

MAGMETER MF300B+
MAGNETIC FLUX
METER

USER MANUAL

Version 2.0 03/14

DIVERSE
CAMBRIDGE
ENGLAND
CB22 5EW

www.diverse-technologies.net

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Thank you for purchasing MF300B+ flux meter. Before using the instrument, please read these instructions carefully. If you are uncertain about any aspect of its operation, please contact Diverse by email for clarification at

sales@diverse-technologies.net

The serial interface version of this product is provided with software to run on a PC.

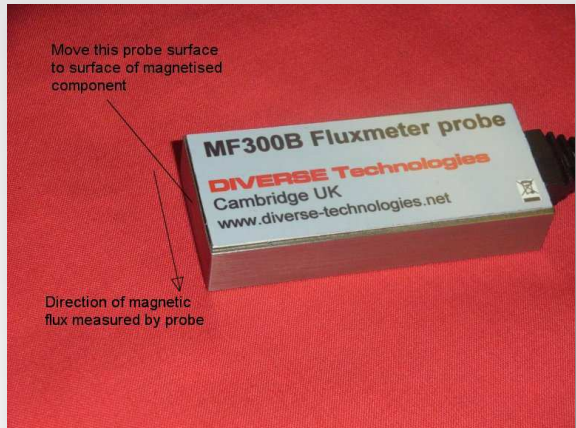
The MF300B+ is the version of our popular MF series which, uniquely, offers the ability to evaluate the flux *inside* magnetic materials. With a selection of magnetic units and a robust stainless steel probe that can be used with confidence in industrial environments.

In the same series is the magnetic field meter, the MF300H+ which is the tool of choice for measuring magnetic fields from steel pipes and welding preparations. With its robust stainless steel probe It is able to capture average or peak fields with confidence in situations where conventional delicate probes cannot be used.

Introduction

The MF300B+ Magnetic Flux Meter is used to measure the magnetic flux density within steel components. The meter can be used to measure static (DC) magnetic flux or varying (AC) magnetic flux in any direction along the surface of the component. The measured values are displayed in either mT (milliTesla), T (Tesla) or G (Gauss).

The MF300B+ is supplied with a probe which is able to measure the magnetic flux density within steels. When the probe is placed on the surface of a steel component, the magnetic flux within the component is sampled to provide the measurement (see picture).



The orientation of the probe on the surface indicates the direction at which the flux density was measured. The probe can be used on flat surfaces or curved surfaces with a minimum radius of curvature of 50 mm.

A serial output for connection of the Magmeter to a computer either through RS232 or USB is available as an option. PC Software is included with this option which enables the magnetic field measurements to be recorded and input to a spreadsheet.

The instrument is supplied in a carrying case together with its dedicated probe.

The MF300B+ Magnetic Flux Meter is calibrated a few days before delivery and a calibration certificate is supplied.

The unit requires 4 AA cells which should be installed in the battery compartment on the rear of the housing.

The Flux probe supplied with the meter is of a robust design suitable for the measurement of magnetic fields in workshops and laboratories. The probe will, however, be damaged, if it is subject to mechanical stresses or forces.

If you have chosen the serial interface version, you should install the software on your PC. To download the serial software go to our website at:

<http://www.diverse-technologies.net/software/setupserial.exe>

The serial software option can be extracted by clicking on "Extract". You will be prompted for the destination directory, and then asked for the password, which is "diverse magmeter mf300".

Your Magmeter is now ready to measure, follow the operation instructions to make a measurements.

The Magmeter has 4 keys:

ⓘ power ✓ tick ▲ up ▼ down

Step 1 Plug in the Flux Probe

Step 2 Power On/Off

Switch the unit on by pressing the ⓘ power key. Hold the probe away from any magnetic surface and switch the unit on by pressing the ⓘ power key.

Step 3 Preparation

Hold the probe away from any magnetic surfaces and press the ✓ tick key. The instrument will display 'zeroing'. Once this is complete the instrument will display 'ready'.

Step 4 Take Measurement (DC field)

Press the ✓ tick. 'Measure DC' will be displayed on the top line and a progress bar will be displayed. Move the probe until it is in good contact with the surface where a measurement is required. The measurement surface of the probe should lie on the surface and the long dimension of the probe should point in the direction where the measurement is required. See picture on page 4.

Once the display stops flashing, it will indicate the peak value of flux density measured by the probe and the integrated value of flux density. Note that the value displayed on the second line

will rise as the probe is taken to the measurement surface but will drop back if the probe is removed before the progress bar has completed. A new reading can be made by repeating steps 3 and 4.

Step 5 Take Measurement (AC field)

After following step 3, press the ✓ tick for 2 seconds. 'AC excitation' will be displayed on the top line and a progress bar will be displayed. Move the probe until it is in good contact with the surface where a measurement is required. The measurement surface of the probe should lie on the surface and the long dimension of the probe should point in the direction where the measurement is required.

