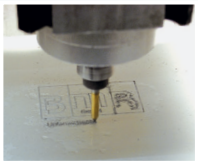
MANUAL

GmbH BMR®
The Sign of Quality



Power Packet in a small Size:

Power Baby 1

Handheld High Frequency Converter SFU 0150

Congratulation
*for purchasing a **BMR-GmbH** product.*
We thank you for the decision for
*choosing a **BMR-GmbH** device*
and wish you much success.

Please read
this manual carefully
before the first use
Version 06.April.2009

Content

1 Introduction

Depending on its construction, the speed of a three-phase A.C. motor is directly dependent on the number of poles and the frequency of the network. In a 3ph 380V/50Hz network, with a 2-pole motor, the rated speed would be 50 U/s * 60 = 3000 Upm.
With D.C. motors (brushless motor D.C.), the speed is dependent on the voltage applied.

Three-phase A.C. motors provide numerous benefits in industry, such as brushless motor operation, long life, favourable performance/weight ratio, high-speed capability, and much more. These motors can be used in many different application areas, such as milling and grinding spindles, or with drilling machinery.

In these mentioned applications, three-phase AC motors are operated using special control gear - frequency converters. These frequency converters convert the fixed 50 Hz network into a 3-phase network with variable frequency and voltage. This greatly reduces the start-up problems and the high starting currents that are unavoidable when high-capacity three-phase A.C. motors are connected to a fixed network. The motor is controlled according to a special characteristic curve until its rated speed has increased, or it has been stopped.

The **SFU 0150** - series high frequency converter has been specially designed for use in these high frequency applications, offering excellent safety, performance and reliability, the result of years of experience in the design and construction of frequency converters, together with the use of the latest materials and the most reliable components. It can be used in many different applications and is as suitable for use as a replacement device in existing systems with older type series as it is in pre-planned applications as a cost-effective solution, helping to prolong the useful life of tools.

2 Description and Features

For the operation of **A.C.** spindles.

The high frequency converter **SFU 0150** allows **speed frequencies** up to **50,000rpm** with 2-pole A.C. spindles. Maximum **High output power is (150VA)** in a **compact design.**

The core of the **SFU 0150** is the **Digital Signal Processor (DSP)** which generates all output signals and captures all input signals.

All parameters, such as current, voltage and frequency, are captured in **real time**, and are adjusted according to load condition by Vector Control Mode.

The **highest efficiency** of motors at **both low and high frequencies** is made possible.

Highest level of operational safety: All operating states such as acceleration, operation at rated speed, and deceleration, are monitored and critical situations are intercepted and brought under control automatically.

Display of Rotational Speed: current load condition and converter status message on three 7 segment LEDs.

Control: The high frequency converter can be controlled manually using 2 push buttons on the front panel or via the control input on the rear panel.

Galvanic isolation: spindle voltages and electronics using a mains transformer

Short-circuit-protected

Over-temperature-protected

3 Technical Data

Mains connection	230V, 50Hz, 1PH / 115V, 60Hz, 1PH as option
Mains Switch Fuse	ON/OFF Switch in combination with a resettable thermo protection switch as mains fuse 1A/250V
Output Power	150 VA (max 5 min)
Spindle Connection	3 prong U, V; W,
Output voltage	3* 36V
Output current	Electronically limited
Output frequency	AC: 833Hz /50,000 rpm
Control input	Start/Stop with a galvanically isolated contact or a B.M.R foot controller.
Display of rotational speed	On 3 x 7 segment LED
Display of status	On 3 x 7 segment LED
Display of load condition	As bar graph on 1st 7 segment LED
Dimensions	200 x 120 x 105 W x H x D (mm)
Weight	App. 2,5kg
Protection	IP20
Operating conditions	ambient temperature 10°C...40°C, max 80% humidity content

ATTENTION: Make sure that the setup for mains voltage is in accordance to the power line used.

