

3-AXIS HALL MAGNETOMETER

THM1176 THM1176-PDA

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
- ▲ 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 Windows XP and Vista

THM1176-PDA only

- ▲ Easy operation by PDA touch screen or MS-Windows based PC software (all included)



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.

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.

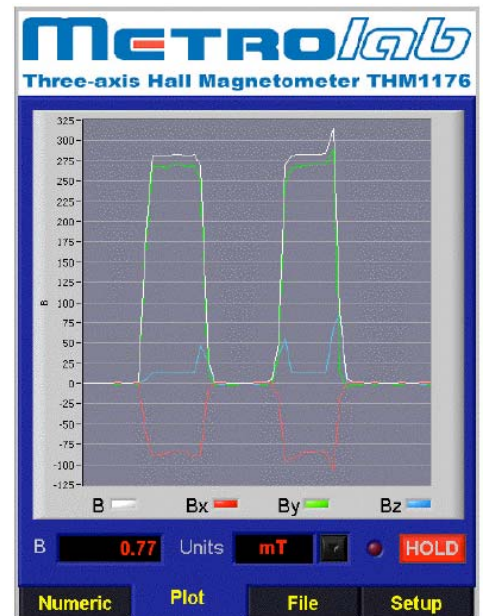
FEATURES

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:

- **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:**
A sensor size of only $150 \times 150 \times 10 \mu\text{m}^3$ provides excellent localization and a self-consistent measurement of the three axes even in highly inhomogeneous fields.
- **Magnetic fields up to 20 T:**
Four measurement ranges – 100 mT, 500 mT, 3 T and 20 T – allow measuring even very strong fields. The standard calibration covers the range up to 3 T. Automatic or manual range setting is provided.
- **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.



Example for a numerical results display



Example for a graphical results display

SPECIFICATIONS

THM1176 THM1176-PDA				
MEASUREMENT MODES				
Software functions:	<ul style="list-style-type: none"> - 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; compatible with Handheld file format			
MEASUREMENTS				
Ranges:	100 mT, 500 mT, 3T, 20T (automatic or manual ranging)			
Data output:	<ul style="list-style-type: none"> - B_x, B_y, B_z (ASCII or binary, single point or array, calibrated or not) - Temperature (uncalibrated) - Time stamp (10ms resolution) 			
Units:	Magnetic flux density in T, mT, G, kG, MHz p (NMR frequency of proton)			
Sample rate:	<ul style="list-style-type: none"> - 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) <p><i>Notes: 1 sample = (B_x, B_y, B_z); Internal buffer size = 2048 samples</i></p>			
Bandwidth:	DC to 1 kHz			
Resolution:	100 mT range	500 mT range	3 T range	20 T range
- No averaging	300 μT	500 μT	3 mT	15 mT
- Averaging 100 samples	30 μT	50 μT	300 μT	1.5 mT
Accuracy:	The greater of ±1% of reading or specified resolution 20 T range specified up to 3 T			
User offset correction:	To be performed before each series of measurements, in Zero Gauss Chamber supplied			
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 (THM1176-PDA only)	
PDA type:	Windows Mobile® 5.0 with USB host interface
PDA size:	(127 x 75 x 21) mm
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:	<ul style="list-style-type: none"> - 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:	<ul style="list-style-type: none"> - Acquisition software (same functionality as desktop software) - Word Mobile, Excel Mobile, PowerPoint Mobile - Outlook Mobile, IE Mobile, MSN Messenger Client - Windows Media Player 10.2 Mobile - ActiveSync Client - Socket Mobile Wi-Fi Companion - Programmable Home Screen, Calculator, Utility programs
OPERATING CONDITIONS	
Probe	
Operating temperature	0°C to +40°C
Storage temperature	-20°C to +60°C
Operating magnetic field	3 T max. for the instrument electronics (located within the probe cable at 2m distance from the sensor)
PDA (THM1176-PDA only)	
Operating temperature	0°C to +50°C
Operating magnetic field	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
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	76 x 22.5 x 14 mm ³
- Probe with housing	113 x 16 x 10 mm ³
- Probe without housing	see figure 1
Stationary mounting point:	For M2.5 screw (not included). Note: to avoid breaking the mounting point, use a spacer and do not over-tighten the screw.
Weight:	150 g
Size of field sensitive point:	150 μm x 150 μm x 10 μm
Sensor dimensions and location of field sensitive point:	see figure 2

