Magnetic Field Generator 1000

User Manual

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1.0 Getting Started: Unpacking, Installation and Safety

Inspect the instrument for any damage caused by shipping. The supplier should be informed immediately if any damage was found.

A well-ventilated indoor environment is required when operating the instrument. Remember, the instrument generates heat during operation and thus, for best performance never obstruct any of the air vents found in the instrument housing. Always be sure there is adequate space around the instrument for passive movement of air. The power supply generates heat and becomes warm during instrument operation. Never cover the power supply and always place it in a well-ventilated area during use.

Package Contents (E0200):

1.	In Vitro Magnetic Field Generator	(1 pc)	
2.	Power supply/cable, wide input range 100 - 240 V, 50 - 60 Hz	(1 pc)	
3.	Sample container PCR VIAL 0,2 ml	(100 pcs)	E0201
4.	Operating manual in English	(1 pc)	

Use only sample holders that have been provided with the instrument or those which may be purchased from the supplier as additional accessories. The instrument warranty only covers the usage of supplier approved accessories.

Warning: Do not place metal objects into the sample holder at any time! Such materials absorb the generated magnetic field and become dangerously warm (>60 °C). This will melt the plastic instrument housing and may give rise to severe personal injuries.

2.0 Introduction

The front panel consists of four buttons and a display. The display will be referred as the *display* in the following text and the buttons printed as **RUN**, **SET**, **+**, and **-**.

2.1 Operation Mode

When the instrument is turned on, the last saved settings are selected and the instrument is in operation mode. The instrument has two operation modes:1. continuous mode and 2. pulse mode. In continuous mode the display will show “Ready”. When pulse mode has been selected the display will show “ReadyP” instead. If the instrument instead says "Cal" on its display, please see section 4.0 "Calibration of the instrument" for more information.

```
Ready    1.03MHz
01m00 19°C 0.5mT
```

Continuous Mode: Display shows that the instrument will operate in continuous mode using the following settings: resonance frequency: 1.03 MHz; time-to-run: 1 minute; current sample holder temperature:19 ºC; and magnetic field strength: 0.5 mT.

```
ReadyP   1.03MHz
01m00 19°C 0.5mT
```

Pulse Mode: Display shows that the instrument will operate in pulse mode using the following settings: resonance frequency: 1.03 MHz; time-to-run: 1 minute; current sample holder temperature:19 ºC; and magnetic field strength: 0.5 mT.

2.2 Settings Menu

The user may adjust the time, magnetic field strength, pulse-on time, and pulse-off time by changing the settings of the instrument. Figure 1 below gives a visual representation of the menu system found in the MFG-1000.

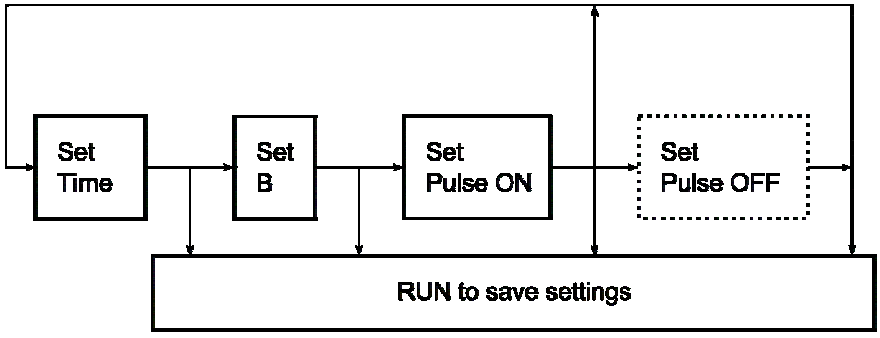

Figure1: A visual representation of the menu system found in the MFG-1000.
Pressing the **SET** button allows the user to move through the menu system to adjust the settings of the instrument. Pressing the **SET** button once activates the time setting of the menu. Adjustment of the time then can be done using the **+** or **-** buttons while the instrument is in the time menu setting. Pressing the **SET** button a second, third or fourth time activates the magnetic field, pulse-on time and pulse-off time, settings of the menu. A fifth press of the **SET** button will return the menu to the time setting. Save the settings at any time by pressing the **RUN** button. Please note that once continuous mode has been selected "Pulse OFF" is not shown in the menu system. Continuous mode is selected by adjusting the pulse-on time to 0 s.

