

# **PT2026 NMR PRECISION TESLAMETER** THE GOLD STANDARD FOR MAGNETIC FIELD MEASUREMENTS



We are the **global market leader** for precision magnetometers. Established in Switzerland in 1985, we have won the trust of all the large **ABOUT** physics laboratories and all leading players in Magnetic Resonance Imaging, across the world.

With Metrolab, you measure magnetic fields with Swiss precision and quality.

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**METROLAB** 

#### **TECHNICAL CHARACTERISTICS AND ACCESSORIES**

#### SYSTEM

MEASUREMENT PRINCIPLE	Pulsed-Wave NMR
FREQUENCY RANGE	1 MHz - 1.1 GHz
RESOLUTION	±0.1 Hz (stable field, low gradient, no averaging), < 0.01 ppm in uniform 1.5 and 3.0 T field (typical)
ACCURACY	±5 ppm, independant of temperature
MAX FIELD GRADIENT	> 1000 ppm/cm at 1 T field
MEASUREMENT RATE	Up to 33 Hz
SIZE	210 x 125 x 324 mm (main unit, optional rack mount)
COMPUTER INTERFACE	USB / USBTMC, Ethernet / VXI-11; IEEE 488.2; SCPI
SOFTWARE	Dedicated PT2026 software
API	Access to all system features; LabVIEW $^{\textcircled{0}}$ 2015 driver and C++ API
TRIGGER	Trigger In or Trigger Out
CLOCK CONNECTOR	10 MHz: External Reference in or Internal Reference out

#### PROBES

Model 1326 probes have the same form factor as PT2025 model 1062 probes. A single connector makes it easy to plug and unplug. An integrated 3-axis Hall probe speeds up the search for the NMR signal.

Model 1426 probes have a remote passive measurement head that fits into small gaps and is ideal for highradiation environments that would damage electronic components.

Model 1526 probes have a remote active measurement head that fits into small gaps. The local treatment of the NMR signal improves the signalto-noise ratio and allows longer cables.



MODEL 1326 NMR PULSED-WAVE PROBES



MODEL 1426 NMR PULSED-WAVE PROBES



MODEL 1526 NMR PULSED-WAVE PROBES

	Model 1326	Model 1426	Model 1526	
STANDARD RANGES PROTON PROBES (P)	0.038 to 11.7 T Covered by 5 probes	0.19 to 10.57 T Covered by 4 probes	0.038 to 11.7 T Covered by 5 probes	
STANDARD RANGES DEUTERIUM PROBES (D)	10.0 - 30.0 T	8.0 - 22.8 T	10.0 - 30.0 T	
WIDE-RANGE PROTON PROBE FOR HIGHLY UNIFORM FIELDS	0.2 - 3.0 T	Not available	0.2 - 3.0 T	
HALL PROBE ASSISTANCE	Integrated Not available		Optional	
SEARCH TIME	With Hall assist < 1s Without Hall assist < 10s	< 10s	With Hall assist < 1s Without Hall assist < 10s	
PROBE ELECTRONICS SIZE	16 x 12 x 231 mm	16 x 12 x 231 mm	16 x 12 x 231 mm	
MAIN CABLE LENGTH	10 m, custom available up to 100 m (incl. multiplexers)			
REMOTE HEAD SIZE	Not applicable	9.2 x 6.2 x 31.5 mm (p) 16.2 x 6.2 x 31.5 mm (D)	10.9 x 6.2 x 60.1 mm (p) 15.9 x 6.2 x 60.1 mm (D)	
REMOTE HEAD CABLE LENGTH	Not applicable	0.5 m (4.3 mm)	1.5 m std, up to 10 m	

#### ACCESSORIES

NMR probe multiplexer, MUX6026, 4 or 8 channel multiplexers. Connect multiplexers with multiplexers to control up to 512 probes.

Probe-extension/multiplexer cable, 3026-10M, standard length 10 m, custom length up to 100 m.

**Transit case, TC8026**, holds one PT2026 NMR teslameter, four probes, one multiplexer, and one probe-extension/multiplexer cable.

