Xpert Solar is specifically designed to lower the LCOE. It reduces installation and upfront costs, and boosts plant reliability, minimizing maintenance expenses. Energy harvest is increased through world-class efficiency and a unique fault-tolerant design.

### Energy harvest maximization

A proprietary control strategy coupled with an optimized filter design yields a CEC efficiency level of 98 percent, which also accounts for all auxiliary losses in the inverter.

A wide MPPT voltage range (500–1000 Vdc) maximizes inverter operation time. It boosts energy harvest and ensures that the unit will not trip under high-irradiance and cold weather conditions, especially in installations designed with a high DC/AC ratio.

### Highly reliable and available

The Power Xpert Solar is a complete fault-tolerant design, allowing for maximum plant availability. Fault tolerance is achieved by a segmented inverter design—3 × 500 kW (550 kW) stacks compose the unit. Each stack can be independently isolated, so that the system runs at partial power in the case of faults.

Reliability is also a key component for the utility-scale inverter. The Power Xpert Solar is made up of conservatively designed critical components (magnetics, IGBTs, capacitors, and the like) and a liquid-cooled design, allowing power electronics and controls equipment to be enclosed in a dust- and water-free environment.

### Minimizes installation cost

A large power block inverter (1.5 MW and 1.65 MW) reduces the pieces of equipment that need to be installed, reduces field wiring, and also reduces transportation and handling costs.

Power Xpert Solar also enables “skidless” inverter stations. Through a close-coupled connection to the step-up transformer, several benefits are realized such as smaller pad sizes, dramatic weight reduction, and easier inverter placement.

In plants where VAR support is needed, the Power Xpert Solar sustains a power factor range of  $\pm 0.91$  without power derating, that is, the inverter runs at full MW while supporting a  $\pm 0.91$  power factor range.

### Grid management features

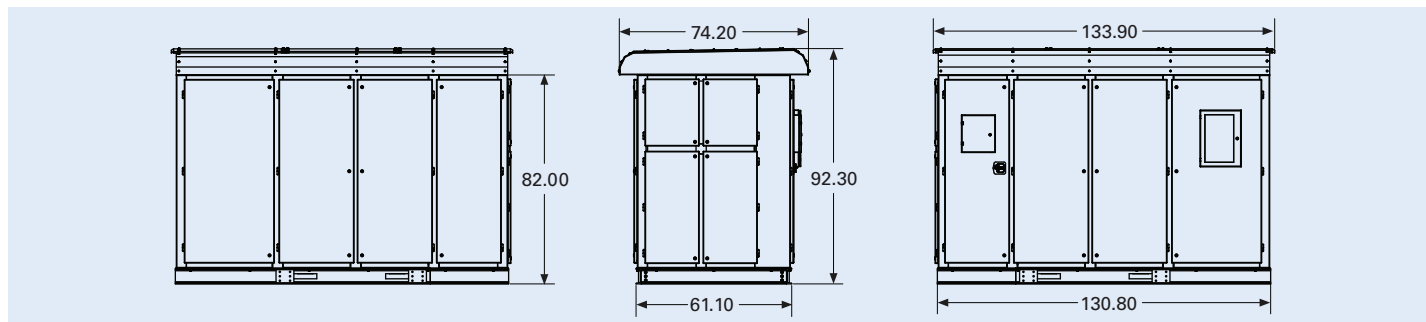
The Power Xpert Solar ensures that stringent grid interconnection requirements are achieved. Proprietary control algorithms allow for true zero voltage ride-through and compliance of the following grid requirements:

- Low and high voltage ride-through (LVRT and HVRT)
- Frequency ride-through (FRT)
- Voltage control—VAR support during grid disturbances
- Frequency droop control
- Power ramp control
- Islanding detection



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## Approximate Dimensions in Inches



