Operation Manual for

MS3 Magnetic Susceptibility Meter

Bartington®
Instruments

Table of Contents

1. About this Manual

This manual provides the information necessary to help customers connect, and operate, the MS3 Magnetic Susceptibility Meter from Bartington Instruments.

It should be read in conjunction with the product brochure DS0020 and the MS2 Sensors operation manual OM0408 available on the Bartington Instruments website. Necessary software can also be downloaded from our download page.

1.1. Symbols Glossary

The following symbols used within this manual call your attention to specific types of information:

WARNING: Indicates a situation in which serious bodily injury or death could result if the warning is ignored.

Caution: Indicates a situation in which bodily injury or damage to your instrument, or both, could result if the caution is ignored.

Identifies items that must be disposed of safely to prevent unnecessary damage to the environment.

Note: A paragraph in this format provides useful supporting information on how to make better use of your purchase.

1.2. Running Windows-based applications

Names of Windows-based applications and menu / command options are shown in **bold type**.

Sequences of instructions for running Windows-based applications are shown with an arrow: → .

Hence, for example, '**Control Panel** → **System and Security** → **Device Manager**' means 'click on **Control Panel**, then **System and Security**, then **Device Manager**'.

2. Safe Use

WARNING: These products are not qualified for use in explosive atmospheres or life support systems. Consult Bartington Instruments for advice.

3. Introduction

The MS3 (Figure 1) is a magnetic susceptibility meter that can be used with the MS2 range of sensors for measuring the magnetic susceptibility of many types of material, including soils, rocks, powders and liquids.

Key to Figure 1

1. 'Computer side': computer cable socket, with USB cable inserted. An RS-232 cable is also provided for connection with a computer's serial port.

2. LED.

3. 'Sensor side': TNC socket for connection to MS2 sensor.

Figure 1. MS3 Magnetic Susceptibility Meter

The MS3 must be used in conjunction with a compatible PC, laptop or PDA, which provide all measurement control and display. A suitable device will have a USB host or RS232 connection, and will operate in a Windows® environment (Windows® or Windows Mobile®). Software is supplied to operate the MS3.

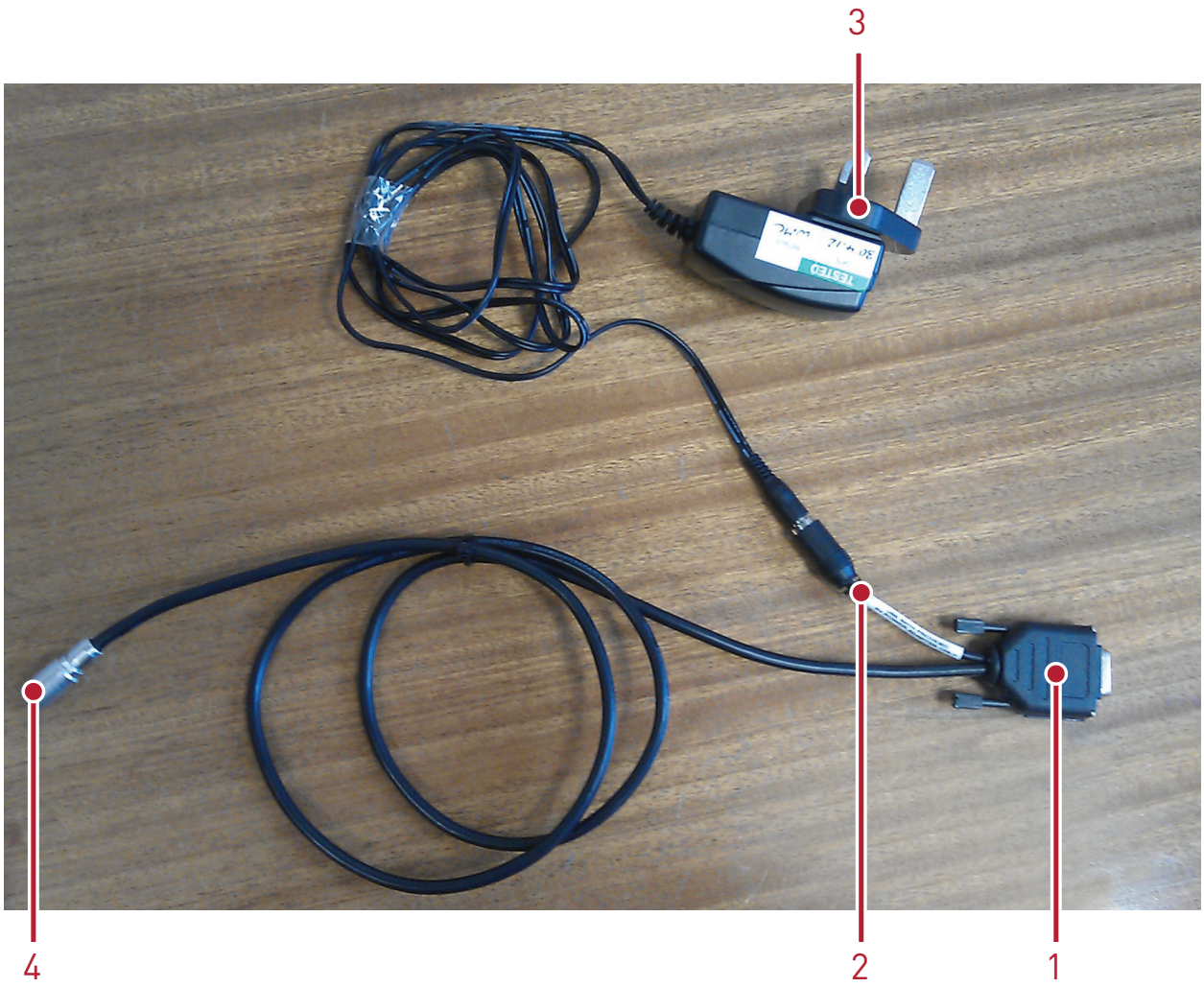
The MS3 meter complies with EMC standards, and therefore has a high immunity to magnetic fields in close proximity.

