The User's Manual of

DX-1205F Gaussmeter

1. Introduction

1.1 The pictures of DX-1205F Gaussmeter

1.2 Product introduction

Thank you for purchasing the DX-1205F digital Gaussian meter. Please read this user manual carefully before putting the device into use. Due to continuous improvement of the product, some contents in this user manual may differ from the actual situation of the product. Any changes are subject to change without prior notice.

The DX-1205F digital Gaussian meter is an optional automated interface magnetic detection device mainly used to measure the size and polarity of the surface magnetic field of permanent magnet material samples, as well as static magnetic characteristic parameters such as magnetic flux density at a certain point in space.

DX-1205F digital Gaussian meter is a multifunctional, portable, and high-precision magnetic parameter

measurement instrument. Equipped with high sensitivity and low drift Hall sensors, and applying advanced digital signal processing technology. It is very suitable for field measurement of surface magnetic field of permanent magnetic materials, surface remanence of Machine element, DC constant magnetic field, magnetic separator or separator. It can be widely used in magnetic material production and application units, measurement and testing institutions, mechanical manufacturing enterprises, university research units, etc. The Test automation scheme is provided to facilitate the resolution of surface magnetic size and polarity of the user's pipeline test samples, and can interface with the user on the site to implement specific sorting functions, reducing the user's trouble in manual sorting

DX-1205F Gaussmeter is a desktop Gaussmeter designed and manufactured using high stability constant current source circuit technology, based on the new development of Hall effect magnetic field intensity measurement instruments. The testing probe adopts an imported GaAs linear Hall chip, with very small differences between probes. Users can directly replace them if damaged, making it an ideal DC magnetic field testing instrument.
Equipment features:

● It has the function of automatically determining the N/S polarity of the magnetic field (positive numbers are N poles, negative numbers are S poles);
● One click range switching capability;
Equipped with one click reset function, no need to manually adjust zero drift;
● Equipped with peak automatic maintenance function;
● Equipped with automatic prompts for exceeding upper and lower limits;

Equipped with standard USB interface and optional software to form an automatic measurement system;

Equipped with standard automated solder free docking male and female interfaces, optional with corresponding sample fixtures to form an automatic measurement device;

Standard transverse probe, optional longitudinal probe and non-standard probe;

※ Operation warning
- The operator should carefully read this manual and fully understand its content before operating the machine;
- The placement, operation, and maintenance of the machine should be completed by a dedicated person in accordance with the instructions in this manual;

1.3 Parameters

Input Power	AC 200~240V 50/60Hz 1A
Display mode	TFT true color LCD screen with six position display
Dimension	307mmx260mmx120mm
Weight	Approx 3.5kg
Usage condition	Temperature: 0 ℃ -50 ℃; Humidity: 40% RH~85% RH
Thermal equilibrium time	10 mins
Test frequency	DC
Range	±1000Gs/±3000Gs/±10000Gs /±30000GS①
Unit	Gs、mT、Oe、kA/m One click switching
Special function	Automatic one click zero adjustment, non-linear correction
Sorting function	You can manually set the upper and lower limit sorting parameters, and the device will automatically prompt in red and green when NG/OK
Accuracy	±(0.45%RD②+100μT)
Temperature coefficient	-0.06%/℃
Min.resolution	0.01Gs
Peak functions	With peak holding function. Two modes: 1. Test Peak Mode; 2. Peak Hold. The product can lock in very low magnetic field peaks (0.1Gs -- 30000Gs)
Probe sensor area	0.3mm×0.3mm
Probe types	Standard configuration: transverse probe; Optional: Longitudinal probe, non-standard customized probe
Probe connector	Standard 15 core DB male plug
Software communication interface	B type USB interface
Automation interface	Solder free plug-in interface (optional)
Digital Output	RS232C interface (optional); USB interface
Analog Output	Full scale corresponding to ± 10V, solderless plug-in interface
Software	Windows XP, Windows 7, and Windows 10 32/64-bit operating systems can be used; The measurement data is saved in text format on the hard drive and can be viewed at any time using office software (any version of Excel, Word, or Notepad can view this data file)）
① The actual calibration only covers 2.5T; ② RD is the reading value; Note: Due to the continuous upgrading and transformation of the product, if there are any changes to this technical indicator, the actual contract shall prevail	

