

VSM02 Vibrating Sample Magnetometer

The VSM02 is an automatic Vibrating Sample Magnetometer for the characterisation of soft and hard magnetic materials

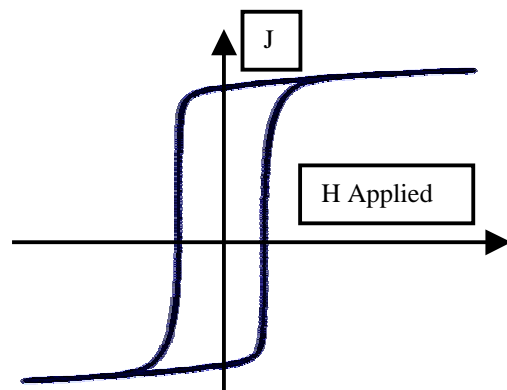
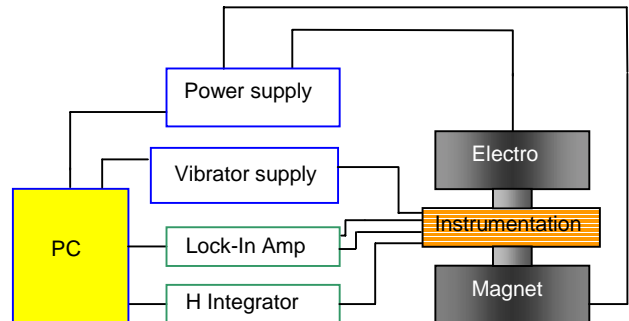


FEATURES

- Measurement of soft and hard materials
- Measurement database
- Automatic measurement sequence
- Data export functions
- Full graphical PC control

Hirst Magnetic Instruments VSM02 PC controlled Vibrating Sample Magnetometer offers sophisticated measuring functions with an easy to use, but powerful graphical user interface.

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Introduction

VSM's work by quasi-statically driving the magnet around its hysteresis loop using an applied field from the electromagnet. The sample is vibrated in this field, the measurement system then detects the applied field (H) and the samples response to the vibration (J) in the applied field.

Soft and hard materials can be measured, including rare earth*. The limit for rare earth materials is the value of coercivity of the sample. For samples that have a suitable coercivity and saturation value, it is possible to obtain full loops, not just single quadrants.

The VSM01 Vibrating sample magnetometer is made up of four main parts: the control PC, the electronics rack, the electromagnet and the vibration and measurement assembly.

* As with all VSM's, with hard materials it is necessary to first fully saturate the sample then drive the material through the demagnetisation quadrant. Please contact us for details of magnetisers.

The Vibrating sample magnetometer

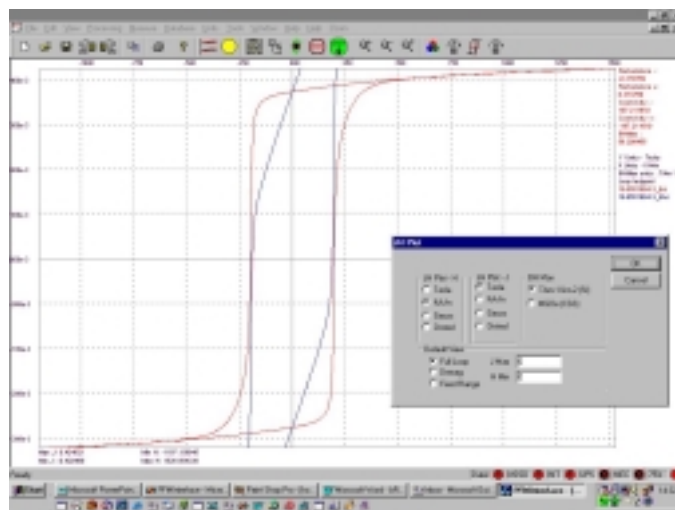


VSM - Vibration and measurement unit

The VSM02 sample holder assembly will accept samples up to 7mm diameter x 5mm high (Other diameters available on request.)

Full loops for soft materials and second quadrant measurements for rare earth materials (subject to the sample's coercivity) are available using the VSM02.

Software



VSM02 Windows control and measurement software

Features

- /// **Familiar windows environment**
Comprehensive Windows software is provided, capable of running the VSM02 at the press of a button. The software follows similar design to many other applications that run on Microsoft Windows™ creating a familiar environment and reducing the time to learn the software.
- /// **Measurement database for 100% traceability**
A measurement database stores every measurement made on the system ensuring 100% traceability and making it impossible to lose a measurement. A more traditional system of entering filenames is also available but it is not a requirement to use it. This is especially useful for industrial QC and similar applications.
- /// **Sample database for easy cataloguing**
Details of sample bulk properties, dimensions and required measurement parameters can be stored. When the sample details are recalled, the measurement options are automatically set-up based on the parameters stored with the sample. The sample details are also used in the processing of data to produce JH and BH loops that are calibrated to unit volume.
- /// **Automatically extracts critical measurements**
Full digital processing. The software's data processing features in built digital filters to remove any noise (user corner frequency).

