

G401 High Precision Single-Axis Gaussmeter

- Bypass Zero Technology
- Accuracy 0.04%
- Range: 10nT ~ 10T



Description:

Gaussmeter G401 is a desktop precision single-axis gaussmeter using COLIY's third-generation semiconductor gallium nitride (GaN) Hall sensor. Gallium nitride sensor has the characteristics of good temperature stability, unaffected by light, high linearity, and low noise, and its performance is ahead of the second-generation semiconductor gallium arsenide (GaAs) sensor technology.

The gaussmeter needs to be calibrated frequently during startup and measurement, which is inconvenient to operate and affects accuracy. Gaussmeter G401 adopts Bypass Zero Technology and high-stability GaN hall sensor, no need to zero, which greatly improves the accuracy of the data and the convenience of use. Gaussmeter G401 is usually equipped with a hall probe, and a low-field probe is optional. The hall probe and the low-field probe have separate sockets, which can work and display at the same time, which makes the G401 Gaussmeter have an extremely wide measurement range from 10nT to 10T.

With the GaN hall probe, the DC accuracy of Gaussmeter G401 is better than 0.04%, the measurement range is up to 100kG (10T), and the frequency response range is DC-10kHz. Gaussmeter G401 has up to 7 display digits, and has extremely low measurement noise in the full scale range, with a typical DC magnetic field noise of 0.01G (1 μ T).

With the low-field probe, the DC accuracy of Gaussmeter G401 is better than 0.2%, the measurement range is up to 6G (600 μ T), and the resolution is up to 0.1mG(10nT). Due to the compact size, the low-field probe is very suitable for measuring weak magnetic fields, especially in narrow space.

Gaussmeter G401 adopts a 10.1-inch color industrial resistive touch screen and a built-in GUI

operation system, which is easy to operate, and users can use it without reading the manual; G401 adopts aviation aluminum alloy shell, which is small in size and saves desktop space; G401 adopts a low-power fanless design, which is green and environmentally friendly.

Gaussmeter G401 is powerful, with maximum/minimum function, magnetic field polarity display function, storage function, time domain graph function, oscilloscope function, real-time spectrum analysis function and 0.2ms pulse magnetic field capture function; G401 Gaussmeter has a variety of Measurement modes: DC standard mode, DC time domain figure mode, AC standard mode, AC spectrum analysis mode, AC oscilloscope mode and 0.2ms pulsed magnetic field measurement mode to meet various complex magnetic field measurement occasions. In addition, Gaussmeter G401 uses Fourier analysis method to measure AC magnetic field (RMS value and spectrum analysis), which is very suitable for measuring AC magnetic field of various waveforms (sine wave, square wave, triangle wave, trapezoidal wave, sawtooth wave, etc.).

Gaussmeter G401 could be equipped with many different kinds of Hall Probes: Transverse Probe, Axial Probe and Probe with temperature compensation. The typical temperature coefficient of ordinary probes(probes without temperature compensation) is $\pm 100\text{ppm}/^\circ\text{C}$, but typical temperature coefficient of probes with temperature compensation is only $\pm 20\text{ppm}/^\circ\text{C}$, so probes with temperature compensation are strongly recommended for better precision and stability when the temperature changes.

Gaussmeter G401 has passed the CE certification and EMC (Electromagnetic Compatibility) test.

Features

<ul style="list-style-type: none">● Bypass Zero Technology● GUI Operation System● Gallium Nitride (GaN) Hall Sensor.● 10.1 inches color touch LCD● AC magnetic field measurement (RMS)● Measure the RMS value of AC magnetic field● 7 display digits● Compact aviation aluminum shell design● Low-field probe: 600μT range & 10nT resolution	<ul style="list-style-type: none">● Measurement range up to 100kG(10T)● Typical DC magnetic field noise 0.01G (1μT)● DC Accuracy 0.04%● Frequency Response DC- 10kHz● Temperature Coefficient up to $\pm 20\text{ppm}/^\circ\text{C}$● Max/Min Function● 0.2ms Pulse Magnetic Field Capture Function● Real-time Spectrum Analysis Function● Oscilloscope Function
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GaN Hall Sensor

GaN materials have the characteristics of strong atomic bonds, high thermal conductivity, good chemical stability and strong radiation resistance. GaN is known as the third-generation semiconductor materials, after the first generation of Ge, Si semiconductor materials and the second generation of GaAs, InP semiconductor materials.