2.2.1 Time

Press the **SET** button once to activate the time menu setting. Adjust the time by pressing the **+** or **-** buttons. The shortest time, which can be selected, is 1 second and the longest is 99 minutes and 59 seconds. Pressing and holding down the **+** or **–** buttons will allow the displayed time in seconds to increase or decrease more rapidly during adjustment. In order to adjust the time in minutes more rapidly, press and hold down the **+** or **–** button and then press the **SET** button at the same time. To stop adjustment, release the **SET** button first followed by the **+** or **–** button.

```
Set Time
01m00
```

Time: Time-to-run can be adjusted when the above display is shown.

2.2.2 Magnetic Field Strength

Press the **SET** button twice to activate the magnetic field menu setting. Adjust the magnetic field strength by pressing the **+** or **-** buttons. The weakest field strength, which can be set, is 0.5mT and the strongest field strength is 5 mT. Pressing and holding down the **+** or **–** buttons will allow the displayed magnetic field to increase or decrease more rapidly during adjustment.

```
Set B
            0.5mT
```

Magnetic Field Strength: The Set B can be adjusted when the above display is shown.

2.2.3 Pulse Mode

The pulse mode is a feature where the instrument turns the set magnetic field on (pulse-on) and off (pulse-off) for set lengths of time. Press the **SET** button three times to activate the pulse-on menu setting. Adjust the pulse-on time by pressing the **+** or **-** buttons. The shortest pulse-on time, which can be selected, is 1 second and the longest is 255 seconds. The instrument will operate in continuous mode when the user adjusts the pulse-on time to zero. Pressing and holding down the **+** or **–** buttons will allow the displayed pulse-on time to increase or decrease more rapidly during adjustment.

```
Set Pulse ON
Cont
```

Continuous Mode: Continuous mode is selected by adjusting the pulse-on time to 0 s.

```
Set Pulse ON
1s
```

Pulse ON: The pulse-on time can be adjusted when the above display is shown.

Press the **SET** button four times to activate the pulse-off menu setting. Adjust the pulse-off time by pressing the **+** or **-** buttons. The shortest pulse-off time, which can be selected, is 1 second and the longest is 255 seconds. Pressing and holding down the **+** or **–** buttons will allow the displayed pulse-off time to increase or decrease more rapidly during adjustment. ***Please note: If continuous mode has been selected in the pulse-on menu setting, then the pulse-off menu setting will not appear in the menu system!***

```
Set Pulse OFF
      2s
```

Pulse OFF: The pulse-off time can be adjusted when the above display is shown.

Pulse Mode Feature Example:

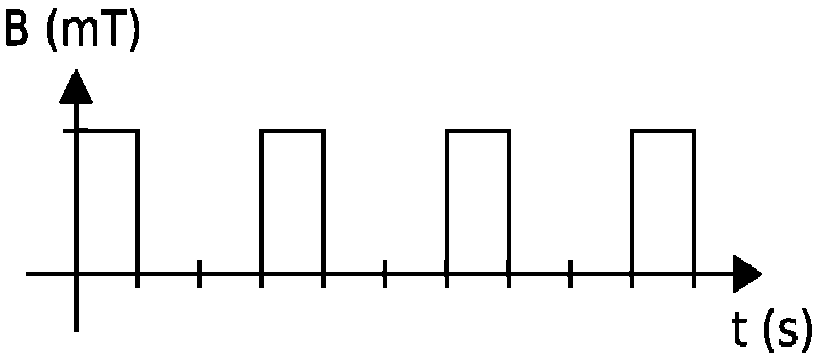

Figure 2: This diagram shows an example of running pulse mode for 10 seconds with the Pulse ON set at 1 second and the Pulse OFF set at 2 seconds.

