

Excellent Technology, Efficiency and Quality



## **BFS 2000 battery formation & testing system**

Charging and discharging rectifiers



## BFS 2000 Battery formation and test system

### General information

For several decades now, BENNING has been manufacturing charging/discharging rectifiers for the battery industry.

These appliances are used not only for the formation processes required in the manufacture of batteries, but also in the standard production of the batteries themselves.

What BENNING is introducing with the BFS 2000 formation and test system is a development providing a straightforward means of controlling and monitoring the formation and test cycles. Whilst saving time & energy as well.

The widest range of battery types can be tested and serviced for applications in power stations and railway applications (mobile specification).

### The system consists of the system components available as listed below:

- Power converter
- Programmable control unit PSE
- Handheld control unit USR-SPS
- Measurement point multiplexor
- Master controller PSE XX/1-25
- Windows-compatible PC
- Control & analysis software

### System control components

#### 1. Power converter power output

These days, the power converter unit is normally specified as a 2-way converter with mains feedback. This avoids the situation of the energy drawn from batteries in the process of discharge being needlessly converted into heat.

Rather, the energy is fed back in order to provide a supply of power for other consumers in the company.

Accordingly, your energy is used logically, and this system helps to save energy and expense.

Many possibilities are conceivable when it comes to dealing with charge/discharge currents, and this includes taking a good look at the maximum output voltage. The following specifications are possible in the standard range:

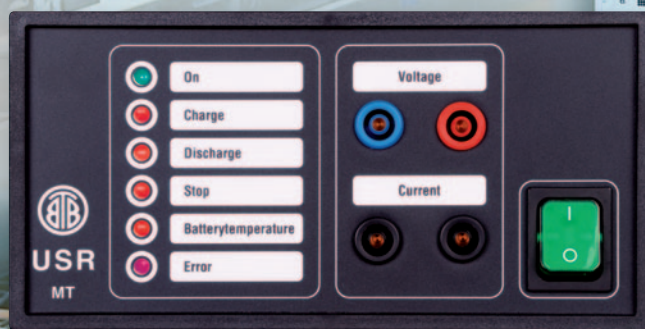


Fig. 2: Indicator panel USR-MT



Fig. 1: 2-way converter with USR-SPS and indicator panel

#### Technical data

Charging/discharge currents	[A]	30, 50, 100, 150, 200, 300, 400, 500, 600 can be set
Current ripple	[%]	5
Current constancy	[%]	$\pm 1.0$ from 10 – 100 $I_{\text{nominal}}$

#### Voltage range (max)

Charge/discharge	[V]	72, 120, 180, 270, 360 can be set
Characteristic curves		I, U, IU, W, P-, R-constant
Voltage constancy	[%]	$\pm 1$ from 10 – 100 $U_{\text{nominal}}$
Mains connection		3 x 400 V $\pm 10$ % 50 Hz $\pm 4$ %
Permissible ambient temperature	[°C]	5 – 40 (at 80 % rel. atm. hum.)
Operating displays on front hinge panel		Appliance on Charge Discharge Pause Fault Battery temperature

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### 2. Programmable control unit PSE

The PSE programmable control unit is a microprocessor-controlled system for process control and for the monitoring of charge/discharge programs, which also serves for logging & storage of measurement data. It should be regarded as a small computer peripheral to a central computer. It's connected to a host computer via an isolated data interface. After the "start" command has been given, it runs the charge/discharge program which feeds in via the serial interface.

In the PSE's maximum population configuration, it's equipped with 3 interfaces. These interfaces are provided in order to connect up the handheld control unit (USR-SPS), the measurement point multiplexor (MSM) and the host computer.

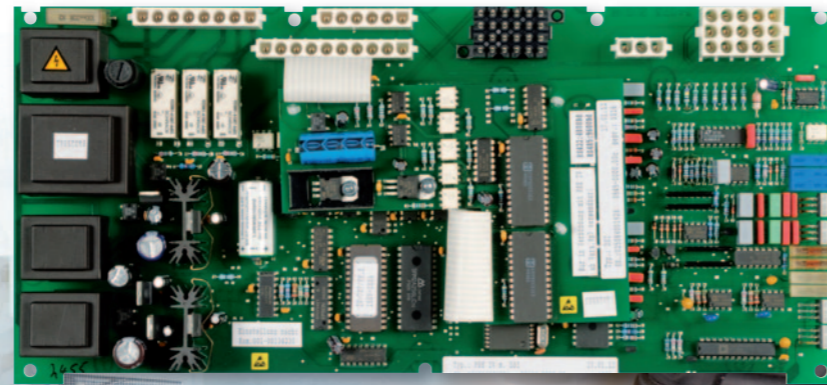


Fig. 4 (top): Programmable control unit PSE



Fig. 3: Handheld control unit USR-SPS

### 3. Handheld control unit USR-SPS

Using the USR-SPS handheld control unit, the PSE can receive individual charging or discharging stage instructions – or even short programs – and carry them out, independent of the central host computer. The display shows you the present operating statuses together with the current & voltage levels in presently operating stages, and also times elapsed, together with amp hours charged up or discharged. Under control from the central host computer, the input keys can be locked and the unit will function purely as a display, in that mode.

