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Power Xpert Solar 250 kW Inverter

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Product Description

The Eaton Power Xpert Solar 250 kW Inverter is based on Eaton's mature PowerChain© Management solutions, which incorporate Eaton's programmable logic controllers (PLCs), advanced variable frequency drives and protective relays. Every critical component inside the Power Xpert Solar 250 kW Inverter is proven to be reliable based on the known life cycles of high volume industrial and electrical control equipment.

Engineered for ease-of-installation, operation, and maintenance, the Power Xpert Solar 250 kW Inverter contains the intelligence to automate the commissioning, operation, and shut down procedures with minimal physical action. These robust utility-interactive three-phase inverters are based on Eaton's mature motor-drive assembly featuring Eaton's Active Front End© (AFE) control technology.

The Power Xpert Solar 250 kW inverter is designed specifically for 480 Vac three-phase utility (grid) applications and 600 Vdc (open circuit) PV systems. It is an excellent choice for either indoor or outdoor installations from a company known for its state-of-the-art electrical products and industry support.

- CEC 96% efficiency
- >99% MPPT efficiency— 3rd Party verified
- Earliest startup—latest shutdown with DC excitation and zero load grid sync
- Minimized offline nuisance events with superior fault tolerance of a utility grade electric protection relay

Features and Benefits

Dual-Stage 250 kW inverter with hysteresis, 2 x 125 kW design, provides optimum efficiency in lower irradiance conditions. Offers less stressful power-stage operation for improved inverter longevity. Seamless dual-inverter operation.

Grid Sensor based vector control ensures precise synchronism and fast response to grid dynamics, ensuring a stable operation and an improved solar energy harvesting.

Advanced Proportional Integral Derivative (PID) control enables precise synchronization to the grid, finer current and power limits. Improved temperature limits, better reactive power or power factor control.

DC excitation algorithm and system control Smart PV energy utilization over wasteful utility-based methods of energizing the transformer. Faster morning "wake-up" and power export. Faster mid-day re-connect improves energy harvesting during utility anomalies and outages, minimal-stress "zero-crossing" grid connection process, less part-count for improved solar-system reliability.

Large DC bus capacitors smart, extremely low ripple-current on the PV array makes for a better, trouble-free solar-module operation. Reduced stress on solar modules and wiring control algorithm ensures lower stress on isolation transformer over adverse environmental conditions.

Inverter re-combiner box with DC circuit breaker option available:

- Optional inverter re-combiner box with DC breakers to meet NEC® 2011 requirements for safe DC disconnect, eliminating the need for external DC disconnects
- DC breaker option eliminates the need to replace DC fuses, allowing cost and time savings (lowering O&M costs)
- Current sensing of each DC input is available for array zone monitoring; DC input current is reported to inverter controller, which makes it available via Modbus®

- DC breakers can be individually turned off, allowing isolation of a defective sub-array while allowing other sub-arrays to operate. This feature enhances de-bugging procedures and maximizes fault-tolerance
- DC breakers are available on different configurations and ampacity (90A DC, 100A DC, 125A DC, 150A DC, 175A DC, 200A DC and 225A DC)

Inverter grounding bus

on DC and AC sides allows installation as per NEC 690.47 (C) (1), (2), or (3), should the facility POCC have a bonded equipment-ground to the facility's grounding electrode system.

Maximum power point:

Fast (mSec based) response time with variable step-size control reacts to sudden changes, improved current response for low-irradiance periods, sudden-onset shading and grid outages, superior solar-energy harvesting

Isolation-transformer-based solar inverter

which operates with all photovoltaic modules (technologies), negative and positive grounded PV systems.

Eaton Logic Controller (ELC) watch-dog system

that ensures greater system integration and information response for display and stored performance data. It Isolates controls from external interference (anti-hacking)

Rich standard features and options list

- Full-load DC switch disconnect and AC breaker, lockout/tagout compatible
- Lockable display and controls door with window sealed against the elements
- Configurable utility connection
  - Three-wire delta (A/B/C), no neutral required
  - Four-wire wye (A/B/C/N), N-sensing only
  - 100 kA surge protection
  - 200 kAIC AC breaker
  - Large DC and AC conductor gland plates on bottom and immediate sides
  - Color, menu-driven display
  - Indicator lights (LEDs) and selection switch
  - Remote, field-duplicable up-fits
    - Remote indicators (LEDs)
    - Remote OFF (shutdown)
- AC view-window for visible blade disconnect
- Infrared inspection ports for DC and AC cabinets
- CEC approved 2% PBI power meter
- Internal heater for humidity and cold temperature control
- Multiple DC input (combiner) with fuse and breaker options
- SunSpec Alliance compatible monitoring (gateway)

Two-cabinet design Inverter and isolation transformer

that enables integration into electrical rooms, provides better package for roof-top installations, is easier to receive, lift, transport and secure, design category(s) seismic complaint, terminated transformer cables included.

