TESLAMETER
OPERATION MANUAL

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MN-0501-E
V1

1. Safety Guidance

Safety notice
The power supply of this instrument is 3 AA batteries, please do not use other types of batteries, otherwise the instrument may be damaged. After inserting the battery, close the battery cover. If you find the battery leaks, do not put the battery in the battery compartment. If you don't use the instrument for a longtime, please remove the battery to prevent the occurrence of the damage caused by battery leakage.

Operation environment
Please keep the surface of the instrument clean and dry. Do not use the instrument near explosive, gas, steam or dust to avoid explosion. Do not use or store in a humid or strong electromagnetic interference environment, otherwise it may cause damage to this instrument or deviation of measured data.

Correct operation
Please follow the steps in this manual during operation, otherwise it may cause deviation of measured data. The sample to be tested should meet the test range of the instrument, otherwise it may cause deviation of the measured data. Please select the correct function and set the test conditions according to the specific measurement requirements of the sample.

Caution:
The probe is a vulnerable part and NOT covered by warranty. Improper use may cause irreparable damage to the probe.

For Teslameter 0501-MA01 using an optional probe, measuring accuracy maybe downgraded.

2. Overview

2.1 Description
The 0501 series teslameter is a portable, multi-functional magnetic field measuring instrument, equipped with a high-sensitivity, low-drift Hall sensor, and applied advanced digital signal processing technology, suitable for measuring the surface magnetic field of permanent magnetic materials and the remanence of material parts, DC constant magnetic field, magnetic separator or ironremover, etc. It can be used as a basic magnetic parameter measuring instrument for magnetic material manufacturers and application units, machine manufacturing enterprises, university scientific research units, etc..

2.2 Functional features
* Magnetic field measurement: up to 2000mT, automatic range switching, measurement accuracy level can be selected from 1 and 5.
* Magnetic field polarity display: directly display the N/S magnetism of the measured magnetic field.
* One-key unit switching: The unit can be set as mT (millitesla) and G (gauss), 1mT=10G
* Maximum value retention: it is convenient to record the maximum magnetic field value when the magnetic field changes rapidly.
* One-key zero function: the influence of zero drift can be eliminated before measurement.
* Built-in USB communication interface, convenient for data transmission or connecting to sampling system.
* Small size, light weight, low power consumption, and it's very suitable for on-site measurement.
* The standard accessory includes a radial Hall probe, and the axial Hall probe is an optional accessory for different measurement conditions.
* Zero drift calibration (Optional) : The zero drift of the instrument can be calibrated with a special magnetic shielding cavity (optional accessory).

2.3 Main Technical Specifications

Range		200mT	2000mT
Resolution		0.01mT	0.1mT
Measurement accuracy	0501-MA01	±1%	
	0501-MA05	≤1000mT: ±2% 1000mT~2000mT: ±5%	

2.4 General Technical Specifications

Working environment: 0°C~45°C, 20%-80% R· H, no condensation.
Storage environment: -20°C~70°C,<85% R·H, no condensation.
Instrument dimension: 160x90x40mm
Weight: about 350g.
Power supply: 3 AA batteries or mini-USB cable power supply.
Communication interface: Hall probe input interface, USB interface.

2.5 Key function

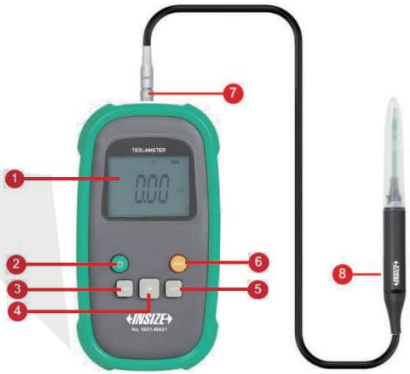

Fig 2.1 Front panel diagram

No.	Name	Description
1	Screen	Display magnetic field value, polarity, unit, battery level and etc.
2	ON/OFF	Power on / off
3	Maximum hold	Press this key to keep displaying the maximum magnetic field value, and press it again to cancel. Press the 'RANGE' and ' ☀ ' keys at the same time to enable or cancel the automatic shutdown function of the device. When the display is ON, the device will automatically shut down after 5 minutes of inactivity
4	Backlight	Turn backlight feature on and off
5	Unit switching	Switch between mT and G
6	Zeroing	In the non-magnetic state, reset the value of the instrument to zero
7	Probe interface	Connect the Hall probe.
8	Radial Hall probe	Place the probe vertically close to the surface of the sample to be tested and keep the correct direction for measurement

