



V Series Rectifier Module

Overview

Eltek V-series rectifiers provide industry-leading efficiency in a 2 RU footprint. Reliability, scalability, and hot-swap capability make for optimal system design and cost-effective deployment—from initial installation to future upgrades. The high-efficiency ("HE") models deliver up to **96%** conversion efficiency and have earned the ENERGY STAR®.

The Eltek Difference

A Better Choice

Energy efficiency is a practical choice that helps protect the environment. Eltek is committed to forming partnerships dedicated to this cause. We are proud to offer the first line of rectifier modules that have earned the ENERGY STAR®.

Industry-Leading Efficiency

With an average efficiency of 96%, V-Series HE rectifiers reduce energy waste and costs. Since they generate less heat, it takes less energy to cool the equipment and immediate environment, thereby reducing expenses throughout the network.

Optimization

Eltek rectifiers are optimized for the demanding power and power conversion needs of wireless communications, enterprise and broad-band access equipment.

Flexibility

V-Series rectifiers are designed to operate in Eltek's Compact and Integrated DC Power Systems. Utilize V-Series rectifiers for 92% conversion efficiency. Upgrade to V-Series HE rectifiers for up to 96% efficiency.

Features

- Average **96%** efficiency (V-series "HE" models)
- V-series High-Efficiency (HE) rectifiers are ENERGY STAR qualified products
- Only 2RU in height
- 100VAC to 240VAC input range
- Operates between 90VAC and 264VAC
- Output power up to 2800W
- Operates at full power in temperatures up to +65°C
- Power factor correction
- Hot-plug/hot-swap installation
- Redundant parallel operation
- Active load sharing
- Advanced internal monitoring
- Front status LEDs
- Internal over-temperature protection
- Internal surge protection
- NEBS Level 3
- CSA/UL Recognized
- VDE Certified
- CE Mark for Low Voltage Directive
- GR-3108 compliant

ENERGY STAR and the ENERGY STAR mark are registered U.S. marks.

Eltek is an ENERGY STAR partner. Thank you for choosing ENERGY STAR qualified products.



Table 1 - V-Series High Efficiency (“HE”) Rectifiers

Rectifier Part Number	Minimum Input Voltage (VAC)	Maximum Rated AC Current (A)	AC Input Voltage Range (VAC)	Nominal DC Output Voltage (VDC)	DC Output Current (A)	Operating Temperature Range
V1000A1-HE	90 / 180	13.55 / 6.33	90-264	48	20	-40°C to +65°C
V1500A1-HE	180	9.87	180-264	48	30	-40°C to +65°C
V2000A1-HE	180	13.34	180-264	48	40	-40°C to +70°C

The V-Series High-Efficiency (HE) rectifiers listed above in Table 1 are ENERGY STAR qualified products.



Table 2 - Standard V-Series Rectifiers

Rectifier Part Number	Minimum Input Voltage (VAC)	Maximum Rated AC Current (A)	AC Input Voltage Range (VAC)	Nominal DC Output Voltage (VDC)	DC Output Current (A)	Operating Temperature Range
V0500A-VC	90 / 180	7.4 / 3.6	90-264	48	10	-40°C to +65°C
V0750A-VC	90 / 180	11.1 / 5.4	90-264	48	15	-40°C to +65°C
V1000A-VC	90 / 180	14.6 / 7.0	90-264	48	20	-40°C to +65°C
V1250A-VC	90 / 180	17.8 / 9.0	90-264	48	25	-40°C to +75°C
V1500A-VC	180	10.4	180-264	48	30	-40°C to +65°C
V2000A-VC	180	14.5	180-264	48	40	-40°C to +70°C
V2500A-VC	180	17.4	180-264	48	50	-40°C to +65°C
V1500B-VC	180	10.9	180-264	24	60	-40°C to +73°C

Additional Technical Specifications - High Efficiency (HE) Rectifiers

AC Input

MODEL	V1000A1-HE	V1500A1-HE	V2000A1-HE
Input Voltage (min)	90 Vac	180 Vac	
Input Voltage (max)	264 Vac		
Input Frequency (min)	47 Hz		
Input Frequency (max)	63 Hz		
Input Current (max)			
@ 90 Vac (amps)	13.55	-	-
@ 120 Vac (amps)	9.92	-	-
@ 180 Vac (amps)	6.33	9.87	13.34
@ 208 Vac (amps)	5.66	7.73 (@ 230 Vac)	10.30 (@ 230 Vac)
Inrush Current (max)	30 amps peak (excludes X caps in the EMC input filter)		
Power Factor	.99 @ typ. @ 230Vac, full load		