Easy maintenance by Eaton's Electrical Services & Systems (EESS)

- No ladder required to service cooling-system air filters; ground-level access
- Three-door design ensures wide opening for limited-access locations
- Country and worldwide local services

Commissioning support

through country and worldwide local services.

Remote monitoring interface

support via Modbus/TCP with an RJ 45 plug, and a terminal block supplying additional I/O and a 120 Vac power supply for compatibility with third party monitoring applications.

Advanced anti-islanding function,

which prevents the operation of the inverter in the event of a utility outage.

AC overcurrent protection and safety

inverter is equipped with a 200 kAIC AC breaker that is operable from the outside of the unit via lockout/tagout–capable handle.

No need for AC fuse replacements, minimizing O&M costs.

Inverter doors are fitted with mechanical interlocks that will safely shut down the inverter if doors are opened.

Human Machine Interface (HMI):

A color touch screen LCD display that represents the status screens during normal operation and additional screens with password protection for access to configuration, troubleshooting, and service.

Standards and Certifications

- UL® 1741 2nd Edition January 2010
- IEEE® 1547
- NFPA 70, National Electrical Code® (NEC)
- CEC Listed (California Energy Commission)
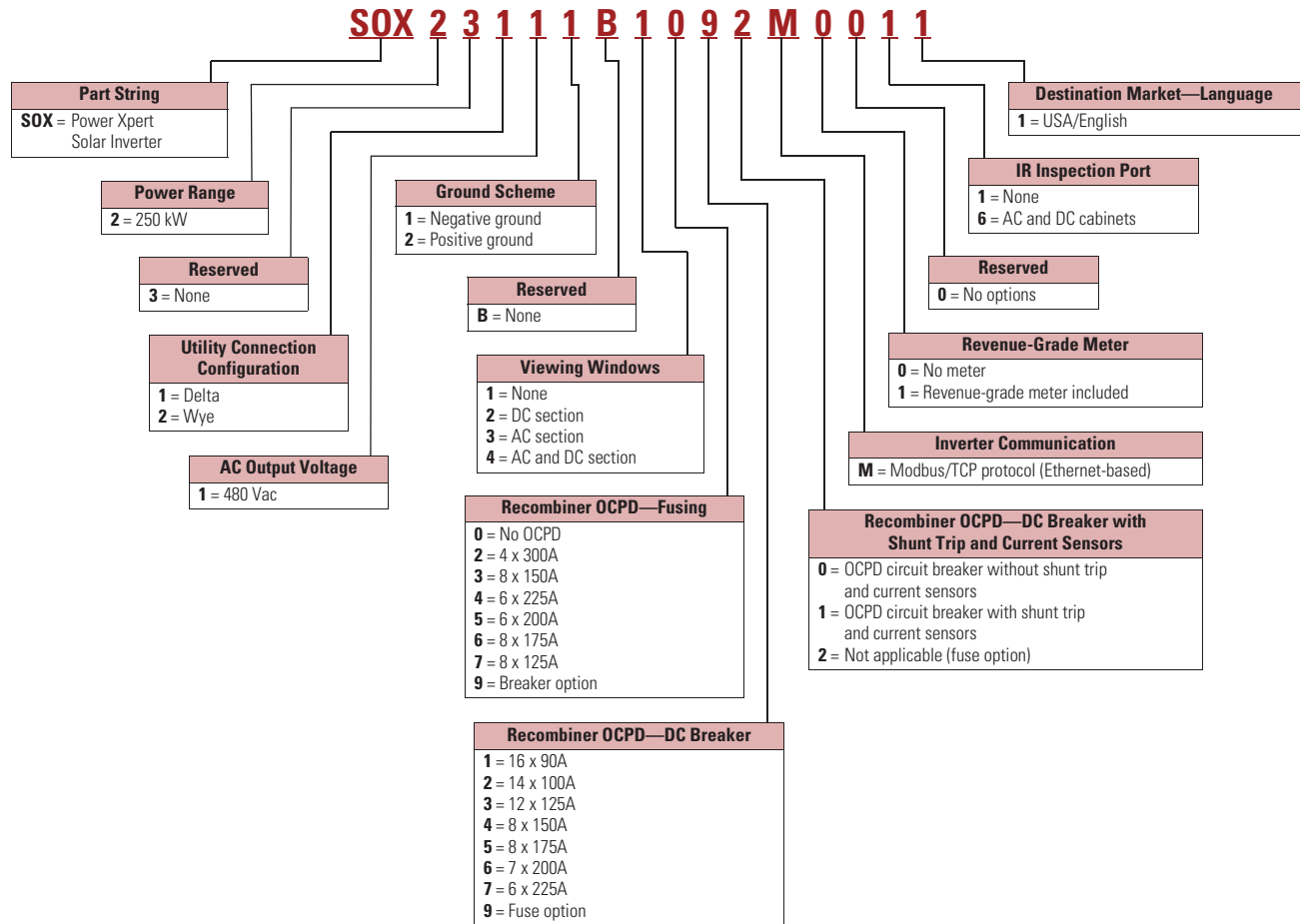- Seismic qualified to IBC/CBC