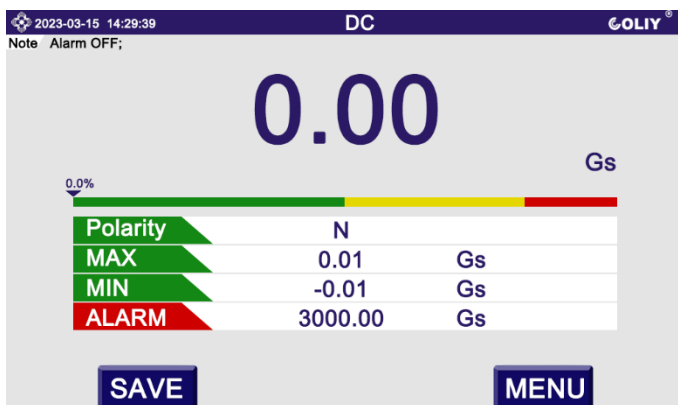
COLIY's third-generation semiconductor gallium nitride (GaN) Hall sensor has the characteristics of good temperature stability, high linearity and low noise, and its performance is ahead of the second-generation semiconductor gallium arsenide (GaAs) sensor technology.



Bypass Zero Technology

During the use of an ordinary gaussmeter, the host and probe will have zero drift due to changes in temperature and hysteresis. Therefore, the probe must be frequently placed in the zero-gauss chamber for zero calibration.

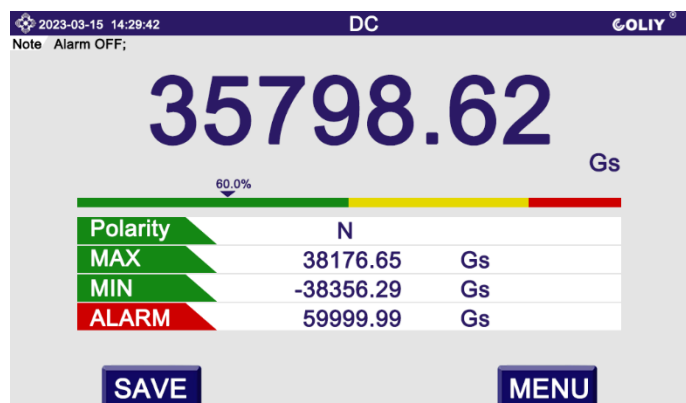
Gaussmeter G401 adopts unique Bypass Zero Technology and high stability GaN Hall sensor. Both the host and probe have low zero drift error and extremely low noise. Temperature and hysteresis do not affect the zero drift of the gaussmeter. There is no need for zero calibration, which greatly improves the accuracy and convenience of use.



GUI Operation System & Display Style

With the desktop instrument operating system (GUI Operation System) developed by COLIY, it's very efficient and convenient for operators to choose menu by touching, to operate gaussmeter.

Color LCD shows magnificent data: time, measurement mode, real-time magnetic flux density, polarity, Max, Min, note, Alarm, trend graph.



Smart Record and Review

DATE	TIME	NUM	MEMO
03-15	14:29:42	0001	
03-15	14:28:25	0012	gol-2
03-14	09:48:29	0001	

DATE	TIME	NUM	VALUE(Gs)	THRESHOLD/ALARM(Gs)
03-15	14:29:42	0001	35798.62	599999.99

Smart Record: Users can choose any time period and time interval, and can add remarks for each record. The host storage capacity is greater than 8000 data.

