

Product Features

- Power module telcom applications
- Fits in 19" high 1.6U
- 1500W constant output power
- Wide input range
- Wide operating temperature
- Hot swap fault tolerant
- Four diagnostic leds
- Active load sharing



Benefits

Constant Output Power

A true constant power with 91% typical efficiency (including redundancy diode) for this 1500W rectifier and racks demonstrates the combination of the long experience of Mitra Innovations for distributed power architecture with the latest developments in technology to offer 3000W with redundancy in less than 2U space. Constant Output Power is the ideal solution for the networks, typically DC/DC converters. It also supplies more current at low voltages a real need when batteries are discharged.

Excellent thermal behavior

With 522W/L, (8.55W/cubic inches) up to 55°C(131°F) , this rectifier gives a good compromise between power density at both 230VAC and 110VAC mains and low internal temperature. This excellent power density leaves a lot of room for the application with superior actual MTBF and lifetime.

Fully featured for all applications

The units are perfect solutions for both indoor and outdoor applications and offer a wide range of features to improve control of the system. Beyond the traditional voltage programming, AC and DC fault control, the unit is equipped with a smart derating of the power in regard to internal temperature. Signals include thermal shutdown, AC mains range detection (low or high) over-voltage, module missing - and offer great flexibility of system configuration.

Excellent reliability

The rectifiers are designed to work in parallel. Active single wire sharing secures a very good load share among units. Redundancy diode on the output allows for hot-swap fault tolerant insertion. Each unit is protected against input under- and overvoltage, output overvoltage, smart output power limitation and over temperature.

Fit for worldwide usage

The units feature a universal input with active PFC and are certified against all major worldwide requirements - UL, CSA and CE marking.

Easy installation and maintenance

The rectifiers do not require any special tools or procedures to be installed in the rack. Four leds on the front plate enable rapid detection of operation and faults, and makes system maintenance very simple.

1 Safety

Certification

CE marked for low voltage directive

EN60950

The power supply is designated as a class 1 apparatus. The protective earth terminal must be connected.

Leakage current : max. 3.5mA at 264V/50Hz

Dielectric strength test (on every unit):

Input - output: 4300VDC

Input - earth: 2700VDC

Output - earth: 1600VDC

2 EMC Data

CE marked for EMC directive

2.1 EMC - Emission EN50081 - 1

Port	Frequency	Limits	Reference standard
AC Input	0.15MHz - 30MHz	B	EN 55022 FCC Docket 20780 Part 15 Sub part J Class B
	0 - 2 kHz	-	EN 61000 - 3 - 2
Enclosure	30 - 230 MHz 30 - 1000MHz	B	EN 55022

2.2 Immunity

Port	Phenomena	Test	Criteria	Reference standard
Enclosure	Radiated RF fields Immunity	130 dB μ V 0.15 MHz -80 MHz (80% AM)	A	EN61000 - 4 - 6
		10V / m 80 MHz - 1000 MHz (80% AM)	A	EN61000 - 4 - 3
	ESD	8kV air 4V contact	A	ENV50140
AC Input	Fast transients Common mode	8kV air 4V contact	B	EN61000 - 4 - 2
	Voltage dips	(5/50 ns) 2kV	B	EN61000-4-4
	Voltage Interruption	-30%, 10ms -60%, 100ms -100%, 5000ms >95% 5s	A B B	EN61000-4-11
		Surge Common mode Differential mode	(1.2 / 50 μ s) 4kV 2kV	A