2.1 Power Xpert Solar 250 kW Inverter

Catalog Number Selection

The catalog number is what determines the exact product feature set. The base configuration and subsequent catalog number of the Power Xpert Solar 250 kW Inverter is **SOX23111B1092M0011**.

Power Xpert Solar 250 kW inverter

SOX 2 3 1 1 1 B 1 0 9 2 M 0 0 1 1

Part String
SOX = Power Xpert Solar Inverter

Power Range
2 = 250 kW

Reserved
3 = None

Utility Connection Configuration
1 = Delta
2 = Wye

AC Output Voltage
1 = 480 Vac

Ground Scheme
1 = Negative ground
2 = Positive ground

Reserved
B = None

Viewing Windows
1 = None
2 = DC section
3 = AC section
4 = AC and DC section

Recombiner OCPD—Fusing
0 = No OCPD
2 = 4 x 300A
3 = 8 x 150A
4 = 6 x 225A
5 = 6 x 200A
6 = 8 x 175A
7 = 8 x 125A
9 = Breaker option

Recombiner OCPD—DC Breaker
1 = 16 x 90A
2 = 14 x 100A
3 = 12 x 125A
4 = 8 x 150A
5 = 8 x 175A
6 = 7 x 200A
7 = 6 x 225A
9 = Fuse option

Destination Market—Language
1 = USA/English

IR Inspection Port
1 = None
6 = AC and DC cabinets

Reserved
0 = No options

Revenue-Grade Meter
0 = No meter
1 = Revenue-grade meter included

Inverter Communication
M = Modbus/TCP protocol (Ethernet-based)

Recombiner OCPD—DC Breaker with Shunt Trip and Current Sensors
0 = OCPD circuit breaker without shunt trip and current sensors
1 = OCPD circuit breaker with shunt trip and current sensors
2 = Not applicable (fuse option)

Product Selection

Over-Current Protection Device—Fusing Option

Recombiner OCPD— Fusing	Utility Connection Configuration	Ground Scheme	Viewing Windows	Revenue Grade Meter	Catalog Number [1]
No OCPD	Delta	Negative ground	None	Not included	**SOX23111B1092M0011**
4 x 300A fuse	Delta	Positive ground	None	Not included	**SOX23112B1292M0011**
6 x 225A fuse	Delta	Negative ground	DC section	Not included	**SOX23111B2492M0011**
6 x 200A fuse	Wye	Positive ground	DC section	Not included	**SOX23212B2592M0011**
8 x 175A fuse	Wye	Negative ground	AC section	Not included	**SOX23211B3692M0011**
8 x 150A fuse	Wye	Positive ground	AC section	Not included	**SOX23212B3392M0011**
8 x 125A fuse	Wye	Negative ground	AC and DC section	Not included	**SOX23211B4792M0011**

Over-Current Protection Device—DC Breaker Option, without Shunt Trip and Current

Recombiner OCPD— DC Breaker	Utility Connection Configuration	Ground Scheme	Viewing Windows	Revenue Grade Meter	Catalog Number [1]
16 x 90A	Delta	Negative ground	AC and DC section	Not included	**SOX23111B4910M0011**
14 x 100A	Delta	Positive ground	None	Not included	**SOX23112B1920M0011**
12 x 125A	Delta	Negative ground	None	Not included	**SOX23111B1930M0011**
8 x 150A	Wye	Positive ground	DC section	Not included	**SOX23212B2940M0011**
8 x 175A	Wye	Negative ground	DC section	Not included	**SOX23211B2950M0011**
7 x 200A	Wye	Positive ground	AC section	Not included	**SOX23212B3960M0011**
6 x 225A	Wye	Negative ground	AC section	Not included	**SOX23211B3970M0011**