4 Safety Precautions and Warnings

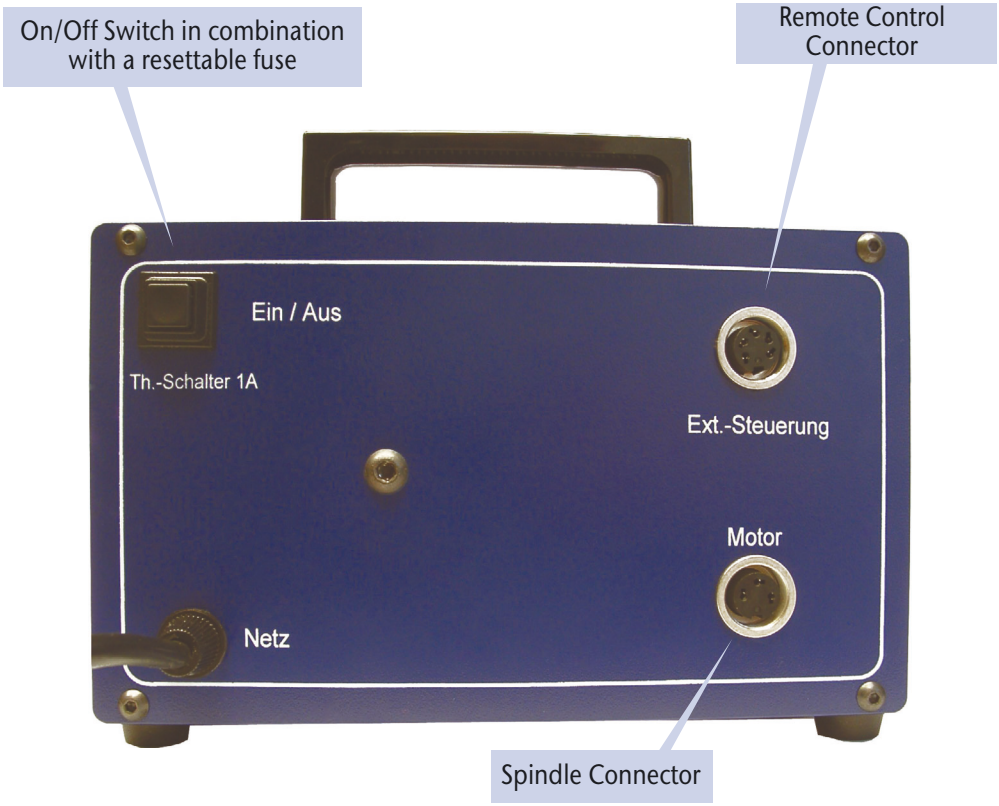
- This device produces dangerous electrical voltages and is used for the operation of dangerous moving mechanical parts.
  For this reason, only professionally trained and qualified personnel should be allowed to install and work with this device!

- Any maintenance or repair work on the device must only be carried out when the mains supply plug has been disconnected!

- Before the first activation can be carried out, it should be established that the tool is installed correctly and securely, to eliminate the possibility of uncontrolled movement of the motor.

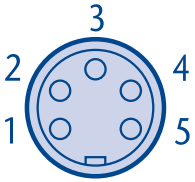
- Safety regulations that are valid for the country where the device is used, must be applied when repair or maintenance work is carried out on the device.
  Maintaining EMC (electro magnetic compatibility) limits is the responsibility of the manufacturer of the machine or device. The inputs on this device are fitted with filters, to increase the interference immunity and to reduce emitted interference, making it possible to use this device in an industrial environment. The EMC of a machine or device is affected by all connected components (cables, wiring, etc.) and for this reason, installation and connection of the device should only be carried out by qualified personnel.

5 Connections, Plugs and Pinouts



ATTENTION: Please do not connect any external voltages to the remote control pins!

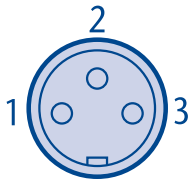
5.1 Remote Control Connector (5 Pin)



Pin 1 = to FSW, B.M.R Footcontroler or contact
Pin 2 =
Pin 3 =
Pin 4 =
Pin 5 = to FSW, B.M.R Footcontroler or contact

- Operation with footswitch = ON/OFF.
- BMR vario footcontroler = ON-OFF- Variable rotational Speed.
- Galvanically isolated contact = Remote Control by a external PLC

5.2 Spindle Connector (3 Pin)



Pin 1 = R
Pin 2 = S
Pin 3 = T

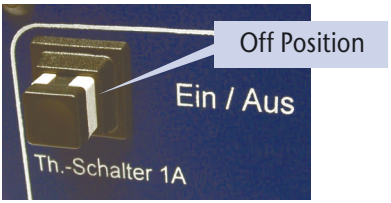
3 Phase for Spindle

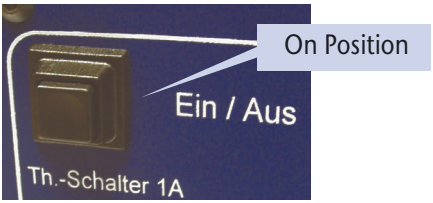
5.3 Mains

3 pin butterfly mains connector.