3 Environmental Data

Parameter	Conditions	Min.	Max.	Unit
Temperature range	Operating (forced air)	-25/(-13)	70/(158)	°C/(°F)
	Starts (20% load max.) degraded mode	-40/(-40)		°C/(°F)
	Integrated power derating 2%/°C	55/(131)	70/(158)	°C/(°F)
	Storage and transit	-40/(-40)	85/(185)	°C/(°F)
Relative humidity	Operating non-condensing	30	95	%
	Storage and transit	10	95	%
Altitude	Operating	70/(9.2)	2000/(6600) 106/(15.4)	m/(feet) kPa/(psi)
	Storage and transit	30/(4.3)	12000/(39400) 106/(15.4)	m/(feet) kPa/(psi)
Vibration	IEC68-2-64 (random)			
	Operating: 20Hz-2000Hz Acceleration: Duration:		6 30	grms minutes
Shock	IEC-68-2-27, MIL - STD - 810E		20	grms
Acoustic noise	Variable speed Meets ETSI spec		49	dBA
MTBF	Full load 25°C/(77°F) Fan excluded Per Bellcore Rpp	700 000		hours

4 Electrical data

4.1 Input data

Parameter	Conditions	Min.	Nom.	Max.	Unit
Input voltage	Universal input switch from 1000W to 1500W between 160V and 180V(without damage)				V
Low operating range		90	110	160	V
Start		88			V
High operating range		180	230	264	V
Stop				275	
Frequency		47		63	Hz
Source current	90VAC, 1000W load			10.5	Arms
	180VAC, 1500W load			13.5	Arms
Inrush current	Complies with ETS 300 132			35	Ap
Start-up time and overshoot	No overshoot		1	3	s
Power factor	50Hz, nominal load	0.95	0.99		
Harmonics	EN61000 - 3 - 2 JEIDA MITI Standards				
Efficiency	110VAC, 1000W load	85			%
	230VAC, nominal load		91		%
Input fuses	2 fuses Type 3AB axial		15 (250V)		A

4.2 Output data

Parameter	Conditions	Min.	Nom.	Max.	Unit
Output Voltage	At 25°C, nominal load	-54.5	-54.6	-54.7	V
Factory pre-set Range		-40		-57	V
Overshoot protection		-59		-60	V
Output power	180VAC < Ui < 264VAC			1500	W
	90VAC < Ui < 160VAC			1000	W
Output current	180VAC < Ui < 264VAC				
	Uo = -54.6V	0	28		A
	Uo = -44V	0	34		A
	90VAC < Ui < 160VAC				
	Uo = -54.6V	0	19		A
	Uo = -44V	0	22.7		A
Current limit				36	A
Regulation	Any combination of load and line			250	mV
Temperature drift				-5 -2.78	mV/°C mV/°F
Dynamic operation	Minimum load 20%				
Overshoot	Load change step : 50%			1	V
Recovery time				4	ms
Narrow band noise	Meets ETS 300 132-2 § 4.8				
Wide band noise	ETS 300 132-2				
RMS	Non weighted			5	mVrms
Psophometric	Weighted			2	mVrms
Hold-up time	Nominal load	20			ms

5 Protections

The rectifier is protected against the following failures:

Mains:

Input fuses, one in each line Type 3AB axial

Mains out of range. The power supply switches off when the mains voltage goes beyond the specified range. In this case, the green led AC good is switched off on the front panel and a specific alarm is generated.

The power supply restarts when the main returns within the specifications.

Under voltage: Power supply starts at 88VAC; stops at 82VAC

Over voltage: Power supply stops at 275VAC; restarts at 265VAC

Power Supply stands voltages up to 300VAC without damage

Output:

Output over voltage: The power supply switches off when voltage on output exceeds the specified overvoltage protection level. The red led Output Overvoltage is illuminated on the front panel.

During an overvoltage condition the power supply is switched OFF in a latching state : reset is achieved by recycling the AC mains.

Overload: The power supply is protected against overload condition. Power supplies resume normal operation when overload is removed.

Smart power derating:

The rectifier delivers 1000W at low line and 1500W at high line.

Output power is decreased for ambient temperature at above 55°C. De-rating slope is around 2% per 1° Celsius or 1.1°Fahrenheit up to 70°C / (158°F).

