Teslameter E 1008537

Instruction manual

06/15 JH

1 "Measuring range" rotary selector switch
2 "Operating mode" rotary selector switch
3 Battery compartment (at rear)
4 "DC offset" knob
5 LCD-display
6 "Analog-output" sockets
7 DIN socket

1. Safety instructions

- Do not use the equipment in damp conditions.
- Do not put sharp kinks in the flexible probe.
- Do not short circuit the sockets.
- Do not turn the rotary knob beyond its limit.
- Do not pull out the plugs for the probes by tugging the cables.
- Do not put sharp kinks in the cables.

2. Description

The transportable teslameter can be used independently of the mains to measure the magnetic flux *B* and magnetic field strength *H* in conjunction with an axial-tangential field sensor (1001040) or a flexible magnetic field sensor (1012892).

The teslameter has four measuring ranges that extend to 1999 mT for the magnetic flux *B* or 1999 A/m for magnetic field strength *H*. The measurements can be read directly from a 3½ digit LCD display. For static magnetic fields (DC generated) the direction of the field is indicated on the digital display by the sign in front of the

reading or can be determined from the polarity of the output voltage.

The "Analog output" sockets at the top of the device allow connection of other display or recording equipment. The output voltage is independent of the measuring range and corresponds to the four digits of the display as output in mV (ignoring decimal point).

Probes can be attached to the 5-pin DIN socket.

By configuring the DC offset, the zero point of the output signal for static fields can be shifted. The teslameter is powered by a battery (9 V block battery).

Measurements can be made inside buildings or outside if the weather is dry.

Description of operating elements

Description	Function
Operating mode "$\frac{H}{A/m} - AC$" "$\frac{B}{mT} - AC$" "$\frac{B}{mT} - DC$"	For measuring the rms value of magnetic field strength *H* in sinusoidally alternating fields For measuring the rms value of magnetic flux *B* in sinusoidally alternating fields For measuring the arithmetic mean value of static and alternating components of magnetic flux *B* in static (DC generated) In the “AC” position the lower frequency limit is 4 Hz, the upper limit is 10 kHz.
Measuring range selector	The measuring range is given by the factor * mT or A/m to which the device is set as shown by the LED display. A measuring range must be selected that is suitable for the required precision of the value to be measured.
Display of measured value	0 to 1999, incl. decimal point and polarity for static (DC) fields
DC offset	Offset for the zero point of the measurement by up to about ± 150 digits
DIN socket	For connecting active probes (Hall sensors or coil probes)
4-mm sockets	Output voltage ± 2 V for the upper limit of the measuring range

3. Technical data

Measuring ranges:	2; 20; 200; 2000 mT 2; 20; 200; 2000 A/m
LCD display:	3.5 digit, 7-segment-display, 13 mm high with sign and decimal point Overrun condition 1 / - 1
Sampling rate:	3 measurements/s
Precision in static or alternating fields:	5% of the maximum value for the measuring range
Input:	DIN socket, 5-pin, 180°, conforming to DIN 41524
Frequency range for AC:	4 Hz / - 3 dB up to 10 kHz / - 3 dB (in the lowest measuring range) up to 1 kHz / - 3 dB
Warm-up period:	5 minutes
Nominal voltage at "Analog output" sockets:	for DC ± 2 V for AC ± 2 V
DC offset:	± 150 digits approx.
Temperature coefficients:	U_A < 0.1%1 K U_{Offset} <5µV/K for B=0 T
Power supply:	9-V block battery for approx. 20 hours operation
Electrical safety specification:	Protection class 1
Dimensions:	195 x 100 x 60 mm³
Weight:	approx. 450 g

4. Operation

Only original 3B Hall sensors or coil probes may be connected to the equipment since the device is calibrated for these. To avoid thermoelectric effects, cables and plugs should be at the same temperature.

4.1 "Operating mode" selector switch

The switch for selecting the operating mode allows you to select between measuring field strength and flux (see table). When it is in the "off" position, the machine is switched off.

4.2 "Measuring range" selector switch

This rotary switch alters the measuring range to between 2 and 2000 mT. For alternating field measurements ("AC" operating mode) the fre-

quency has to be within the range 4 Hz to 10 kHz. For a range of 1.999 mT at max. 1 kHz.

4.3 "DC offset" knob

The offset-knob (a 10-turn potentiometer) is only effective for static (DC) field measurements. It can alter the offset by approximately ±150 digits. Before accurately calibrating the DC offset, the device should be allowed about 5 minutes to warm up in order to minimise any offset drift after calibration. In the most sensitive measuring range, 1.999 mT or 1.999 A/m, noise or earth hum can cause a minimum value to be displayed even when no field is being measured.

4.4 LCD display

The measured value is displayed to a maximum precision of 3.5 digits in all ranges. In addition for static (DC) fields the polarity is displayed as well as a decimal point and the units. If the measuring range is exceeded (overrun) "1" or "-1" is displayed.

4.5 "Analog output" socket

The voltage at the sockets is given be the following relationship:

Output voltage in V = Value displayed ignoring decimal point / 1000

Example:

Measuring range = 20

Displayed reading= 15.58

Output voltage = 1.558 V

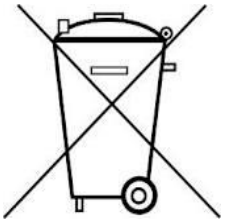
Output voltage in V = 1558 / 1000

4.6 DC offset for static (DC) fields

Before measuring static fields the DC offset should be calibrated by means of the DC offset knob only after the device has been allowed to warm up for five minutes.
In the two lowest measuring ranges, a display of up to ± 40 µT may arise depending on the orientation of the sensor in the Earth's magnetic field.
If this additional reading interferes with the measurement, the sensor should be turned so that no value is displayed. The probe should then be fixed on a stand and the field to be measured should be moved into the proximity of the sensor in a vertical alignment.
For measurements inside coils, the zero point may drift if measurements cover long periods. If it is not desired to turn off the magnetic field, a changeover switch can be incorporated to reverse the field's polarity. Then the arithmetic mean can be calculated from the positive and negative values *B*+ und *B*-.
For measurements of alternating fields the zero point adjusts automatically shortly after the equipment is switched on.

5. Storage, cleaning and disposal

- Keep the equipment in a clean, dry and dust-free place.
- Do not clean the unit with volatile solvents or abrasive cleaners.
- Use a soft, damp cloth to clean it.
- The packaging should be disposed of at local recycling points.
- Should you need to dispose of the equipment itself, never throw it away in normal domestic waste. Local regulations for the disposal of electrical equipment will apply.



- Do not dispose of the battery in the regular household garbage. Follow the local regulations (In Germany: BattG; EU: 2006/66/EG).