#### WARRANTY AND CALIBRATION

Warranty: 2 years

Calibration interval of the main unit PT2026: 12 months

CE marked

Specifi cations are subject to change; for detailed and up-to-date specifi cations, please see www.gaussmeter.com.cn

#### **1-1 DIMENSIONS**

PT2026 Main Unit	210 X 125 X 324 mm
MUX6026 Multiplexer	250 X 80 X 180 mm



PT2026 main unit, front and back panel



MUX6026 NMR probe multiplexer

# **1-2 MEASUREMENT**

Measurement principle: pulsed wave Nuclear Magnetic Resonance

Frequency range	1 MHz – 1 GHz
Resolution	± 0.1 Hz (stable field, low gradient, no averaging)
	< 0.01 ppm (10 ppb) in uniform 3 T field
Accuracy	± 5 ppm, independent of temperature
Max gradient	> 1000 ppm/cm
Measurement rate	Up to 33 Hz
Trigger modes	Immediate, Timed, Bus, External

#### 1-3 RATINGS

Power	55 VA, 100 – 240 VAC, 50-60 Hz
Overvoltage	Accepts temporary overvoltage occurring on the mains supply—transient overvoltage up to the levels of overvoltage category II.
Fuse	3.15 A (T), 5x20 mm, 250 V
Environment	Indoor use; no air inlet (IP 50)
Operating temperature	10 – 40 °C
Storage / transport temperature	Deuterium probes: 0 – 80 °C Other: -25 – 80 °C
Altitude	≤ 2000 m
Relative humidity	Maximum 80 % for temperatures up to 31 °C, decreasing linearly to 50 % relative humidity at 40 °C
Pollution	Pollution degree 2: only non-conductive pollution occurs, except that occasionally a temporary conductivity caused by condensation is to be expected.
Magnetic environment	< 0.2 T (PT2026 Main Unit)
Electromagnetic environment	Equipment intended to be used in an industrial electromagnetic environment, class A.

#### 1-4 SOFTWARE

Supported platforms	Microsoft Windows XP SP3 or higher
API	Access to all system features; LabVIEW <sup>®</sup> 2015 SP1
Licenses	Metrolab (including source code for API)
	National Instruments (LabVIEW <sup>®</sup> and NI-VISA run-times)

# 2- Probe Specifications

#### 2-1 PROBE MODEL 1326

Heavy-duty probe, suited for most measurements.

A single connector makes it easy to plug and unplug. An integrated 3-axis Hall probe speeds up the search for the NMR signal.



#### Ranges

Model designation	Range minimum (T)	Range Maximum (T)	Sample diameter, material
1326-0.038-0.14	0.038	0.14	7.45 mm, Hydrogen / synthetic rubber
1326-0.13-0.48	0.13	0.48	5.1 mm, Hydrogen / synthetic rubber
1326-0.46-1.5	0.46	1.5	2.9 mm, Hydrogen / synthetic rubber
1326-0.9-3.2	0.90	3.2	2.9 mm, Hydrogen / synthetic rubber
1326-1.4-4.8	1.4	4.8	2.9 mm, Hydrogen / synthetic rubber
1326-4.35-11.7	4.35	11.7	1.8 mm, Hydrogen / natural rubber
1326-10-32	10	32	3.6 mm, Deuterium / heavy water
1326-0.1-3	0.094	3.05	7.35 mm, Hydrogen / synthetic rubber

Note that model 1326-0.1-3 is a specialty probe, suitable only for applications where a highly uniform field can be guaranteed, such as calibration magnets.

Custom ranges are available upon request.

## Dimensions



#### 2-2 PROBE MODEL 1426

Model 1426 probes have a remote passive measurement head that fits into small gaps and is ideal for high-radiation environments that would damage electronic components.



# Ranges

Model designation	Range minimum (T)	Range maximum (T)	Sample diameter, material
1426-0.19-0.52	0.19	0.52	4.0 mm, Hydrogen / synthetic rubber
1426-0.42-1.29	0.42	1.29	3.0 mm, Hydrogen / synthetic rubber
1426-1.13-3.52	1.13	3.52	3.0 mm, Hydrogen / synthetic rubber
1426-3.17-10.69	3.17	10.69	1.8 mm, Hydrogen / natural rubber
1426-8.00-22.80	8.0	22.8	3.6 mm, Deuterium / heavy water

