# H-series
## (Rectifier Module)

### Overview:

The Eltek Valere rectifier modules provide unprecedented power density and power levels in a true plug and play format. With a wide range of available voltages, power ratings, and form factors, the rectifiers provide optimal and cost effective solutions for your power needs.

### (The Eltek Valere Difference)

**Optimization**

Eltek Valere rectifiers are optimized for the demanding power needs of wireless communications, enterprise and broadband access equipment.

**Small size, big power**

These compact 1RU rectifiers can provide up to 2500 Watts of power. The small size frees up space to reduce system size or incorporate additional electronics.

**Industry leading efficiency**

An industry leading 93% efficiency reduces the thermal load thus improving the overall reliability and availability of the system.

**Flexibility**

These rectifiers are designed to operate as an integral component in Eltek Valere's H-series Mini DC Power Systems. They are extremely flexible and can be operated either with a system controller or as a standalone module in enterprise applications.

### (Features)

Small 1RU Footprint
Output Voltages from 12V to 48V
Output Power up to 2500W
Typical efficiency 93%
Wide Range Operating Temperature from -40℃ to +70° C
Universal AC Input
Power-factor Correction
Hot-Pluggable
Redundant Parallel Operation
Active Load Sharing
NEBS Level 3 Certified
UL60950 Recognized
VDE EN60950 Certified
Advanced Internal Monitoring
CE Mark for Low Voltage Directive

See reverse side for specifications

# (H-series Rectifier Module)

## Additional Technical Specifications

## AC Input Specifications

| H SERIES | H0750A1 | H1250A1 | H2000A1 | H2500A1 | H1500P1 | H1250B1 | H1250C1 | NOTES |
|---|---|---|---|---|---|---|---|---|
| Input Voltage (min) | 90 Vac | 90 Vac | 180 Vac | 180 Vac | 180 Vac | 90 Vac | 90 Vac | Startup Voltage. Unit operates to 5V below startup voltage |
| Input Voltage (max) | 264 Vac | | | | | | | Steady State Voltage. Unit with stands short duration excursions to 300Vac. |
| Input Frequency (min) | 47 Hz | | | | | | | |
| Input Frequency (max) | 63 Hz | | | | | | | |
| Input Current (max) | | | | | | | | |
| @ 100 Vac (amps) | 9.7 | 16 | - | - | | 16.4 | 16.6 | |
| @ 120 Vac (amps) | 7.9 | 13 | - | - | | 13.4 | 13.5 | |
| @ 180 Vac (amps) | 5.2 | 8.8 | 13.8 | 16.9 | | 8.7 | 8.9 | |
| @ 208 Vac (amps) | 4.5 | 7.6 | 12.0 | 14.6 | | 7.5 | 7.7 | |
| Inrush Current (max) | 34 amps peak | | | | | | | Excludes X caps in the EMC input filter. |
| Power Factor | .99 @ typ. @ 230Vac, full load | | | | | | | |

## DC Output Specifications

| MAIN OUTPUT | H0750A1 | H1250A1 | H2000A1 | H2500A1 | H1500P1 | H1250B1 | H1250C1 | NOTES |
|---|---|---|---|---|---|---|---|---|
| Vo Set Point (min/typ/max) | 42/48/56 | 42/48/56 | 42/48/56 | 42/48/56 | 28/36/42 | 21/24/28 | 10.5/12/14 | Volts |
| Regulation (min/max) | ±1 (%) | | | | | | | Total regulation line, load, aging & temperature |
| Output Current (min/max amps) | 0/15 | 0/25 | 0/40 | 0/50 | 0/40 | 0/50 | 0/100 | |
| Output Power (watts max) | 840 | 1400 | 2240 | 2800 | 1680 | 1400 | 1400 | |
| Current Limit Setpoint (min/max amps) | 5/20 | 5/30 | 5/48 | 5/60 | 5/48 | 5/60 | 10/120 | Current limit setpoint is adjustable via I2C or through Eltek Valere NIC. |
| Short Circuit Current (peak amps) | 23 | 37 | 60 | 75 | 60 | 75 | 150 | Excluding output capacitor discharge current. |
| Short Circuit Current (RMS amps) | 8 | 15 | 20 | 25 | 20 | 25 | 50 | |
| Output Noise* | o 20 mV rms typical (10kHz to 20MHz)<br>o 30 dBrnc (measured w/o external battery)<br>o 250mV P-P (10 Khz to 20 Mhz) | | | | | | | |
| 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* (maximum) | 3.5 sec | | | | | | | Measured from application of valid ac voltage to regulation set-point |
| Adjustable Over-voltage Protection (min/max) | 50/60V | 50/60V | 50/60V | 50/60V | 50/60V | 27/30V | 13/15V | Remotely Configured. Adjustable via I2C or through Valere NIC. |
| Backup Over-voltage Protection (max) | 60 Vdc | 60 Vdc | 60 Vdc | 60 Vdc | 60 Vdc | 32 Vdc | 19 Vdc | |
| Load Sharing (min/max) | ±5 (%) of full load | | | | | | | |
| Reverse Output Current (max) | 0.5 amps | | | | | | | Internal reverse protection is provided. |
| Efficiency | 90% | 92% | 93% | 93% | 92% | 90% | 88% | Typical @ 230 Vac |