DC Output

MODEL	V1000A1-HE	V1500A1-HE	V2000A1-HE
Vo Set Point (Vdc min/typ/max)	42/48/56		
Regulation (min/max)	±1% (Total regulation line, load, aging & temperature)		
Output Current (min/max amps)	0/20	0/30	0/40
Output Power (watts max)	1120	1680	2240
Current Limit Setpoint (min/max amps)	21/24	31/36	42/48
Short Circuit Current (peak amps)	30	45	60
Short Circuit Current (RMS amps)	20	30	40
Output Noise*	25 mV rms typical (10kHz to 20MHz) 36dBrc (@54V and full load)		
Output Rise Time* (min/max)	100/400 msec (measured at 10 – 90% of final output level)		
Dynamic Response* (maximum)	3% (change in output voltage within 10 msecs after a 10 to 100% load step change)		
Turn On Delay* (max)	3.5 sec (measured from application of valid ac voltage to regulation set-point)		
Adjustable Over-voltage Protection (min/max)	54/60 Vdc, remotely configured		
Backup Over-voltage Protection (max)	60 Vdc		
Load Sharing (min/max)	±5% of full load		
Reverse Output Current (max)	0.5 amps (internal reverse protection provided)		
Average Efficiency (typical @ 230 Vac)	96.2%		

*Compliant from -20°C to +75°C

Typical specifications, unless otherwise stated
Nominal line: 230 VAC
Nominal setpoints: 54 VDC (for 48Vrectifiers)
Nominal load: 100% of rated current
Specifications are subject to change without notice

V-Series High Efficiency (HE) Rectifiers have earned the ENERGY STAR for Uninterruptible Power Supplies



Additional Technical Specifications – Standard Rectifiers

AC Input

MODEL	V0500A	V0750A	V1000A	V1250A	V1500A	V2000A	V2500A	V1500B
Input Voltage (min)	90 Vac				180 Vac			
Input Voltage (max)	264 Vac							
Input Frequency (min)	47 Hz							
Input Frequency (max)	63 Hz							
Input Current (max)								
@ 100 Vac (amps)	6.6	9.8	13.2	14.2	-	-	-	-
@ 120 Vac (amps)	5.4	8.2	10.6	12.3	-	-	-	-
@ 180 Vac (amps)	3.6	5.4	7.0	9.0	10.4	14.5	17.4	10.9
@ 208 Vac (amps)	3.1	4.7	6.0	7.5	9.0	12.5	14.8	9.4
Inrush Current (max)	30 amps peak (excludes X caps in the EMC input filter)							
Power Factor	.98 typ. @ 230Vac, full load			.99 @ typ. @ 230Vac, full load				

DC Output

MODEL	V0500A	V0750A	V1000A	V1250A	V1500A	V2000A	V2500A	V1500B
Vo Set Point (Vdc min/typ/max)	42/48/56							21/24/28
Regulation (min/max)	±1% (Total regulation line, load, aging & temperature)							
Output Current (min/max amps)	0/10	0/15	0/20	0/25	0/30	0/40	0/50	0/60
Output Power (watts max)	560	840	1120	1400	1680	2240	2800	1680
Current Limit Setpoint (min/max amps)	10.5/12	15.5/18	21/24	26/30	31/36	42/48	52/60	63/72
Short Circuit Current (peak amps)	20	25	30	38	45	60	75	90
Short Circuit Current (RMS amps)	10	15	20	25	30	40	50	60
Output Noise*	25 mV rms typical (10kHz to 20MHz) 36dBrc (@54V and full load)							
Output Rise Time* (min/max)	100/400 msec (measured at 10 – 90% of final output level)							
Dynamic Response* (maximum)	3% (change in output voltage within 10 msec after a 10 to 100% load step change)							
Turn On Delay* (max)	3.5 sec (measured from application of valid ac voltage to regulation set-point)							
Adjustable Over-voltage Protection (min/max)	54/60 Vdc, remotely configured							27/30 Vdc, remotely configured
Backup Over-voltage Protection (max)	60 Vdc							34 Vdc
Load Sharing (min/max)	±10 % of full load	±5% of full load						
Reverse Output Current (max)	0.5 amps (internal reverse protection provided)							
Efficiency (typical @ 230 Vac)	88%	91%			92%		90%	

*Compliant from -20°C to +75°C

Typical specifications, unless otherwise stated

Nominal line: 230 VAC

Nominal setpoints: 54/27 VDC (for 48V/24V rectifiers, respectively)

