

UMMS

Universal Magnet Measuring System

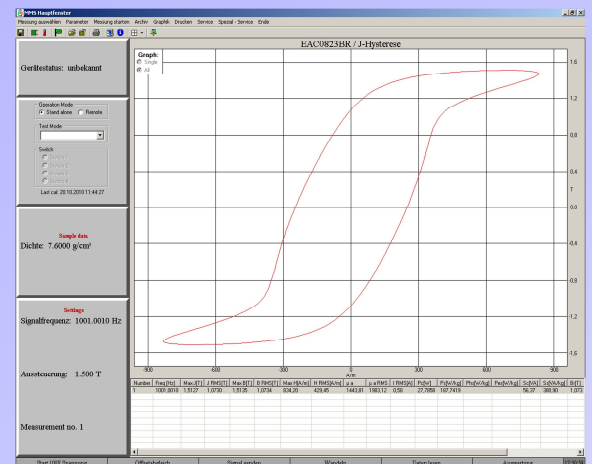
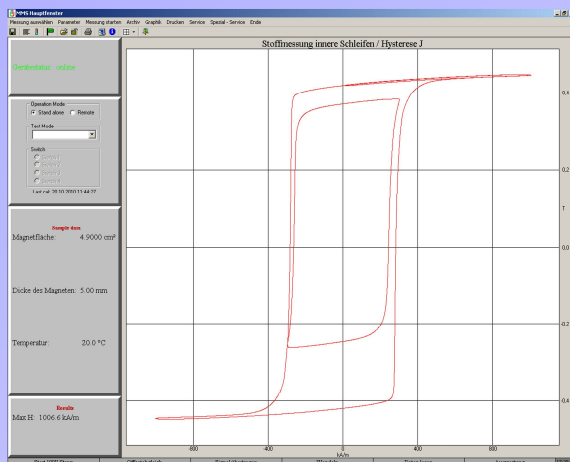
Soft- and hardmagnetic hysteresisgraph

Customized modular system
Up to 5 16-bit sample channels

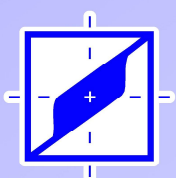
Switch for 4 devices

4 quadrant power amplifier
100V/20A and 200V/10A
Optional 100V/40A and 200V/20A
Voltage and current source

All IEC 60404 measurements
DC to 10 kHz



1500 VA heating up to 180°C



ECKEL Magnet Test Equipment

Universal Magnet Measuring System UMMS

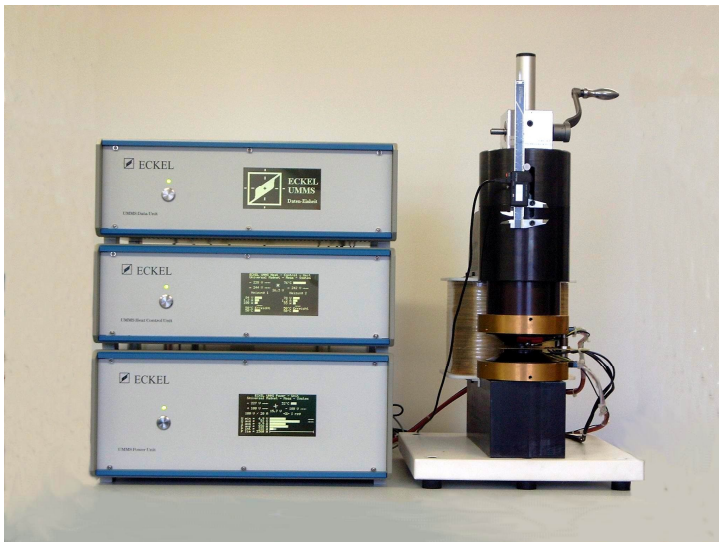
This digital system combines the entire magnet measurement technology in one device!

The UMMS is the top instrument of the ECKEL product range for soft magnetic measurements. For only hardmagnetic measurements we today recommend the newer Robograph RE.

Based on the long-standing experience with digital magnet measuring devices the UMMS has been developed to provide the user with maximum performance in all fields of magnet measuring technology.

Extremely hard magnetic materials such as Rare Earth materials can be measured as well as soft magnetic materials such as transformer sheets. Furthermore, the frequency can be varied from DC to the kHz range and the signal form can be changed as desired.

