

## Product Features

- Constant output power
- Universal input
- No derating at low mains
- Extended temperature range
- Active load sharing
- Hot swap- fault tolerant
- Worldwide certification



## Benefits



### Cost effective constant output power

With 555W/L, (9.09W/cubic inch) up to 55°C / (131°F), this rectifier delivers 500W constant output power at both 230VAC and 110VAC input. The low 1U profile fits the rack into a standard cabinet leaving a lot of space for the application.

### Fully featured

The rectifiers and racks offer a wide range of features to improve control of the system. Beyond the traditional AC and DC fault control, the unit is equipped with a smart derating of the power in regard to internal temperature. Signals include output current read-out, remote on/off, voltage programming, single wire active load sharing.

### 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 over-voltage, output over-voltage, smart output power limitation and over-temperature. Combined with the very high conversion efficiency and MTBF of 300 000 hours per Bellcore RPP standard this secures excellent system availability.

### Fit for worldwide usage

The units work with a universal input. Active PFC secures low level of harmonics. Units are certified against all major worldwide requirements, UL, CSA and CE marking.

### Easy installation and maintenance

The rectifiers do not require any specific procedure or any special tools to be installed in the rack. A DC good led on the front plate immediately signals the proper working of the unit, failures or degraded mode, resulting in very simple and quick maintenance.

# 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: 4800VDC  
Input - earth: 3200VDC  
Output - earth: 1600VDC

# 2 EMC Data

CE marked for EMC directive

## 2.1 EMC - Emission EN50081 – 1

Port	Phenomena	Frequency	Limits	Reference standard
AC Input	Conducted	0.15MHz - 30MHz	B	EN 55022 Telcordia GR-63-Core
	Harmonic current	0 - 2 kHz	-	EN 61000 - 3 - 2
	Voltage fluctuation and flicker			EN61000 - 3 - 3
Enclosure	Radiated E field	30 - 1000 MHz	B	EN 55022

## 2.2 Immunity EN50082 - 1

Port	Phenomena	Test	Frequency	Criteria	Reference standard
Enclosure	RF electromagnetic field amplitude modulated	3 V/m 80% AM	80Mhz to 1GHz 1kHz mod	A	EN61000-4-3
	RF electromagnetic field keyed carrier	3 V/m 50% duty	900MHz 200Hz	A	ENV50204
	ESD	8 kV air 4kV contact		B	EN61000-4-2
AC Input	RF common mode, amplitude modulated	3 V 80% AM	150kHz to 80MHz 1kHz	A	EN61000-4-6
	Burst/Fast transients Common mode	1kV Tr=5ns/Th=50ns	5kHz	B	EN61000-4-4
	Surge Line to ground Line to line	Tr=2.2µs/Th=50µs 2KV 1KV		A	EN61000-4-5
	Voltage dips	-30%, 10ms -60%, 100ms		B C	EN61000-4-11
	Voltage interr.	>95% 5s		C	

### 3 Environmental Data

Parameter	Conditions	Min.	Max.	Unit
Temperature range	Operating (forced air)	-20/(-4)	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	20	80	%
	Storage and transit	10	95	%
Altitude	Operating	70(9.2)	2000/(8200) 110/(15.6)	m/(feet) kPa/(psi)
	Storage and transit	30/4.3	12000/(39400) 110/(15.6)	m/(feet) kPa/(psi)
Vibration	Non-operating	10	60	Hz
	Constant amplitude: 0.15mm Constant acceleration: 2g	60	150	Hz
Shock	IEC-68-2-27, MIL - STD - 810E		10	g
Acoustic noise	Variable speed NEBS and ETS 300 753 class 3.1 standards		49	dBA
MTBF	Full load 30°C / (86°F) Fan not included Per Bellcore kpp	300000		HOURS

## 4 Electrical data

### 4.1 Input data

Parameter	Conditions	Min.	Nom.	Max.	Unit
Input voltage					V
Low operating range		90	110	130	
Start		80		90	V
High operating range		180	230	264	V
Frequency		47		63	Hz
Source current	90VAC, 500W load			6.9	Arms
	180VAC, 500W load			3.4	Arms
Inrush current	Per ETS 300 132			20	Apk
Start-up time and overshoot	No overshoot		1	3	s
Power factor	50Hz, nominal load	0.95	0.99		
Harmonics	EN61000-3-2				
Efficiency	110VAC, nominal load	85			%
Input fuses	One in line 5 x 20mm		10		A