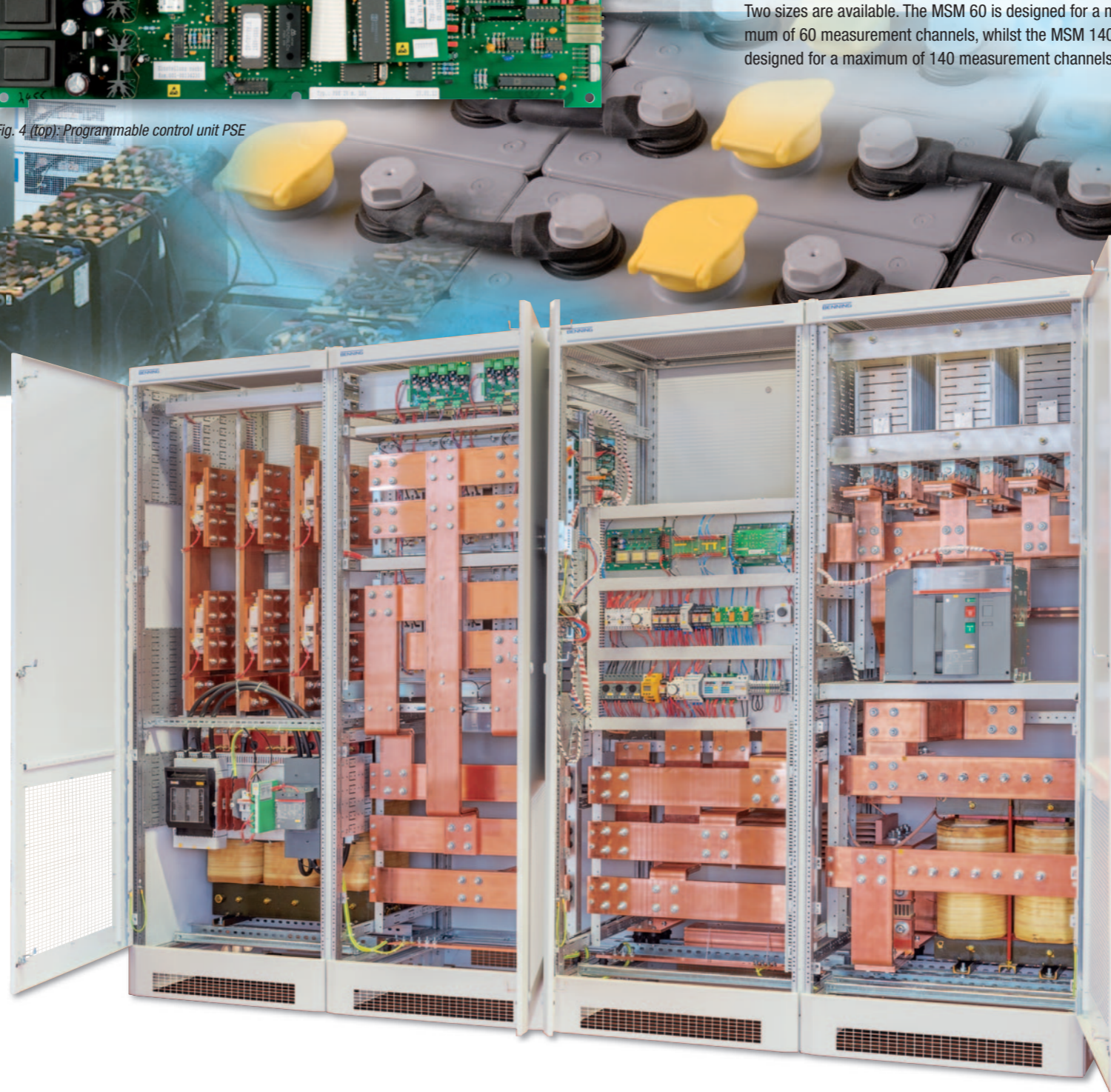


Fig. 5: Formation/charging system

## BFS 2000 Battery formation and test system

### 4. Measurement cell multiplexor MSM (option)

The measurement point multiplexor is an autonomous, independent small computer for logging and storage of measurement data and readings corresponding to individual-cell voltages or individual-electrolyte temperatures.