For the technical specification, refer to the product brochure.

4. Powering the MS3 Meter

The MS3 meter is usually powered through a cable connected to the host USB port of a PC computer (see Figure 1) or other USB-fitted device.

It can also be powered through the serial port of the computer by using a special RS-232 cable with an integrated 5V DC supply socket, which is in turn connected to the special 5V mains adaptor, all of which are supplied (Figure 2, Figure 3). See Connecting to a Computer Serial Port.



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Key to Figure 2

1. Serial port connector
2. Integrated 5V DC supply socket
3. 5V mains adapter
4. Connector to 'computer side' of MS3

Figure 2. RS-232 cable with integrated power socket.

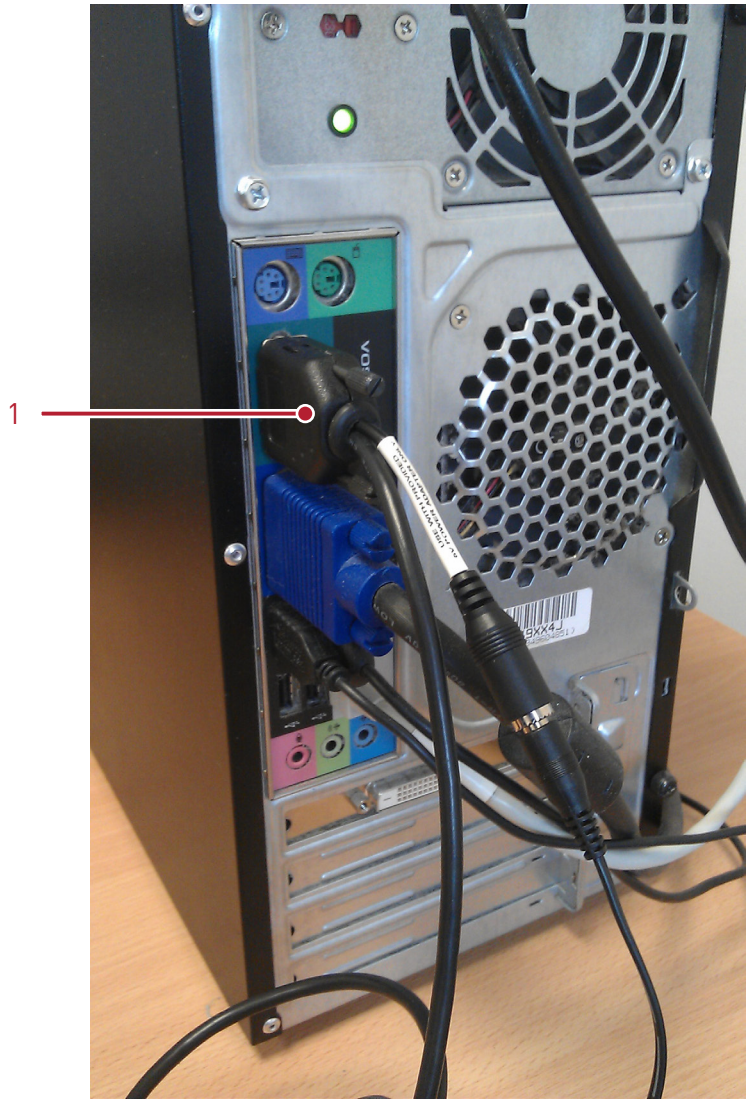

Figure 3. RS-232 cable connected to a computer's serial port [1].

5. Software

The MS3 meter is designed to work with proprietary Bartington Instruments Bartsoft software running on a Windows computer or Windows Mobile PDA.

The software is supplied on a disk for installation onto the computer, or can be downloaded from the Bartington Instruments website. The main software designed for the MS3 is **Bartsoft**. If using the MS3 with the Temperature/Susceptility system then **GeoLabsoft** (GeoLab) should be downloaded.

Note: Downloading software ensures that you are always running the latest release.

Note: The Operation Manual for Bartsoft or Bartsoft Mobile used with the MS3 meter are at: www.bartington.com/om-software.

6. Connecting the MS3 Meter

6.1. Connecting to a Computer USB Port

Connect the MS3 USB cable between the computer side of the MS3 meter and the USB host port of the computer (see Figure 1).

6.2. Connecting to a Computer Serial Port

It may be necessary to connect to the serial port of the computer. This is done by using the special RS-232 serial cable supplied with the MS3 meter (see Figure 2). Connect the computer side of the MS3 meter to the serial port of the computer. Ensure that the 5V mains charger supplied is connected in the 5V inlet of the RS-232 cable provided to power the MS3. Using an RS-232 Cable Connection.

