3-AXIS HALL MAGNETOMETER

THM1176

narda Safety Test Solutions®
an L3 Communications Company

A Complementary Product From
METROLAB

Measuring static magnetic fields

ranging from low fields up to 20 Tesla

- **Non-directional measurement using an isotropic 3-axis HALL probe**
- **High Field probe (20 Tesla) and Low Field probe (8 mT) versions**
- **Small sized field sensitive point for accurate measurements in high gradient fields**
- **Frequency range from DC to 1 kHz**
- **USB probe interface, bus–powered**
- **PC control software included for Microsoft Windows and Mac OS X**

PDA versions only

- **Easy operation by PDA touch screen**

DESCRIPTION

The Three-axis Hall Magnetometer is used to measure the magnetic field (flux density). Its unique, extraordinarily compact design allows it to be used as a portable instrument or directly connected to a PC.

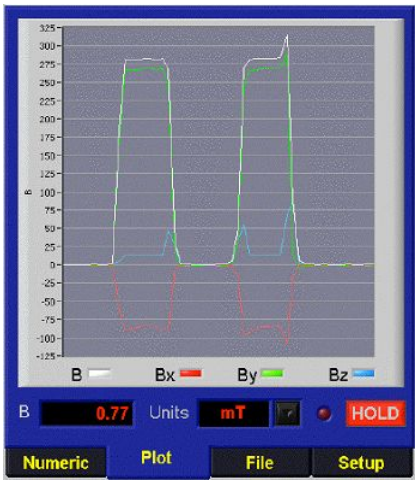
Example for a numerical results display

APPLICATIONS

The probe is designed for measuring magnetic fields with frequencies from DC to 1 kHz. Measurements on medical equipment (magnetic resonance imaging, MRI), metal production equipment and railway systems are typical applications. To avoid injuries to patients or personnel with implants, hospitals usually mark the danger zone around an MRI scanner, where the field exceeds 0.5 mT (5 Gauss).

FEATURES

The total magnetic flux density is provided no matter the orientation of the probe, which greatly facilitates many measurement tasks such as field mapping. Outstanding features are as follows:



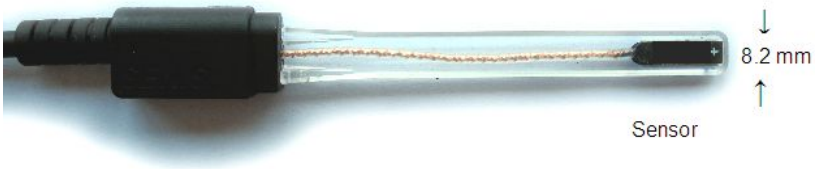
Example for a graphical results display

- **Three axes:**
  Simultaneous measurement of all three axes of the magnetic field provides the total field, no matter the orientation of the probe.
- **Microscopic field sensitive volume:**
  The High Field sensor volume of only 150 x 150 x 10 μm^3 provides excellent localization and a self-consistent measurement of the three axes even in highly inhomogeneous fields. The Low Field sensor volume is 6 x 3.4 x 10 mm^3.
- **Magnetic fields up to 20 T:**
  The High Field probe allows measuring even very strong fields as far as 20 Tesla. The standard calibration covers the range up to 3 T.
  The Low Field probe measures up to 8 mT with a resolution of 2 µT.
- **Bandwidth of DC to 1 kHz:**
  The 1 kHz bandwidth allows measuring AC fields generated, for example, by transformers and motors.
- **Graphical results display:**
  Magnetic flux density vs. time can be displayed as a graph.
  Measurement data can also be recorded to file.

SPECIFICATIONS

	THM1176-HF High Field Probe				THM1176-LF Low Field Probe
MEASUREMENTS					
Measurement ranges: (automatic or manual ranging)	±100 mT	±500 mT	±3 T	±20 T	±8 mT
Resolution: - No averaging - Averaging 100 samples	 300 µT 30 µT	 500 µT 50 µT	 3 mT 300 µT	 15 mT 1.5 mT	 2 µT 0.2 µT
Uncertainty:	±1% of reading at least the specified resolution 20 T range specified up to 3 T				±20 µT
Units:	Magnetic flux density in T, mT, G, kG, MHz p (NMR frequency of proton)				Magnetic flux density in T, mT, µT, G, mG,
User offset correction:	To be performed before each series of measurements, in Zero Gauss Chamber supplied				
Bandwidth:	DC to 1 kHz				
Functions:	- Numerical and graphical display of data (including total field) - Range and units selection - Hold and Maximum - Record to file and recall file				
Record file format:	ASCII tab delimited				
Data output:	- B_x, B_y, B_z (ASCII or binary, single point or array, calibrated or not) - Temperature (uncalibrated) - Time stamp (10ms resolution)				
Sample rate:					
- Immediate trigger (default)	Approx. 12 kHz (free-running, until internal buffer is full)				
- Timed trigger	0.36 Hz to 2.048 kHz (timer resolution of at least 0.24 ‰; continuous read-out in blocks of 2048 samples)				
- Bus trigger (via USB)	Up to approx. 400 Hz (until internal buffer is full)				
	Notes: 1 sample = (B_x, B_y, B_z); Internal buffer size = 2048 samples				
INTERFACE					
Interface:	USB 2.0, full speed (12 Mbps)				
Class / USB driver:	USBTMC (USB Test & Measurement Class) / USB488 DFU (Device Firmware Upgrade)				
Protocol:	IEEE 488.2, SCPI (Standard Commands for Programmable Instruments)				
Connector:	USB Type A				
Power:	USB bus-powered, 4.3V to 5.25V 35 mA min (idle, power-saver on), 90 mA max				
Wake-up time from power-saver:	100 ms				