Thermal shutdown:

The power supply switches off when the safety inner temperature is exceeded (typical 110°C/230°F). During a thermal shutdown condition the red led (Excessive Temperature) is illuminated on the front panel and a specific alarm is generated. The power supply restarts when the internal temperature returns within safe conditions (typical 95°C / (203°F)). AC recycle does not clear an over temperature condition.

Hot Swap:

The power supply is designed with an internal redundancy diode in the -54V. When mounted in parallel, power fail of any module will not impact the operation of the other modules.

6 Signals

Visual

AC good: Each rectifier is equipped with a green led on the front plate. Led switches off when AC is out of range.

DC good: Each rectifier is equipped with a green led on the front plate. Led switches off when no DC power is available.

Thermal Shutdown: A red led switches on when the inner temperature has reached its limit.

Output overvoltage: A red led switches on when the inner temperature has reached its limit.

Monitoring signals (See drawings for pin assignment)

0V signal: All signals are referenced to the "0V signal". The maximum voltage difference between 0V signal and power output 0V (+48V) is $\pm 3V$.

Current sharing: Internal to the rack. Provided via an analogue bi-directional signal, single wire connection; provides $\pm 10\%$ sharing accuracy.

Connector pin is available on each rectifier connector.

Output current reading: The unit features a voltage signal proportional to the output current (0.1V/A)

AC OK: Digital signal delivered when the mains voltage is in the specified input voltage range (90 to 265VAC), (PNP open collector, active high, 10V/5mA).

AC high mains: Digital signal delivered when the mains voltage is in the specified high mains range (PNP open collector, active high, 10V/5mA).

DC OK: Digital signal delivered when the output voltage is above -36V, (PNP open collector, active high, 10V/5mA).

Temperature OK: Digital signal delivered indicating that the unit is within normal operating limits, (PNP open collector, active high, 10V/5mA).

Missing Module: Digital signal delivered when the power supply is present (active low: strap to 0V Signal).

Control signals

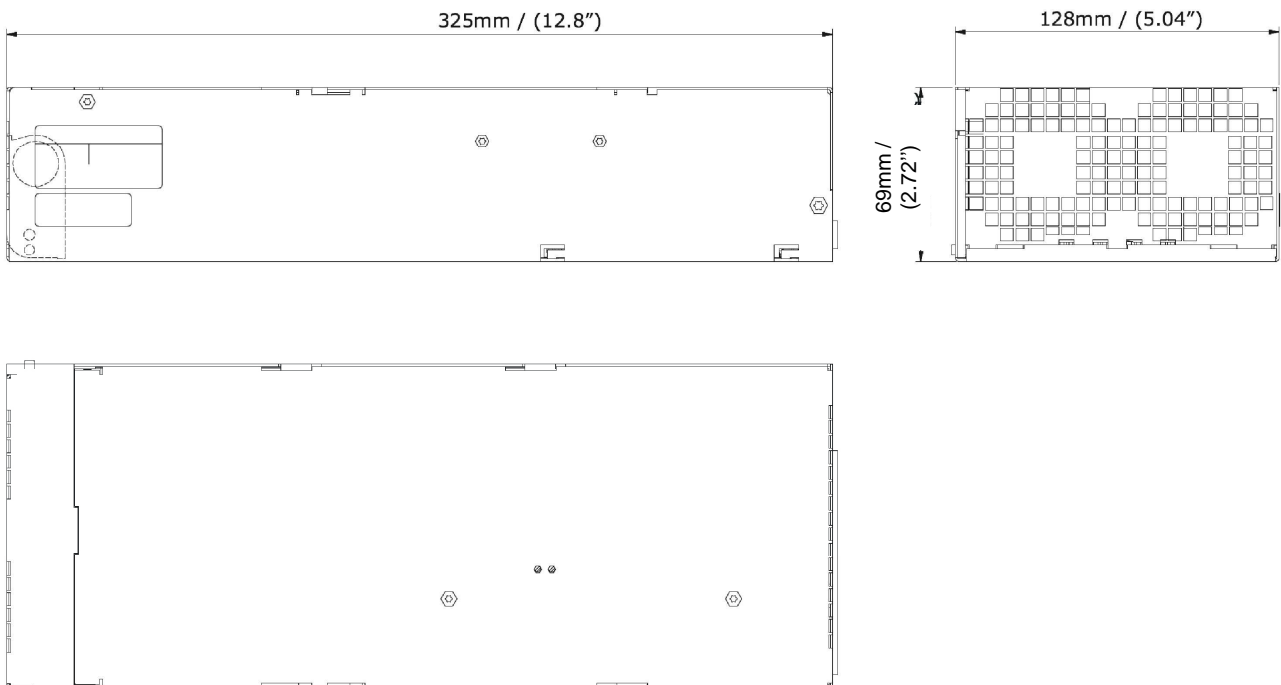
Output voltage programming. The output voltage of the rectifier can be driven by an analogue signal. $U_{out} = -40V - 4 \times U_{prog}$.