5.4 Mains Switch and Fuse

The mains switch is realized as a combination between a push-push button mains switch and a thermo protection fuse for 1A. Exeeding the rated current will trigger the thermo fuse to switch in the OFF Position





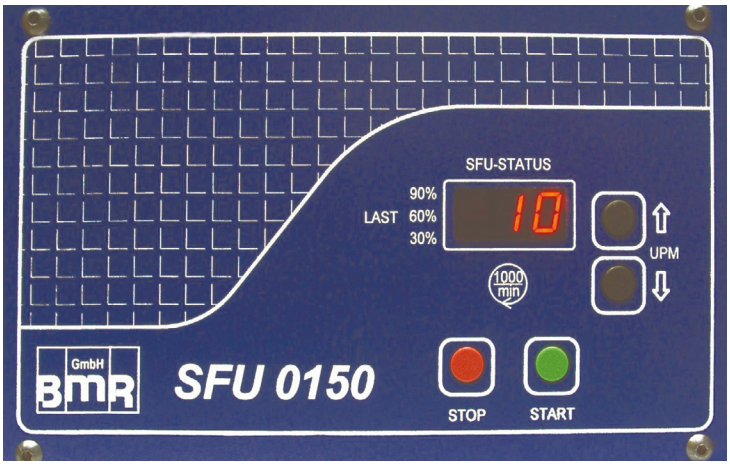
6 Functions, Setup and Operation

4 Possibilities for Operation:

- Manually with the buttons on the front panel
- Operation with footswitch = ON/OFF
- **BMR** Vario foot controler = ON / variable rot. speed / OFF
- Galvanically isolated contact = remote control

ATTENTION: Please do not connect any external voltages to the remote control pins!

6.1 Front Panel



6.2 Setup of Rotational Speed

The rotational speed of a connected spindle or the frequency of the output voltage at the spindle terminals can be set up in several ways.

- **Preselection manually via rpm buttons on the front panel**
  The needed speed of rotation can be adjusted with the buttons on the front panel and is displayed on 3 digits on the LED-Display. During operation of the spindle the speed of rotation is displayed with 2 digits.
- **Start, Stop and Setup with the B.M.R foot controler**
  The maximum value of the rotational speed wished can set with the buttons on the front panel. From zero position (OFF) up to the maximum equivalent with the preselected rotational speed . The rotational speed can be increased or decreased depending on the pressure applied to the foot controller. For example for the max. rpm the foot pedal has to be pushed completly down.

6.3 Starting and Stopping the Frequency Converter

Because of multiple requirements the frequency converter SFU0150 can be started and stopped in several ways.

- **Manually with the help of the push buttons at the front panel**

Start with the green button **START**

Stop with the red button **STOP**

- **With a galvanically isolated contact**
  If Pin 1 and 5 of the remote plug is shorted, the converter is started and the rotational speed is setup according the preselection displayed at the front panel
- **With foot controler**
  If the footcontroler is actuated beyond zero position, the speed of rotation is set up according to the position of the foot controler pedal. If the pedal is brought into stop position, the converter is stopped.

6.4 Setup of direction of rotation

The direction of rotation may be changed before the start. To achieve this, the push buttons **STOP** and **START** have to be actuated simultaneously for about 5 sec (press Stop first, then Start) In this configuration mode it is possible to change the direction between clockwise (displayed: rE) and counterclockwise (displayed: Li) with the help of the **RPM** push buttons.

If the push buttons are left unpressed for more than 10 sec, it is switched back to operating mode.

6.5 Operation

If the converter is started and the spindle is spinning, the speed of rotation is displayed at the right LED digits. The horizontal bars of the left digit serves as display of current load condition.

Some display examples: The converter is set to 10-thousand rpm each

idle running or load <30 %

load 30 % - 59 %

load 60 % - 89 %

load 90 % - 100 %

overload >100 %
cut-off after 10 sec. of load

excess temperature of the converter
cut-off after 10 sec. of load

7 Safety Functions

A **controlled spindle stop** according to the preset acceleration data is carried out because of the events listed below.

