

# VPS/Natron/CE+T Sierra SDP Platform

(Software Defined Power)

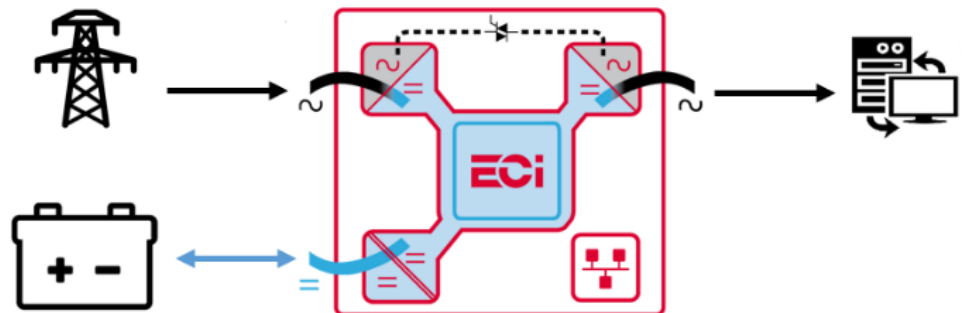


## Description of the SDP System

Each SDP cabinet is configured with three power systems consisting of the following components:

- CE+T Sierra 3PH Bidirectional Converter System Significantly improves PUE (Power Usage Effectiveness)—no dedicated cooling required
- CE+T Inview S Monitor
- Natron Sodium-Ion 48VDC Battery Module

Each system operates independently from the each other in order to allow VPS to demonstrate their ability to route power as needed to the loads via their controlled distribution. The CE+T Sierra systems are configured for 230/400VAC 3PH power and operate from a 48VDC battery. The Sierra system is fully bidirectional at each port allowing VPS to dynamically shift power as needed from the battery or grid to support the power demand by the load. The Natron Sodium-Ion Battery Modules are configured in one, two, or three unit combinations with each set of Sierra Converters to demonstrate varying discharge rates among the three power systems. There are two identical cabinets assembled for the deployment.



System Power Flow Diagram

**SDP Platform Data**

AC Input	230 / 400VAC 3PH, 4W+G
AC Output	230 / 400VAC 3PH, 4W+G
DC Battery	48VDC; Sodium-Ion Battery (See Natron Data Sheet)
Max Possible Power Per System	36kVA / 30kW
Configured Power Per System	8kVA / 15kW
Max Planned Output Current	25A per System
Input/Output Cable	8AWG SOOW Cable 6' Whip (Top Cabinet Exit)
Input Connector	IEC 60309 Plug (x3)
Output Connector	IEC 60309 Receptacle (x3)
Cabinet Dimensions	24" Wide x 31.5" Deep x 84" High
Estimated System Weight	~750lbs

**CE+T Sierra Module Data**

**AC Input Data**

Nominal voltage / Current	230VAC / 11.7A
Voltage range	150 - 265VAC (De-rating from 185 to 150VAC)
Brownout	1600W @ 150VAC / 2400W @ 190VAC linear decreasing
Power factor / THD	> 0.99 / < 3%
Frequency (Synchronization range)	50Hz (47 - 53Hz) or 60Hz (57 - 63Hz)

**DC Input Data**

Nominal voltage (range)	48VDC (40 - 60VDC) <sup>1</sup>
Nominal current (at 48VDC and 2400W output)	53.4A
Maximum input current (for 15 seconds) / voltage ripple	66.8A / < 10mV RMS

**AC Output Data**

Efficiency AC to AC (EPC) / DC to AC / AC to DC	> 96% / > 93.7% / > 93.7%
Nominal voltage <sup>2</sup> (Adjustable)	230VAC (200 - 240VAC)
Frequency / frequency accuracy	50 or 60Hz / 0.03%
Nominal Output power (VA) / (W)	3000VA / 2400W
Short time overload capacity	125% (15 seconds)
Admissible load power factor	Full power rating from 0 inductive to 0 capacitive
Total harmonic distortion (resistive load)	< 3%
Load impact recovery time (10% - 90%)	≤ 0.4ms
Nominal current	13A @ 230VAC
Crest factor at nominal power	3 : 1 for load P.F. ≤ 0.7
Short circuit clear up capacity at AC input / On battery	109A / 34A RMS for 20ms
Short circuit current after > 20ms	22.5 A for 15 seconds
AC output voltage stability	± 1% from 10% to 100% load

**DC Output Data**

Nominal voltage (range)	53.5VDC (44 - 60VDC)
Maximum power	2.4kW <sup>3</sup>
Maximum current at 48VDC	50A
Reverse polarity protection	YES
Efficiency AC to DC	> 93.7%
Max. Voltage interruption / total transient voltage duration (max)	0 sec / 0 sec