2.2.4 Saving Settings

To save the settings to memory, press the **RUN** button. The display will show a message, “Saving settings” for 2 seconds and then return to operation mode where the saved settings are shown on the display (see 2.1 operation mode). When the instrument is initially turned on the last saved settings are selected. If a power supply failure should happen during adjustment in the settings menu, the instrument returns to its default settings on the next power up.

```
Saving settings
```

Saving Settings: The display will show the above message for 2 seconds after the **RUN** button has been pressed.

3.0 Running the Instrument

The instrument is in operation mode when Ready (continuous mode) or ReadyP (pulse mode) is shown on the display. The instrument settings that have been selected and saved are also shown on the display. To start a run, press the **RUN** button. The display will show a message, “Starting…” while the instrument looks for its internal settings and applies them for field generation. A run can be terminated by pressing any button.

```
Starting...
```

Starting a Run: The instrument will initially display this message immediately before the run begins.

Once the instrument is ready for field generation, the instrument will begin the run and the display will show a message, “RUN”. The time left to run in minutes and seconds, and the current measured magnetic field strength will also be shown. The data on the display is updated once every second. ***Note: If the current measured magnetic field strength shown on the display during a run is not the same magnetic field strength selected in the settings menu, the instrument may need to be recalibrated. See section 4.0 “Calibration of Instrument” for more information.***

```
Run
00m43       1.3mT
```

Performing a Run: During a run, the instrument displays “RUN” together with the time left to run in minutes and seconds, and the current measured magnetic field strength.

When the instrument has completed a run, it will beep ten times and the display will show a message, “Done” together with the current temperature of the sample holder. To return to operation mode again, press any button.

```
Done
       19°C
```

Completed Run: The display will show the above message once the instrument has completed a run. To return to operation mode press the **RUN** button.

4.0 Calibration of Instrument

Calibration of the instrument may occasionally be required for operation. To enter the calibration mode of the menu system, press the **SET** button before switching on the instrument and continue to hold the **SET** button down until “Cal” is shown on the display. Release the **SET** button once “Cal” is shown.

```
Cal
```

Calibration Mode of Menu System: To enter the calibration mode of the menu system press the **SET** button before turning on the instrument and continue holding it until “Cal” is displayed.

After “Cal” has disappeared from the display, the stored calibration data from the instrument’s memory will be shown. If "Cal 0%" is shown on the display, no valid calibration data is currently available in the memory. Calibration of the instrument is required before operation. If "Ready 100%" and a frequency is shown on the display, valid calibration data is available in the memory. The frequency is the current resonance frequency. The user may press the **SET** button and return the instrument to operation mode.

```
Cal
0%    19°C
```

No Calibration Data Available in Memory: When Cal 0% is shown on the display, the instrument must be calibrated before operation.

```
Ready  1036025Hz
100%  19°C
```

Calibration Data Available in Memory: When Ready 100% is shown on the display together with the resonance frequency, valid calibration data is available. Press the **SET** button to return to operation mode.

To calibrate the instrument, press the **RUN** button when the instrument is in the calibration mode of the menu system. The display will show “RunCal” during the calibration. The percentage of the calibration process completed is also shown on the display during the calibration process. When the calibration is completed “Ready 100%” is shown on the display.

```
RunCal  975000Hz
1%
```

Calibration of Instrument: When “RunCal” is shown on the display the instrument is in the process of calibration. In this example, the instrument is testing 975000 Hz to find the resonance frequency and 1 percent of the calibration process has been completed.

Pressing any button on the front panel of the instrument during the calibration process will interrupt the calibration. After any interruption of the calibration process, "Cal 0%" may be shown on the display in which case no calibration data will be available in the instrument’s memory. The instrument must be recalibrated before operation.

5.0 Maintenance

NOTE: Maintenance of the instrument may only be carried out when the instrument is unplugged from the mains outlet!

The instrument is essentially maintenance-free. The instrument may be cleaned using a mild soap and a moist cloth as needed. The instrument should never come into contact with abrasive materials. The sample holder may be cleaned with mild soap and Q-tips. Take extra care that water never enters into the instrument or comes into contact with the electronic parts. The instrument should be thoroughly dried before use.

