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SAGEON

SAGEON® Micro 48VDC Rectifier 6 Amps to 50 Amps

Overview

The SAGEON® Micro 48V Series Rectifier is a switched-mode rectifier module designed to provide up to 50A of output current into a 48VDC nominal system. This rectifier is available in 6A, 12.5A, 25A, 34A and 50 models and has been designed to be used in conjunction with a battery to provide an uninterruptible DC power system. The low noise and high reliability make it ideally suited to telecommunications applications. From 1 to 27 rectifiers can be configured as a system using one control and supervisory unit (SAGEON® Plant Controller). The system can be monitored and controlled remotely using SageView® software.

Applications

- Telecommunications
- Utility
- Industrial

Ordering Guide

Output Current	Output Power Derating [1]	Rated Input Voltage [2]	Input Current 120/208/230/240VAC	Model No.
6A	430W	120-240VAC	3/1.7/1.6/1.6	100-7665-4806
12.5A	560W @ 85VAC to 890W @ 120VAC	120-240VAC	7.4/3.6/3.3/3.1	100-7665-4812
25A [H]	560W @ 85VAC to 1400W @ 185VAC	208-240VAC	9/7.5/6.8/6.5	100-7665-4825
25A [L]	770W @ 85VAC to 1200W @ 120VAC	120-240VAC	11/9.4/8.4/8	100-7670-4825
34A	770W @ 85VAC to 1900W @ 185VAC	208-240VAC	11/10.3/9.3/8.9	100-7670-4834
50A	770W @ 85VAC to 1900W @ 185VAC	120-240VAC	15.5/13.1/11.8/11.3	100-7675-4850

Operating characteristics of the SAGEON® Micro 48V Series Rectifier are at 77°F (25°C) ambient, 230VAC unless otherwise stated.

1. Output power linearly increases as input voltage increases
2. The rectifier operates from 85VAC to 285VAC. Nominal AC feed as per the rated voltage range. Rated output current guaranteed over the rated voltage tolerance and rated temperature, output, altitude, frequency ranges; output is self-limiting.

H, L. The 25A rectifiers are available in two models; low input voltage (L) for all applications including 120VAC; and a cost-reduced high input voltage (H) model for all applications, but with derated output power (854W) when fed from a 120VAC source.

Safety Certification

IEC60950:1999
AS/NZS 60950:2000
UL60950:2000

Sageon Micro 48 Specifications

Input

Voltage Range	85 - 275VAC
Current	See model table
Frequency	50/60Hz ±10%
Power Factor	>0.98 for >50% load; >0.99 for 100% load Reduced power factor above 275VAC
Harmonic Distortion	<5%, typically at full load when operated with mains voltage with <2% THD
Inrush Current	< 9A RMS
Soft Start	Ramp-up time 8 seconds to full load
Protection	AC input fuse on both lines. Overvoltage shutdown at ~305VAC. Under-voltage shutdown at ~70VAC. Fully protected up to 440VAC (for accidental phase-to-phase connection or neutral loss).
Voltage Withstand Test	1500VAC input to chassis for 1 minute; (2200VDC 100% tested on production units for 2 seconds)
Conversion Frequency	>110kHz

Output

Voltage Range	Float: 42.0 - 58.0V	Equalize: 42.0 - 59.5V
Current Limit Range	20% -120% of Rated Output	

Power Limit (derating)
Current limit is automatically reduced in direct proportion to input voltage and in inverse proportion to output voltage.

Minimum Output Vin 240V, Current (A) with input voltage at minimum of Rated Voltage Tolerance						
Rated Output	6A	12.5A	25A H	25A L	34A	50A
Power Limit	430W	890W	1400W	1200W	1900W	2400W
Model No.	100-7665-4806	100-7665-4812	100-7665-4825	100-7670-4825	100-7670-4834	100-7675-4850
Output (volts)	Output (amps) @ 240VAC					
46.7V	7.2A	15.0A	30.0A	25.6A	40.0A	50.0A
48V	7.2A	15.0A	29.2A	25.0A	40.0A	50.0A
54V	7.2A	15.0A	25.9A	22.2A	35.6A	44.4A
56V	7.2A	15.0A	25.0A	21.4A	34.3A	42.9A
57.6V	7.2A	15.0A	24.3A	20.8A	33.3A	41.7A
59.5V	7.2A	15.0A	23.5A	20.1A	32.0A	32.0A