2. Introduction of Hardware

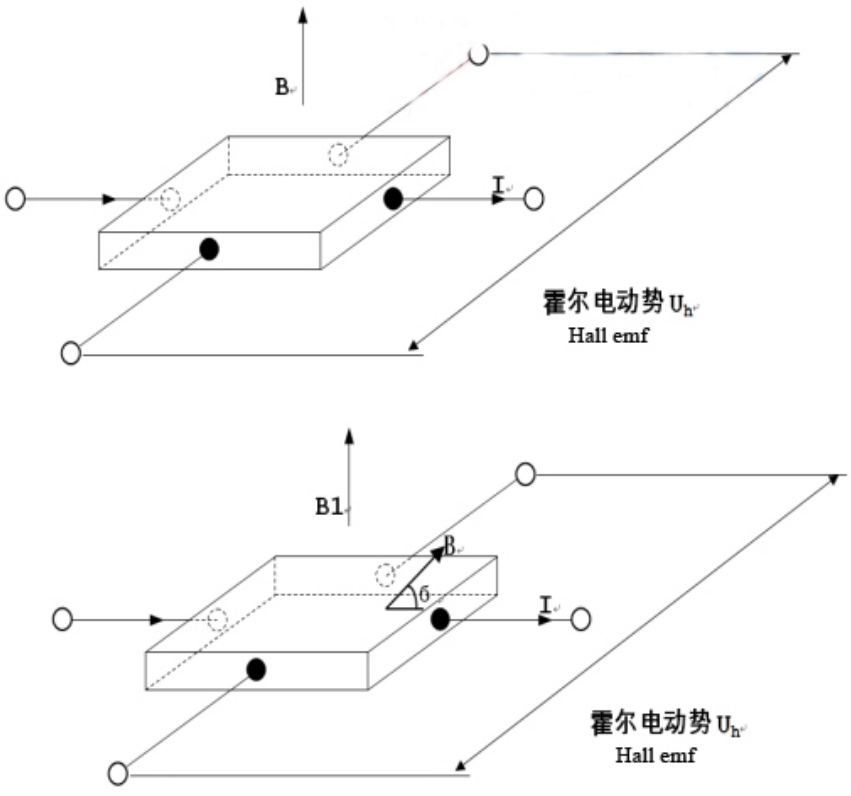
2.1 Test principle

When a semiconductor carrying current is in a magnetic field perpendicular to the current direction, the semiconductor will produce a transverse magnetic field List of electrical phenomena. The Hall effect refers to the generation of electromotive force in the direction perpendicular to the magnetic field and current. The Hall effect can be explained by classical electromagnetic theory. The Hall electromotive force is usually expressed as: Uh=Rh × I × B

Rh is the Hall coefficient, I is the current, and B is the vector of the measured Magnetic flux density perpendicular to the current direction. If the measured magnetic field is perpendicular to the Hall chip test surface, then the magnetic field displayed by the test is consistent with the measured magnetic field value; When the measured magnetic field is not perpendicular to the direction of the current (the angle between the Hall chip test surface and the actual measured magnetic field) б， At this point, the magnetic field B1 displayed in the test is equal to the measured magnetic field B × Sin б)。

Therefore, for a specific Hall device, as long as the current I passing through is constant, the magnetic field B can be indirectly measured through the Hall electromotive force of the Hall device.