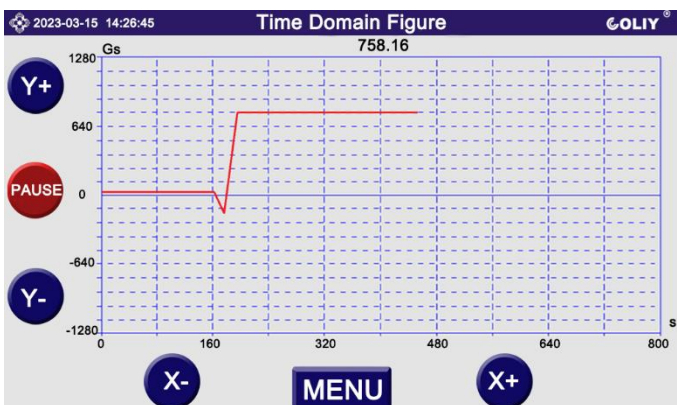
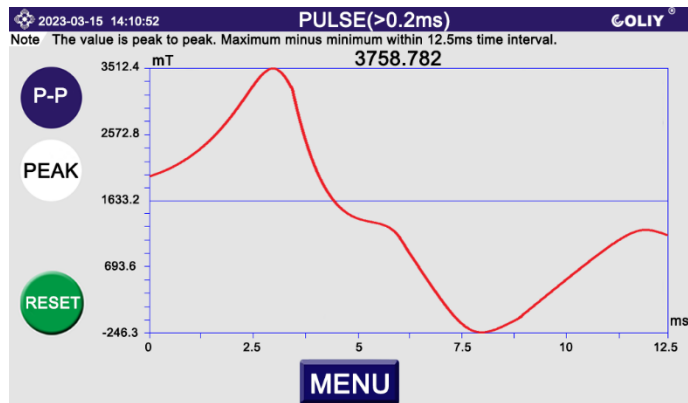
Smart View: Provides a detailed record list, and users can view the details of each measurement data. Click any record list, the user can see the complete storage information, the display format of this information is similar to the screenshot display.

Pulse Mode

G401 Gaussmeter has high-speed sampling and can capture the pulsed magnetic field with a pulse width of $>0.2\text{ms}$, and the maximum pulsed magnetic field value is up to 10T.

The peak-to-peak value or the peak value of the pulsed magnetic field can be selected according to the application.

This is ideal for measuring magnetizers and other fast pulsed magnetic field applications.



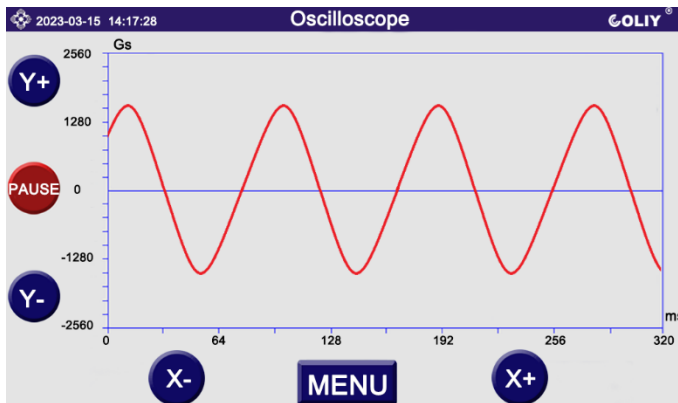
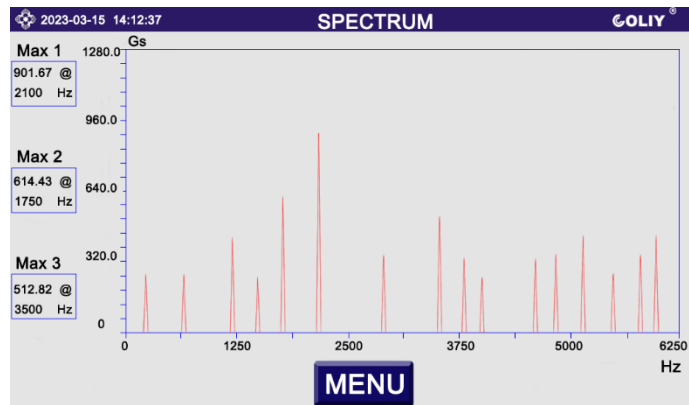
Time Domain Figure Mode

Gaussmeter G401 can display the trend graph of magnetic field changes with time within 800 seconds and the current magnetic field value.

Spectrum Mode

For AC magnetic field, Gaussmeter G401 has real-time spectrum analysis function, and the spectrum analysis range is <10kHz.

Using Fourier analysis of 20Hz-10kHz AC magnetic field, the screen will display the 3 largest magnetic field peaks and frequency values.