6.3. Connecting to a MS2 Magnetic Susceptibility Sensor

Connect the sensor side of the MS3 meter to the MS2 sensor with the TNC-TNC cable supplied.

6.4. Connecting to a MS2WFP Power Supply Unit

Connect the computer side of the MS3 meter to the MS2 port on the MS2WFP Power Supply Unit, using the special RS-232 cable provided with the MS3 (see Using an RS-232 Cable Connection).

Connect the computer port on the MS2WFP to the serial port of the computer, using the 9-way RS-232 cable also supplied.

7. Device Drivers

7.1. Installed Drivers

On the computer, open **Device Manager** and expand **Jungo** to check that both drivers (**Bartington Instruments** and **Magnetic Susceptibility Device**) exist and are working properly with the MS3 meter connected.

7.2. Driver Update and Troubleshooting

If they are not working correctly, this may be because the latest versions of the drivers have not installed properly. In that case:

- Update the drivers by clicking on **Control Panel** → **System and Security** → **Jungo**. Expand **Jungo**:
    - Click on **1-Bartington Instruments** → **Device Driver** → **Update Driver.**
    - Click on **Browse My Computer for Driver Software.**
    - Click on **Look in C:\Program Files\Bartington Instruments\Bartsoft\USB Driver** (or your chosen installation folder).
    - Click on **Update Driver.**
    - Click on **2-Magnetic Susceptibility Device** → **Device Driver** → **Update Driver.**
    - Click on **Browse My Computer for Driver Software**.
    - Click on **Look in C:\Program Files\Bartington Instruments\Bartsoft\USB Driver** (or your chosen installation folder).
    - Click on **Update Driver.**

Check to see if **Bartington Instruments** and **Magnetic Susceptibility Device** are now working properly with the MS3 meter connected. If this still isn't the case:

- Uninstall Bartsoft by going to **Control Panel** → **Programs and Features** and selecting the program for un-installation. When prompted, ensure the device driver is also uninstalled.

