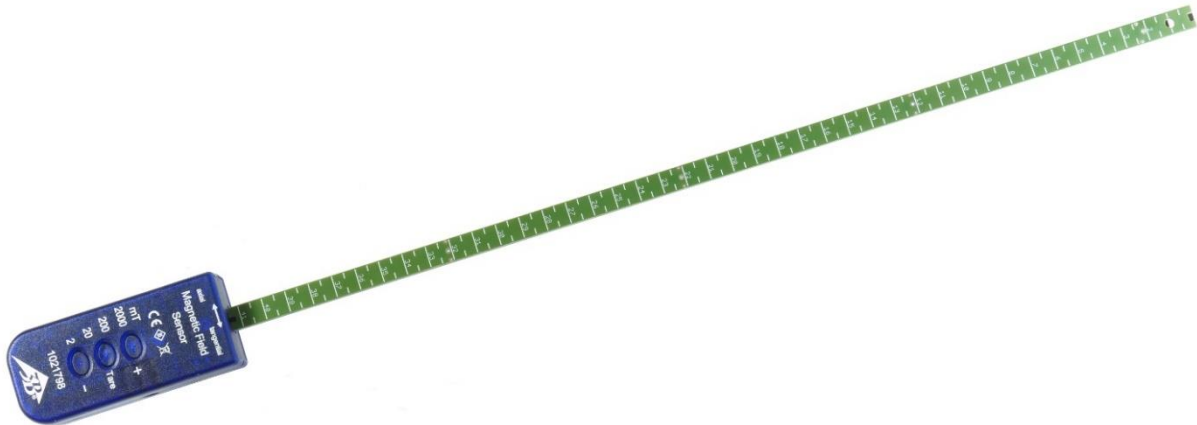


Magnetic field sensor FW axial/ tangential, ± 2 T 1021766

Instruction manual

10/20 SD/ GH



1. Safety instructions

This magnetic field sensor is not suitable for use in safety-critical applications.

- Do not use the sensor for anything other than educational purposes.
- Do not bend the probe or subject it to any other mechanical stress.
- Do not exceed the maximum temperature for the sensor, 175°C.
- Do not let the sensor element come into any contact with water.

2. Description

Sensor box with attached sensor probe, 410 mm long, 10 mm width and max. 3 mm thick, for measuring magnetic flux density B in axial and tangential direction.

At the tip of the sensor 2 Hall sensors are installed for the respective field direction. Selection of the field direction by means of a switch on the front of the sensor.

The centimetre scale on the probe has a zero point centred in the middle of the active surface of the Hall sensor. The distance between the active surface and the end of the probe is 0.6 mm. This enables precise measurements of the magnetic field produced by current-carrying conductors (e.g. with the Biot-Savart set 1018478)

The axial Hall sensor is offset by 10 mm.

The scale on the top of the sensor board is for the tangential sensor, the scale on the bottom for the axial sensor.

Two buttons (+, -) allow the measuring range to be selected. Zero calibration is carried out using the calibrate (Tare) button. Visual indication of the currently activated measuring range is provided by means of an LED under the imprinted range. When the "Tare" button is pressed, the LED for the respective range will flash.

For a defined orientation in the magnetic field which is to be measured, the device can be attached to a stand.

The sensor box includes automatic detection of the CMA interfaces distributed by 3B.

3. Equipment supplied

1 Sensor box

Additionally required

1 Sensor cable 1021514

4. Technical data

Measuring range:	2, 20, 200, 2000 mT
Resolution	0.01 mT (2 + 20 mT) 0.1 mT (200 mT) 1 mT (2000 mT)
Configuration:	axial/ tangential
Sensor type:	Linear Hall effect sensor
Probe length:	tangential: 410 mm, axial 400 mm relative to the face of the sensor box case

Calibration range:	
2 mT range:	+/-1 mT
20 mT range:	+/-10 mT
200 mT range:	+/-100 mT
2000 mT range:	+/-1000 mT
Max. non-linear:	±1.5% of total measuring range

Temperature dependence:

$$B(T) = B(300K) \cdot \left[1 - 0,00088 \left(\frac{T}{K} - 300 \right) \right]$$

Dimensions;	230 x 40 x 25 mm ³
Weight:	50 g

5. Operation

Note:

- In order to avoid permanent damage to the Hall sensor used in the tip of the probe, do not subject it to any mechanical pressure.
- Do not bend the probe tip.
- Connect the sensor to the CMA interface using the sensor cable. The sensor is detected automatically.
- Detection of the sensor is temporarily out of action during changes in measuring range and during the calibration procedure. After a few seconds the sensor will again be displayed as detected.
- Zero calibration only ever applies to the selected measuring range. For calibration purposes, take the sensor out of the magnetic field and press the "Tare" button. If the zero calibration needs to be particularly accurate, the probe tip should be screened using mu-metal. The zero calibration is completed after about 5 s.