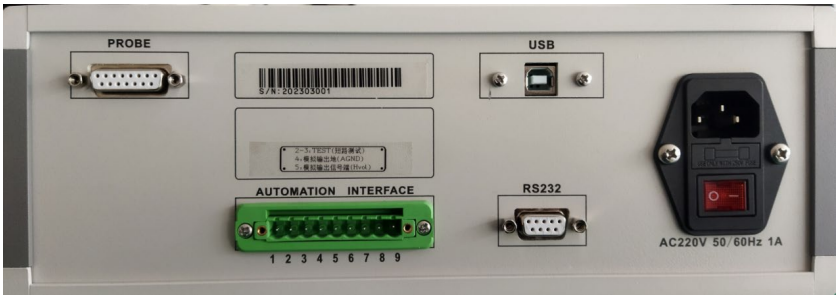
The testing principle diagram is as follows:



2.2 The functions on the panel

Front panel:

Back panel:



The RS232 definition of DX-1205F is as follows:

Baud: 115200

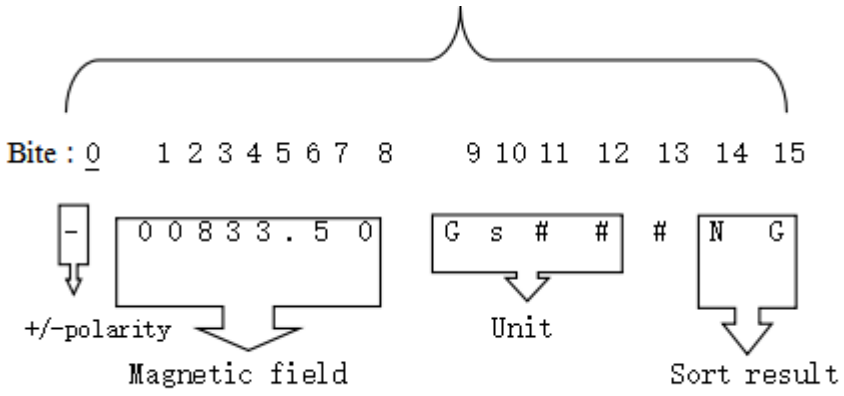
Data bits: 8 bits

Stop bit: 1 bit

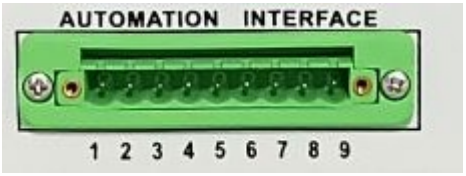
Check digit: None

Units: There are four types of output data units, namely Gs (Gaussian), mT (Millimeter), Oe (Oster), and kA/m (Kiloampere per meter)

The data format (16 characters) is shown in the following figure:



The commonly used commands are as follows:
1. Send magnetic field test command (wait for receiving and sending magnetic field test data after sending): @ 2T#
2. Command to read real-time magnetic field value (unit: 0.01Gs): @ 3R#
Definition of output automation interface for DX-1205F (a total of 9 pins):



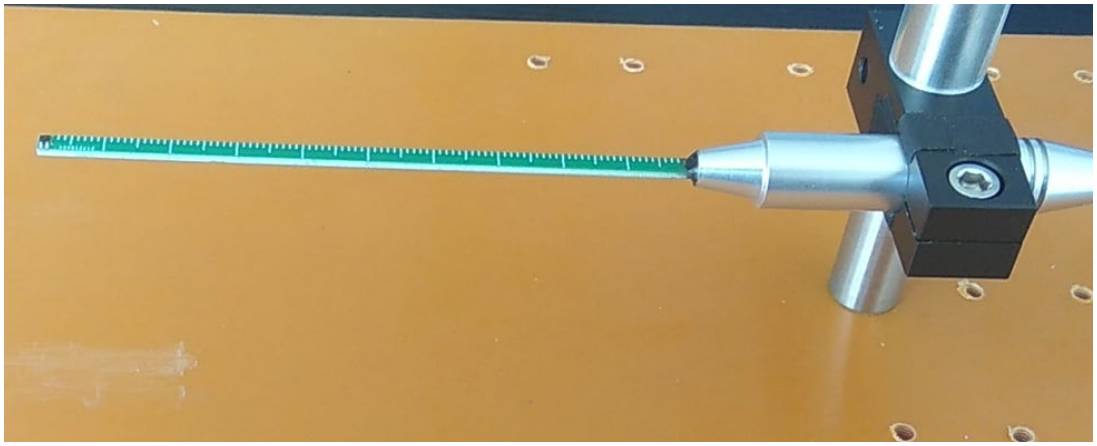
1. 6: NC (empty pin)
2-3: Test (switch input signal, test and sort after short circuit of pin 2 and pin 3, and the short circuit time is recommended not to exceed 1 second)
4: AGND (analog output signal ground)
5: Hvol (analog output signal terminal): Analog signal amplitude corresponds to ± 10V on full scale
Note: First gear: ± 1000Gs corresponds to ± 10V Second gear: ± 3000Gs corresponds to ± 10V
Third gear: ± 10000Gs corresponds to ± 10V Fourth gear: ± 30000Gs corresponds to ± 10V
The sorting relay signals of pins 7, 8, and 9 are optional functions
7-8: OK (When all sorted data is qualified, the relay signals of pins 7 and 8 will close the path)
8: COM (relay common terminal)
8-9: NG (When any of the sorted data is unqualified, the relay signals of pins 8 and 9 will close the path)

