

BENNING

World Class Power Solutions



Telecom-Power
slimline
Module Systems

- compact
- reliable
- flexible



SLIMLINE Module Systems

Compact, reliable and flexible

SLIMLINE Module Systems

The manufacturers of AC and DC power systems have increased the power density of their products a lot over the last few decades.

BENNING, as one of the leading DC power supply companies, was able to double the power density of their products every decade over the last 30 years (Fig. 1). This development continues, as the telecom-operators have less and less space in GSM and UMTS base stations and are asking for more compact power solutions.

With the newly designed *SLIMLINE* module systems (SMS) BENNING has the answer to this demand and can offer a more than 100 % higher power density compared to existing products.

This new development includes ultra compact rectifier and distribution modules which can be integrated into 1 U 19" sub-racks.

In contrast to the present vertical arrangement of DC power modules, the new slimline modules are arranged horizontally. This arrangement allows the fitting of 3 rectifier SMS 1500 (48 V 30 A) across a 1 U 19" sub-rack (Fig. 4).

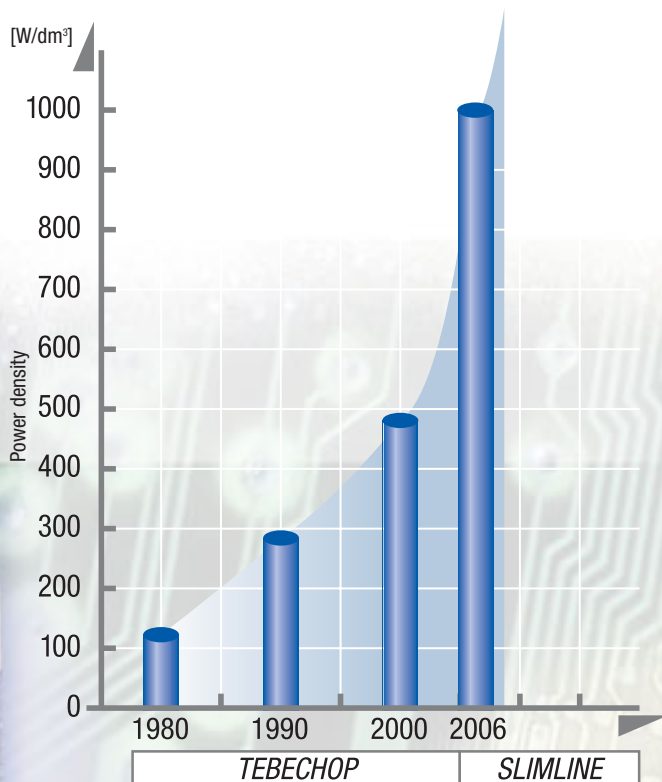


Fig. 1: Power density of single phase 48 V telecom rectifiers over the last decades.

Advantages of *SLIMLINE* Module Systems:

- Extremely high power density reducing space demands.
- High efficiency >90 % between 30 % and 100 % load (Fig. 2).
- Wide range of input voltage (85 V – 275 V) allows the operation of *SLIMLINE* systems in nearly all countries in the world.
- Power constant DC output with temperature compensation.
- Real hot-plug connection.
- Automatic set-up of additional rectifiers.
- Ease of installation, operation and expansion.
- Tolerant of harsh environmental conditions- operational from -33 up to +75 °C ambient temperature.
- Systems status and alarm information with microprocessor controlled monitoring systems *SLIMLINE* MCU or MCU 2500.
- Remote control with modem, HTML, or SNMP (option).

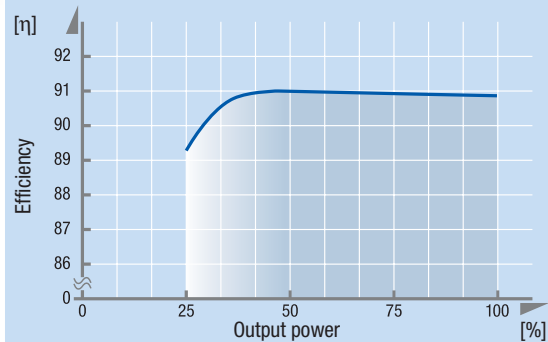


Fig. 2: Efficiency vs. output power (Rectifier 1500 W)