- If necessary, the zero calibration procedure may need to be repeated between measurements.
- Hold the sensor box in the magnetic field to be measured, making sure to keep the sensor element oriented in a tangential plane, and then carry out the measurement.

6. Example Experiment

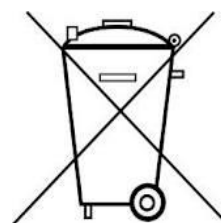
Measurement of the magnetic field strength within an adjustable Helmholtz array using VinciLab

1 Helmholtz coils on base plate	1003193
1 VinciLab	1021477
1 Magnetic field sensor FW ax./tan.	1021798
1 Adapter	
1 DC power supply 20 V @ 115 V	1003311
oder	
1 DC power supply 20 V @ 230 V	1003312
1 Set of experiment leads	1002843

- Set up the experiment according to figure 1.
- Fasten magnetic field sensor in the holder using the adapter.
- The coils are to be connected in series with the same winding direction.
- Set a constant current of e.g. 1.5 A on the power supply unit.
- Proof of the Helmholtz equation at a coil distance of half the coil diameter.
- Measure the homogeneity of the magnetic field in axial and tangential direction.

7. Disposal

- Packaging should be disposed of at local recycling centres.
- If the equipment itself is to be disposed of, never put it into normal household waste. Local regulations for disposal of electrical equipment should be observed.



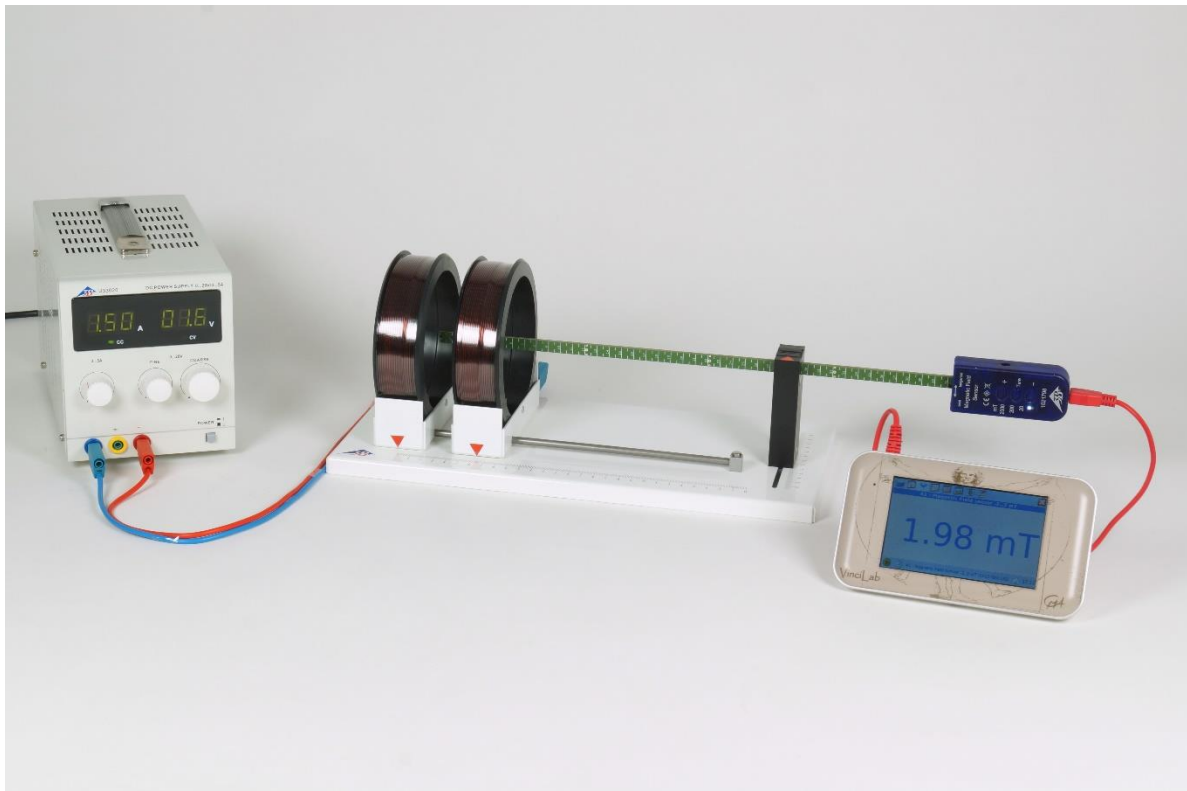


Figure 1: Experiment set-up