Nominal load: 100% of rated current

Specifications are subject to change without notice

Additional Specifications

Auxiliary Output

PARAMETER	
Nominal Voltage	12V
Vmin/max	10.5 / 14
Source Current Rating (min/max)	0 / 500mA
Sink Current* (max)	100mA

* Current required for internal controls when AC is not present

Physical

PARAMETER	
Height	87.6mm (3.45") (includes faceplate)
Width	86.7mm (3.41") (includes faceplate)
Depth	282.9mm (11.14")
Weight	3.2kg (7 lbs)

Environmental

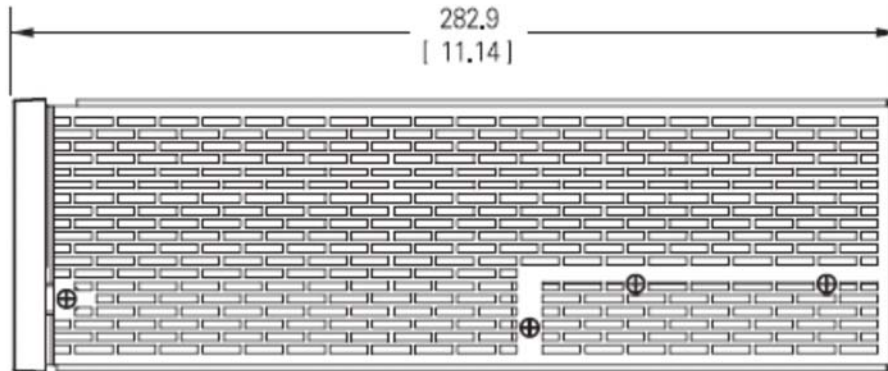
PARAMETER	MINIMUM	MAXIMUM	UNIT	NOTES
Storage Temperature	-40	85	°C	
Operating Temperature (internal cooling)	-40	65	°C	V1250A operates in temps up to 75°C; V2000A, up to 70°C; V1500B, up to 73°C
Humidity	5	95	%	Relative humidity, non-condensing
Altitude	-200	8000	Ft	For operation above 8000' , maximum temperature is derated 2°C per 1000' for temps above 65°C

APPLICABLE STANDARDS			
NEBS Level 3		EN61000-4-3	Radiated, radio-frequency, electromagnetic field immunity test. 10 V/m.
GR-3108-CORE	Class 2: Protected Environments	EN61000-4-4	Electrical fast transient/burst immunity test.
EN55022 Level B	Radiated Emissions Conducted Emissions	EN61000-4-5	Surge immunity test. 6 kV: Line to Line. 6 kV: Line to Ground.
EN61000-3-2	Limits for harmonic current emissions	EN61000-4-6	RF Common Mode.
EN61000-3-3	Limits for voltage fluctuations and flicker in low-voltage systems.	EN61000-4-8	Magnetic Field.
EN61000-4-2	Electrostatic discharge immunity test.	EN61000-4-11	Voltage dips, short interruptions and voltage variations.