6.0 Specifications

***Magnetic flux density adjustable range	0.5 mT – 5 mT (0-50 Gauss) in 0.1 mT steps
Magnetic field strength adjustable range	0 - 50 Oe (0 - 4000 A/m)
Field activation time setting range	1 s – 99 min 59 s
Field activation in pulsed mode duty cycle	ON (1 – 255 s), OFF (1 – 255 s)
Volume of homogeneous magnetic field	0.4 cm^3 (L4 x W7 x H15 mm)
Sample container regulation temperature	15 °C (10 - 20 °C during operation)
Instrument ambient operating temperature	18 – 25 °C
Input voltage power supply	100 V – 240 V (50-60 Hz)
Instrument voltage/ power consumption	19 V DC / max 90 W
Instrument size	L280 x W160 x H120 mm
Weight (excluding power supply)	1.9 kg

***The generated magnetic flux density has been calibrated against an external reference coil at the factory. The displayed value of the generated magnetic flux density is calculated from real-time measurements of the coil current.

7.0 Manufacturer Information

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www.euris.org

8.0 Safety

This is important information; please read carefully before installing or using this instrument

The In Vitro Magnetic Field Generator 1000 is designed for operation by **trained** personnel that are aware of the principles and applications involved. For further help and advice please contact your local retailer, European Institute of Science AB, e-mail *info@euris.org* or visit *www.euris.org*

The In Vitro Magnetic Field Generator 1000 is a sensitive electronic instrument designed for use in a laboratory or controlled environment. Careful adherence to the installation instructions must be observed. If in doubt contact a **relevant and competent authority** for advice before proceeding.

In addition to observing the instructions detailed in the User Manual for this instrument all installation, operating and service personnel must be aware of, and employ, **a safe system of work.**

This instrument is designed for minimal maintenance, which must be carried out carefully following the **procedures detailed in this manual**. Other than those items defined in the maintenance procedures herein there are **no user serviceable items** in this instrument. Removal of covers and attempted adjustment or service by unqualified personnel will invalidate any warranty and incur additional charges for repair.

All information, advice and warnings on the handling, storage and use must be carefully observed. It is important that **good laboratory practice** is observed when handling samples, chemicals, reagents and ancillary equipment in order to carry out measurements and analysis with this instrument. Suitable **safety and personal protective equipment** must be used at all times.

Keep the **electronic cables and connectors** away from any liquid and magnetic field. Humidity at electric connections may be hazardous to health.

If it is suspected that safety protection has been impaired in any way, the instrument must be made **inoperative and secured** against any intended operation. The fault condition must be reported to the **appropriate servicing authority.** In all such reports the model number and serial number of the In Vitro Magnetic Field Generator must be quoted.

EC DECLARATION OF CONFORMITY

European Institute of Science In Vitro Magnetic Field Generator 1000 complies with the following European Standards:

EN 61326-1:2006 Electrical equipment for measurement and laboratory use.

EN 61326-2-3:2006 Electrical equipment for measurement, control and laboratory use. EMC-requirements-Part 2-3 Particular requirements- Test configuration operational conditions and performance criteria for transducers with integrated or remote signal conditioning.

Following the provision of:

EMC Directive Low Voltage Directive

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WARRANTY

European Institute of Science AB warrants that this product is free from defects in materials and function at the time of original purchase and for a period of one year from that date. When the name EURIS is mentioned in the following text, it means, unless otherwise stated, European Institute of Science AB (reg. number 556404-2769), and retailers.

If, during the warranty period, any defect in the product arises due to a deficiency in materials or function, EURIS pledges to, at EURIS's option, either repair or replace the defective product with the same or an equivalent model. EURIS, however, takes no responsibility for:
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4. Incompatibility due to technological developments.
5. Defects caused by external equipment or abnormal wear.
6. Defects caused by normal wear and tear.
7. Damage caused by the usage of inappropriate power sources.
8. Damage arising in connection with or as a consequence of upgrading with additions to or alterations of the product, using software or hardware not produced by or approved by EURIS.

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