Definition of RS232 interface pins for the output serial port of DX-1205F (a total of 9 pins):

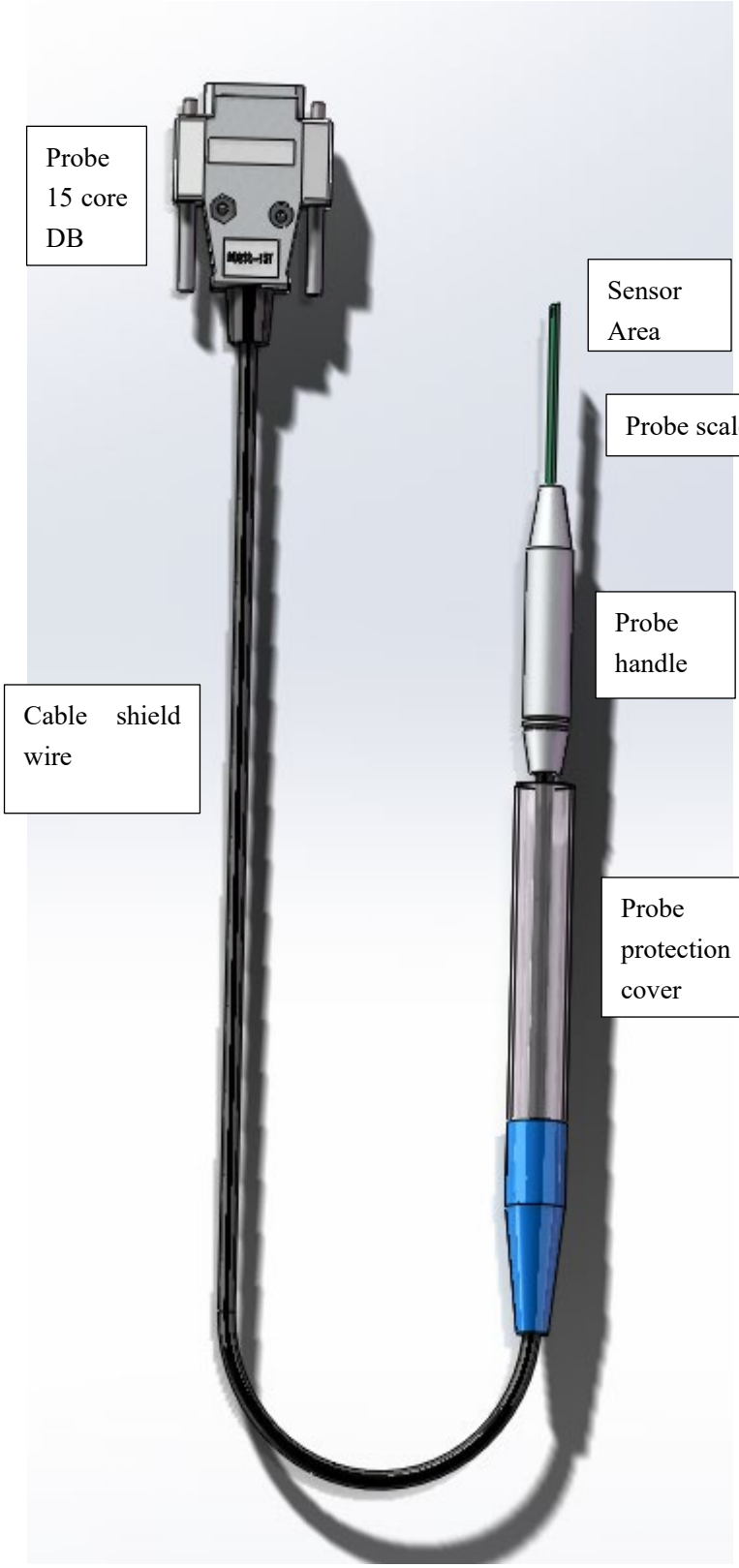
1. 4, 6, 7, 8, 9: NC (empty PIN)
2: RXD (RS232 level) 3: TXD (RS232 level) 5: GND