All measurement levels are stored independent of the PSE or of the host computer. If necessary, values can be transmitted to the host computer, on request.

The MSM is housed in an enclosed casing and can be installed directly at the battery charging centre. It's connected to the PSE and to the host computer via an interface and a data cable. This makes it possible to keep the cable which runs from the battery to the MSM to a short length.

Two sizes are available. The MSM 60 is designed for a maximum of 60 measurement channels, whilst the MSM 140 is designed for a maximum of 140 measurement channels.

### 5. Master controller PSE XX/1-25

The Master PSE is a microprocessor-controlled interface converter with 2 structurally separated, serial data interfaces for the setting up of a data group between several PSEs and a host computer.

#### Master PSE XX

The Master PSE XX is used for converting the RS 485 interface (as defined according to the EIA standard) to RS 232. The following parameters can be programmed using the internal dip-switch S1:

- Baud rate, word length and parity mode of RS 232 interface
- Baud rate of RS 485 interface (SDB 1/2)



Fig. 6: Master controller PSE

Using the internal dip switch S2, the Master PSE's address can be modified from XX to any setting between one and 25, in order to enable automatic fault status enquiry for the connected PSE to be operated – in the case of data group systems – with just one group = max. 25 PSEs.

#### Master controller PSE 1-25

The Master PSE 1-25 has the function of interface distribution within a data group, featuring fault status enquiry with the connected PSE. This PSE will always be required if the duty involves addressing more than one PSE group.

# BFS 2000 Battery formation and test system

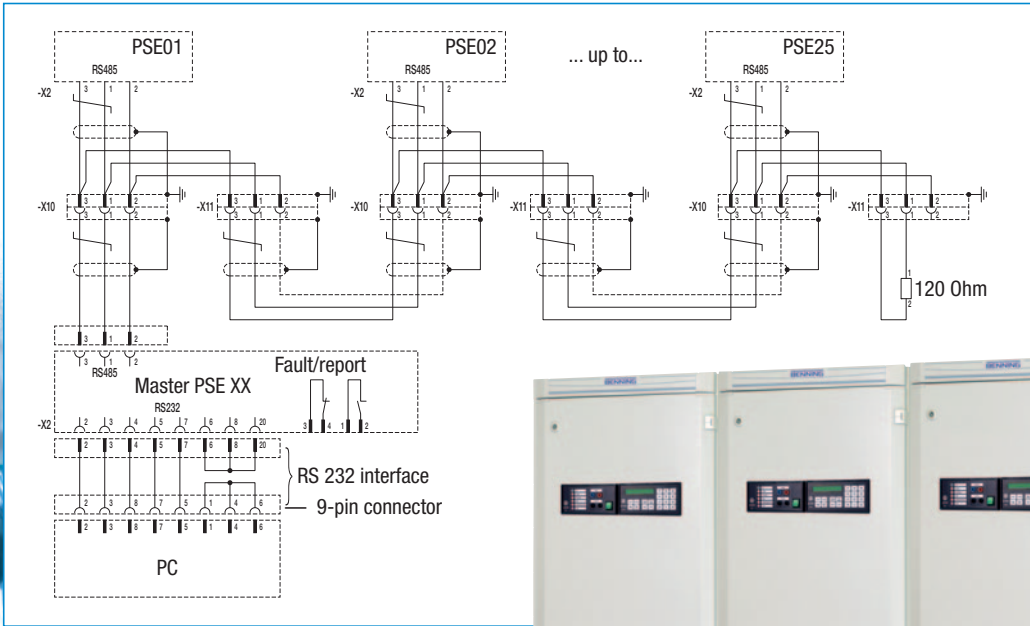


Fig. 7: Wiring of Data interface for 1 group = max. 25 PSE



Fig. 8: Formation/charging system

## 6. Host computer

The following configuration is required:

- Windows-compatible PC
- Serial interface (com)

