NE050ECO48ATEZ ECO Priority Rectifier

Uncompromised Advanced Technology to Simplify Your Network

The OmniOn Power™ NE050ECO48A ECO Priority Single-phase Rectifier is designed to efficiently transform energy from any source* into the 48 Volt DC power needed for wireless cell sites. This means that one single rectifier can be used globally to meet all your 48V powering needs – even if you have off grid sites that use renewable sources to keep refuelling and maintenance cost down.

The ECO Priority Rectifier prioritizes the renewable source by using Maximum Power Point Tracking to optimally draw from the renewable source, using grid and generator power only as a compliment to the sustainable source.

Solar Applications*

ECO Priority Rectifiers efficiently and easily transform solar panel output into telecom grade -48 Volt power. They use a straightforward provisioning method where one rectifier is assigned to manage one string of solar panels, and are a good product match with the most popular mono and poly crystalline solar panels on the market today.

A True System Solution

ECO Priority Rectifiers are part of the proven Infinity Power System particularly designed to meet the unique needs of wireless sites.

- Monitoring / control – the built in microprocessor controls and monitors all critical rectifier functions and communicates with the system controller using the built in Galaxy Protocol serial interface.
- Dual Voltage Compatible – unique connector pin designation allows the 48 Volt rectifier to be used in a “Universal” power shelf, alongside DC-DC converters supporting loads at 24 Volts dc.
- Plug and Play – installation of the rectifier in a shelf connected to a compatible system controller initializes all set up parameters automatically. No adjustments are needed.

Feature and Advantages

- Compact – 1RU form factor provides high power density 24 Watts / Cubic inch.
- Efficient – Peak efficiency of 95.6 % occurs at 50% load matching sweet spots with customer use patterns.
- Flexibly provides 50 Amps of 48 Volt power from both conventional and sustainable sources of energy.
- Starts and runs at any input voltage from 95 to 275 V_{AC} or from 100 to 400V_{DC}.
- Operates over a broad temperature range (-40°C through +75°C).
- Fail safe performance – hot insertion capabilities allow for rectifier replacement without system shutdown; soft start and inrush current protection prevent nuisance tripping of upstream breakers.
- Extended service life – parallel operation with automatic load sharing ensures that units are not unduly stressed.

Electrical Specifications

INPUT VOLTAGE & OUTPUT POWER	
Response to AC Input Voltage	Operates according to figure, turning on at all V_{IN} above $90V_{AC}$. Output power: 1200W < $140V_{AC}$ 2725W > $175V_{AC}$ Output power follows linear path between defined points. 300V max excursion voltage
AC Input Current	15A max @ $120V_{AC}$ 15A @ 200-$240V_{AC}$
Power Factor	0.98 @ loads over 50%[1]
THD	< 5% @ loads over 50%[2]
Holdover	15 milliseconds, with V_{OUT} final >21 V
Frequency	45-66Hz or DC
Response to DC input voltage	Maximum Power Point Tracking from 100-$400V_{DC}$ with full power above $250V_{DC}$
DC input current	11A max. Photo Voltaic source only. Output power based on source.
Max system DC voltage	$200V_{DC}$ max PV system voltage to ground is obtained by mid-string, centre point, grounding each string and sizing stings according to lowest recorded temperature at site.

OUTPUT	
V_{OUT}	+42–$58V_{DC}$ range Default = 54.5 V_{DC}
I_{OUT}	22A @ low input line 50A @ high input line
Regulation	0.05% w/controller
Ripple	100 mV_{RMS}, 250 mV_{P-P}[3]
Efficiency	95.6%
Soft Start	Starts up into fully discharged batteries.

*AC and solar source capability as of Nov. 2012

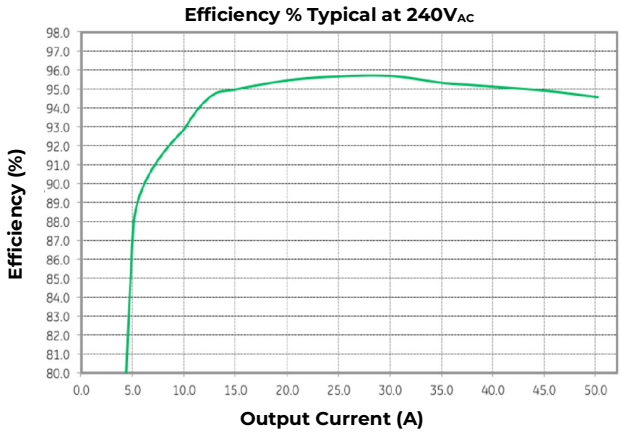
[1] 180V_{AC} to 240V_{AC} Input, 0.98 typical.
>240V_{AC} Input, 0.96 typical.