2.3 Probe introduction

DX-1205F standard configuration with transverse Hall probe.
The probe is composed of the sensing end, scale PCB board, probe handle, cable shielding wire, DB15 core connector, and acrylic sheath.
The sensing end of the probe is encapsulated with a Hall sensor, which is very fragile and fragile. The tip thickness after packaging is 1.7mm and the width is 3.5mm.
The probe handle is the part where the operator holds the probe, and users can use a fixed device to hold the handle to ensure more stable measurement data.



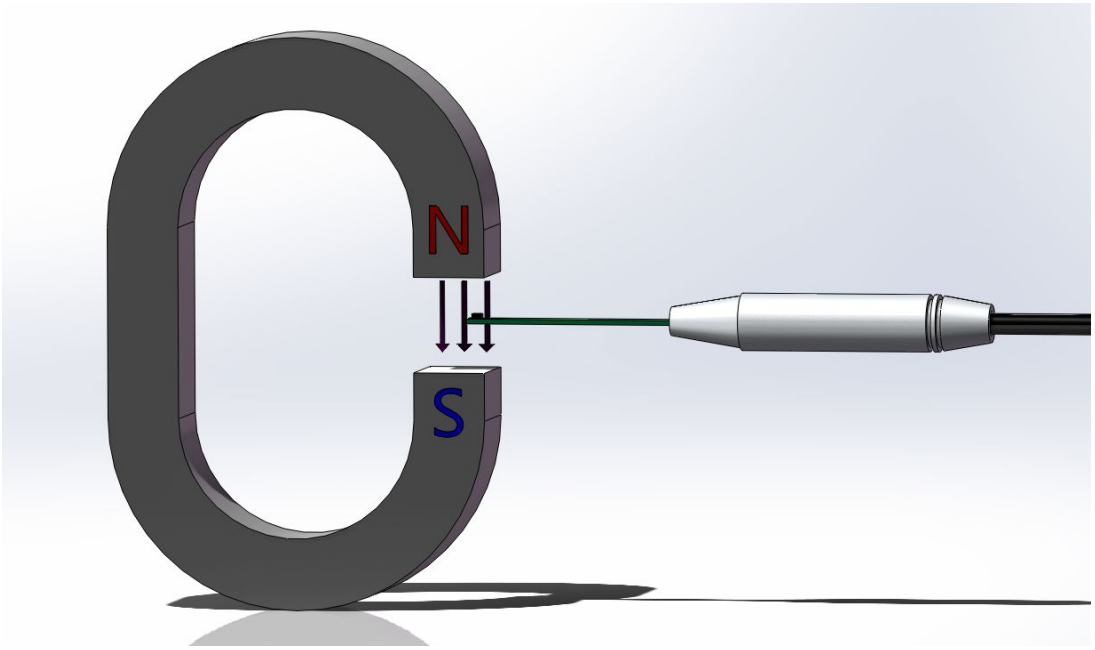
The cable shield wire connects the probe to the probe plug (15 core DB connector), with a length of 1.5m. The connector is DB15 core, connected to the probe socket on the DC-1205F rear panel.
The acrylic protective shell is used to protect the sensing end of the probe and the scale PCB board. The probe can extend the cable from the protective casing during measurement, and after the measurement is completed, extend the cable back into the protective casing for protection