PDA SPECIFICATIONS (PDA versions only)	
PDA type:	Industrial-quality PDA with USB host interface and Windows Mobile®
PDA size:	127 x 75 x 21 mm^3
PDA weight:	230 g with 2600 mAh battery, stylus and USB adaptor cable
Display:	64K colour TFT LCD, 3.5", 240 x 320 pixels
Input Device:	Stylus or fingertip
Connectors:	- Power jack - 2.5mm audio headset jack - 26 pin connector for ActiveSync, USB 1.1 host and USB 2.0 client - CompactFlash and SDIO expansion slots
Audio:	Built-in microphone and speaker
Memory:	128 MB SDRAM, 256 MB NAND Flash
Wireless LAN:	IEEE 802.11 b/g; internal antenna
Bluetooth:	V2.0 + EDR class 1
Battery life:	6 hours min.
Record file format:	ASCII tab delimited
Pre-loaded software:	- THM1176 Acquisition software - Word Mobile, Excel Mobile, PowerPoint Mobile - Outlook Mobile, IE Mobile, MSN Messenger Client - Windows Media Player Mobile - ActiveSync Client - Socket Mobile Wi-Fi Companion - Programmable Home Screen, Calculator, Utility programs
OPERATING CONDITIONS	
Probe Operating temperature Storage temperature Operating magnetic field	 0°C to +40°C -20°C to +60°C 3 T max. for the instrument electronics (located within the probe cable at 2m distance from the sensor)
PDA Operating temperature Operating magnetic field	 0°C to +50°C 1 T max. The PDA may experience forces as high as 50 N. Note: The touch screen of the PDA will cease to function. The power of the PDA must be cycled to restore full operation.
GENERAL SPECIFICATIONS	
Warranty	2 years, the PDA is limited to 1 year and the batteries to 3 months
Recommended calibration interval:	18 months (3-Axis Hall Probe only)
Certification	CE approved
Maintenance	Firmware upgradeable by end user
Accessories (included)	See ordering information
Country of origin	Switzerland

PROBE HEAD – MECHANICAL DETAILS		
Size: - Instrument electronics - Probe with cap - Probe without cap	 76 x 22.5 x 14 mm^3 113 x 16 x 10 mm^3 (see figure 1) see figure 2 (cap is removable on the THM1176-HF probe only)	
Size of the field sensitive area:	THM1176-HF 150 µm x 150 µm x 10 µm	THM1176-LH 6 mm x 3.4 mm x 10 mm
Weight:	150 g	
Figure 1:	Probe with cap (all versions) 	
Figure 2:	Probe with removed cap (THM1176-HF only) 	
Figure 3:	PDA versions come with transport case 	PC versions come with cardboard box 

ORDERING INFORMATION

PDA Versions	Part Number (P/N)
THM1176-HF-PDA, Magnetometer, High Field, PDA included Includes: - 3-Axis High Field Hall Probe with 3 meter cable - Industrial-quality PDA (pre-installed software, ready to use) - Heavy duty Li-Ion battery (2600 mAh), plus spare (1200 mAh) - AC adaptor/charger (100-240 VAC 50/60 Hz) with wall socket adaptor plugs for Europe, UK, USA, Australia - USB-Host adaptor cable to connect PDA to THM1176 - USB-Device adaptor cable to connect PDA to PC - CD with acquisition software for PC (Windows XP/Vista/Windows 7, Mac OS X), PDA (Windows Mobile), LabVIEW source code for all PC and PDA software and user's manual in English (PDF) - Zero Gauss Chamber - Carrying Case - Certificate of calibration [1)] [1)] (Full-range calibration on 0.1, 0.5 and 3 T ranges; 20 T range to 3 T)	**2901/101**
THM1176-DUO-PDA, Magnetometer, High + Low Field, PDA included Includes all parts from 2901/101 plus a Low Field Hall Probe	**2901/105**
PC Versions	**Part Number (P/N)**
THM1176-HF-PC, Magnetometer, High Field, PC Version (*requires a PC for operation)* Includes: - 3-Axis Hall Probe with 3 meter cable - CD with acquisition software for PC (Windows XP/Vista/Windows 7, Mac OS X), LabVIEW source code and user's manual in English (PDF) - Zero Gauss Chamber - Certificate of calibration [1)] [1)] (Full-range calibration on 0.1, 0.5 and 3 T ranges; 20 T range to 3 T)	**2901/102**
THM1176-DUO-PC, Magnetometer, High + Low Field, PC Version Includes all parts from 2901/102 plus a Low Field Hall Probe	**2901/106**

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