[2] 180V_{AC} to 240V_{AC} > 60% load.
240V_{AC} to 275V_{AC} > 80% load.
>275V_{AC} THD unit operational and THD can be out of specification.

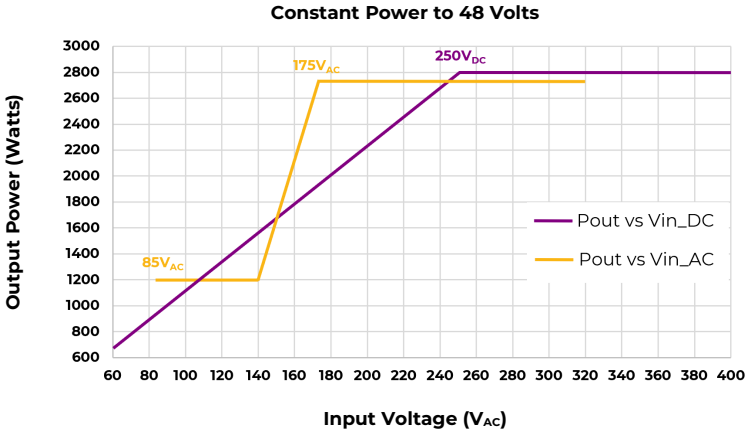
[3] May fallout of specification for voltages >295V_{AC}.
Limits may be exceeded momentarily during load dynamic change from 5-10A.

Characteristic Curves

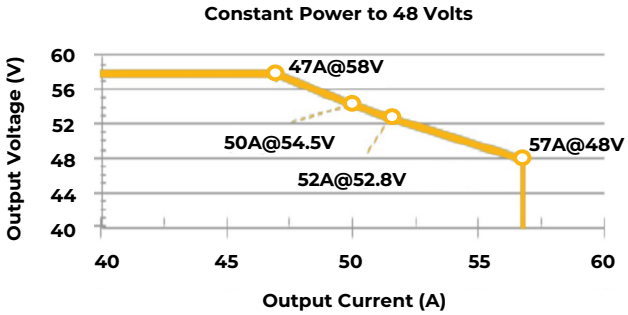
Efficiency is market leading for diode protected, true hot pluggable, 48 Volt rectifiers. The NE050ECO48A offers a powerful combination of efficiency, network simplicity and reliability.

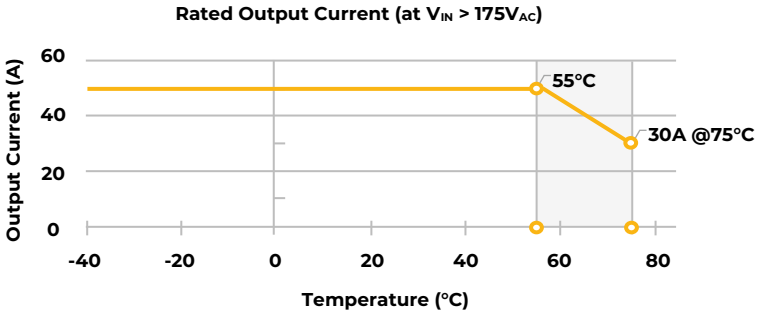


Efficiency vs Output Current
(Temp: 25°C, V_{IN} 240V_{AC}, 60Hz)



