

MAG
INSTRUMENTS



PSM PORTABLE
SPINNING
MAGNETOMETER

www.mag-instruments.com

The world's most versatile rock magnetometer

The PSM is a compact and sturdy device to measure the magnetic moment of rock samples and other materials at an affordable price level.

Portability, easy setup and standalone as well as PC-controlled operation make the PSM a versatile research tool.

Measure everywhere

A rugged but lightweight design, long-lasting internal battery and a stable tripod bring maximum flexibility and high quality magnetic measurements out-of-the-box in any environment.

Measure everything

Custom exchangeable sample holders, its slow spinning rate and large measurement range make the PSM a versatile, state-of-the art magnetometer with a wide range of applications.



Key features

☞ Truly portable, table-top magnetometer

Use it anywhere in the laboratory, classroom or during field work.

☞ Standalone and PC-controlled operation

Even without a connected PC or power line a PSM is fully operational.

☞ Easy and rapid measurement procedure

An intuitive software, custom sample holders and automatic measurement progression ensure an efficient workflow.

☞ Large dynamic range (1×10^{-9} – 0.1 Am^2)

Its large measurement range with a noise level of $1 \times 10^{-9} \text{ Am}^2$ promotes a wide range of applications from analysing sediment and soil samples to investigating strongly magnetised synthetic materials.

☞ Most affordable rock magnetometer on the market

Affordability and a small footprint make the PSM an ideal addition for dedicated paleomagnetic laboratories as well as for interdisciplinary research groups interested in magnetic measurements for magneto-stratigraphy, environmental proxy analysis, material sciences etc.

☞ Measurement of fragile samples

The PSM's slow spinning rate of 2 Hz allows the measurement of fragile materials such as unconsolidated sediments.

☞ Determines magnetic homogeneity

Every PSM measurement includes an estimate of the specimen's magnetic homogeneity. An inhomogeneous magnetisation can reduce the measurement accuracy and indicate, for example, partial remagnetisation or a non-uniform distribution of magnetic carriers.

„It performed exactly as hoped with precise and repeatable measurements in a timely manner. The engineering is fantastic [...]”

Shelby A. Jones,
Office of Archaeological
Studies, Santa Fe
USA

A simple and robust design for precise and intuitive magnetic measurements

Sample handler

Lift to access the sample holder

Shielded sample cavity

Exchangeable holders can host any specimen $\lt; \text{Ø } 34 \text{ mm}$

USB interface

Connect to a PC for comprehensive software control

Power supply

Operation and charging of the battery (12-20V)

Control knob

Fully control the device without PC connection

Graphic LCD display

Navigate the on-board operation system

Internal Battery

>10 h continuous operation, fully recharged in 2-3 h

Internal memory

SD card to store measurement data



Precision & flexibility

To ensure that specimens are precisely oriented and centred, we provide custom sample holders for arbitrary shapes with a footprint smaller than 34 mm diameter.



Fast & easy workflow

Automatic measurement progression can be activated to minimise the user actions during a measurement sequence for a seamless and efficient workflow.

Operation



Control software

The PSM can be operated with an intuitive PC-Software. The user-friendly interface allows one to acquire, store, manipulate and export the measurement data.



Out-of-the box functionality

Delivered in a compact, rugged case the PSM can be set up and operated within minutes. The calibration is performed with a single calibration sample and there is no need for any mechanical adjustment of the device.



Standalone operation

Through a graphic LCD display and control knob the PSM can be fully operated without a PC. Measurement results can be stored on the inbuilt SD card.