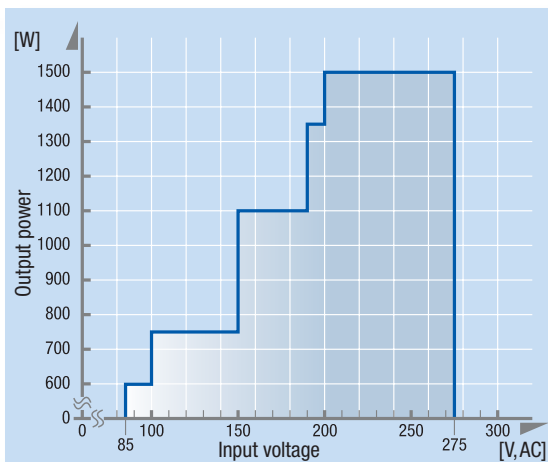


Fig. 3: Output power vs. input voltage (Rectifier 1500 W)



SLIMLINE Module Systems – Designed to operate in nearly all countries of the world

SLIMLINE modules for the creation of systems: 1. Rectifier modules 48 V DC

- **Rectifier module 500 W**
output power 500 W (Fig. 5)
- **Rectifier module 1500 W**
output power 1500 W (Fig. 6)

Three 500 W or 1500 W rectifier modules fit into a specially designed 19" 1 U sub-rack (Fig. 7-8).

Max. 6 modules 500 W or 9 modules 1500 W can be used as one power block. With this arrangement the total DC power will be 1500 W – 13500 W.

The rectifier modules can supply the max. output power between mains voltages of 200 V and 275 V.

Between 200 V and 85 V the output power will be reduced in steps (Fig. 3). To allow the operation of SLIMLINE systems in outdoor stations, the operation temperature ranges between -33 °C and +75 °C.

Starting from +55 °C the output power will derate down to 50 %.



Fig. 4: Comparison of volume 6 U and 3 U



Fig. 5: SMS 500, 48 V – 500 W



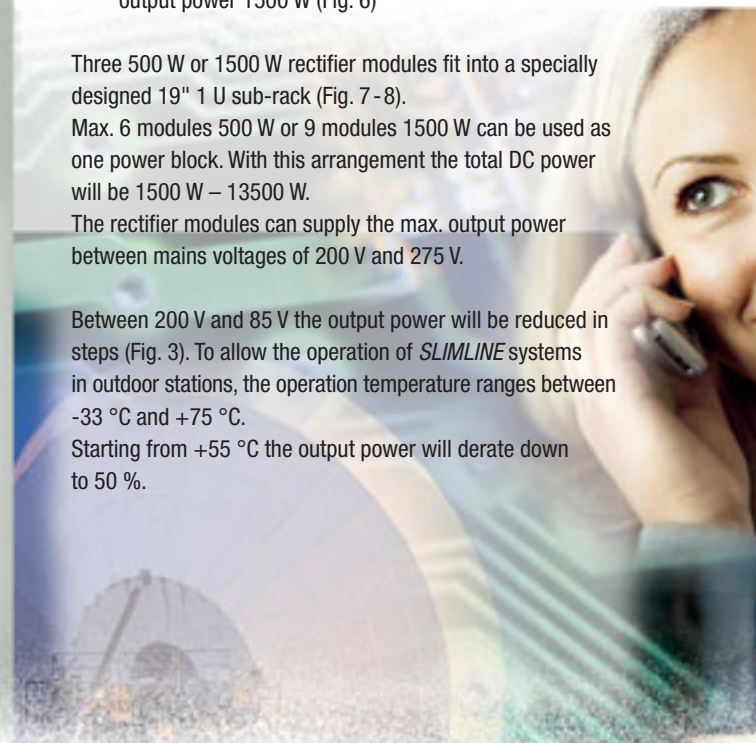
Fig. 6: SMS 1500, 48 V – 1500 W



Fig. 7: 3 x 48 V – 500 W and distribution



Fig. 8: 6 x 48 V – 500 W and distribution



Flexible Distribution Modules Individual choice of fuses/breakers

SLIMLINE modules for the creation of systems:

2. Distribution modules

- **Distribution SMS 4500**
max. power 4500 W
- **Distribution SMS 13500**
max. power 13500 W

Following the ultra compact design of the SLIMLINE rectifier modules, BENNING also offers 1 U and 3 U high battery and

load distribution modules. These modules include battery fuses or breakers, load fuses or breakers and battery and/or load disconnect units (Fig. 8 - 10).