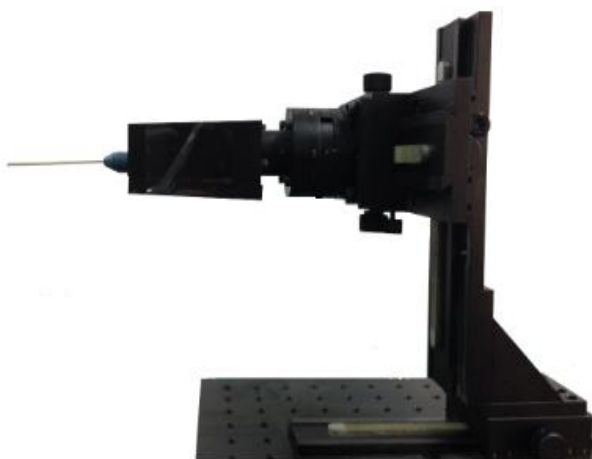
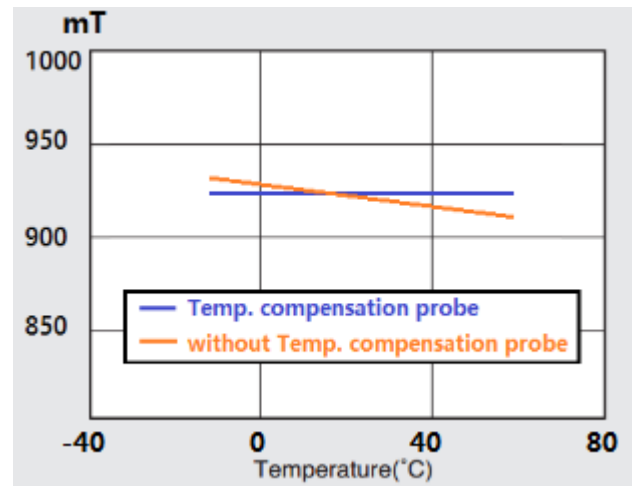


Oscilloscope Mode

Gaussmeter G401 has a breakthrough integrated magnetic field oscilloscope function, which can display the AC magnetic field waveform up to 5kHz in real time, or high-frequency noise disturbance.

Temperature Compensation

The temperature coefficient of ordinary probes (probes without temperature sensor) is 100ppm/°C, but temperature sensor-contained probes have the function of temperature compensation, and the temperature coefficient is down to 20ppm/°C, so temperature sensor-contained probes are strongly recommended for better precision and stability when the temperature changes.

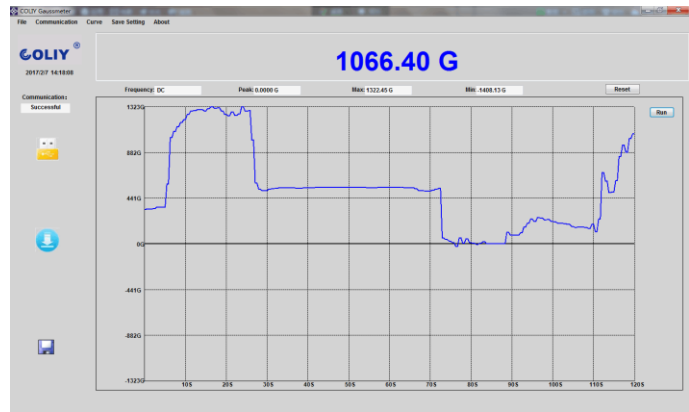


3D Movement Platform

3-Direction Precision Movement Platform is made of non-magnetic material. Users fixed the probe on the bracket front-end, and then manually rotate the knob so that the probe moves stably along the X, Y, Z-axis to a certain position and lock fixed. Maximum strokes of XYZ axis are 180mm, 180mm and 280mm, with the positioning accuracy of 0.1mm.

SMART PC Software

SMART computer software has rich features: Automatically record and display trend graph; Display the magnetic flux density, maximum and minimum in real time; Export saved data from the gaussmeter host; Record and save measurement data in real time.



Metal Protector of Probe

All probes of COLIY gaussmeter are protected by non-magnetic metal protectors (protective sleeves).

The non-magnetic metal protector can be tightened with the probe grip to protect the probe from strong impacts, squeezing, etc. It can prevent the probe from falling damage from a height of 10 meters, and even resist hammer strikes. It is recommended that users tighten and fix the non-magnetic metal sleeve after completing the magnetic field measurement to protect the probe from damage to the greatest extent.



Split Design

The main unit and base of Gaussmeter G401 are designed in a split type. With the base, the G401 Gauss meter host can be placed on the desktop upright; when the base is removed, the G401 Gauss meter host can be used as a handheld tablet, which is flexible and convenient. Mobile phone charging bank, can be used as a mobile power supply for G401 gaussmeter.