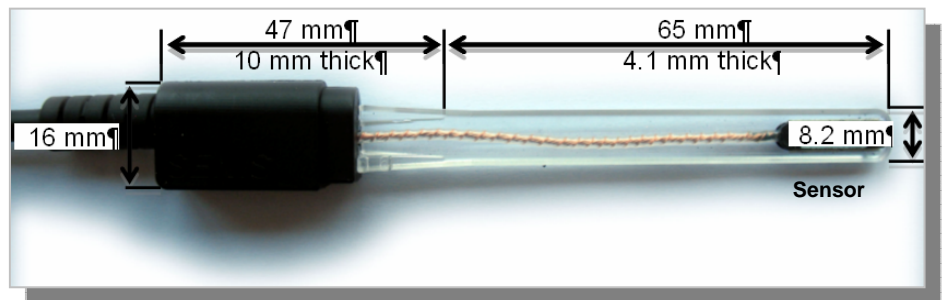
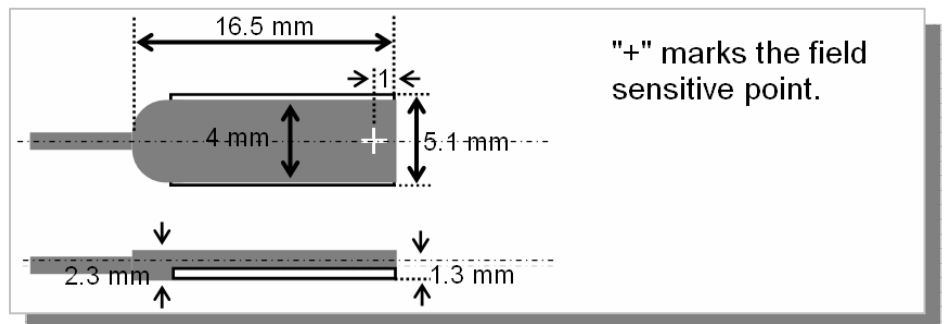


Figure 1: Size of the probe head with removed housing



"+" marks the field sensitive point.

Figure 2: Sensor dimensions and location of the field sensitive point

ORDERING INFORMATION

THM1176-PDA	Part Number (P/N)
<p>THM1176-PDA, 3-Axis HALL Magnetometer with PDA Handheld Computer included</p> <p>Includes:</p> <ul style="list-style-type: none"> - 3-Axis 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) and PDA (Windows Mobile), LabVIEW source code for all PC and PDA software and user's manual (PDF) - Zero Gauss Chamber - Carrying Case - Certificate of calibration ¹⁾ <p>¹⁾ (Full-range calibration on 0.1, 0.5 and 3 T ranges; 20 T range to 3 T)</p>	<p>2901/101</p>
THM1176	Part Number (P/N)
<p>THM1176, 3-Axis HALL Magnetometer for Personal Computer (Windows XP/Vista)</p> <p>Includes:</p> <ul style="list-style-type: none"> - 3-Axis Hall Probe with 3 meter cable - CD with acquisition software for PC (Windows XP/Vista), LabVIEW source code and user's manual (PDF) - Zero Gauss Chamber - Certificate of calibration ¹⁾ <p>¹⁾ (Full-range calibration on 0.1, 0.5 and 3 T ranges; 20 T range to 3 T)</p> <p style="text-align: center;"><i>Requires a Personal Computer for operation</i></p>	<p>2901/102</p>

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