The LC Display in the front plate indicates current, voltage and temperature.

For the control and monitoring of the system the SLIMLINE MCU can be used (optional).



Fig. 9: Rectifier,
Distribution SMS 4500:
2 x Battery breaker
3 x 48 V – 1500 W
6 x Load fuses

Fig. 10: Rectifier,
Distribution SMS 4500:
2 x Battery breaker
3 x 48 V – 1500 W
20 x Load fuses



Fig. 11: Rectifier,
Distribution SMS 13500:
2 x Battery breaker
9 x 48 V – 1500 W
16 x Load fuses

SLIMLINE Module

Specifications

Systems

SLIMLINE module systems are made up with 1 U sub-racks for the necessary number of plug-in rectifier modules needed, and BENNING wall or floor system cabinets with monitoring and control unit MCU 2500. These unit allows local monitoring via frontpanel keypads and LCD.

Remote monitoring and control can be done via modem, HTML or SNMP (option).

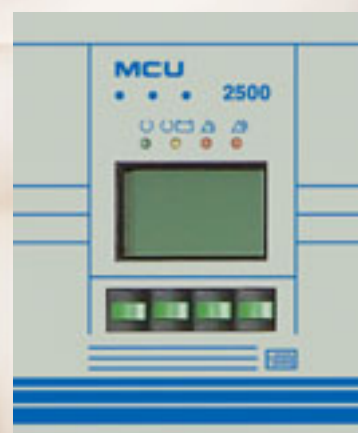
Software packages are available.



Wall cabinet 19"



Wall cabinet with batteries



Monitoring and control unit MCU 2500

Specifications

Rectifier Modules SMS		SMS 500	SMS 1500
-----------------------	--	---------	----------

AC Input

Nominal	[V]	200 – 275	
De-rating	[V]	at 85 – 200	
Operation	[V]	85 – 275	
Cut off, Switch off	[V]	> 275	
Frequency	[Hz]	47 – 63	
Input current (at 230 V)	[A]	2,5	6,3
Power factor		> 0,99	

DC Output

Boost	[V]	2,4	
Float	[V]	2,23	
Output current max. at 50 V DC	[A]	10	30
Characteristic		IPU (Power constant)	
Static voltage regulation	[%]	0,5	
Dynamic voltage regulation (Load step 10-100-10)	[%]	± 5	
Response time	[ms]	< 5	
Noise voltage	[mV]	2	
Efficiency	[%]	typ. 91	

Rectifier Modules SMS		SMS 500	SMS 1500
-----------------------	--	---------	----------

Other specifications

Ambient temperature	[°C]	-33 up to +75	
Power de-rating	[°C]	at 55	
Storage temperature	[°C]	-40 up to +85	
Emission		cl. B (EN 55022)	
Safety		IEC 60950	
Visual indications on the frontplate		Red LED = Fault Green LED = Operation	
Fan speed		Temperature controlled	
Dimensions	Width	1/6 19"	1/3 19"
	Height	1 U	
	Depth [mm]	250	275
Weight	[kg]	1,0	1,7

Distribution Modules		SMS 4500	SMS 13500
----------------------	--	----------	-----------

Dimensions	Width	19"	
	Height	1 U	3 U
	Depth [mm]	325	
Weight	[kg]	5,0	13,0

Subject to alterations.



www.benning.de

BENNING worldwide

Austria

Benning GmbH Elektrotechnik und Elektronik
Eduard-Klinger-Str. 9
A-3423 St. Andrä-Wördern
Tel. 0 22 42 / 3 24 16-0
Fax 0 22 42 / 3 24 23
E-Mail: info@benning.at

Belarus

IOOO BENNING Belarus
ul. Derzinskogo, 50
BY-224030, Brest
Tel. 0162 / 22 07 21
Fax 0162 / 22 07 21
E-Mail: info@benning.brest.by

Belgium

Benning Belgium
Power Electronics
Z. 2 Essenestraat 16
B-1740 Ternat
Tel. 02 / 58 287 85
Fax 02 / 58 287 69
E-Mail: info@benning.be

Croatia

Benning Zagreb d.o.o.
Trnjanska 61
HR-10000 Zagreb
Tel. 1 / 61 97 060
Fax 1 / 61 97 059
E-Mail: benning.zg@zg.t-com.hr