## Utility-Scale—Power Xpert Solar Inverter

| Description                                     | Rating  |              |
|---|---|--------------|
|   | 1500 kW   | 1650 kW      |
| <b>AC Output Specifications</b>                 |   |              |
| Nominal apparent power AC at 50°C               | 1650 kVA  | 1815 kVA     |
| Rated output power AC at 50°C                   | 1500 kW   | 1650 kW      |
| Maximum continuous output current at 50°C       | 3000A   |              |
| Nominal operating voltage                       | 320 Vac   | 352 Vac      |
| Operating voltage range (withstand)             | ±10%  |              |
| Nominal operating frequency                     | 60 Hz   |              |
| Operating frequency range                       | 57–63 Hz  |              |
| Total harmonic distortion at rated power        | Per IEEE® 1547, <5% TDD                                 |              |
| Power factor at rated power                     | ±0.91 adjustable power factor                           |              |
| AC configuration                                | Delta 3-wire  |              |
| <b>DC Input Specifications</b>                  |   |              |
| Number of DC inputs                             | Customer-specified fuse arrangement (16–24 input pairs) |              |
| Maximum input voltage open circuit, $V_{oc}$    | 1000 Vdc  |              |
| MPPT input DC voltage range                     | 500–1000 Vdc  | 550–1000 Vdc |
| MPPT DC voltage range for full power production | 500–1000 Vdc  | 550–1000 Vdc |
| Nominal DC operating current                    | 3100A DC  |              |
| PV array grounding                              | Negative and positive (optional)                        |              |
| DC monitoring                                   | Optional current sensors on each DC input               |              |
| <b>Efficiency and Losses ①</b>                  |   |              |
| Weighted efficiency (CEC)                       | 98%   |              |
| <b>Protection</b>                               |   |              |
| AC disconnect                                   | AC circuit breaker with LOTO                            |              |
| AC surge suppression                            | Yes, monitored by inverter SCADA                        |              |
| DC disconnect                                   | Load brake switch disconnect                            |              |
| DC surge suppression                            | Yes, monitored by inverter SCADA                        |              |
| Ground fault monitoring                         | Yes, monitored by inverter SCADA                        |              |
| Insulation monitoring                           | Optional  |              |

| Description  | Rating   |
|--|--|
| <b>Communications and Controls</b>                         |  |
| Communications with plant central controller               | Modbus® TCP<br>Optical fiber connection optional   |
| Power metering   | Optional power metering device   |
| HMI  | Color TFT device provides real-time and historic inverter and array parameters   |
| <b>Mechanical Specifications</b>                           |  |
| Operating temperature range full power                     | –20° to 50°C   |
| Optional extended temperature range (cold weather package) | –40° to 50°C   |
| Storage temperature range                                  | –30° to 70°C   |
| Enclosure protection                                       | NEMA® 4 for power electronics and controls equipment; NEMA 3R for magnetics and switchgear   |
| Application  | Outdoor  |
| Enclosure construction                                     | Powder-coated cold-rolled steel with corrosion-resistant hardware and fittings   |
| Relative humidity  | 0–100% condensing  |
| Inverter mounting  | Pad or skid mount  |
| Cooling  | Independent, self-contained, closed-loop liquid cooling and air forced convection  |
| Maximum operating altitude                                 | 3300 ft (higher altitudes possible with derating)  |
| Inverter dimensions in inches (H x W x D)                  | 92.3 x 130.8 x 61.1  |
| <b>Standards and Compliance</b>                            |  |
| Safety   | UL® 508c, UL 1741 (in process)   |
| Grid management  | FERC 661, BDEW   |
| <b>Design Features</b>                                     |  |
| Grid management features                                   | LVRT<br>HVRT<br>ZVRT<br>FRT<br>Ramp control<br>Frequency droop<br>Grid management features adjustable to meet FERC, WECC and ERCOT requirements<br>Optional anti-islanding detection |

① Preliminary

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Printed in USA  
Publication No. PA08303003E / Z13028  
December 2012



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