Add: Unit 409, No.992, Anling Road, Huli Dist, Xiamen, China, Zip code: 361012
Tel: 86-592-5237772 Email: info@dexinmag.com

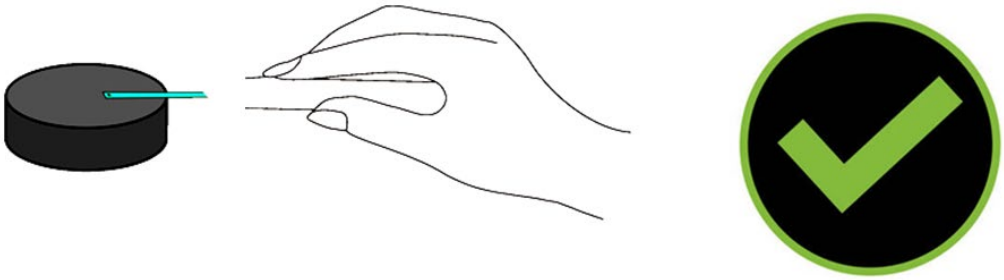
2.4 Introduction for probe testing polarity and testing methods

Standard horizontal Hall probe: When the magnetic field line enters the Hall sensor from the sensing end sealing side of the probe, the DX-1205F reading shows a symbol of+or N, and vice versa, the symbol is - or S.



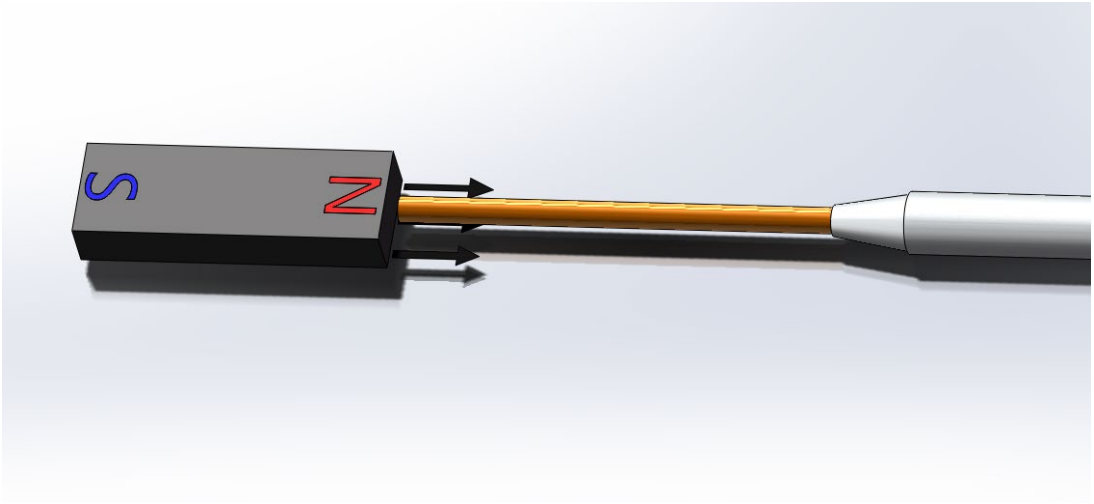
Place the convex side of the probe (i.e. the side with the chip sealing side) horizontally on the surface of the tested magnet or the magnetic field measurement point to measure the surface magnetism of the magnet.

