

Teslameter FM 302 for AS-active-probes

- USB interface
- Control software with oscilloscope display and data logging capability
- 4½ digit display DC, RMS: in Tesla, Gauss, A/m, Oersted
- Absolute or relative measurement
- Minimal or maximal measurement
- High precision
- 3 measuring ranges per probe (x1, x10, x100)
- Calibrated probes for μ T-, mT- and T- range
- Calibrated analog output: DC – 100 kHz
- Factory calibration certificate
- Made in Germany



The Teslameter FM 302 is a handy measuring instrument for all AS-active-probes. It measures magnetic fields within a wide range of applications. This includes alternating fields as well as magnetic steady fields. For AC measurements one can either display the mean (DC) or RMS value.

After plug in the desired probe one can start to measurement immediately without adjustment of zero and scale, since the AS-active-probes are calibrated. Therefore replacing probes for every range can be used at every time.

The Teslameter FM 302 permits the fast adaptation to different measuring tasks by simply plugging in one of the AS-active-probes. Depending on the type of the AS-active-probe one can measure fields from a few nano Tesla up to 12 Tesla. See our homepage – Teslameter – AS-active-probes: datasheet (pdf).

The Teslameter FM 302 offers numerous functions, which may be controlled via keypad and / or via USB interface. The USB interface permits to read the current measured value and to control the device with more options than via the keypad.

The measuring time of the display can set between 0.1 s and 5 s (via keypad) or 25.5 s (via USB). Additionally a further digital filtering of the displayed values with a settable filter length between 2 and 64 values may be activated. The unit of the displayed values can be switched between Tesla, Gauss, Oersted and A/m.



With the function relative measurement the measured values may be displayed referenced to a settable reference value. As reference value the current measured value can be set via keypad or USB command. The USB command additionally allows to set an arbitrary reference value.

In addition to the currently measured value the device can save and display the minimal or maximal measured value.

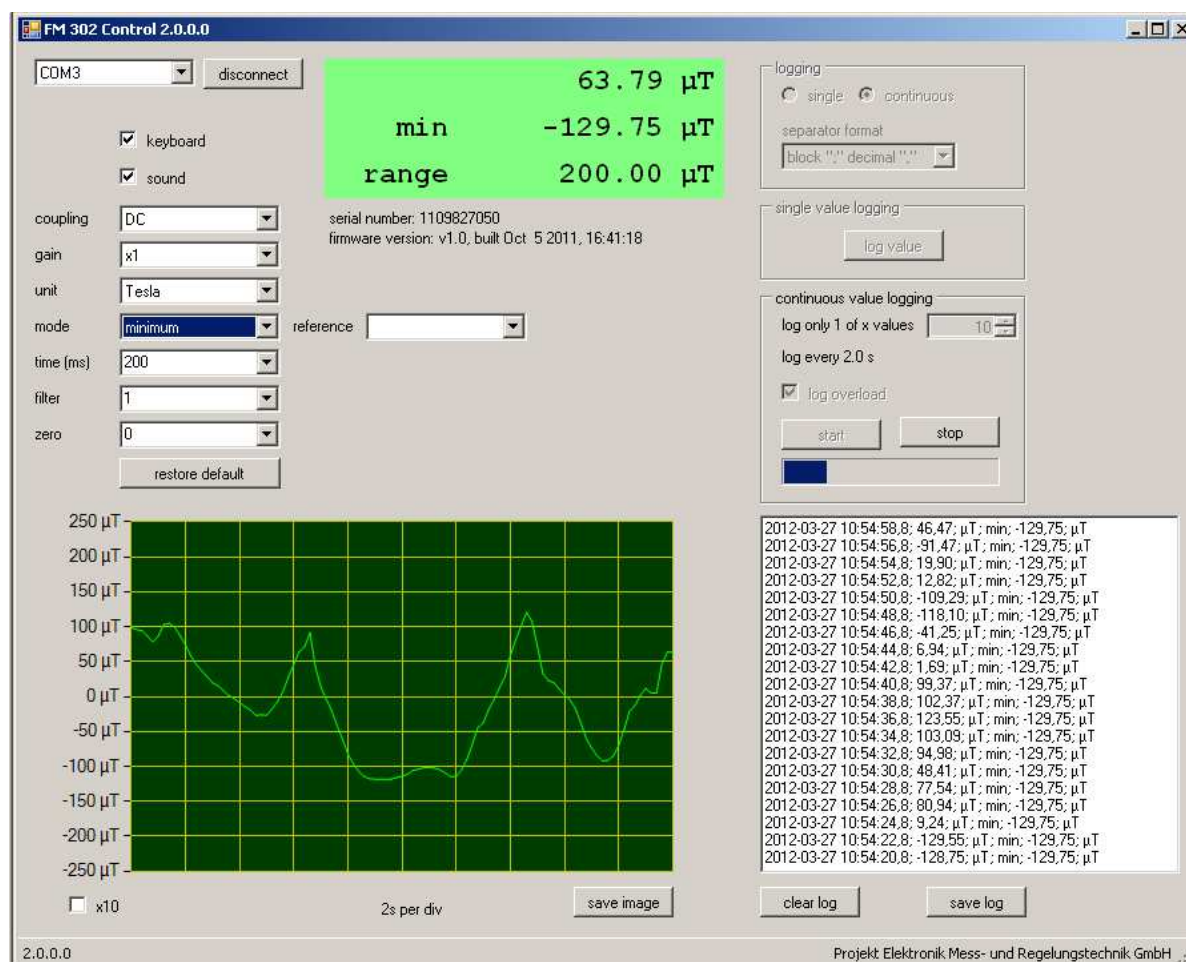
An exact zero adjustment can be done with a zero chamber and by calling the zero function.