Over-Current Protection Device—DC Breaker Option, with Shunt Trip and Current

Recombiner OCPD— DC Breaker	Utility Connection Configuration	Ground Scheme	Viewing Windows	Revenue Grade Meter	Catalog Number [1]
16 x 90A	Delta	Positive ground	AC and DC Section	Not included	**SOX23112B4911M0011**
14 x 100A	Delta	Negative ground	AC and DC Section	Not included	**SOX23111B4921M0011**
12 x 125A	Delta	Positive ground	None	Not included	**SOX23112B1931M0011**
8 x 150A	Wye	Negative ground	None	Not included	**SOX23211B1941M0011**
8 x 175A	Wye	Positive ground	DC Section	Not included	**SOX23212B2951M0011**
7 x 200A	Wye	Negative ground	DC Section	Not included	**SOX23211B2961M0011**
6 x 225A	Wye	Positive ground	AC Section	Not included	**SOX23212B3971M0011**

Note

[1] Catalog numbers are not limited to the examples shown. More combinations may be obtained from catalog numbering system, see **Page V15-T2-4**.

Technical Data and Specifications

AC Output Specifications—Factory Default

Description	Specification
Maximum continuous output power	250 kW
Weighted efficiency (CEC)	96%
Maximum continuous output current	312A
Maximum fault current output	365A for 8ms
Maximum branch overcurrent protection	400A [1]
Nominal operating voltage	Three-phase 480 Vac
Operating voltage range	423–528 Vac
Nominal operating frequency	60 Hz
Operating frequency range	57.0–60.5 Hz
Tare loss	70W
Total harmonic distortion	< 3% THD
Power factor	> 0.99
Utility connection	Delta three-wire (A,B,C); wye four-wire (A,B,C,N) [2]

DC Input Specifications

Description	Specification
DC maximum input voltage	600 Vdc
DC maximum power point tracking range (MPPT)	300–500 Vdc
DC operating range	300–600 Vdc
DC input start	400 Vdc [3]
DC operating current nominal	860A
Maximum DC ISC input	1340A
Factory configured PV array grounding	Positive/negative

Mechanical Specifications

Description	Specification
Operating temperature range without power fold back	−20º to 50ºC
Storage temperature range	−30º to 70ºC
Enclosure rating	UL Type 3R
Enclosure(s) construction	Polyester powder coated cold rolled steel
Relative humidity	0 to 95% noncondensing
Inverter weight	4000 lbs (1814 kg)
Transformer weight	2850 lbs (1293 kg)
Inverter envelope dimensions in inches (mm) H x W x D	94.00 x 93.00 x 46.00 (2387.6 x 2362.2 x 1168.4)
Transformer dimensions in inches (mm) H x W x D	64.00 x 50.00 x 40.00 (1625.6 x 1270.0 x 1016.0)
Inverter and transformer mounting	Pad mount—not free standing
Isolation transformer—external	Delta/wye
Cooling	Air convection
Max altitude (before potential derating)	3300 ft (1000m)
Air flow/inverter	1700 cfm [3]
Seismic rating successfully evaluated	Seismic qualified to IBC/CBC

Certifications

Description
UL 1741 2nd Ed Jan 2010, IEEE 1547

Notes
[1] 400A AC breaker.
[2] Factory default is delta three-wire.
[3] Factory default is 400 Vdc.

Dimensions

Approximate Dimensions in inches (mm)

Power Xpert Solar 250 kW Inverter Dimensions and Connection Diagrams

X6 ø 2.00 (50.8) Lifting Holes

84.25 (2140.0)

42.13 (1070.1)

18.06 (458.7)

93.58 (2376.9)

90.05 (2287.3)

Front ISO View Inv. Unit Only

Front ISO View with Transformer

Fork Lift Pockets

6.00 (152.4)

30.00 (762.0)

45.42 (1153.7)

Top View with Doors Open

97.25 (2470.2)

Top View Minium Clearance to Wall

8.00 (203.2) Minium Clearance, Wall to Air Duct

35.70 (906.8) From Front of Unit Doors Open 80°

21.40 (543.6)

36.00 (914.4)

22.00 (558.8)

8.00 (203.2) Minium Equipmant Clearance, Greater Personel Clearance Recommended