The digital signal processing of the UMMS offers possibilities that have not yet been available. Suitable algorithms allow for compensation regarding temperature, saturation and eddy current. The manual alignment of the measuring equipment (e.g. J compensation) is not necessary. All mutual inductances for measuring equipment according to IEC 60404 are not required.



Most of the measurements are performed as hysteresis measurements. The UMMS can also perform any other measurement that involves the generation and/or the measurement of magnetic fields. In addition, any existing measuring device can be connected to the UMMS. The only limitation is the power capacity of the output stage.

To meet this universal approach the UMMS consists of modules that perfectly solve the specific measuring task by their combination and, in particular, through the use of the special measuring and evaluation software.

UMMS with Heat Control Unit and Rare Earth yoke for DC measurements

- Hysteresis measurements ($B + J$) of hard ferrite to soft iron, from DC to higher frequencies, including the calculation of B_r , $B_H C$, $J_H C$, μ_r , specific and absolute losses (hysteresis and eddy current), apparent power and reactive power, e.g. all IEC 60404 measurements.
- Demagnetisation curves of Rare Earth materials at room temperature
- Hysteresis measurements of Rare Earth materials in combination with the Heat Control Unit
- Temperature coefficients of hard magnetic materials in combination with the Heat Control Unit
- Flux hysteresis measurements of ferrite materials according to Bosch standard
- Commutation curves (measured in one run).
- Passing through of partial hysteresis, magnet calibrations (specific demagnetisation).
- Frequency response, spectral analysis, total harmonic distortion, intermodulation, also measured in direct sequence with a three-dimensional presentation, effectiveness of transformers.
- Measurements with motors and ignition coils while in operation
- Temporal, thermal and local variations

Any other measurement that allows for an appropriate setup of measuring equipment can be programmed according to customer-specific requirements.

The UMMS mainly consists of two devices, as well as the measuring equipment and a PC:

The **UMMS Data Unit** provides the signal converters, as well as the digital and analogue control of the output stage, and also the link to the PC. The UMMS Data Unit automatically configures itself to the plug-in boards installed.

The plug-in boards can be selected to match the required measurements.

The sampling board with 1MHz, 16-bit analogue/digital converter is available in three versions:

- As a universal board with an input range for maximum inputs from +/- 5.3mV to +/- 360V.
- As an energising current or voltage measurement board with an input range of +/- 5.3mV to +/- 2.75V. These boards are directly connected to the output stage.
- As a sensor board with an input range of +/- 5.3mV to +/- 11V. This board contains, in addition, an onboard current and voltage source that can be digitally controlled.

All sampling boards have differential inputs and are protected against overvoltage. The sampling rate can be freely selected between 38Hz and 1MHz. By repeated, deferred measurements real sampling rates of up to 100MHz can be achieved with AC measurements. Up to 5 sampling boards can be handled simultaneously.

The **UMMS Power Unit** is the output stage that provides the energising signal for the generation of the magnetic field. It has a power output of 2000 VA. It can be switched between 100V/20A and 200V/10A. Additionally, it can be operated as a current or voltage source for DC measurements.

The power bandwidth is 10 kHz. The UMMS Power Unit contains a microcontroller and a graphic display. It is short-circuit-proof, forced-draught cooled, thermally controlled and has an automatic emergency cut off. An offset alignment is automatically performed.

The UMMS Power Unit has an EEPROM interface for the read-in of parameters that automatically recognizes the measuring equipment. This EEPROM can also be retrofitted to old measuring equipment. As a result of the recognition of the measuring equipment the correct software will be automatically loaded.

Heatable measuring inserts are required in the special case of measuring hysteresis of Rare Earth materials. The **UMMS Heat Control Unit** is then used for the supply and control of the heating. It consists of two separately controllable DC voltage sources, each rated at 700 VA and controls the heating of the measuring inserts via surface temperature sensors. As DC sources are used the heating can also be applied during the measurement. This guarantees a constant temperature for the whole duration of the measurement.

To connect a measuring system to several equipments the **UMMS Switch Unit** is used. Thus four measuring equipments can be used alternately without changing cables and plugs.