An additional feature is the analog output of the device, which can be used for displaying (oscilloscope, chart recorder), measured value capturing (PC) and field control.

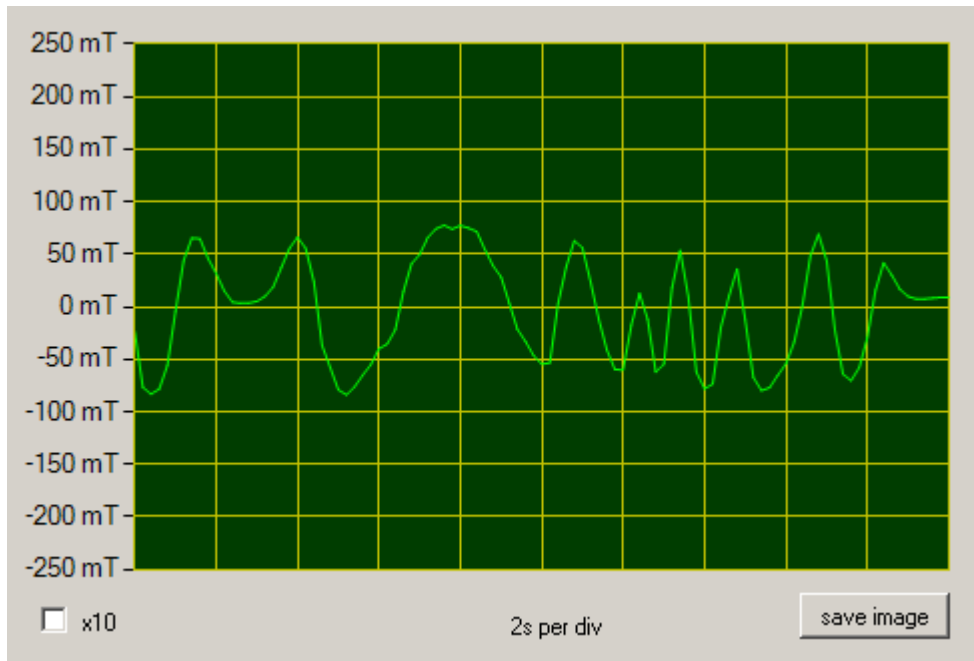
The internal amplifier of the FM 302 offers the amplification ranges x1, x10 and x100 which influences the display and also the analog output. Thus also small measured values are presentable reliably.

Control Software for Teslameter FM 302

Included in the delivery is a control software for the Teslameter FM 302. This software permits to make all settings of the Teslameter FM 302 via the PC. For this, the software not only allows the settings possible via the keypad of the device but makes available the whole range of functions available via the commands of the USB-Interface.