Gaussmeter G401 Specification:

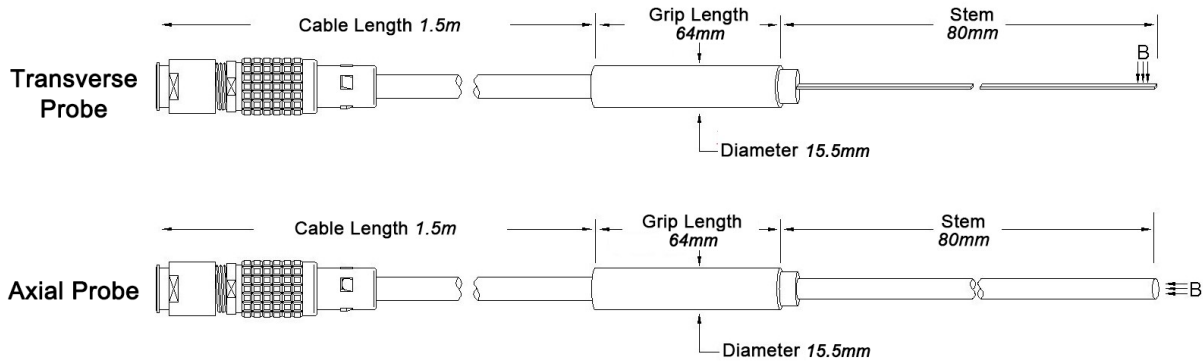
Gaussmeter Model	G401	
Probe Type	Hall Probe	Low-field Probe
Measurement Specification		
Accuracy(DC)	±0.04%	±0.2%
Range	100kG (10T)	6G(600μT)
Resolution	0.01G(1μT)	0.1mG(10nT)
Frequency Response	DC - 10kHz	DC
Measurement Mode	<p>1, DC Standard Mode, displays the real-time magnetic flux density, polarity, Max, Min, and alarm threshold;</p> <p>2, DC Time Domain Figure Mode, displays the trend graph of magnetic field changes with time within 800 seconds;</p> <p>3, AC Standard Mode, AC frequency response range 0.5Hz- 10kHz, RMS value, suitable for various waveforms, such as sine wave, square wave, triangle wave, trapezoidal wave, sawtooth wave, etc.</p> <p>4, AC Spectrum Mode, using Fourier analysis of 20Hz-10kHz AC magnetic field, the screen will display the 2 largest magnetic field peaks and frequency values.</p> <p>5, AC Oscilloscope Mode, displays the AC magnetic field waveform up to 5kHz in real time, or high-frequency noise disturbance.</p> <p>6, Pulse Mode, captures the pulsed magnetic field with a pulse width of >0.2ms, and the maximum pulsed magnetic field value is up to 10T.</p>	<p>DC Standard Mode, displays the real-time magnetic flux density, polarity, Max, Min, and alarm threshold</p>
Zero Drift	Using Bypass Zero Technology, there is no zero drift, and temperature and hysteresis have no effect on the zero drift of the magnetic field.	<p>5nT/°C (Regular probe)</p> <p>1nT/°C (Probe with temp. sensor)</p>
Typical Temperature Coefficient	<p>±100ppm/°C (Regular probe)</p> <p><±20ppm/ °C (Probe with temperature sensor)</p>	<p><±500ppm /°C (Regular probe)</p> <p><±100ppm/°C (Probe with temp. sensor)</p>
Display Digits	Full 7 digits, maximum 99999.99G	

Gaussmeter

Host storage capacity	>8000 data	
Front Panel		
Screen	10.1 inches color resistive touch LCD, 1024 x 600 Pixel	
Units	Gauss(G), Tesla(T), Amperes per meter (A/m)	
Display Update Rate	4 readings/second	
Display Mode	DC, AC, MAX, MIN, Alarm, N/S Polarity Indication, Spectrum Analysis, 0.2ms Pulse Magnetic Field Capture, Time Domain Figure, Oscilloscope, etc.	DC, MAX, MIN, Alarm, etc.
Probe		
Hall Sensor	COLIY's third-generation semiconductor GaN Hall sensor	COLIY small-size low-field sensor
Probes	See " Probe Specifications " for details.	
Connector	6-core waterproof connector	
Probe Grip and Protector	Non-magnetic aviation aluminum alloy, resistant to 10m drop	
Probe Cable	6 shielded twisted pair core flexible cable; Standard CAT5e	
Probe Cable Length	Standard 1.5m; Customizable longest length of 30 m	
USB Interface		
Function	1, Communication Interface: to connect PC with gaussmeter host for monitoring the measurement; 2, Charging interface: Used to connect a 5VDC charger or mobile power supply	
Software/ Driver	With host computer software / Support LabVIEW™	
Analog Output (Only with hall probe)		
Linearity (DC)	±0.1%	
Function	Real-time output: these are high-level differential voltages proportional with the magnetic flux density	
Range	±5V	
Output Proportion	6 options (x1, x2, x4, x8, x16, x32)	
Frequency Response	See probe frequency response parameters	
Connection	BNC adapting cable for analog output	
Host Specification		
Operating Temperature	-20°C to +50°C	
Storage Temperature	- 25°C to +60°C	
Warm-up Time	Ready to use. Optimum performance after 5 minutes of warm-up	