Remote ON/OFF: Input signal; the power supply is ON when a 10kOhm resistor is present between the ON/OFF pin and the 0V signal; it is OFF when the pin is left unconnected or tied (shorted) to 0V Signal. Cycling this signal resets the overvoltage protection memory.

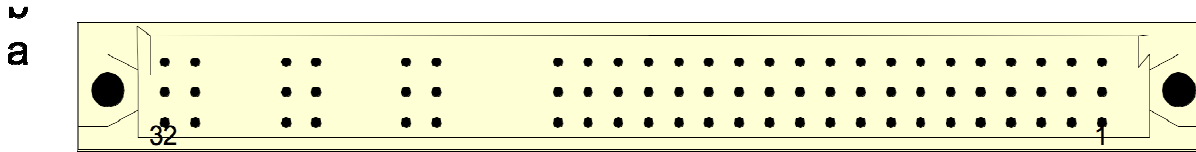
7 Mechanical Specifications

7.1 Rectifier CAR1548TN

Outline Dimensions



Rectifier Pin Assignment (see drawing): Connector DIN41612 Type C male 3 x 32



7.2 Rectifier Pin Assignment

#	Function	#	Function	#	Function
a1 - a7	OUT - [-54V]	b1 - b7	OUT - [-48V]	c1 - c7(*)	OUT - [-48V]
a8	Do not connect	b8	Do not connect	c8	Do not connect
a9 - a15	OUT + [+0V]	b9 - b15	OUT + [+0V]	c9 - c15	OUT + [+0V]
a16	DC OK	b16	Programming	c16	Current monitoring
a17	Do not connect	b17	AC OK	c17	Sharing
a18	Do not connect	b18	Temperature OK	c18	AC High
a19	Missing module	b19	Remote ON/OFF	c19	0V signal
a20 - a22	REMOVED	b20 - b22	REMOVED	c20 - c22	REMOVED
a23 - a24	LINE	b23 - b24	LINE	c23 - c24	LINE
a25 - a26	REMOVED	b25 - b26	REMOVED	c25 - c26	REMOVED
a27 - a28	NEUTRAL	b27 - b28	NEUTRAL	c27 - c28	NEUTRAL
a29 - a30	REMOVED	b29 - b30	REMOVED	c29 - c30	REMOVED
a31 - a32	PE	b31 - b32	PE	c31 - c32	PE

(*) pin c7 (sense-) to be connected to OUT-

8 Product overview and ordering information

Description	Order Number
Rectifier -48V 1500W Cardboard dimensions Net weight of rectifier Total weight	CAR 1548TN 420mm x 190mm x 160mm / (16.54" x 7.48" x 6.30") 3,2kg / (7.05lbs) 3,5kg / (7.72lbs)
Power System for three rectifiers Cardboard dimensions Net weight of empty rack Total weight	ACE153ST.K48N 590mm x 510mm x 230mm / (23.23" x 20.08" x 9.06") 6kg / (13.22lbs) 6.4kg / (14.12lbs)