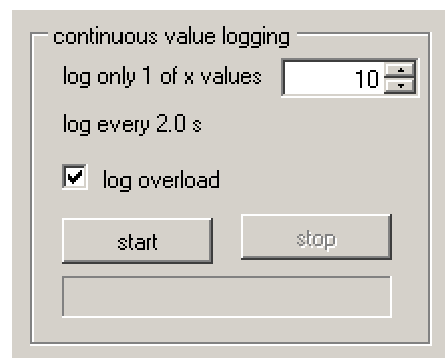


Besides the pure display of the current measured value the software offers an oscilloscope-like display of the last 100 measured values. Thus the time axis depends on the set measuring time. The scaling of the amplitude axis is given by the plugged in probe and the gain setting of the FM 302. In addition a zoom to one tenth of the measuring range may be activated. The generated display can be saved in different image formats.



The control software allows not only to display the measured values of the FM 302 but also to save them in a log file. For this, there are two different modes.

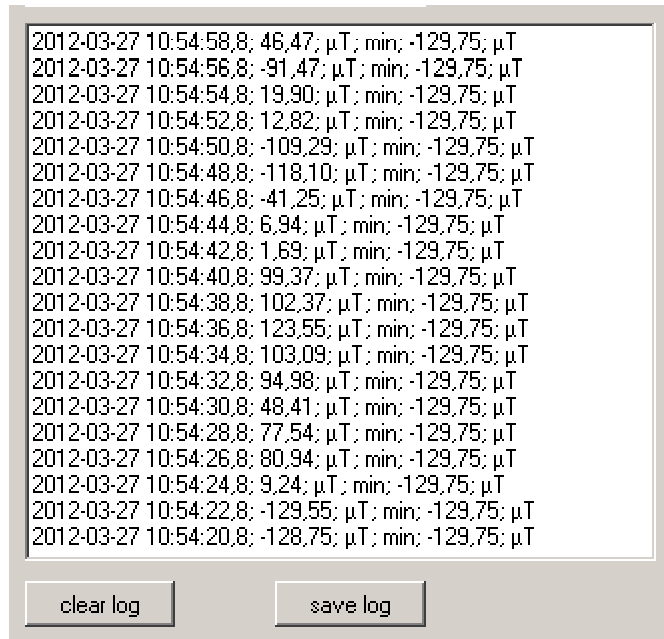
In the mode “single value logging” single measured values may be saved via pressing a button (by mouse or keyboard). This mode is suitable e.g. for manual operated measurements where a number of different points has to be measured.



In contrast, in the mode “continuous value logging” the measured values are written continuously and automated into the log. This mode is suitable to record traces over longer time periods. To not bloat the amount of data unnecessary there is, besides the variant of long measuring times, the possibility of only logging one of x measured values. The x may be set from 1 to 10,000. The logging cycle which results from the settings is displayed by the programm.

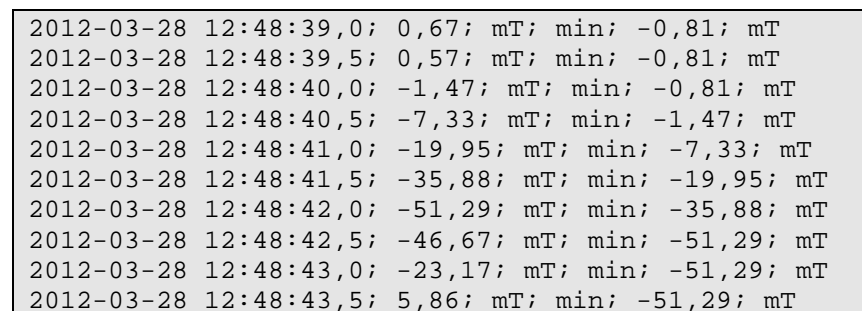
It is saved one measured value at a time in one row with the current time stamp with 0.1 s resolution, the current measured value, the unit and, if activated, the value produced by the measuring mode relative measurement, maximal measurement or minimal measurement and the corresponding unit.

The program shows a preview of the last 20 logged measured values. Thereby the most recent value is displayed at the top.



For saving there are two different formats available. The logging may occur in the classic CSV format (Comma-Separated Values) where the data blocks are separated by a comma and the period is used as decimal point. Alternatively to separate the data blocks, the semicolon may be used whereby the comma is available as decimal point. This setting simplifies the import of the log into German localized software.

Below you can see a fragment of a log file as an example. Here the measured values are listed chronological downwards. The last measured value is at the bottom.