Once the display stops flashing, it will indicate the peak value of ac flux density measured by the probe and the integrated value of flux density. Note that the value displayed on the second line will vary as the ac field varies.

NB. If the DC mode is used to measure a time varying flux or if the AC mode is used to measure a static flux then the reported values will be in error.

Step 6 Changing units

Press ▲ up to change the measurement units, mT (milliTesla), Tesla (T) and Gauss (G) can be selected.

Step 7 Switch off

Press and hold the ⓘ power key to switch the unit off when no further measurements are required.

Step 8 Serial Output

Readings from the MF300B+ can be output to a computer via the serial link.

Plug in the MagMeter using the cable provided, either RS232 or USB.

Values can be output from any of the display options by pressing the tick key for less than two seconds or the space bar on the PC.

Software

The serial version of the MF300B+ is supplied with software to run on a windows (7/Vista/XP/2000) PC, see First Time for information about installation.

The first time you use it, you should identify the communications port you wish to use, the program provides you with a list of possible ports. The chosen port is stored in the configuration file and will be automatically selected next time it's run. Connect the MF300B+ to the computer serial port or USB ports. If using USB port you will need the USB to serial adapter cable supplied.

Ensure the MF300B+ is switched on. With the software, select start: this will open the communications port and get the MF300B+ to identify itself on the listbox on screen. Pressing a computer key (except special keys - see below), or the ▲ up key on the MF300B+ will cause the current reading to be transmitted to the PC and it will be displayed.

'I' : Gives the instrument type

'V' : Software version

'B': Battery voltage

Use file save to save the results to a CSV file which can be directly imported into Excel or Open Office.

MF300B+ Specification

Accuracy:

+/- 5% of full scale, in the range 0.3 to 1.3 Tesla when used on mild steel.

Operating Temperature:

0C to +40C.

Units:

mT, T, G

Range:

0 - 1.99T,

Resolution:

10mT.

Zero:

Zeroed at the start of every measurement and actively between measurements.

Surface:

The probe can monitor the magnetic flux within flat surfaces, or curved surfaces with a radius as small as 50 mm.

Probe: Stainless steel, active area 21 x 7 mm

Power:

4x AA (R150) Cells (Alkaline, NiCAD or NiMH may be used). Auto power off after 5 minutes.

	Symbol	cgs	SI
Magnetic Flux	ϕ	Maxwell	Weber
Flux Density	B	Gauss	Tesla
Magnetising force	H	Oersted	A-T/m
Permeability of free space	μ	1	$4\pi \times 10^{-7}$

A-T/m is Ampere-Turns/m

Conversion Factors

	Multiply by	To Obtain
Gauss	1E-4	Tesla
Oersted	79.577	A-T/m

In a vacuum or air then $B = \mu_0 H$, then $\mu_0 = 4\pi \times 10^{-7}$ so:

Flux density B in Gauss = Magnetising Field H in Oersteds.

Flux density B in Tesla = $4\pi \times 10^{-7} \times H$ in A-T/m

If the MF300B+ displays the legend "Low battery" the batteries are low charge. If you have purchased the rechargeable unit then connect the charger and wait at least 30 minutes before using. Wait 8 hours for full recharge. If you have the dry cell unit replace with 4xAA alkaline cells.

Never use the battery charger with conventional dry cell batteries.

Diverse Technologies accepts no responsibility for the consequential losses arising from the ability or inability to use the equipment supplied. The limit of warranty is the repair or replacement of any faulty components, directly attributable to manufacturing defects, arising during the period of 12 months following purchase. This does not include damage resulting from incorrect operation of the instrument.

Designed and manufactured by:-
Diverse Technologies & Systems Ltd.
Zeromag House
46-48 Whittlesford Road
Shelford
Cambridge CB22 5EW
UK

Tel: +44 (0) 1223 84 44 44
Email: sales@diverse-technologies.net
<http://www.diverse-technologies.net>

The MF300B+ and probe is supplied with a calibration certificate. It is recommend that the unit is returned to Diverse annually for recalibration.

IMPORTANT

Although the calibration can be checked by any competent institution, the specialised calibrated torus and complex computer arrangements required to change or correct the calibration can only be undertaken at Diverse Technologies. The cost for this is the same or less than that charged by institutions such as BSI or NPL.

If the MF300B+ requires repair, the unit should be returned to Diverse, there are no user serviceable parts.

Disposal and Recycling

This instrument should be disposed of in a responsible manner to allow the components within it to be recycled. The wheellie bin symbol shown here and on the product means that the product is classed as Electrical and Electronic Equipment and should not be disposed with other household or commercial waste at the end of its working life.



The Waste of Electrical and Electronic Equipment (WEEE) directive (2002/96/EC) has been put in place in the EU to recycle products using the best recovery and recycling techniques to minimise the impact on the environment, treat any hazardous substances and avoid landfill. Business users should ensure that this product is not mixed with other commercial waste for disposal.