# Dimensions

Probe, model 1426						
Electronics	16 x 12 x 231 mm					
			Γ			1
Measurement head		<b>L</b> [mm]	<b>W</b> [mm]	<b>T</b> [mm]	<b>P</b> [mm]	
	Proton sample	32 ±0.5	9.2 ±0.2	6.0 ±0.2	4.0 ±0.3	
	Deuterium sample	32 ±0.5	16.5 ±0.2	6.2 ±0.2	4.0 ±0.3	
PWP1426 Remote Head for Med	dium and High Field		PWP1426 Remot	e Head for D20	D sample	
Centre of N	MR somole			Centre of MMR sor	T	+. *
Cable Length	Electronics – head:					
	50 cm, Ø 4.3 mm					
	Probe- Electronics					
	10 m; custom upon request					
	100 m max total length (incl. multiplexers)					

#### 2-3 PROBE MODEL 1526

Model 1526 probes have a remote active measurement head that fits into small gaps. The local treatment of the NMR signal improves the signal-to-noise ratio and allows for longer cables.



#### Ranges

Model designation	Range minimum (T)	Range Maximum (T)	Sample diameter, material
1526-0.038-0.14	0.038	0.14	7.45 mm, Hydrogen / synthetic rubber
1526-0.13-0.48	0.13	0.48	4.0 mm, Hydrogen / synthetic rubber
1526-0.46-1.5	0.46	1.5	2.9 mm, Hydrogen / synthetic rubber
1526-0.9-3.2	0.9	3.2	2.9 mm, Hydrogen / synthetic rubber
1526-1.4-4.8	1.4	4.8	2.9 mm, Hydrogen / synthetic rubber
1526-4.35-11.7	4.35	11.7	1.8 mm, Hydrogen / natural rubber
1526-9.5-32	9.5	32.0	3.6 mm, Deuterium / heavy water
1526-0.1-3	0.094	3.05	7.35 mm, Hydrogen / synthetic rubber
1526-0.65-2.4	0.65	2.4	2.9 mm, Hydrogen / synthetic rubber

Note that model 1526-0.1-3 is a specialty probe, suitable only for applications where a highly uniform field can be guaranteed, such as calibration magnets.

Custom ranges are available upon request.

# Dimensions

Probe, model 1526																																											
Electronics	16 x 12 x 231 ı	16 x 12 x 231 mm																																									
Management Hand		[ [mm]		T [mm]	<b>D</b> [mm]																																						
Measurement Head																																											
		63 ±0.5	$10.8 \pm 0.2$ 12.8 ± 0.2	0.0 ±0.2	4.5 ±0.3																																						
	Head D <sub>2</sub> O	60.5 ±0.5	15.8 +0.2	6.0 +0.2	4.5 +0.3																																						
Head D2O60.5 ±0.515.8 ±0.26.0 ±0.24.5 ±0.3PWP1526 Remote Head for Medium and High FieldPWP1526 Remote Head for Low FieldOutput <tr <td=""><td colspan="3" ou<="" td=""></td></tr> <tr><td>PWP1526 Remote Hea</td><td>ad for D2O sample</td><td></td><td></td><td></td><td></td></tr> <tr><td colspan="4">Contre of Nume somole</td></tr> <tr><td>Probe cable length</td><td>Electronics – h</td><td>nead:</td><td></td><td></td><td></td></tr> <tr><td></td><td>150 cm, up</td><td>o to 10 m, Ø 4</td><td>.3 mm</td><td></td><td></td></tr> <tr><td></td><td colspan="3">Probe- Electronics</td></tr> <tr><td></td><td colspan="3">10 m; custom upon request</td></tr> <tr><td></td><td>100 m max</td><td>total length</td><td>(incl. multiple</td><td>exers)</td><td></td></tr>								PWP1526 Remote Hea	ad for D2O sample					Contre of Nume somole				Probe cable length	Electronics – h	nead:					150 cm, up	o to 10 m, Ø 4	.3 mm				Probe- Electronics				10 m; custom upon request				100 m max	total length	(incl. multiple	exers)	
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## 2-4 INTEGRATED HALL PROBE

# Availabilty

	Hall probe
Model 1326 probe	Included
Model 1426 probe	Not available
Model 1526 probe	Optional

### Measurement

Acquisition	Hall and NMR signals acquired <b>nonsimultaneously</b> to avoid signal disruption
	Hall signal measured until NMR search range is reached
	Hall probe can be deactivated
Color of the display of the measured field strength	Orange during Hall measurement
	Green during NMR measurement
Precision (Hall)	E0/