Output Power vs AC Input Voltage





Environmental, Compliance & Physical

Operating Ambient Temperature Range	-40°C to +75°C (Output derates at 2%/°C beginning at 55°C)
Cooling Method	Front to back airflow with onboard temperature controlled fans
Operating Relative Humidity	0 - 95% (non-condensing) for use in a controlled environment
Electromagnetic Compatibility	FCC Part 15, EN 55032 (CISPR32), EN 55035, Level A, GR-1089
Lightning Surge	EN/IEC 61000-4-5 Level 4 (Error free), ANSI C62.41 Category B 100 kHz ring and 1.2/50µs combination waves (6kV damage free)
Agency Certifications* Planned	UL1950, EN60950, CSA*234/950, NEBS GR-1089, GR-63-CORE, RoHS 6/6
Heat Release	158 Watts, or 539 BTU/hr at full load of 2725 Watts
Mean Time Between Failure (MTBF)	300k Hours @ 25°C per Telcordia SR-332, Method 1, Case 3
Height x Width x Depth **Weight, Packaged Weight**	1.63x5.23x13.85in (42x133x352mm) 5.05 lbs (2.2 kg), 5.95 lbs (2.7kg)

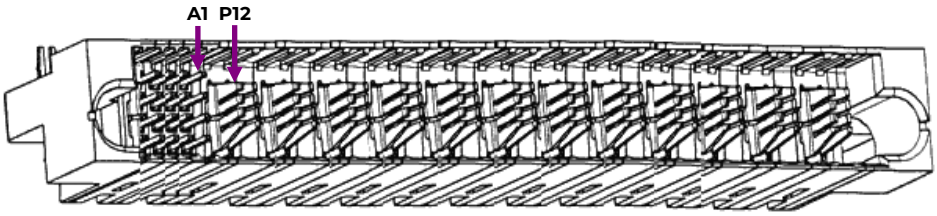
Power Unit and Power Unit Shelf Connectors

Power Unit PWB

A4	A3	A2	A1	-48V	-48V	RTN	RTN	RTN	RTN	+24V	+24V	+24V	PE/GND (ACEG)	L2/N	L1
B4	B3	B2	B1			(-48/ +24V)	(-48/ +24V)	(-48/ +24V)	(-48/ +24V)						
C4	C3	C2	C1												
D4	D3	D2	D1												
				P12	P11	P10	P9	P8	P7	P6	P5	P4	P3	P2	P1
4x Pins	4x Pins	4x Pins	4x Pins	Blade	Blade	Blade MFBL (long)	Blade MFBL (long)	Blade MFBL (long)	Blade MFBL (long)	Blade	Blade	Blade	Blade MFBL (long)	Blade	Blade