The created log files may be imported easily into common software for data evaluation like e.g. Microsoft Excel, OpenOffice Calc, Matlab or gnuplot. This allows the individual analysis and processing of the measured data.

The source code of the control software is included and can be used as a basis for the development of an own control software.

Technical Data for Teslameter FM 302 (without AS-active-probes)

Measuring modes	DC / AC (RMS)
Ranges	3 ranges per probe, see homepage – Teslameter – AS-active-probes: datasheet (pdf) gain x1, x10, x100
Bandwidth (-3 dB)	DC – 100 kHz (DC) 5 Hz – 100 kHz (AC)
Adjustable offset	±2000 digit at most sensitive range (x100)
Measurement uncertainty	0.1 % ±2 digit (DC) (at 25 °C ±1 °C)
Temperature coefficient	max. 0.01 %/K
Zero drift	max. 3 digit/1K, typ. 1 digit/1K (DC) at most sensitive range
Input resistance	10 kΩ ±0.1 %
Operation	keypad with 8 keys USB interface
Operation temperature	+5 °C to +50 °C
Storage temperature	-10 °C to +50 °C
max. relative humidity	70 % at +35 °C
Power	9 V battery at least 400 mAh battery or accumulator, life time >20 h, depending on probe type, jack for 9 V power adapter 9 V DC, 40 mA, minus at inner port USB interface (low power device)
LCD display:	
Display	4½ digit two line LCD-display
Display range	±25100 digit
Resolution	¹ / _{20,000} of each measurement range of the probe (e.g. 0.1 mT at a range of 2 T)
Measurement uncertainty DC	<0.1 % ±2 digit (DC) (at 25 °C ±1 °C)
Measurement uncertainty RMS	100 digit (at 25 °C ±1 °C)
Measuring modes	mean value (DC) true effective value (AC / true RMS)
Measuring modes	absolute measurement relative measurement minimal measurement maximal measurement
Display unit	Tesla, Gauss, Oersted, A/m
Update rate	given by measuring time
Measuring time	settable 0.1 s (10 Hz) to 5 s (via keypad) or 25.5 s (via USB interface)
Digital filter	moving average filter with settable filter length of 1 to 64 values



Analog output:

Output voltage	±2.7 V
Factor	±2 V per full scale of range of probe (e.g. range 2 T → factor 1 V/T)
Bandwidth (-3 dB)	DC – 100 kHz (DC) 5 Hz – 100 kHz (AC)
Rise time	<2 µs
Output connector	BNC
Output impedance	50 Ω

USB interface:

Connector	USB-B-jack
Standard	USB 1.1 / USB 2.0 compatible
Driver	Windows, Linux, Mac
PC interface	creates a virtual serial port control via ASCII commands

Control software on CD:

Control possibilities	whole range of functions available via the USB interface
Measured value display	current measured value as number with unit value of set measuring mode as number with unit oscilloscope like display
Oscilloscope display	last 100 measured values range given by probe and gain setting or $\frac{1}{10}$ of it (10 times more sensitive)
Saving format	as JPEG, PNG, BMP, TIFF, GIF or EMF image
Data logging	single values by key press or continuously automated
Log format	comma separated and period as decimal point (CSV) semicolon separated and comma as decimal point time stamp with 0.1 s resolution, measured value, unit
System requirements	Windows with .NET Framework 4.0 available (Windows XP and later) .NET Framework 4.0 (installed with control software)
Source code	Visual Basic 2010 Express project

included in delivery

Teslameter FM 302:

- Teslameter FM 302
- case
- 2 m USB cord
- operating manual
- CD with drivers and control software
- factory calibration certificate
- replacement battery

included in delivery

AS-active-probe

in accordance with your choice from our AS-active-probes program



Options:

- zero chamber
- probe extension cord up to 10 m
- 9 V power adapter

Application Notes

On our website (<http://www.projekt-elektronik.com/applikation.php>) under Application you can find many additional documents with information, hints and examples for measuring of magnetic fields.

Questions?

Do you have any question about a measuring task? Call us, we would be pleased to advice you.

As manufacturer of this system we can fulfill your desires about developing AS-active-probes, changing of measurement range or other needs. Please call us or send us an email.

Gladly we accept your suggestions,

your PE – Team.