NOTE: * Operating temperature range: -20℃ to +50℃


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## AUXILIARY OUTPUT SPECIFICATIONS

| AUXILIARY OUTPUT | H0750A1 | H1250A1 | H2000A1 | H2500A1 | H1500P1 | H1250B1 | H1250C1 | NOTES |
|---|---|---|---|---|---|---|---|---|
| Output 1 | | | | | | | | |
| 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 |

NOTE: Output 1 operates independent of main DC output and is referenced to Vout-

## PHYSICAL SPECIFICATIONS

| PARAMETER | H0750A1 | H1250A1 | H2000A1 | H2500A1 | H1500P1 | H1250B1 | H1250C1 | NOTES |
|---|---|---|---|---|---|---|---|---|
| Depth | 361.9mm (14.25") | | | | | | | |
| Height | 101.7mm (4.00") | | | | | | | |
| Width | 41.3mm (1.63") (chassis), 42.9mm (1.69") (faceplate) | | | | | | | |
| Weight | 2.7kg (6lbs) | | | | | | | |

## ENVIRONMENTAL SPECIFICATIONS

| PARAMETER | Minimum | Maximum | UNIT | NOTES |
|---|---|---|---|---|
| Storage Temperature | -40 | 85 | ℃ | |
| Operating Temperature | -40 | 70 | ℃ | Full power -40℃ to +50℃; output power derates 2%/℃ above 50℃. |
| Humidity | 5 | 95 | % | Relative Humidity Non Condensing |
| Altitude | -200 | 8000 | Ft | For operation above 8000' , maximum temperature is derated 2℃ per 1000' |

## General Requirements

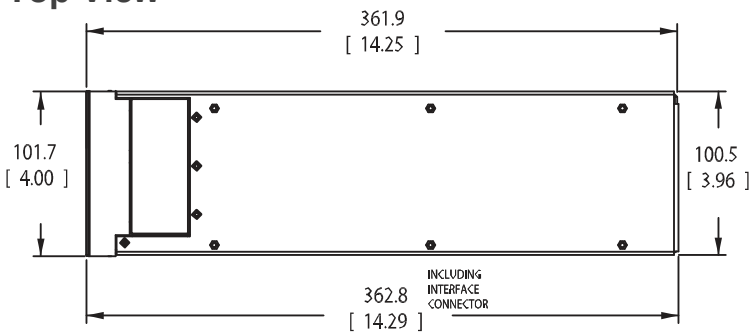
| Applicable Standards | | | |
|---|---|---|---|
| Shock | IEC68-2-27, Mil-STD-810E, 20G | EN61000-3-3 | Limits for voltage fluctuations and flicker in low-voltage systems. |
| Vibration | IEC68-2-64 (random vibration), Frequency Range: 20 - 2000 Hz, Time duration: Minimum of 30 minutes. | EN61000-4-2 | Electrostatic discharge immunity test. Level 4. All user accessible ports. Damage free, operational and non-operational. Criterion B. |
| Seismic Rating | Zone 4, per GR-63-CORE | EN61000-4-3 | Radiated, radio-frequency, electromagnetic field immunity test. Level 3: 10 V/m. |
| Radiated EMI | Conforms to EN55022, Level B. | EN61000-4-4 | Electrical fast transient/burst immunity test. Level 4. |
| Conductive Emissions | EN55022, Level B & FCC Class B | EN61000-4-5 | Surge immunity test. Installation Class 4. 6 kV: Line to Line, Criterion A. 6 kV: Line to Ground, Criterion A. |
| NEBS | EMC, Surge Standards, and Electrical Safety per GR-1089-CORE. | EN61000-4-6 | RF Common Mode. Level 3, Criterion A. |
| IEEE-C62.41 | IEEE Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits. Category A2. | EN61000-4-8 | Magnetic Field. Level 3, Criterion A. |
| EN61000-3-2 | Limits for harmonic current emissions for class D equipment. | EN61000-4-11 | Voltage dips, short interruptions and voltage variations. |