The correct measurement method is shown in the following figure: (The test surface of the probe chip is basically parallel to the surface of the sample, and the magnetic field line is perpendicular to the surface of the test chip at this time)

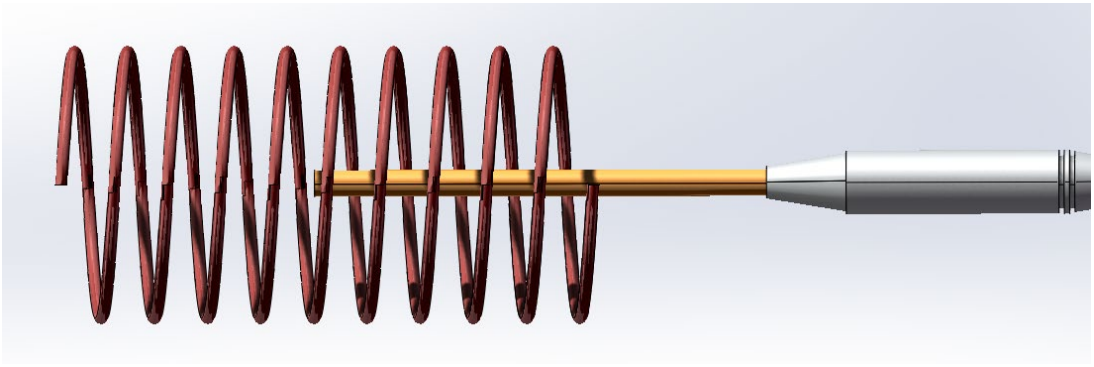


The following figure shows the incorrect measurement method: (The test surface of the probe chip is not parallel to the surface of the sample, and the magnetic field line is not perpendicular to the surface of the test chip, resulting in a smaller test value)

Longitudinal Hall probe: When the magnetic field line enters the Hall sensor from the sensing end of the probe, the DSG-510 reading shows a symbol of+or N, and vice versa, the symbol is - or S



Schematic diagram of longitudinal Hall probe testing solenoid magnetic field: Place the longitudinal probe in the central area of the solenoid and perpendicular to the magnetic field line



Add: Unit 409, No.992, Anling Road, Huli Dist, Xiamen, China, Zip code: 361012
Tel: 86-592-5237772 Email: info@dexinmag.com

2.5 The operation of keyboard

2.5.1 Zero Key

2.5.1.1 Clear the current displayed value to make comparison measurement, and compare the magnetic field data between other Test point and this state (virtual reference zero)

2.5.1.2 Place the sensing end of the probe into a zero Gaussian cavity (or other non magnetic environment) and press the Zero key to reset the device's magnetic field display.

2.5.1.3 Clear or reset the locked peak in Peak Mode, Peak Hold (peak lock cannot be cleared)

2.5.2 Unit Key

Select the button to display the reading unit. Press the Unit key continuously to directly select and switch between units such as Gs (Gauss), mT (millitesla), Oe (Oster), kA/m (kiloamperes per meter), etc. After restarting, the initial unit is Gs (Gauss)

2.5.3 Peak key

Turn on/off the Max/Min holding function and set the holding method.

Continuously pressing the Peak key allows for direct switching between Peak Mode, Peak Hold mode, and normal test mode.

2.5.3.1 Peak Mode: It can display the positive and negative peaks of the test separately at the same time

2.5.3.2 Peak Hold: Locks the currently displayed peak value

2.5.4 Range key

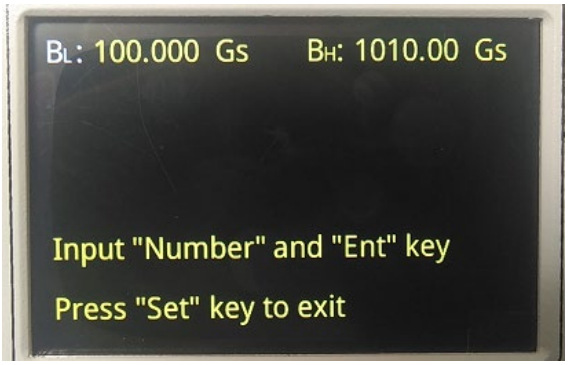
Press the button to select the magnetic field range. Press the Range key continuously to directly switch between the four gear ranges of 1000Gs/3000Gs/10000Gs/30000GS. The value of the range is displayed in the lower left corner of the LCD screen, and the unit of the range changes in real-time with the unit set by the device.