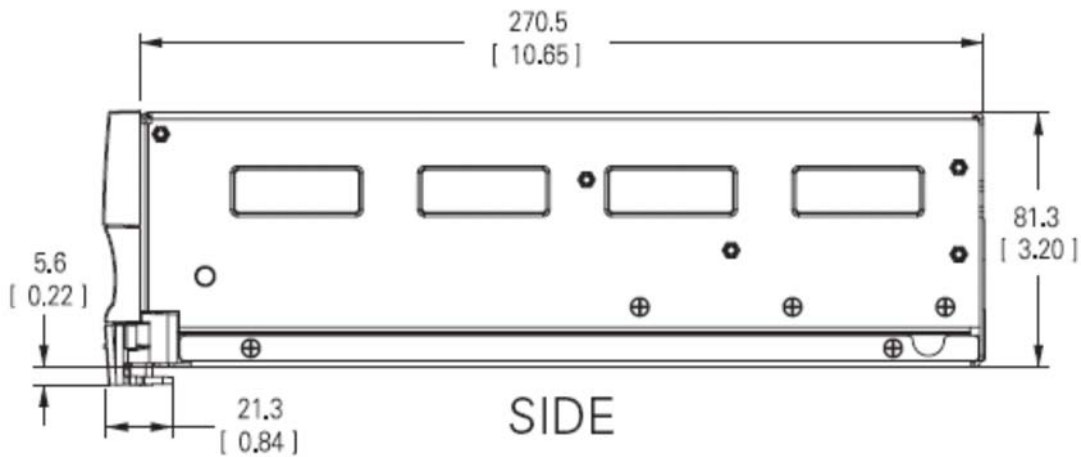
V Series Rectifier Module

Dimension drawings

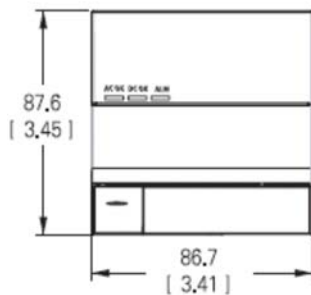
TOP VIEW



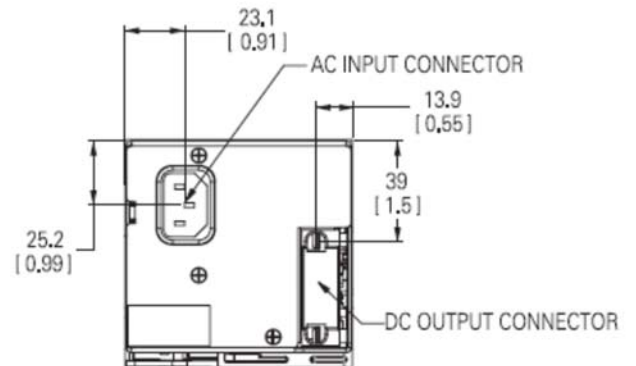
SIDE VIEW



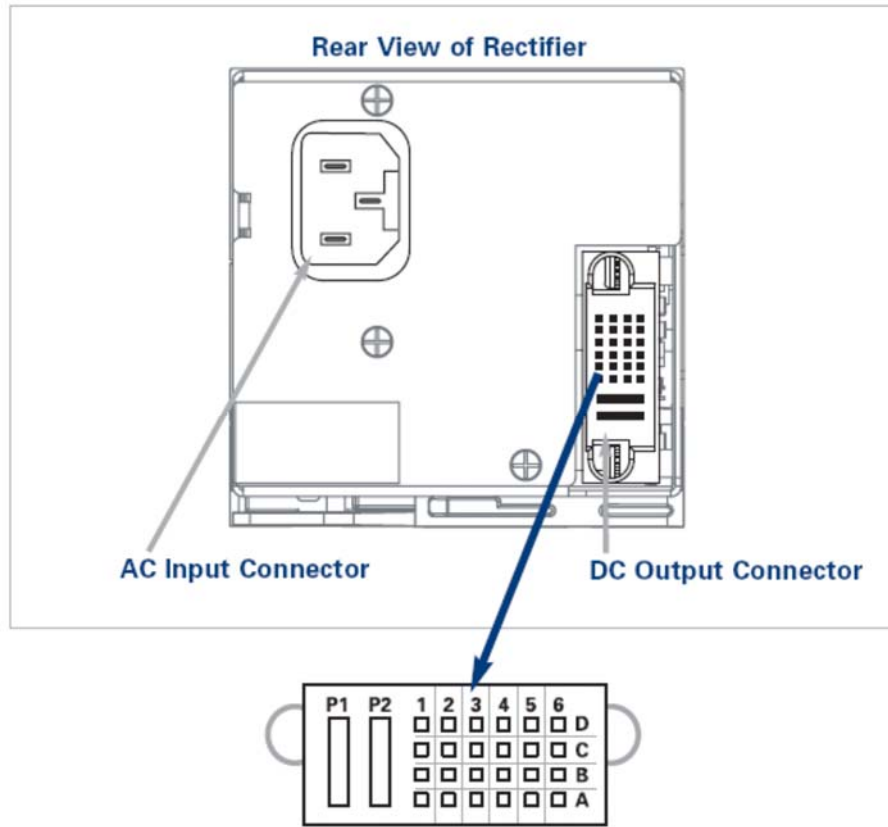
FRONT VIEW



BACK VIEW



Rectifier Connector Pin-out



Unit Connector p/n: 51732-007
 Mating Connector p/n: 51742-102024
 Supplier: FCI/Berg

FCI NUMBERING	1	2	3	4	5	6
D	REMOTE_SENSE+	MODULE_DISABLE	MODULE_PRESENT	AC_FAIL	LOGIC_GROUND	MODULE_ALARM
C	REMOTE_SENSE-	SHORT_PIN	OPTION	RESERVED	OPTION	SHELF_BIAS
B	OPTION	OPTION	LOC1	OPTION	RESERVED	SCL
A	V_MARGIN	ISHARE	LOC2	LOC0	TEMP	SDA
P1	OUTPUT POSITIVE					
P2	OUTPUT NEGATIVE					

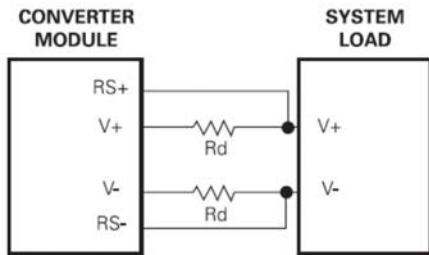
Rectifier Signal Descriptions

OUTPUT+ and OUTPUT-

Power blades used for connecting positive and negative power connections.