Czech Republic

Benning CR s.r.o.
Zahradní ul. 894
CZ-293 06 Kosmonosy
(Mladá Boleslav)
Tel. 3 26 72 10 03
Fax 3 26 72 25 33
E-Mail: benning@benning.cz

France

Benning Conversion d'énergie
43, avenue Winston Churchill
B.P. 418
F-27404 Louviers Cedex
Tél. 0 / 2.32.25.23.94
Fax 0 / 2.32.25.08.64
E-Mail: info@benning.fr

Germany

Theo Benning
Elektrotechnik und Elektronik GmbH & Co.KG
Münsterstr. 135-137
D-46397 Bocholt
Tel. 0 28 71 / 93-0
Fax 0 28 71 / 93 297
E-Mail: info@benning.de

Great-Britain

Benning Power Electronics (UK) Ltd.
Oakley House
Hogwood Lane
Finchampstead
GB-Berkshire
RG 40 4QW
Tel. 0118 9731506
Fax 0118 9731508
E-Mail: info@benninguk.com

Hungary

Benning Kft.
Power Electronics
Rákóczi út 145
H-2541 Lábattlan
Tel. 033 / 50 76 00
Fax 033 / 50 76 01
E-Mail: benning@vnet.hu

Ireland

Theo Benning GmbH
North Industrial Estate
Whitemill North
IRE-Wexford / Rep. Ireland
Tel. 0 53 / 91 76 90 0
Fax 0 53 / 91 41 84 1
E-Mail: benning@benning.ie

Italy

Benning Conversione di Energia S.r.L.
Via 2 Giugno 1946, 8/B
I-40033 Casalecchio di Reno (BO)
Tel. 0 51 / 75 88 00
Fax 0 51 / 61 67 655
E-Mail: info@benningitalia.com

Netherlands

Benning NL
Power Electronics
Peppelkade 42
NL-3992 AK Houten
Tel. 0 30 / 6 34 60 10
Fax 0 30 / 6 34 60 20
E-Mail: info@benning.nl

Poland

Benning Power Electronics Sp.z.o.o.
Korczykowska 30
PL-05-503 Głusków
Tel. 0 22 / 7 57 84 53 / 7 57 36 68-70
Fax 0 22 / 7 57 84 52
E-Mail: biuro@benning.biz

P. R. China

Benning Power Electronics (Beijing) Co., Ltd.
Tongzhou Industrial Development Zone
1-B Bei Er Street
CN-101113 Beijing
Tel. 010 61568588
Fax 010 61506200
E-Mail: info@benning.cn

Russian Federation

000 Benning Power Electronics
Scholkovskoje Chaussee, 5
RF-105122 Moscow
Tel. 4 95 / 9 67 68 50
Fax 4 95 / 9 67 68 51
E-Mail: benning@benning.ru

Slovakia

Benning Slovensko, s.r.o.
Kukuríčná 17
SK-83103 Bratislava
Tel. 02 / 44459942
Fax 02 / 44455005
E-Mail: benning@benning.sk

South East Asia

Benning Power Electronics Pte Ltd
85, Defu Lane 10
#05-00
SGP-Singapore 539218
Tel. (65) 6844 3133
Fax (65) 6844 3279
E-Mail: sales@benning.com.sg

Sweden

Eldaco AB
Box 990, Hovslagarev. 3B
S-19129 Sollentuna
Tel. 08 / 6239500
Fax 08 / 969772
E-Mail: power@eldaco.se

Switzerland

Benning Power Electronics GmbH
Industriestrasse 6
CH-8305 Dietlikon
Tel. 044 / 8057575
Fax 044 / 8057580
E-Mail: info@benning.ch

Spain

Benning Conversión de Energía S.A.
C/Pico de Santa Catalina 2
Pol. Ind. Los Linares
E-28970 Humanes, Madrid
Tel. 91 / 6048110
Fax 91 / 6048402
E-Mail: benning@benning.es

Ukraine

Benning Power Electronics
3 Sim'yi Sosninykh str.
UA-03148 Kyiv
Tel. 044 / 501 40 45
Fax 044 / 273 57 49
E-Mail: info@benning.ua

U.S.A.

Benning Power Electronics, Inc.
11120 Grader Street
USA-Dallas, TX 75238
Tel. 214 5531444
Fax 214 5531355
E-Mail: sales@benning.us

BENNING