Host Temperature Coefficient	<±10ppm/°C, the effect on accuracy is almost negligible in the operating temperature range
Ambient Magnetic Field	<1kG(0.1T)
Power Supply	5VDC; could be charged by a mobile power supply
Power Supply Interface	Type-C USB
Dimension (excl. Base)	281 mm W × 164 mm H × 26 mm D
Weight	1.52kg
Shell Material	Aviation Aluminum Alloy
Certification	CE Certification, EMC Certification

Probe Specification (Hall Probes)



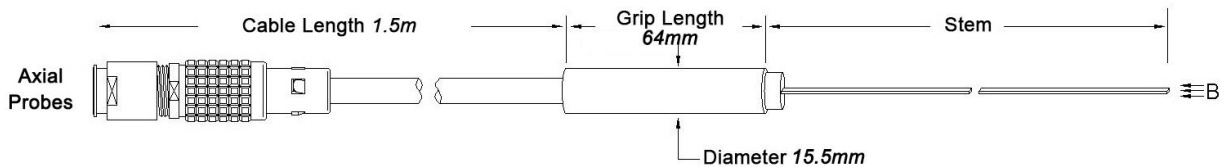
Model Gaussmeter G401's Hall Probes

Probe Model	Range	Resolution	Frequency Response	Stem dimension (mm)	Operating temp. (°C)	DC Accuracy (25°C)	Stem surface material
Transverse T08M150G401 T08M150G401T	100kG (10T)	0.01G (1μT)	DC-10kHz	80*2.2*1	-20 - +60	±0.04% Reading ± 0.01% FS	Metal (copper)
T08P150G401 T08P150G401T	100kG (10T)	0.01G (1μT)	DC-10kHz	80*2.5*1.3	-20 - +60	±0.04% Reading ± 0.01% FS	Plastic
T06U150G401 T06U150G401T	100kG (10T)	0.01G (1μT)	DC-1kHz	60*2.5*0.5	-20 - +60	±0.2% Reading ± 0.03% FS	Plastic
Axial A08M150G401 A08M150G401T	100kG (10T)	0.01G (1μT)	DC-1kHz	80*Φ6	-20 - +60	±0.1% Reading ± 0.01% FS	Metal (copper)
A04S150G401 A04S150G401T	100kG (10T)	0.01G (1μT)	DC-1kHz	60*2.2*1	-20 - +60	±0.2% Reading ± 0.03% FS	Metal (copper)

Note:

- 1, Option “T” : Temperature sensor contained Probe, has the function of temperature compensation, and the temperature coefficient is $<\pm 20\text{ppm}/^\circ\text{C}$;
- 2, Each probe’s fully calibrated measurement range: $\leq \pm 20\text{kG}(\pm 2\text{T})$.
- 3, Probe stem dimension, surface material, and probe cable length can be customized.

Probe Specification (Low-field Probes)



Model Gaussmeter G401's Low-field Probes

Probe Model	Range	Resolution	Frequency Response	Stem dimension (mm)	Operating temp. ($^\circ\text{C}$)	DC Accuracy (25°C)	Stem surface material
Axial A06L150G401 A06L150G401T	6G ($600\mu\text{T}$)	0.1mG (10nT)	DC	55*5*2.5	-20 - +60	$\pm 0.2\%$ Reading \pm 0.1% FS	Plastic

Note:

- 1, Option “T” : Temperature sensor contained Probe, has the function of temperature compensation, and the temperature coefficient is $<\pm 100\text{ppm}/^\circ\text{C}$;
- 2, Magnetic field unit conversion: $1\text{G} = 100\mu\text{T} = 100,000\text{nT}$.