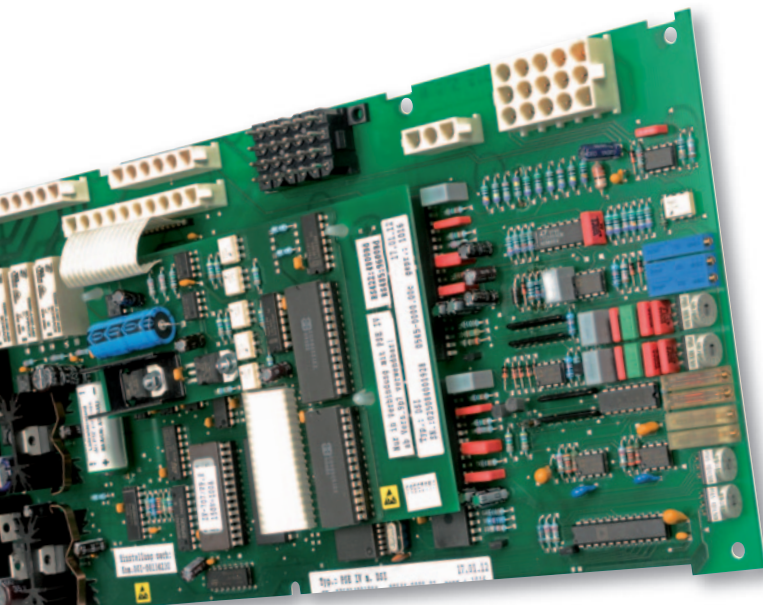
## 7. Program software

The program software enables the control and monitoring of formation and test systems: up to a maximum of 625 appliances, which can be combined in groups of 25 each.

A wide range of different characteristics, such as I<sub>a</sub> IU, I<sub>Ua</sub> IUa, W<sub>a</sub>, P<sub>Ua</sub>, can be covered. It is also possible to work through a range of gradients with rising or falling current.

In the process of logging individual cells' readings, a maximum of 10 measurement times per program step can be selected as desired. You can also have responses actuated, such as movement onto the next step – or termination of the program presently running – once your preset measurement points have been reached.

For further information, please contact your local BENNING office.

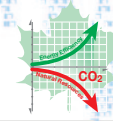


ISO  
9001

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SCCP



## BENNING worldwide

### Austria

Benning GmbH  
Elektrotechnik und Elektronik  
Eduard-Klinger-Str. 9  
3423 ST. ANDRÄ-WÖRDERN  
Tel.: +43 (0) 22 42 / 3 24 16-0  
Fax: +43 (0) 22 42 / 3 24 23  
E-mail: info@benning.at

### Belarus

000 «BENNING Elektrotechnik  
und Elektronik»  
Masherova Ave., 6A, 1003  
224030, BREST  
Tel.: +375 162 / 51 25 12  
Fax: +375 162 / 51 24 44  
E-mail: info@benning.by

### Belgium

Benning Belgium  
branch of Benning Vertriebsges. mbH  
Assesteenweg 65  
1740 TERNAT  
Tel.: +32 (0) 2 / 5 82 87 85  
Fax: +32 (0) 2 / 5 82 87 69  
E-mail: info@benning.be

### Croatia

Benning Zagreb d.o.o.  
Trnjanska 61  
10000 ZAGREB  
Tel.: +385 (0) 1 / 6 31 22 80  
Fax: +385 (0) 1 / 6 31 22 89  
E-mail: info@benning.hr

### Czech Republic

Benning CR, s.r.o.  
Zahradní ul. 894  
293 06 KOSMONOSY  
Tel.: +420 / 3 26 72 10 03  
Fax: +420 / 3 26 74 12 99  
E-mail: odbyt@benning.cz

### France

Benning  
conversion d'énergie  
43, avenue Winston Churchill  
B.P. 418  
27404 LOUVIERS CEDEX  
Tel.: +33 (0) / 2 32 25 23 94  
Fax: +33 (0) / 2 32 25 13 95  
E-mail: info@benning.fr

### Germany

Benning Elektrotechnik und Elektronik  
GmbH & Co. KG  
Factory I: Münsterstr. 135-137  
Factory II: Robert-Bosch-Str. 20  
46397 BOCHOLT  
Tel.: +49 (0) 28 71 / 93-0  
Fax: +49 (0) 28 71 / 9 32 97  
E-mail: info@benning.de

### Great-Britain

Benning Power Electronics (UK) Ltd.  
Oakley House, Hogwood Lane  
Finchampstead  
BERKSHIRE  
RG 40 4QW  
Tel.: +44 (0) 1 18 / 9 73 15 06  
Fax: +44 (0) 1 18 / 9 73 15 08  
E-mail: info@benninguk.com