Outline Drawing

Shown looking into the rear of the power unit

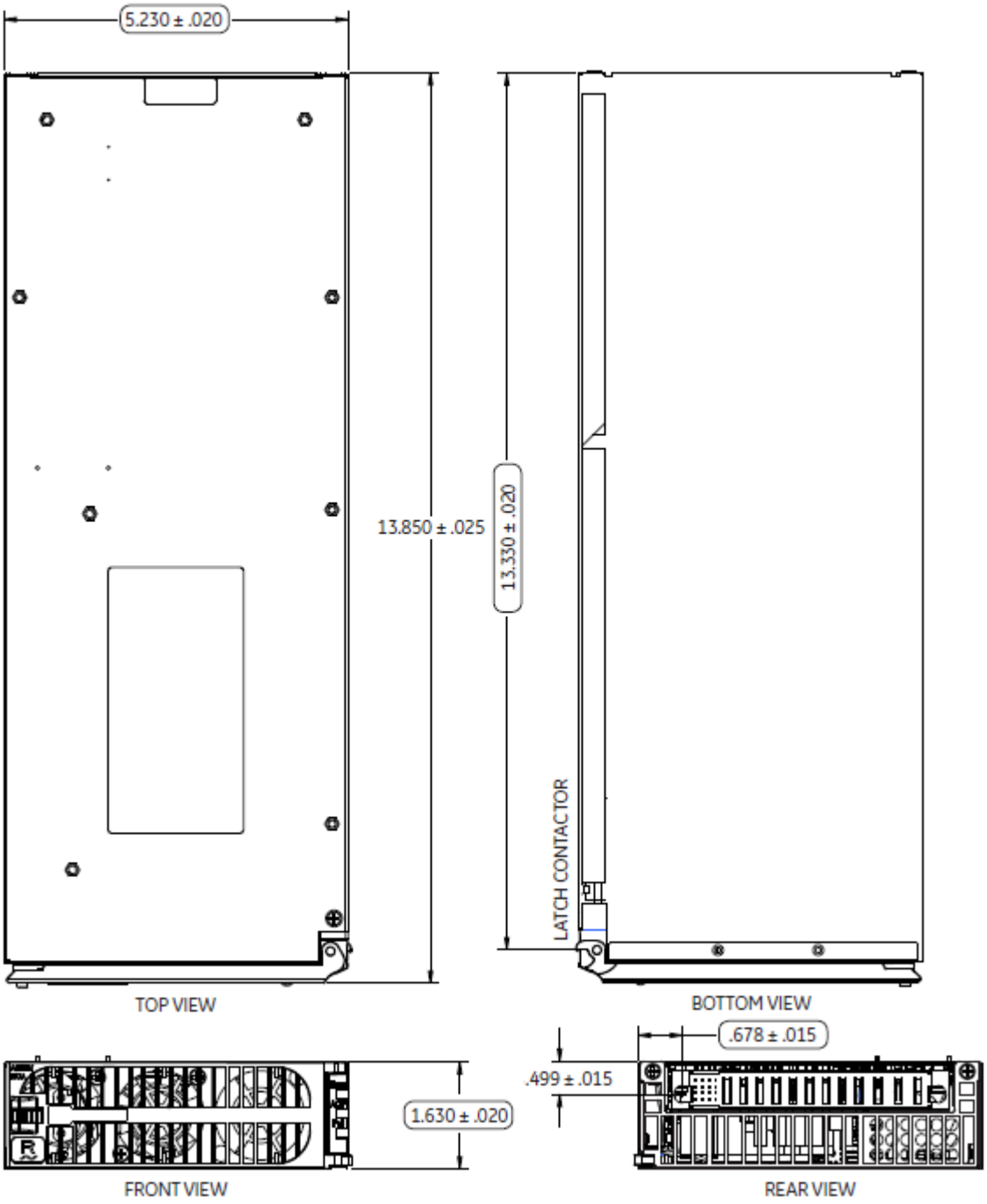


Power Unit Connector - AMP Multi-Beam XL (FCI # 51939-234LF or Tyco # 1900948-1)

Signals and Signal Pins

Pin	Length	Signal	Description	
A1	Long	RS-485-	Non-Inverting RS-485 signal line (RS-485 A)	
B1	Long	RS-485+	Inverting RS-485 signal line (RS-485 B)	
C1	Long	Factory Programming	Reserved for Factory Programming – Open Circuit in the system shelf.	
D1	Long	Return	• Signal Return for PSIDn, SIDn, & Interlock • Power Units Connect Return to NE Common Return internally. • Power Units diode isolate the Return signals from each Power Slot.	
A2	Long	PSID0	Power Slot Address 0	• Logic 1 = Open Circuit (~3.3V). Logic 0 = Connection to the Return signal (~0.7V). • Left slot (front view) is Power Slot 1 and has address 000B. • Power Slot ID signals are connected directly to the Return signal at each Power Slot or left open.
B2	Long	PSID1	Power Slot Address 1	
C2	Long	PSID2	Power Slot Address 2	
D2	Long	SID3	Shelf Address 3	• Logic 1 = Connection to Return signal (~0.7V). Logic 0 = Open Circuit (~3.3V). • Shelf addresses 1 (00001B) through 31 (11111B) are valid. Shelf address 0 (00000B) is invalid. Address 31 (11111B) disables comm. fail LED • Power Unit Shelf ID signals connect to Shelf Return left open
A3	Long	SID4	Shelf Address 4	
B3	Long	SID5	Shelf Address 5	
C3	Long	SID6	Shelf Address 6	
D3	Long	SID7	Shelf Address 7	
A4	Short	Interlock	• Disables power conversion within a Power Unit when not connected to the Return signal. • Power Unit Shelves connect Interlock directly to the Return signal at each Power Slot.	
B4	Long	Factory Programming	Reserved for Factory Programming – Open Circuit in the system shelf.	
C4	Long			
D4	Long			

Physical Interface Dimensions



Change History (excludes grammar & clarifications)

Revision	Date	Description of the change
1.2	07-12-2021	Updated as per template
1.3	11-15-2023	Updated as per OmniOn Power™ template
1.4	12-21-2023	Added footnotes in “Electrical Specifications” section
1.5	01-04-2024	Updated to change FS to DS
1.6	06-24-2024	Updated Document short name (DSN), Formatting changes

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