REMOTE_SENSE+ and REMOTE_SENSE-

These signals are used to compensate for distribution drop across the output distribution. The maximum voltage drop from the rectifier module to the remote sense connection (the complete round trip) must be maintained to less than 1V.



The remote sense leads may be left un-terminated in applications where remote voltage regulation is not required.

ISHARE

All rectifiers ISHARE pins are tied together on the system backplane to support load sharing. This connection may be terminated between rectifiers or left un-terminated in systems where load share is not required.

SHORT_PIN

The short pin is used to disable the rectifier if not fully seated in a system. It is required to be tied to OUTPUT- in the system backplane in order for the rectifier to provide proper output voltage. It may not be left un-terminated.

I²C Communications Bus (SCL, SDA, LOC0, LOC1, LOC2)

The I²C Communications Bus provides information about internal rectifier conditions as well as full control of output voltage and alarming set-points. SCL and SDA are common data signals and can be wired directly to a system controller or on a common shared bus between the rectifiers in a system and the main system controller.

LOC0, LOC1, and LOC2 are location pins used to set rectifier address in a system where the I²C bus is shared between rectifiers. They may be left un-terminated to generate a logic 1 or connected to OUTPUT- to generate a logic 0.

The I²C Communications Bus signals are logic referenced to OUTPUT-. The Address Scheme is shown.

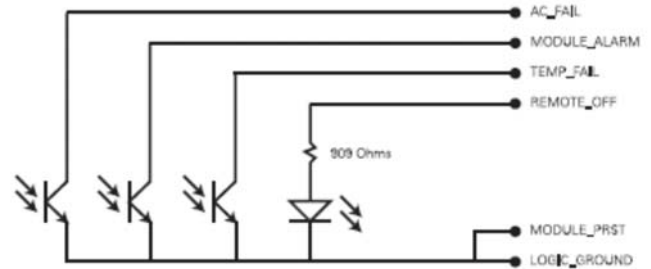
LOC 0 Logic Level	LOC 1 Logic Level	LOC 2 Logic Level	Rectifier I ² C Position
0	0	0	0x10
0	0	1	0x12
0	1	0	0x14
0	1	1	0x16
1	0	0	0x18
1	0	1	0x1A
1	1	0	0x1C
1	1	1	0x1E

For more information on I²C, refer to the I²C Application Guide.

SHELF_BIAS

Provides a 12V/500 mA bias for system operation. Shelf bias is a bi-directional signal that can be provided from an external source to power the secondary control circuitry within each rectifier. Shelf bias is internally protected from overload conditions.

Isolated Interface Signals



AC_FAIL

This signal is an opto-isolated open collector signal referenced to LOGIC_GROUND within each rectifier. AC_FAIL is a normally closed signal which signifies the presence of an alarm with a high impedance. AC_FAIL indicates the presence of valid AC input voltage to the rectifier.

MODULE_ALARM

This signal is an opto-isolated open collector signal referenced to LOGIC_GND within each rectifier. MODULE_ALARM is a normally closed signal which signifies the presence of an alarm with a high impedance. MODULE_ALARM is designed to provide a power fail warning to indicate the pending loss of DC voltage during line drop conditions. MODULE_ALARM is asserted at least 5mSec prior to loss of DC output voltage during these conditions.

TEMP_FAIL

This signal is an opto-isolated open collector signal referenced to LOGIC_GND within each rectifier. TEMP_FAIL is a normally closed signal which signifies the presence of an alarm with a high impedance. This alarm indicates that the rectifier module has shut down due to an over temperature condition.

REMOTE_OFF

This signal is a current limited input designed to accept a 3.3V to 5V input voltage. Applying a voltage between these pins will result in disabling the DC output voltage from the rectifier. This signal may be left un-terminated in systems where REMOTE_OFF is not required or is implemented via the I²C Interface.

MODULE_PRESENT

This signal is internally connected to LOGIC_GND within each rectifier. It may be used to determine the presence of a rectifier module in a system location.