Optional Accessories

Model	Descriptions
SAMRT PC Software	PC SOFTWARE for Gaussmeter
Probe Extension Cable	Cables are available in lengths to 30m.
ZC10	Zero chamber, provides up to 80 dB attenuation in fields up to 500 G and can be used with standard probes. Internal dimension of the Chamber: diameter 6.8mm x 44.5mm
PS-1W	Mobile power supply, and G401 can be powered via a USB interface to meet the needs of outdoor measurement of magnetic fields. Capacity: 10000mAh; Input: 100- 240VAC; Output: 5V/2A
GHOLD100	3-Direction Precision Movement Platform, is made of non-magnetic material. Users fixed the probe on the bracket front-end, and then manually rotate the knob so that the probe moves stably along the X, Y, Z-axis to a certain position and lock fixed. Maximum stroke of XYZ axis are 180mm, 180mm, and 280mm; positioning accuracy of 0.1mm; center load: 20kg; weight: 6.2kg

The most popular Package

Package Product No. G40101: Gaussmeter G401 + Probe T08M150G401

Description of Probe Type Selection

T	08	M	150	G401	T
PROBE TYPE	STEM LENGTH	PROBE STYLE	CABLE LENGTH	GAUSSMETER MODEL	TEMPERATURE COMPENSATED
A - AXIAL T - TRANSVERSE X - 2 AXIS Y - 3 AXIS	06 - 6 cm 08 - 8 cm 10 - 10 cm 25 - 25 cm ...	C – CRYOGENIC F – FLEXIBLE L – LOW FIELD M – METAL P – PLASTIC U – ULTRATHIN W – WIDE FIELD	150 – 150cm ...	G401 – G401 probe	T - YES BLANK - NO

Appendix: G401's Test Data

Through comparison method, the NMR Gaussmeter PT2026 and Gaussmeter G401 were used to measure the uniform magnetic field of different densities. The test data are as follow:

Item	Standard (G) PT2026 NMR Gaussmeter	Measured (G) COLIY MODEL G401	Accuracy of reading	Error(G)
1	1769.90	1770.18	-0.016%	-0.28
2	2531.57	2531.87	-0.012%	-0.30
3	3085.77	3085.88	-0.004%	-0.11
4	3665.51	3665.77	-0.007%	-0.26
5	4257.08	4257.41	-0.008%	-0.33
6	4857.42	4857.92	-0.010%	-0.50
7	7956.30	7957.60	-0.016%	-1.30
8	8478.90	8478.10	0.009%	0.80
9	9522.20	9521.20	0.011%	1.0
10	10754.70	10754.5	0.002%	0.20
11	12744.00	12744.1	-0.001%	-0.10
12	13810.00	13810.4	-0.003%	-0.40
13	14336.00	14336.9	-0.006%	-0.90
14	15362.70	15363.2	-0.003%	-0.50
15	16311.50	16312.0	-0.003%	-0.50
16	17056.30	17056.4	-0.001%	-0.10
17	18152.30	18152.4	-0.001%	-0.10
18	-1982.68	-1982.66	0.001%	0.02
19	-2594.66	-2594.86	-0.008%	-0.20
20	-3114.29	-3114.48	-0.006%	-0.19
21	-3689.74	-3689.85	-0.003%	-0.11
22	-4269.54	-4269.62	-0.002%	-0.08
23	-4862.46	-4862.23	0.005%	0.23
24	-7574.40	-7574.60	-0.003%	-0.20
25	-8752.40	-8752.80	-0.005%	-0.40
26	-9856.90	-9857.50	-0.006%	-0.60
27	-10357.70	-10358.5	-0.008%	-0.80
28	-11333.20	-11333.4	-0.002%	-0.20
29	-12765.50	-12765.9	-0.003%	-0.40
30	-13816.00	-13816.0	0.000%	0.00
31	-14564.30	-14564.0	0.002%	0.30
32	-15355.30	-15354.7	0.004%	0.60
33	-16164.00	-16163.5	0.003%	0.50
34	-17364.40	-17362.7	0.010%	1.70
35	-18150.10	-18147.5	0.014%	2.60

Note:

- 1, **Standard (G)** is the magnetic field measurement of PT2026 (basic accuracy of 5ppm);
- 2, **Measured (G)** is the magnetic field measurement of G401 (basic accuracy of 0.04%);
- 3, **Error (G)** is equal to **Standard (G)** minus **Measured (G)**;
- 4, **Accuracy of reading** is equal to **Error (G)** divided by **Standard (G)**.