### 4.2 Output data

Parameter	Conditions	Min.	Nom.	Max.	Unit
Output Voltage					
Factory pre-set		53.9	54	54.1	V
Range operation		40		58	V
Overvoltage protection		59		60	V
Turn on overshoot	Nominal load			0.5	V
Overshoot				2	ms
Turn on/off delay time					
Mains	230V typ., max. at 90V		1	3	s
Remote on				200	ms
Remote off				100	ms
Turn-off		15		40	ms
Output current	High line (230VAC)	0	9.3		A
	Low line (110VAC)	0	9.3		A
Current limit		12.5		15	A
Short circuit protection	Non latching			25	A
Regulation					
Source effect				±0.1	%
Load effect				±0.5	%
Temperature drift	Between -20°C and 70°C			1	%
Dynamic operation					
Overshoot	Minimum load 20%			1	V
Recovery time	Load change step: 50% dI/dt : 0.5A/μs			4	ms
Wide band noise	ETS 300 132-2				
Rms	Non weighted			10	mVrms
Psophometric	Weighted			2	mVrms
Hold-up time	Nominal load	15			ms

## 5 Protections

The power supplies are protected against the following failures:

### Mains:

- a) Input fuse in the line Type 5x20mm 10A
- b) Mains under voltage: The power supply switches off when the mains voltage goes below the specified range.  
When acting, the green led DC 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 between 80VAC and 90VAC  
Power supply stops between 70VAC and 82VAC

### Output:

- a) Output overvoltage: The power supply switches off when voltage on output exceeds the specified over voltage protection level. During an overvoltage condition the power supply is switched OFF in a latching state: reset is achieved by recycling the AC mains.
- b) Overload: The power supply is protected against overload condition. The current is limited to 15A. Power supplies resume normal operation when overload is removed.

### Smart power derating:

Output power is decreased if ambient temperature is above 55°C.  
Derating slope is around 2% per degree Celsius or 1.1% per degree Fahrenheit up to 70°C.

### Thermal shutdown:

The power supply switches off when the safety inner temperature is exceeded (typical 110°C).  
The power supply restarts when the internal temperature returns within safe conditions (typical 95°C).  
AC recycle does not clear an over temperature condition.

### Hot swap

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

## 6 Signals

Signals are described for both rectifiers and power rack.  
Signals for the power rack are depending on rectifier selection.

### Visual

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

### Monitoring signals (See drawings for pin assignment)

- a) Current sharing: internal to the rack. Provided via an analogue bi-directional signal single wire connection; Maximum differential current between two units is 1A.  
Units will load share within  $\pm 10\%$  sharing accuracy.
- b) DC OK: Digital signal delivered when the output voltage is above 39V.  
Open for  $U < 39V$ , below 1V if  $U_{out}$  above 39V.
- c) Output current read-out: 0.18V for 1A. Output impedance 680 Ohms