Specifications are subject to change without notice

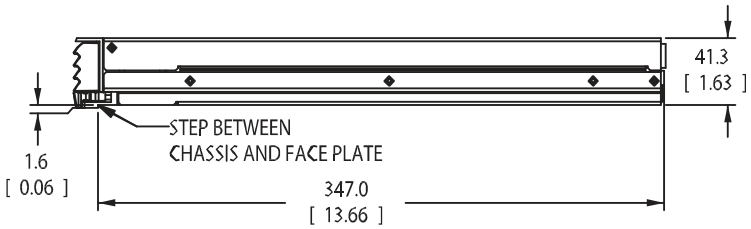
# (H-series Rectifier Module)

## Dimension drawings

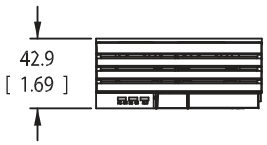
### Top View



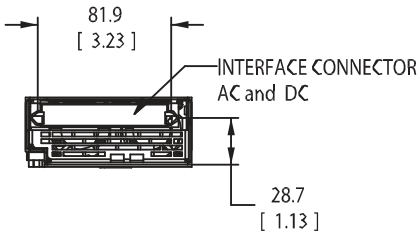

### Side View




### Front View

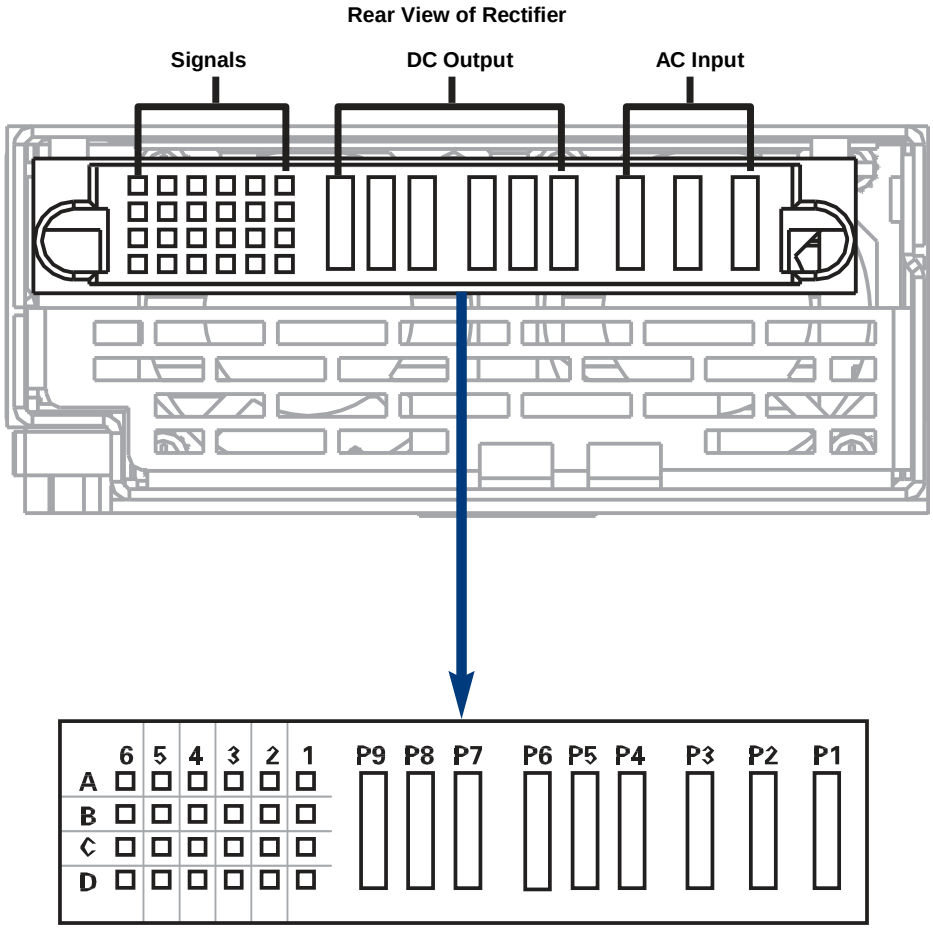



### Back View



# (H-series Rectifier Module)

## Rectifier Connector Pin-out Requirements




Unit Connector p/n: 51939-140LF
Mating Connector p/n: 51866-025LF
Supplier: FCI/BERG

| FCI NUMBERING | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|
| A | LOGIC_GROUND | AC_FAIL | OPEN | LOC1 | SCL | ISHARE |
| B | MODULE_ALARM | MODULE_PRST_OUT | OPEN | LOC0 | RESERVED | REMOTE_SENSE- |
| C | MODULE_DISABLE | MODULE_PRST_IN | RESERVED | AUX_OUTPUT_1 | V_MARGIN | SECONDARY_RETURN |
| D | TEMP_ALARM | OPEN | LOC2 | SDA | SHORT_PIN | REMOTE_SENSE+ |
| P9 | OUTPUT POSITIVE | | | | | |
| P8 | | | | | | |
| P7 | | | | | | |
| P6 | OUTPUT RETURN | | | | | |
| P5 | | | | | | |
| P4 | | | | | | |
| P3 | CHASIS GROUND | | | | | |
| P2 | AC LINE 1 | | | | | |
| P1 | AC LINE 2 | | | | | |

## (Non-Isolated Signals)

### 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.

### V_MARGIN

V_Margin is used in systems where analog voltage margining up of the output voltage is required. The rectifier output voltage will default to the I2C setpoint value, which is factory default set to the nominal output of the specific rectifier (see table on page 2). Analog margining will then allow a host system to increase the rectifier above this I2C setpoint. It may be left un-terminated in systems where this feature is not required.