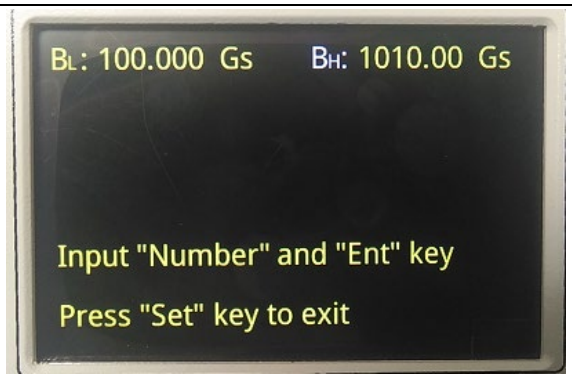
2.5.5 ESC key

Button to cancel remote alarm

2.5.6 Set key

The button for setting the upper and lower limits of the alarm. Press Set key to enter the upper and lower limit setting menu, and BL value and BH value will appear on the screen: there is an English prompt at the bottom of the screen: enter the corresponding value through the number key, switch and confirm the input status of the upper/lower limit through the Enter key, and press Set key to save and exit. (Input "Number" and "Ent" key Press "Set" key to exit)





B_L: lower limit set value: when it is displayed in white, it can be modified by number keys, and the upper and lower limit input status can be switched by Ent key. When the test data is lower than the lower limit set value, press Ent key in the test display Home screen to display NG unqualified, and the display time is about 3 seconds.

B_H: Upper limit set value: when it is displayed in white, it can be modified by number keys, and the upper and lower limit input status can be switched by Ent key. When the test data is higher than the upper limit set value, press Ent key in the test display Home screen to display NG unqualified, and the display time is about 3 seconds.

OK: When the value displayed on the Home screen is greater than the lower limit setting value and less than the upper limit setting value, green OK is displayed, and the display time is about 3 seconds.

2.5.7 Up and Down Key

Select the button for refreshing the magnetic field display. Press the Up/Down keys consecutively to switch between the five refresh speeds SUPER SLOW/SLOW/MED/FAST/SUPER FAST. When switching, the corresponding letter will flash in the upper right corner of the device's LCD screen, and the display time is about 1 second

SUPER SLOW

SLOW

MED

FAST

SUPER FAST

2.5.8 Ent key

Enter key, also called confirmation key

2.5.8.1 Sort and confirm the current results of the test (OK and NG prompt require this button to confirm)

2.5.8.2 Confirm and switch the set upper and lower limit values (B_L and B_H values need to be confirmed by clicking this button)

2.6 USB interface introduction

2.6.1 USB interface

The DX-1205F digital Gaussian meter provides a USB interface and is connected to the computer using the included USB A-B cable. Users only need to install the corresponding USB driver to communicate with DX-1205F. Please refer to the software function introduction in the following chapter for specific installation methods.

2.6.2 USB communication format and response mechanism (this function is optional)

DX-1205F can communicate using USB2.0, and the communication functions have been fully defined. Users only need simple commands to communicate directly with the device, greatly reducing the workload of R&D personnel in developing code. Most of the time, only relevant functions need to be called

2.6.3. USB interface command set (this function is optional)

//Communication function

/**********

**Function name: CreateDevice

**Function Function: Create Hardware Handle

**Input parameter: DeviceID: Device ID number

**Output parameter: None

**Function return: Successfully created returns hardware handle (greater than 0), failed returns -1

**********/

Static public int CreateDevice (int DeviceID)

//Communication function

/**********

**Function name: CloseDevice

**Function function: Turn off the device

**Input parameter: hDevice: Device handle

**Output parameter: None

**Function returns: success returns 1, failure returns -1

**********/

Static public int CloseDevice (int hDevice)

//Read Function

/**********

**Function name: GetBval

**Function function: Read the real-time magnetic field value of the device

**Input parameter: hDevice: Device handle

**WaitTime: waiting timeout, in ms

**Output parameter: pValue: Device real-time magnetic field value storage address (int integer, unit: 0.01G)

**Function returns: success returns 1, failure returns -1

**********/

Static public int GetBval (int hDevice, int [] pValue, int WaitTime)