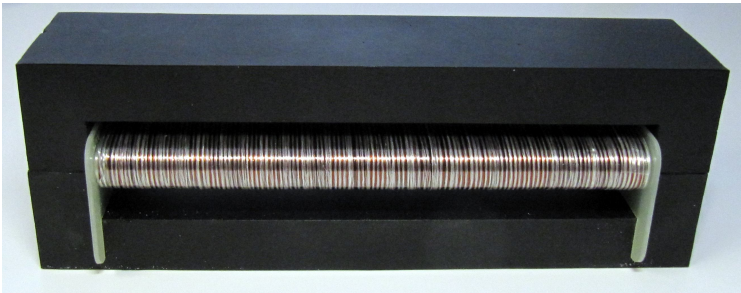


UMMS Switch Unit

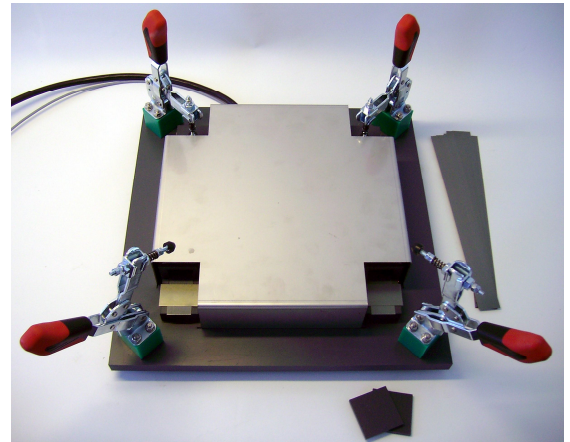
Manual or automatic switching by PC at selecting the appropriate measurement is possible. All relay positions can be programmed separately on the PC, e.g. to allow one temperature sensor to be used for several equipments. Additionally it is possible to add name and icon to every switching position.

For softmagnetic AC measurements the UMMS uses digital parametric signal adaption and in some cases even blind signal adaption to adapt the primary current as well as the secondary voltage to desired shape by adaptive regulation algorithms and thus measurement can be performed e.g. with sinusoidal field H or sinusoidal induction B. This is a worldwide unique feature.

Samples for measurement devices:



Single sheet tester similar to IEC 60404-3



Epstein Frame according IEC 60404-2

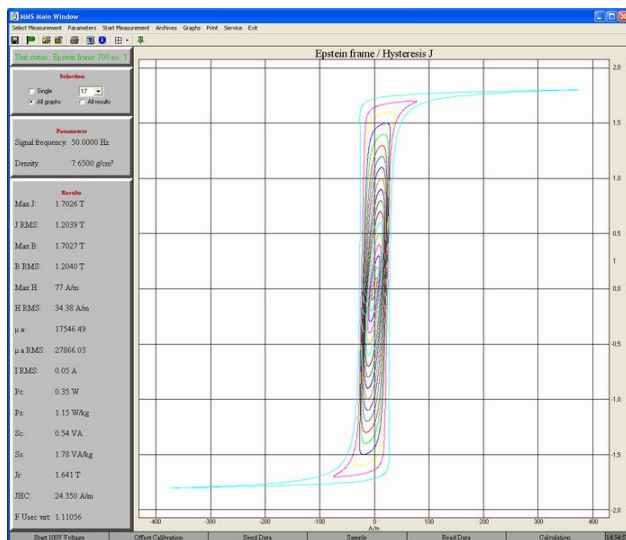
The UMMS software allows preselection of series of measurements for one sample. B or H measurement, frequency and excitation can be preselected for each measurement of the series. All results are presented in one table.

Some of the possible results are:

Max J, J RMS, Max B, B RMS, Max H, H RMS, μ_a , μ_a RMS, I RMS, Pc, Ps, Sc, Ss, Jr, JHC, Form factor.



Ring measurement with remote switchable shunts IEC 60404-6



Hysteresis Epstein frame

The software offers the following display features:

- Display of B- and J-Hysteresis
- Display of the origin signals like primary current, primary voltage, secondary voltage
- Export of the results as Excel file
- Selection of the results to be displayed
- Tolerance check for selectable results
- Export of the print as Windows metafile
- Complete user definable print layout
- Self test functions
- Very comprehensive configuration setup
- Online help