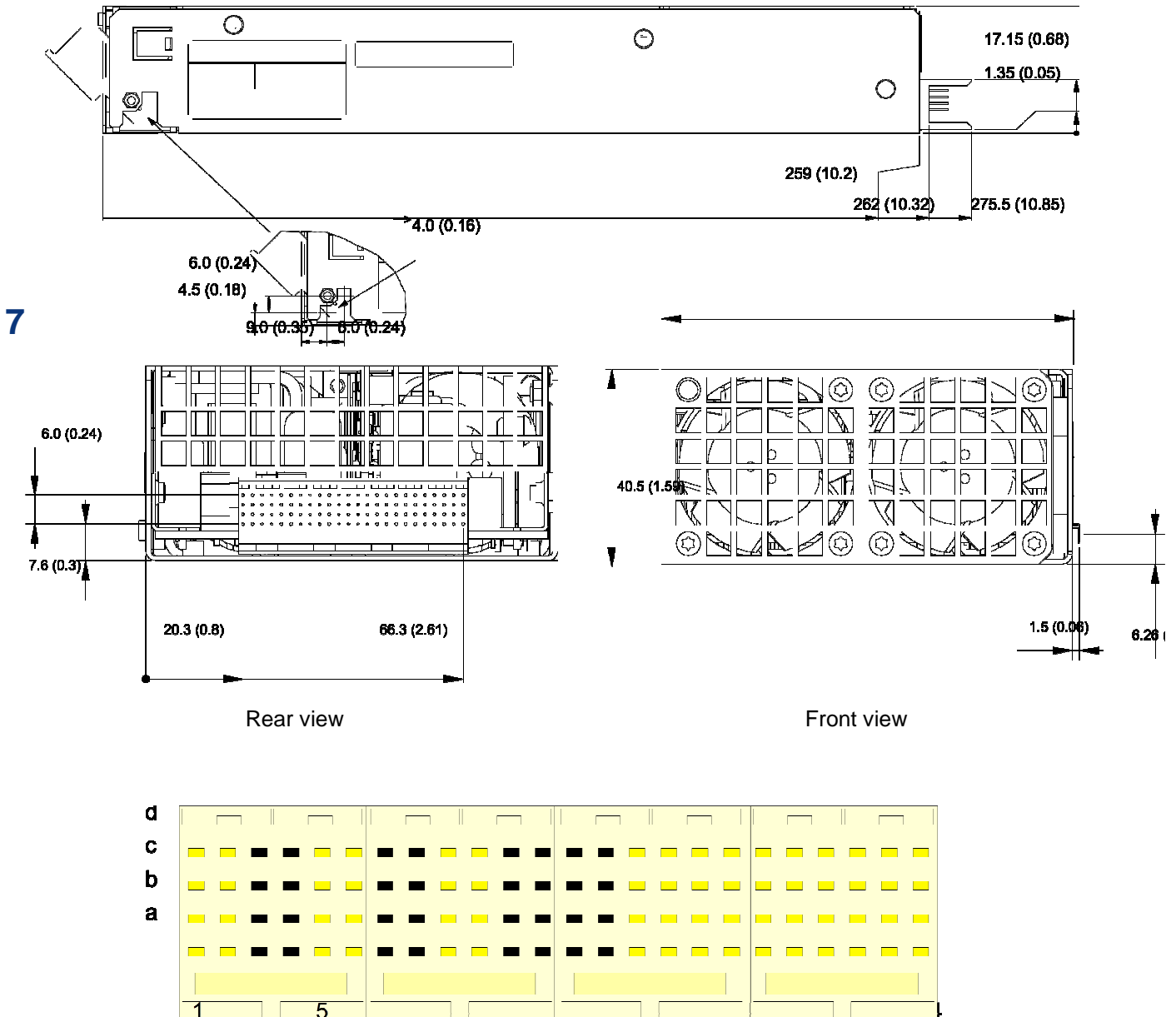
### Control signal

- a) Remote ON/OFF: Input signal; the power supply is ON when the voltage difference between remote pin and V is above 3V. It is OFF when the pin is tied (shorted) to 0V.
- b) Output voltage programming: (CAR1548TN only)  
Output voltage can be assigned to an external signal  
Uprog.  $U_{out} = 40 V + 1.89 \times U_{prog}$  for Uprog between 0V and 9.5V

## 6 Mechanical Specifications

### 6.1 Rectifier CAR0548TN

#### Outline Dimensions



Connector: FCI - METRAL (MILLIPACS -1) type 88951-101 (4 x 24p)

Mating connector for CAR0548:

Metral F receptable - 64 CTS - STB Part nr. HM1S43FRR460H6P  
= straight version for PCB

Metral F receptable - 64 CTS - PF Part nr. HM1F43FDP459H6P  
= right angled version for PCB

Manufacturer: Framatome Connectors

Rectifier Pin Assignment

#	1	2	3	4	5	6	7	8	9	10	11	12
A	Earth	Earth			L	L			N	N		
B	Earth	Earth			L	L			N	N		
C	Earth	Earth			L	L			N	N		
D	Earth	Earth			L	L			N	N		
#	13	14	15	16	17	18	19	20	21	22	23	24
A			Inhibit	Ground	Sharing	OUT+	OUT+	OUT+	OUT+	OUT-	OUT-	OUT-
B			Uprog			OUT+	OUT+	OUT+	OUT+	OUT-	OUT-	OUT-
C			I_sense	Remote	TP_ovp	OUT+	OUT+	OUT+	OUT-	OUT-	OUT-	OUT-
D			DC_fault	OTP		OUT+	OUT+	OUT+	OUT-	OUT-	OUT-	OUT-

Uprog for CAR0548TN only

## Product overview and ordering information

Description	Order Number
Rectifier -54V 500W	CAR0548TN
Cardboard dimensions	420mm x 190mm x 70mm / (16.54" x 7.48" x 2.76")
Total weight	1.8kg / (3.97lbs)
Net weight of rectifier	1.35kg / (2.8lbs)