| INPUT VOLTAGE | RECTIFIER OUTPUT VOLTAGE INCREASE |
|---|---|
| 0V or Un-terminated | 0V |
| 5V | 10V |

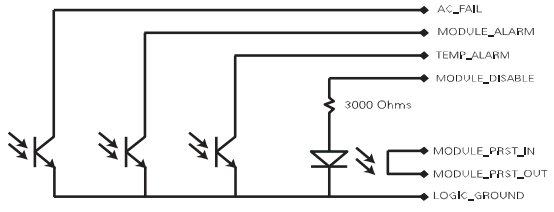
### Address Pins (LOC0, LOC1, LOC2)

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 logic 1 or connected to OUTPUT- to generate logic 0.

### I2C Communications Bus (SCL, SDA)

The I2C Communications Bus provides information about internal rectifier conditions as well as full control of output voltage and alarming setpoints. 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. The rectifiers communicate via the proprietary Eltek Valere Communication Protocol. Contact your Eltek Valere representative for technical assistance in interfacing to the rectifiers using this interface protocol. The I2C Bus signals are logic referenced to OUTPUT-.

ISOLATED ALARM INTERFACE




## (Isolated Signals)

### MODULE_PRESENT

This signal is a connection to logic ground. It may be used to determine the presence of a rectifier module in a system location.

### AC_FAIL_ALARM

This signal is an opto-isolated open collector signal referenced to LOGIC_GND within each rectifier. AC_ALARM is a normally closed signal which signifies the presence of an alarm with a high impedance. AC_ALARM 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 an 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.

### OVERTEMP_ALARM

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

### MODULE_DISABLE

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





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