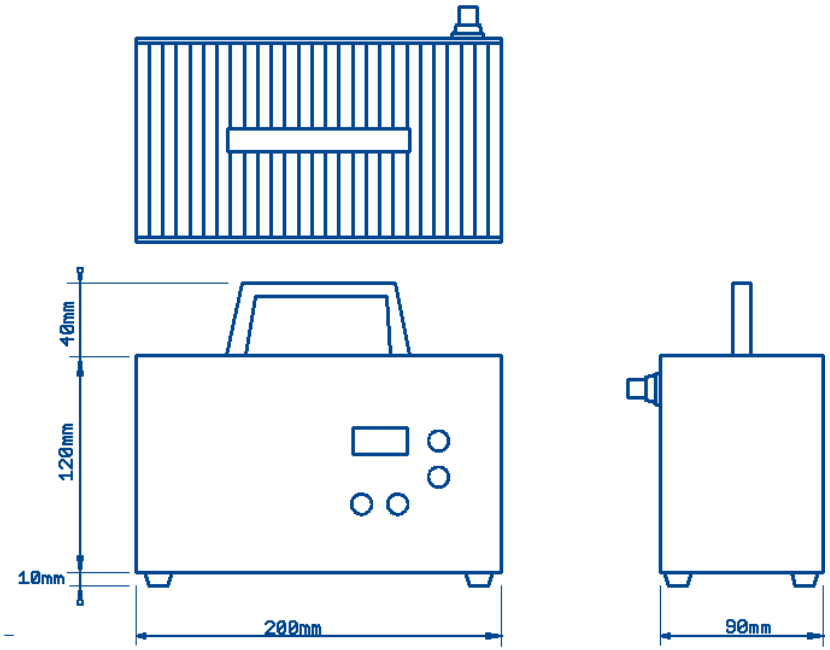
- Converter switch-off, if maximum power consumption is exceeded constantly. In this case the thermofuse with the ON-OFF switch is triggered.
- Stop because of exceeding the max. internal temperature of the converter after a time delay of 10sec.
- Stop because of exceeding the max. nominal output load of the converter after a time delay of 10sec.
- Immediate-Stop because of exceeding maximum spindle current.

8 EMC Electro Magnetic Compatibility

This device was developed for use in industrial environments. For trouble-free operation and to reduce emitted interference, the following should be observed during wiring of the equipment:

- The EMC of a machine or device is affected by all connected components (motor spindle, length and type of cables, wiring, etc.). Under certain conditions, the use of additional filters can be necessary to maintain the current laws.
- The ground and shield connections of all devices used in conjunction with the frequency converter should be as short as possible and have as large cross-section as possible.
- Control devices used with the frequency converter (PLC, CNC, IPC, ...) should be connected to an earth terminal bar.
- For mechanical installation, use serrated lock washers to guarantee good electrical contact with the housing.
- All connections both to and from the frequency converter should be shielded cables. The shield must be completely connected to ground.
- Supply cables, motor cables and control cables should be mounted separated from each other. Where crossing points cannot be avoided, cables should be laid at 90° to each other.
- The control cable should be laid as far away as possible from the spindle cable.

9 Dimensions SFU 0150



Subject to technical changes.
Edition: April 12, 2008

ATTENTION: Old electric and electronic devices must not be placed into the domestic waste but have to be disposed separately!

10 EG Declaration of Conformity

Manufacturer:

BMR GmbH
Unterreichenbacher Str. 1
90455 Nuernberg

Product: **SFU 0150**

The above mentioned products comply with the regulations of the following European guidelines:
89/336/EWG approximation of legal regulations on EMC"
The adherence to the above mentioned guidelines requires an installation into the total unit according to the EMC.

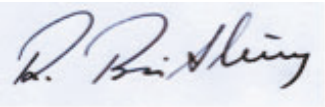
The following standards are applied:

EN 61800-3 Electric drives with variable rotation speed EMC product standard including special test procedures

C3 standards which are also complied with:

VDE 0839 Teil 6-4, IEC 61000-6-4
VDE 0160 Teil 100, IEC 61800-3
VDE 0847 Teil 4-8, IEC 61000-4-8
VDE 0847 Teil 5-5, IEC 61000-4-5
VDE 0875 Teil 11 + Bbl. 1, IEC / CISPR 11 (CISPR TR 28)
VDE 0847 Teil 4-6, IEC 61000-4-6
VDE 0847 Teil 4-2 +A1, IEC 61000-4-2 +A1
VDE 0847 Teil 4-11, IEC 61000-4-11
VDE 0847 Teil 4-3, IEC 61000-4-3 +A1
VDE 0839 Teil 6-2, IEC 61000-6-2
VDE 0847 Teil 4-4, IEC 61000-4-4

Nuernberg, April 12, 2008



Rudolf M. Brittling, executive director

11 General Hints

Our high frequency converters are highly valuable precison devices. Please take care of them with the necessary attention, to preserve their high precision, high power ability, and long lifetime.