Caution: Make sure that the MS3 meter is disconnected, before attempting to uninstall the driver.

- After the un-install is complete, restart the computer. Download the latest version of the software from the download page and install it.
- On completion of the installation, restart the computer for the second time.
- Connect the MS3 meter and wait for a few seconds for the operating system to load the device drivers.
- Repeat the steps in Installed Drivers to ensure that the drivers are now working.

Note: In the event drivers do not install properly, refer to Troubleshooting.

8. Using a MS3 with Bartsoft

8.1. Using a USB Cable Connection

Open Bartsoft on the computer.

Bartsoft searches automatically for any MS3/MS2 devices as it starts up. If found, the LED on the MS3 will flash green. On Bartsoft, the status window will turn green (refer to Bartsoft Operation manual for details). In **Meters**, the option "**Multi-susceptibility Meter via USB**" will appear if an MS3 is detected.

A search can be forced by clicking on **Meters -> Find Meters**.

If an MS3 is still not recognised, in Bartsoft click on **Meters** → **Search Options**, and make sure that the **search for MS3** box is ticked.

If it is not recognised, check that the drivers are installed properly, and update the drivers as outlined in Device drivers.

During this time Bartsoft will display a red square at the bottom right of the window, along with the message '**no meter detected**'.

> **Note:** In the event drivers do not install properly, refer to Troubleshooting.

8.2. Using an RS-232 Cable Connection

This is used if measurements are taken using software programs which only recognise serial communication, such as AMS Winbar or GeoLabsoft for the MS2 Susceptibility/Temperature systems. The special RS-232 cable (supplied) is used to connect the MS3 meter to the serial port of the computer. A USB-to-serial adaptor cable can also be used when no RS232 port is available.

The MS3 mimics the MS2 communication protocol and also offers A, B or C settings as on the MS2 Meter. The appropriate protocol is selected through Bartsoft with the MS3 connected to the PC via USB. The protocol for data transmission is set in **Bartsoft** → **Meters** → **Multi-susceptibility USB meter** → **RS232 setting**.

- Click on **RS-232 settings**, and depending on the system being used select:
    - **A.** Standard operation 1200 bps with a 7 bit word (however, this will not work when using Bartsoft).
    - **B.** Operation 1200 bps with an 8 bit word (for the MS2 Susceptibility/Temperature system).
    - **C.** Operation at 9600 bps with an 8-bit word (for special applications).

8.2.1. Using MS3 with the MS2 Susceptibility/Temperature (X/T) System

In order to use the MS3 with the MS2 X/T (susceptibility/temperature) system, the MS3 must have its serial communication setup to B (see Using an RS-232 Cable Connection above).

Connect the MS3 meter to the power supply. Connect the MS2 port on the MS2WFP Power Supply to the computer side of the MS3 meter, using the special RS-232 cable provided with the MS3.

Connect the 5V mains power supply adapter to the power inlet on the RS-232 cable.

Caution: Ensure that the power supply is 5V rather than 12V. Using a higher voltage may result in a protective fuse being blown in the MS3, which will need replacement by Bartington Instruments.

Connect the sensor side of the MS3 meter to the MS2W sensor, using the TNC-TNC cable supplied.

Connect the serial port of the computer to the computer port on the MS2WFP Power Supply, using the 9-way RS-232 cable supplied.

Connect the power supply to the computer.

Switch on the 5V mains power supply adapter.

- On the computer, go to **Control Panel → System and Security → Device Manager → Ports (COM and LPD) → Communications Port Settings.**
- Click on the COM port displayed and set the port settings to match that of the protocol setting **B** selected on the MS3; 1200 bps, 8 data bits, no parity, and 2 stop bits.
- Click on **Advanced**, and drag both **Transmit and Receive** buffers to **Low**.
- Click **OK**.

Open Bartsoft on the computer:

The MS3 meter will now be operating normally, and its LED flashing green. Measurements may be taken using the GeoLab software.

In the event that communication cannot be established, check the RS-232 setting of the MS3 by plugging the MS3 directly to your computer. This can be done using the RS-232 cable.

• Click on **Meters → Search Options**, and ensure that the **Search for MS3** and **Include RS-232** boxes are ticked, and that the COM port selected is the port that the power supply is plugged into.