Data export facilities

Comprehensive data export facilities allow data to be easily migrated to other software. The current measurement can be exported through the clipboard as a copy operation or saved as a tab delimited file (txt).

System calibration from inside user interface

System calibration constants are adjusted through the user interface. No manual editing of files required.

Full backup, including backup to CD

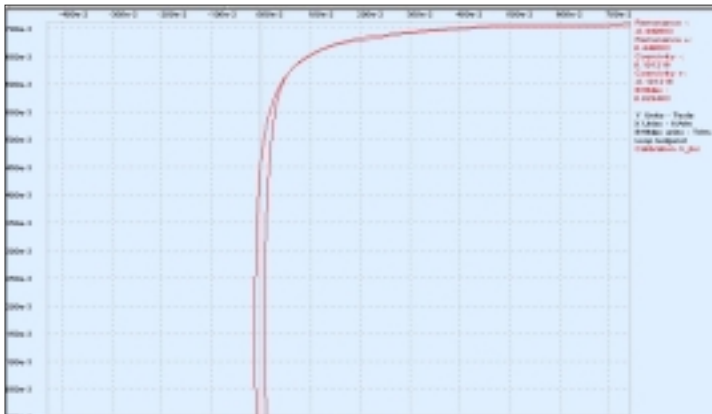
Measurements can be backed up to CD (subject to CD writer, optional). This is a fully integrated process to the software. A simple selection of the batch of measurements to be backed up is all that is required. The software takes care of the CD writing process. Data can easily be recalled from CD with very simple steps.

Full graphical display

The software can simultaneously display multiple loops either in one or separate window for easy comparison of measurements.

Measurements available as hard copy with printer

Loops can easily be printed with a choice of data (JH,BH or both), with user definable extents.



A chip of razor blade, 1st and 2nd Quadrant. 0.1g sample.

Specifications

Accuracy (Traceable to NPL)

J Measurement	+/- 1%
H Measurement	+/- 1%
BH Product	+/- 2%

Repeatability

J Measurement	+/- 0.5%
H Measurement	+/- 0.5%
BH Product	+/- 1% Traceable

Sensitivity

J Pickup	2.5x10 ⁻⁶ EMU
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Measurement method

H channel	Pickup coil + Integrating flux meter
J channel	Pickup coil + Lock-in Amplifier

16 bit, multi-channel data acquisition card

Sample dimensions

Maximum diameter	7mm
Maximum height	5mm

Electromagnet

Polepiece Diameter 75mm/100mm Interchangeable

75mm Pole Face (Minimum Values)

20mm gap (required)	1.2 Tesla
Absorbed Power	1.8kW

Bulk properties

Working Temperature	+15C to +35C
Storage Temperature	0C to +45C
Max Working Humidity	90% RH
Weight	500Kg Approximately
Water Cooling	Water-cooled heatsinks fitted to magnet coils. External cooler optional
Heated Stage	Optional

Power Supply

Input Voltage	230Vac 1 ph.
Input Current (max)	10A
Output Voltage	0-90Vdc per output
Output Current	0-10A max per output

Vibration

Frequency (Factory pre-set)	51.6Hz (adjustable)
Amplitude	Pre-set to optimum

Integrating Flux Meter Specifications

The Integrating fluxmeters are built into the main housing and are not user accessible components.

Ranges (Selectable from PC software)

1	3.333 mVS
2	33.33 mVS
3	333.3 mVs
4	3333 mVs

Fully automatic drift correction ensures no drift error in measurements.

Lock-In Amplifier Specifications

The Lock-in amplifier is built into the main housing and is not a user accessible component.

All functions are accessible through the PC software as part of the measurement set-up procedure.

Frequency range	10Hz-100kHz
Accuracy	1%
Gain stability	200ppm/°C

Gain ranges

Input	7 ranges from x1 to x1000
Output	4 ranges from x1 to x1000
Total	28 ranges

Analogue filter

Time constants	24 Options from 82uS to 33s
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PC

The PC supplied will be based on current PC specifications and availability. Please note that that the following is a minimum specification.

Minimum specifications

Monitor	17 "
Hard Disk Drive	10Gb
Operating System	Windows 98 SE
CD	CD-R
Processor	700Mhz
Mouse and Keyboard	Standard
Printer	Optional
Network Card	Optional
Sound Card	Optional
Graphics Card or on Board Graphics	Standard

Due to a process of continual improvement, Hirst Magnetic Instruments Ltd. Reserve the right to change any specifications without notice.