



*Flatpack Remote Power System (RPS)*

## Remote powering of DSL equipment

*Remote powering is a concept for distributing DC power over existing twisted pairs up to 10 km. The concept is typically for use in broadband applications, where telecom equipment is located close to the end-user and requires power. What makes remote powering attractive is the independence from local power utilities and centralized back-up systems (batteries). The system consists of a Central Office Remote Power System and a remote-end converter. The design of the system is based on safety standards IEC 60950-21, IEC 60950-1, and GR-10989-CORE.*

### CO Flatpack Remote Power Systems

The Flatpack Remote Power Systems are designed for remote powering of telecom equipment, providing  $\pm 190$  V DC from a 48 V DC source. The power system consists of a 2HU Flatpack Mini PRS chassis, 19" or 21" (ETSI) wide. This chassis houses up to two DC/DC converters and VA limiters.

The DC/DC converter is a 1500-watt step up converter which provides  $\pm 190$  V DC from a traditional  $-48$  V DC source. The VA limiter distributes the  $\pm 190$  V DC and provides a safe power distribution over existing twisted pairs, protecting the Remote Feeding Circuits (RFT) from over-voltage, over-current, and leakage current to ground. The VA limiter has 12 individual outputs of up to 100 W each (RFT-V).

### Remote-end converter

The remote-end converter consists of parallel DC/DC converters that terminate the twisted pairs being feed from the CO. The converter incorporates high-energy surge protection and is specifically designed

to work from a limited power source (VA limiter) fed over a high-impedance line. The modules can be paralleled to meet the power requirement at the remote end.



*Remote-end converter*

### Dimensioning

To dimension the system, a cable calculator for calculating remote power capability should be used.

# Technical data

## THIS DOCUMENT IS VALID FOR RELEASES

- EDA 2.1 and EDA 2.2

## FLATPACK RPS

- Two DC/DC converters 48/190 V DC
- Two VA-limiters with a total of 24 output channels
- Dimensions (WxHxD):  
482.6 x 48.9 (2U) x 300 mm / 19" x 1.96" x 11.8"  
Widening brackets for 23" mounting is included .
- Weight: 14 kg (30.9 lbs) incl. converters and VA limiters

## DC/DC CONVERTER MODULE

- Input: 48 V DC (40-60 V DC)
- Output:
  - 130 V DC (125-139 V DC) / 6.6 Amps
  - 90 V DC: (160-199 V DC) / 6.6 Amps
- Dimensions (WxHxD):  
218 x 43 x 240 mm / 8.58 x 1.69 x 9.45"
- Weight: 3 kg (6.6 lbs)

## VA LIMITER MODULE

- Input:  $\pm 130$  V DC or  $\pm 190$  V DC
- Output: 12 channels of  $\pm 130$  V DC or  $\pm 190$  V DC
- RFT-V: max. 100 W
- RFT-C: max. 50 mA
- Dimensions (WxHxD):  
214 x 41.5 x 243 mm / 8.4 x 1.6 x 9.6"
- Weight: 1.5 kg (3.3 lbs)

## REMOTE END CONVERTER

- Input: 100-400 V DC, 1-5 channels per module
- Output: 54 V DC (48-55 V DC) / 1.5 Amp per channel

## APPLICABLE STANDARDS

- Electrical safety  
IEC 60950-1  
IEC 60950-2
- EMC  
ETSI EN 300 386 v1.3.2x
- Environment  
ETSI EN 300 019-2  
ETSI EN 300 132-2
- Telcordia NEBS GR-63-CORE (Pending)
- Telcordia NEBS GR-1089-CORE (Pending)

Subject to change without notice

Cable Calculator			specific resistance			
<i>double click to use</i>				20 deg C	0.01678 Ohm mm	
				25 deg C	0.01712 Ohm mm	
				35 deg C	0.01780 Ohm mm	
Fixed parameters			AWG	diam	ohm/km	35 deg C Ohm/km/pair at 35 deg C
Central office voltage	Vco	380 V	19	0.912	27.2	54.5
Remote Converter input current	I <sub>max</sub>	235 mA	22	0.644	54.6	109.3
Remote Converter efficiency	eff	0.86	24	0.511	86.8	173.6
			26	0.405	138.1	276.3
Variable parameters				specific	Ohm/km/pair	
Power required	P	200 W	temp	reistance	AWG 19	AWG 22
Number of channels (40-75)	n	5			AWG 24	AWG 26
Calculated parameters						
max line impedance	Z <sub>line</sub>	775 Ohm				
			35 deg C			
	resistance	max cable length (km)				
Cable size	(Ohm/km)	1 pair	2 pairs	3 pairs	4 pairs	
19 AWG	54.6	14.2	28.4	42.6	56.8	
22 AWG	109.3	7.1	14.2	21.3	28.4	
24 AWG	173.6	4.5	8.9	13.4	17.9	
26 AWG	276.3	2.8	5.6	8.4	11.2	