Custom control

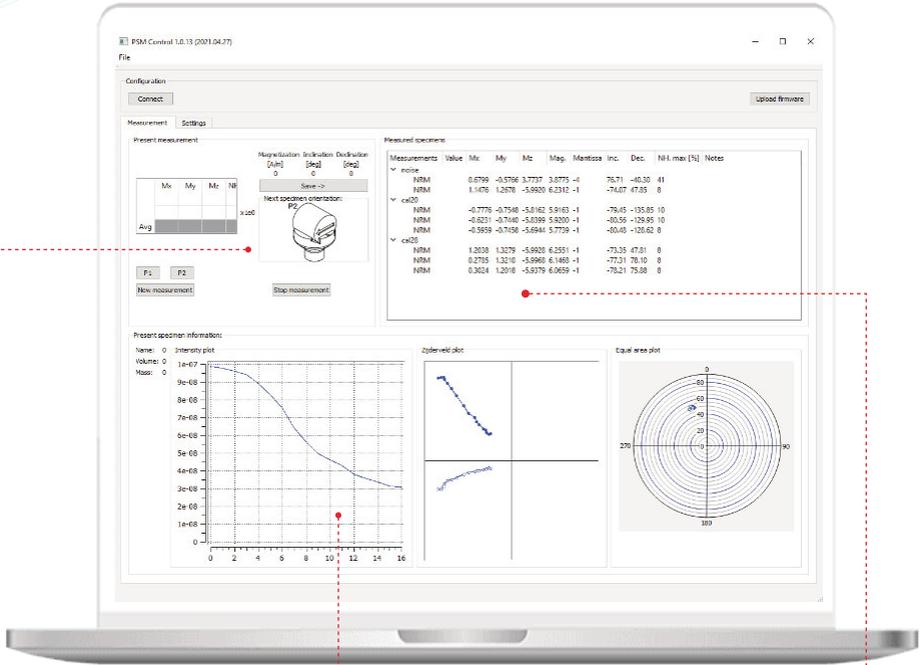
On request, we can also provide a communication library for smooth integration and operation of the PSM with your own laboratory software.



Tripod mount (standard 3/8")

Use the supplied tripod to position the PSM horizontally on any surface.

User-friendly software for easy data acquisition



Measurement

Summarises the raw data and progress of the current measurement

Results

Lists all specimens and measurement results stored inside the database

Data Visualisation

Displays results of the specimen selected from the database

Software



Measurement

- ✔ Calibrate instrument and subtract sample holder.
- ✔ Select manual or automatic measurement mode.
- ✔ To measure, create a new entry or select a specimen from the database.
- ✔ Optionally categorise measurements by magnetic state (NRM, ARM, IRM) or site.
- ✔ Choose a predefined measurement sequence (currently 1-6 orientations are supported as well as a special mode for non-homogeneous samples; others upon request).
- ✔ To simplify the measurement a small pictogram indicates the required sample orientation.
- ✔ Individual data points of the current measurement sequence can be reviewed for consistency before being stored.



Data handling

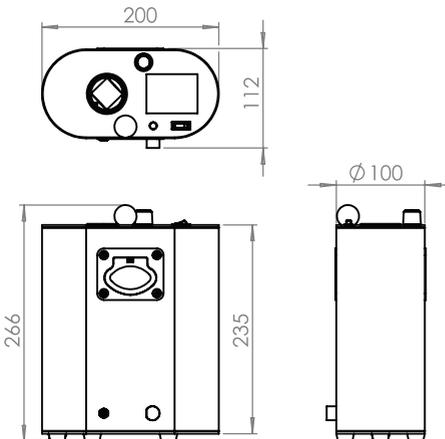
- ✔ The raw data of each measurement are directly stored and archived in a SQLite database.
- ✔ Processed results can be exported in text format or directly accessed from the database with third party software.
- ✔ Review all measurement results of the current project in text form and visually (intensity, Zijdervelt diagram and stereonet).
- ✔ Transform paleomagnetic directions between core, geographic or tilt corrected coordinates.

Additional software functionality, such as custom measurement sequences, can be added upon request.