Efficiency	Better than 90% from 50 - 100% output power
Line Regulation	Better than ± 0.05%
Load Regulation	Terminal voltage drops by 0.42V ± 0.03V from zero to full load (for passive current sharing) for stand alone units, or regulates to better than ±0.05% for SAGEON® Controller managed units
Transient Response	± 2% for 10% to 90% to 10% step load change ± 1% of final value within 1ms of step change ± 0.2% for a 25% step change in AC input voltage
Noise	< 0.96mV RMS Psophometrically weighted < 32dBrnC < 10mV RMS (10kHz - 100MHz) < 100mV peak to peak (10kHz - 100MHz)
Load Sharing	Better than ± 5% of full scale with active current sharing from SAGEON® Controller
Voltage Withstand Test	1000 VAC output to chassis for one minute (1500VDC 100% testing on production units for 2 seconds)

Standards

EMC	ETSI EN 300 386 V1.3.2 (2002-12)
Safety	IEC60950:1999; AS/NZS 60950:2000; UL60950:2000
Environmental	ETSI EN 300 019

Mechanical

Dimensions, inches (mm)	8.5 (216) W x 10 (255) D x 1.7 (43) H
Weight	5.1lbs. (2.3kg)
Cooling	Fan-cooled, speed controlled
Mounting	19in x 1RU Micro Sageon sub-rack

Remote Controls (Sageon® Controller)

Battery Menu	Float Voltage, Equalize Voltage
Rectifier Menu	Current Limit, High Voltage Alarm, Low Voltage Alarm, High Voltage Shut-Down (HVSD), HVSD Restart
Equalize Mode	The rectifier will automatically enter and exit equalize mode at user specified conditions, or can be manually initiated. Under any fault condition the rectifier will default to the float value.
External Digital Voltage Control (EDVC)	The rectifier float and equalize voltages are digitally controlled over a limited range to achieve active current sharing between parallel connected rectifiers, for temperature compensation, voltage drop in the DC bus to control battery discharge tests, and to limit the maximum battery recharging current. Rectifiers are fully protected against loss of communications and will maintain output.
Rectifier Inhibit	Rectifiers can be inhibited by a signal from a remote SageView® terminal, transmitted via the SAGEON® Controller.
Test Function	When the test function is activated on the SAGEON® Controller the rectifier LEDs are flashed.

General

Protection	Fusing - protects against reverse polarity connection and protects DC bus if internal components fail Hot pluggable - no surge when connection is made to a live DC bus Overvoltage - only faulty unit shuts down Overcurrent - can sustain short circuit at output terminals indefinitely Over-temp. - gradual reduction of power limit if heatsink temperature exceeds preset limit. Supplementary thermal overload production is provided
Audible Noise (nominal input)	<45dBA @ ≤25°C <55dBA @ >45°C
Operating Temperature	-40°C to 70°C 6A, 12.5A, 25A H, 50A - Full Power at -40°C to 55°C, 50% at 70°C 25A L, 34A - Full Power at -40°C to 50°C, 50% power at 65°C, 25% power at 70°C
Storage Temperature	-40°C to +70°C
Humidity	0 to 100% RH condensing including dripping water and icing conditions
Altitude	Operational to 13,100ft (4,000 m). Derate maximum ambient temperature by 5°C per 3,300ft (1,000m) above sea level. (Consult factory above 13,000 ft)
Acoustic Noise	55dB (A weighted)
Vibration Operational Transport	2-9Hz,displacement, 9-200Hz, 5m/s 2, Continuous, any direction. 2-9Hz, 3.5mm displacement, 9-200Hz,10m/s 2 acceleration, 200-500Hz,15m/s 2 acceleration, One hour, any direction.
Shock Operational Transport (packaged) Drop Test (packaged)	40m/s² half sine, 11ms duration, any direction. 180m/s² half sine,6ms duration, any direction. 1m drop all faces.

Sageon Micro 48 Specifications

Alarms & Monitoring

Front Panel LEDs

Green	Yellow	Red	Condition
Off	Off	Off	Primary power off
Flashing	Off	Off	Primary power bad
On	Off	Off	Normal
On	Flashing	Off	Alarm
On	On	Off	Equalize
Off	Flashing	On	Shutdown

Primary Power Bad	Indicates that the input AC is too low or too high, or that the primary circuit is faulty.
Normal	Status is Normal.
Alarm	Indicates an alarm condition (see table below).
Equalize	Rectifier is in equalize mode.
Shutdown	Rectifier is shut down by remote control, or there is an internal fault in the rectifier.