These devices leave our company only after a quality test and a load check have been carried out. Before mounting and use please read the attached manual carefully and pay attention to the points listed below.

- Before the first activation of the device, verify if it is in a faultless optical condition. If it was damaged during transportation, it must not be used and not turned on.
- During the installation the safety regulations must be observed.
- Before the converter is turned on for the first time, it should be verified that connected parts cannot carry out uncontrolled movements.
- The frequency converter must not be operated close to heating devices or magnetic devices.
- Sufficient air circulation around the converter should be ensured.
- Fluids should be prevented from intruding into the housing. If it seems to have happened, the converter has to be switched off immediately.
- If the converter is connected to a remote control, it should be verified that the switch is in the OFF position before connecting.
- All repairs and maintenance on our converters must be carried out by skilled and instructed persons, only.
- All repairs and maintenance on the converter and the relating accessories must be carried out by skilled and instructed persons in the OFF-state only. To ensure this, the mains plug should be pulled out. In doing this, both the terms of regulations for preventing accidents and the general and national rules for mounting and safety have to be applied.

Our common hints can give only a rough guideline because it is not possible for BMR to deal with every specific situation. The compliance with the limits of EMC demanded by law is the responsibility of the manufacturer of the unit or machine. By doing controls and tests in our own laboratory, BMR can guarantee that our products comply with the corresponding standards if they are installed and used in an appropriate manner.

12 Warranty

With exclusion of additional claims we give a warranty on our high frequency converter for 1 year on errors due to material, mounting and construction.

We commit to repair or replace the parts without any costs which seem to be defective by our estimation and which are not damaged by not appropriate handling.

Warranty claims have to be sent to us in written form. The customer has to pay the costs to send the defective device back to BMR within the time of warranty. If this is not complied with or if we detect an external intrusion into our control unit, we withdraw our duty of warranty.

Our duty of warranty is limited to the repairing or replacing of the defective parts. We refuse claims of responsibility or warranty for direct or indirect consequential damages, caused by faults of our products.

Changes in construction may be carried out without any message or notification.

Our common terms of business conditions apply.

BMR GmbH is a dynamic and flexible company. We take into account specific requirements of our customers as well as demanding solutions in design. These are integrated according to qualitative and functional aspects maintaining of course our high quality standard.
Our company is working according to the highest economical and ecological standards which are mirrored at **BMR** in all areas. Especially in manufacturing we try to improve our ecological standard constantly. It has been and is our constant purpose to comply with these demands.

Subject to technical changes.

GmbH BMR®

The Sign of Quality

The company **BMR GmbH** was founded in 1978.

We develop, construct and manufacture electronic devices and electronic drive units.

Nearly all the steps of the manufacturing process are carried out within our company.

The development department designs all our printed circuit boards first in a schematic form and then as a layout. They furthermore develop the firmware for the microcontrollers and DSPs and even the Windows PC Software for our devices.

The manufacturing department solders and mounts all the components. And finally in the quality and test department the devices are tested and set up according to the customers requirements.

We have established "*short ways*" between the departments in order to guarantee a constant level of high quality and to be able to realize changes fast and in a flexible way.

By keeping the manufacturing processes within our company, we have gained years of knowledge and experience, offering this further to our customers as an extra service.

Our goal is a quick,
flexible und reliable execution of orders.

With our long-time experience, especially in manufacturing frequency converters, we have gained a strong position in the market. This becomes evident especially in our growing presence in domestic and overseas markets.

Our present product profile:

- High frequency converters for industrial use
- Drive units for Electroluminescence displays
- Intelligent lighting controls
- Control units for domestic appliances
- Acoustic test units
- Motor controls
- Accumulator charger
- Time controls, for example grease controls used in automotive applications
- Development of oem controls
- Manufacturing of electronic devices using wire-through and surface mount technique
- We also work as an extended workbench for well known companies

Our strength is called quality!

The Sign of Quality

The quality sign "Made in Germany" is the synonym for **precision, reliability and innovation.**

BMR GmbH feels commited to these values. With two decades of experience in the sector of developing, constructing and manufacturing electronic devices and controls this was and still is the prescription for our success.

Our policy of "short ways" ensures constant high quality. This makes it possible to react rapidly, in time and flexible with changes and requirements for our products.

This concept is valued by our customers and becomes evident in our steadily growing presence in the market at home and abroad.

If you are interested in our products and accessories, contact us or visit us on our website:
www.bmr-gmbh.de

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