Technical specifications



Property	Value
Dynamic range	$1 \times 10^{-9} - 0.1 \text{ Am}^2$
Noise level	$1 \times 10^{-9} \text{ Am}^2$
Precision¹	<5%
Specimen size	1 inch cylindrical, 23 mm cube or prism. Others upon request.
Continuous measurement time²	>10h
Dimensions (W×D×H)	20 cm × 10 cm × 27 cm
Weight³	3.5 kg
Spinning frequency	2 Hz
DC power supply	12-20 V (19 V recommended)



¹ Standard deviation at the boundary of sensitivity (1×10^{-8}) normalised by the mean value. Specification provided for homogeneous samples.

² Operation time given that measurement is performed continuously one after another. In case of pauses between measurements, the battery lasts longer.

³ Weight of the PSM only, without auxiliary components (power supply, case, tripod).

Scope of delivery

- ✔ Portable Spinning Magnetometer
- ✔ Set of holders for cylindrical and cubic specimens
- ✔ One cylindrical and one cubic calibration sample
- ✔ Power/charging and USB connection cables
- ✔ Tripod (20-25 cm height, 3/8" thread)
- ✔ Rugged, water resistant travel case
- ✔ Windows-based control software
- ✔ Remote installation and online training

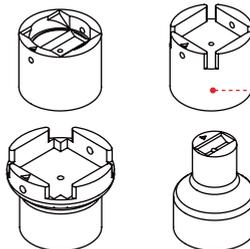
Rugged travel case

Safely transport or store the PSM and accessories



Available configurations

- ✔ Additional software functionality, such as custom measurement sequences, can be added.
- ✔ Upon request we can provide customised holders to fit any specimen shape with a footprint smaller than \varnothing 34mm.



Sample holders

Examples of custom holders

Application examples¹



Paleomagnetism

The full-vector magnetisation of oriented rock samples or burned archaeological artefacts can be determined to derive their characteristic magnetic remanence direction and/or magnetisation intensity. These data are used, for example, in plate tectonic reconstructions, to investigate the nature and history of the geomagnetic field and for magnetostratigraphy.



Geochronology

Rock sequences of lava flows or sediments (from long cores or outcrops) can be dated by polarity and paleointensity magnetostratigraphy.



Rock magnetism

The magnetic properties of materials like rocks, sediments or soils can be investigated. These can be used to better understand how the rocks were formed or how they acquired their magnetisation.

Proxy parameters can be determined that relate, for instance, to the grain size, mineralogy, or origin of the investigated materials. Measurements can also be used to interpret terrestrial magnetic anomalies in magnetic surveys.



Archaeology & magnetometry

Characterising the magnetic properties of soil samples and other materials from archaeological sites is useful to refine the interpretation of magnetic anomalies in magnetograms. The paleointensity of baked archaeological artefacts can be obtained and used to date the materials.



Environmental sciences

The magnetic properties of soil and sediments can indicate environmental changes and serve as proxies for paleoclimatic and paleoceanographic studies.

¹additional demagnetising equipment necessary

About Mag-Instruments



Who we are

Based in Munich, Germany, Mag-Instruments was founded in 2014 by robotics engineer Dr. Przemyslaw Kryczka and a group of specialists in geophysics, mechatronics, and robotics to bring state-of-the-art technology into magnetic measurements.

In cooperation with Prof. Nikolai Petersen from the Ludwig-Maximilians University Munich, Mag-Instruments continues to manufacture and service all products originally developed by Petersen Instruments.



What we do

We develop and manufacture innovative, scientific equipment for laboratory and field applications. Our constantly-growing product line includes state-of-the-art magnetometers, magnetic field generating instruments such as Helmholtz coil setups, and demagnetising equipment.

Our in-house development process facilitates flexibility and cost reduction, allowing us to provide affordable, custom solutions for your research endeavour.

We can customise our products to best suit your individual application needs!

Contact us for new solutions, including automated measurement systems.

The logo graphic consists of a series of thin, light blue lines that flow and curve around the central text, creating a sense of motion and depth. The lines are more densely packed in some areas, creating a darker blue effect, while they are more sparse in others, appearing as a light blue mist.

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