### Greece

Benning Hellas  
Chanion 1, Lykovrisi 141 23  
ATHENS  
Tel.: +30 (0) 2 10 / 5 74 11 37  
Fax: +30 (0) 2 10 / 5 78 25 54  
E-mail: info@benning.gr

### Hungary

Benning Kft.  
Power Electronics  
Rákóczi út 145  
2541 LÁBATLAN  
Tel.: +36 (0) 33 / 50 76 00  
Fax: +36 (0) 33 / 50 76 01  
E-mail: benning@benning.hu

### Italy

Benning Conversione di Energia S.r.l.  
Via Cimarosa, 81  
40033 CASALECCHIO DI RENO (BO)  
Tel.: +39 0 51 / 75 88 00  
Fax: +39 0 51 / 6 16 76 55  
E-mail: info@benningitalia.com

### Netherlands

Benning NL  
branch of Benning Vertriebsges. mbH  
Peppelkade 42  
3992 AK HOUTEN  
Tel.: +31 (0) 30 / 6 34 60 10  
Fax: +31 (0) 30 / 6 34 60 20  
E-mail: info@benning.nl

### Poland

Benning Power Electronics Sp. z o.o.  
Korcunkowa 30  
05-503 GŁOSKÓW  
Tel.: +48 (0) 22 / 7 57 84 53  
Fax: +48 (0) 22 / 7 57 84 52  
E-mail: biuro@benning.biz

### P. R. China

Benning Power Electronics (Beijing) Co., Ltd.  
No. 6 Guangyuan Dongjie  
Tongzhou Industrial Development Zone  
101113 BEIJING  
Tel.: +86 (0) 10 / 61 56 85 88  
Fax: +86 (0) 10 / 61 50 62 00  
E-mail: info@benning.cn

### Russian Federation

000 Benning Power Electronics  
Domodedovo town,  
microdistrict Severny,  
"Benning" estate, bldg.1  
142000 MOSCOW REGION  
Tel.: +7 4 95 / 9 67 68 50  
Fax: +7 4 95 / 9 67 68 51  
E-mail: benning@benning.ru

### Slovakia

Benning Slovensko, s.r.o.  
Šenkvičká 3610/14W  
902 01 PEZINOK  
Tel.: +421 (0) 2 / 44 45 99 42  
Fax: +421 (0) 2 / 44 45 50 05  
E-mail: benning@benning.sk

### South East Asia

Benning Power Electronics Pte Ltd  
85, Defu Lane 10  
#05-00  
SINGAPORE 539218  
Tel.: +65 / 68 44 31 33  
Fax: +65 / 68 44 32 79  
E-mail: sales@benning.com.sg

### Spain

Benning Conversión de Energía S.A.  
C/Pico de Santa Catalina 2  
Pol. Ind. Los Linares  
28970 HUMANES, MADRID  
Tel.: +34 91 / 6 04 81 10  
Fax: +34 91 / 6 04 84 02  
E-mail: benning@benning.es

### Sweden

Benning Sweden AB  
Box 990, Hovslagarev. 3B  
19129 SOLLENTUNA  
Tel.: +46 (0) 8 / 6 23 95 00  
Fax: +46 (0) 8 / 96 97 72  
E-mail: power@benning.se

### Switzerland

Benning Power Electronics GmbH  
Industriestrasse 6  
8305 DIETLIKON  
Tel.: +41 (0) 44 / 8 05 75 75  
Fax: +41 (0) 44 / 8 05 75 80  
E-mail: info@benning.ch

### Turkey

Benning GmbH Turkey Liaison Office  
19 Mayıs Mah. Kırkkçi Sokak No:16/A  
34736 KOZYATAGI  
KADIKÖY / ISTANBUL  
Tel.: +90 (0) 2 16 / 4 45 71 46  
Fax: +90 (0) 2 16 / 4 45 71 47  
E-mail: info@benning.com.tr

### UAE

Benning Power Systems  
Middle East / Office: 918,  
9th Floor, AYA Business Center  
ADNIC Building, Khalifa Street  
ABU DHABI  
Tel.: +971 (0) 2 / 4 18 91 50  
E-mail: benningme@benning.fr

### Ukraine

Benning Power Electronics  
3 Sim'yi Sosninykh str.  
03148 KYIV  
Tel.: 0038 044 501 40 45  
Fax: 0038 044 273 57 49  
E-mail: info@benning.ua

### U.S.A.

Benning Power Electronics, Inc.  
1220 Presidential Drive  
RICHARDSON, TEXAS 75081  
Tel.: +1 2 14 / 5 53 14 44  
Fax: +1 2 14 / 5 53 13 55  
E-mail: sales@benning.us