Rectifier Status Monitoring	SAGEON® Controller and SageView® monitor status of the rectifier; Output current, Heatsink temperature, Software version.
Current	Monitored on SAGEON® Controller and SageView® with 1A resolution; Accuracy ± 1% at full load.
Voltage	System voltage normally displayed on SAGEON® Controller alpha-numeric LCD display; Accuracy ± 0.5%.
Address	The rectifier address is factory set via dip switches on the rear of the power module.

Rectifier Alarm Monitoring

The Alarm table shows alarm conditions that are monitored by the rectifier and are displayed on both SAGEON® Controller and SageView®. The mnemonics listed here appear on SageView®, but full alarm description appears on SAGEON® Controller.

Vh*	Output voltage too high.
Vl*	Output voltage too low.
Il*	Unit is in current limit.
Po*	Unit is in power limit.
Th*	Heatsink temperature high and thermal limit is active.
Nd*	No demand (output voltage higher than internal regulation value).
Lo*	Load current low (less than 1A).
Ma*	Operating parameters out of range (or eeprom fault).
Sd	Unit is shut down by remote command - user shutdown.
Mr	Internal reference voltage fault.
Mc	Rectifier communication fault (no response).
Vs	High voltage shut down. Latched alarm. Incorrect user setting or rectifier / system fault.
Off	Unit is shut down due to AC out of range or rectifier primary circuit fault.
Ts	Temperature sensor fault.
Dc	DC-DC feedback fault. Latched alarm.
Ff	Fan failure or inadequate air flow.

* Indicates flashing of alarm led on rectifier.

EMC Test Levels

Emissions

Category	Tested to
Harmonics	IEC 61000-3-2, Class A
Flicker	IEC 61000-3-3, Class B
Conducted RF	AC Terminals: CISPR 22, Class B | DC Terminals: CISPR 22, Class A
Radiated RF	CISPR 22, Class B

Immunity

Category	Tested to
Electrostatic Discharge (ESD)	IEC 61000-4-2; (Level 4: Air 15kV, Contact 8kV) - Criterion A
Radiated RF	IEC 61000-4-3; (Level 4: 10V/m, 1kHz 80% AM) - Criterion A
Electrical Fast Transient (EFT)	IEC 61000-4-4; (Level 4: 4kV on AC lines) - Criterion A, (Level 3: 2kV on load and 1kV on communications lines) - Criterion A
Surge Protection	ANSI C62.41-1991 category B3 - AC lines; (Combination Wave 6kV/3kA; Ring Wave 6kV/500A) IEC 61000-4-5 (Impulse); (6kV/3kA Common Mode [CM] on AC lines) - Criterion B, (6kV/3kA Differential Mode [DM] on AC lines) - Criterion B, (Level 3: 2kV CM, 1kV DM on DC lines) - Criterion B IEC 61000-4-12 (Ring Wave); (6kV/500A, 100kHz CM & DM on AC lines) - Criterion A | (Level 3: 2kV CM, 1kV DM on DC lines) - Criterion B
Conducted RF	IEC 61000-4-6; (Level 3: 10V on AC, load and communications lines) - Criterion A
Voltage Dip, Interruptions	IEC 61000-4-11; (Level: 100% dip for 10ms) - Criterion A, (Level: 30% dip for 500ms) - Criterion A, (Level: 60% dip for 1000ms) - Criterion B, (Level: 100% dropout for 5s) - Criterion B

ABOUT GREEN CUBES TECHNOLOGY

Green Cubes Technology harnesses over 30 years of industry experience to ensure we design, develop and deliver solutions for the most challenging energy needs. We offer battery technology innovation, application design and performance management to drive productivity, scalability and sustainability.

Green Cubes provides complete power systems to the stationary power industry. With the addition of the Guardian and Aspiro Product lines offered under the UNIPOWER brand, these industry proven DC plant systems serve critical applications all around the world. Green Cubes offers complete power solutions including energy storage, power conversion, and seamless integration.

For more information, email **contact@greencubes.com** or visit **greencubes.com**

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