• Click on **Settings**, ensure that the **Current Device Settings** are set to **B** (1200bps, 8 data bits, no parity, and 2 stop bits), and click the **Test Connection** button.

• If successful the message: **Connection to Device was Successful,** will be displayed in the bottom right hand corner of the window.

The MS3 meter will now be operating normally, and its LED flashing green. Measurements may be taken using the GeoLab software.

Reconnect the MS3 to the MS2WFP and the MS2WFP to the computer and reattempt connection. If problem still occurs, please refer to Troubleshooting.

8.2.2. Running the GeoLab Application

Note: This is explained in OM0004 which is supplied on the disk included as part of the MS2 X/T system. It is also available on the Bartington Instruments Website.

8.2.3. Taking AMS Winbar Measurements

Connect the MS3 meter to the computer via the USB cable.

Open Bartsoft on the computer.

- Click on **RS-232 Settings** and set the MS3 to **A**. Click **Update**.

Reconnect the MS3 computer side to the computer serial port using the special RS-232 cable provided with the MS3.

Connect the 5V mains power supply adapter to the power inlet on the RS-232 cable.

Caution: Ensure that the power supply is 5V rather than 12V. Using a higher voltage may result in a protective fuse being blown in the MS3, which will need replacement by Bartington Instruments.

- On the computer, go to **Control Panel → Device Manager → Ports (COM and LPT) → Communications Port Settings.**
- Click on the COM port displayed. Set the port settings to match that of the protocol position **A** selected on the MS3; 1200 bps, 7 data bits, no parity, and 2 stop bits.

  Note: If multiple serial communication devices are connected, the MS3 can be disconnected and reconnected to determine which port is being used.

- Click on **Advanced**, and drag both **Transmit and Receive buffers** to **Low**.
- Click **OK**.

Connect the sensor side of the MS3 meter to the MS2B using the TNC-TNC cable supplied.

Switch on the 5V mains power supply adapter.

Open the AMS Winbar program.

- Click on **Set Up** in the application main window.
- Click on **Communication** and select the appropriate COM port number.
- Check that the COM port is set up for 1200 bps, 7 data bits, no parity, and 2 stop bits.

9. MS3 Meter Visual Check

The MS3 meter should now be operating normally, and the LED at the computer end of the body of the meter should be flashing green.

If not, then follow the guide below:

LED status	Problem	Action
No LED indication	No power supply; 5V supply not connected to computer side of the MS3.	Check the condition of the USB cable, and that it is properly connected both ends. If using the RS-232 special cable, ensure it is connected to the 5V mains adaptor.
Steady orange	The MS3 is communicating with the computer, but there is no sensor detected.	Ensure that a sensor is connected. Check the condition of the cable, and that the connectors are tight. Ensure the drivers have been installed on the computer and are working (go to **Control Panel** → **Device Manager**).
Steady red	The MS3 is not communicating with the computer.	Check that the USB cable is properly connected and inspect the cable visually for breaks. Ensure the drivers have been installed on the computer and are working (go to **Control Panel** → **Device Manager**). When using the RS-232, Bartsoft will not operate if the MS3 protocol is set to **A**. Ensure that the MS3 has been set to either **B** or **C** communication mode. If using the RS-232 special cable, ensure it is connected to the 5V mains adaptor, and that it is switched on.

10. Taking Measurements

Instructions for using the Bartsoft, Bartsoft Mobile and GeoLabsoft application software are available at www.bartington.com/om-software.

Instructions are also supplied on the disk included as part of the system.

11. Troubleshooting

In the event of any apparent malfunction, email service@bartington.com, or telephone the Bartington Instruments service team on +44 (0)1993 706565.

Caution: Fault finding by customers may invalidate the warranty.

The meter is not user serviceable.

The most likely causes of failure, and their solutions, are detailed in MS3 Meter Visual Check.

12. Care and Maintenance

Surface dirt contamination on the MS3 meter should be removed using a mild detergent solution only.

13. Storage & Transport

The meter is supplied in a cushioned case which is ideal for storage and transporting the device.

14. End of Life Disposal

This product (electrical and electronic equipment) should not be placed in municipal waste. Check local regulations for disposal of electronic products.

Notes

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