2.6 Display function

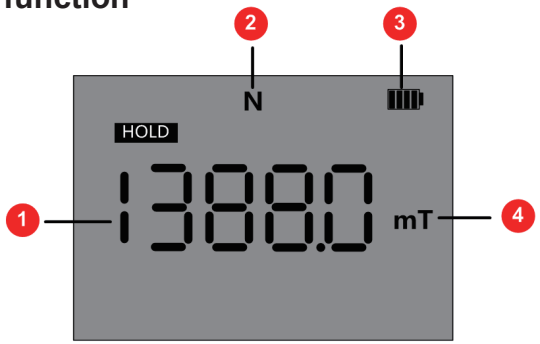

Fig 2.2 LCD Display

No.	Name	Description
1	Display value	Display the measured magnetic field value. If you press the 'HOLD' key, the HOLD mark is displayed on the upper left corner of the value, and the maximum measured value will be held at this time; press the 'HOLD' key again to cancel the hold function. When the Hall probe is inserted, the buzzer prompts 2 beeps and displays the value normally, when the Hall probe is pulled out, the buzzer prompts 2 beeps and displays '---'.
		The instrument has automatic range switching function. When the measured value is ≤200mT, the range is 200mT; when the measured value >240mT, the range is 2000mT; when 200mT< the measured value ≤240mT, the range remains unchanged.
2	Polarity	The screen shows 'N' when the direction of the magnetic field passes through the 'TEST' surface of the Hall sensor.
3	Battery indicator	If the buzzer prompts 3 times when the machine is turned on, or the buzzer prompts 3 times during use, and the battery power icon flashes, please replace the battery in time. If there is no action for 5 minutes, the instrument will automatically shut down
4	Unit	Display the current magnetic field unit, mT [millitesla] or G [Gauss] you can press the 'UNIT' key to switch, 1 mT= 10 G

3. Instrument Operation

3.1 Install the battery

Fig 3.1 Schematic diagram of battery installation

CAUTION

To avoid false readings, the battery should be replaced immediately when the battery icon is not displayed in the upper right corner of the screen.

Steps to replace the battery:

* Turn the screw of the battery door counterclockwise with a Phillips screwdriver to remove the battery cover.
* Remove the used AA batteries and place the new batteries into the battery compartment.
* Close the battery cover and twist the screw, the battery level will be displayed in the upper right corner of the screen after power on.
* The device can always work online when connected to the power supply with an optional mini-USB cable.
* The charger must meet the GB/T 17626.5-2019 electromagnetic compatibility test and measurement techniques surge (impact) immunity test standard.

3.2 Install the probe

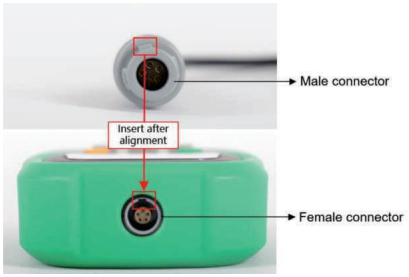

Fig 3.2 Probe connection diagram

Fig 3.3 Schematic diagram of the force position when the probe is pulled out

CAUTION

Precautions for replacing the probe:

When inserting the male connector of the probe into the female connector on the top of the teslameter, make sure that the convex point of the probe female connector matches the groove of the teslameter male connector as shown in Figure 3.2.

* When removing the probe, pinch the position shown in Figure 3.3 and pull out the probe female connector.

* For Teslameter 0501-MA01 using an optional probe, measuring accuracy maybe downgraded.

3.3 Basic measurement steps

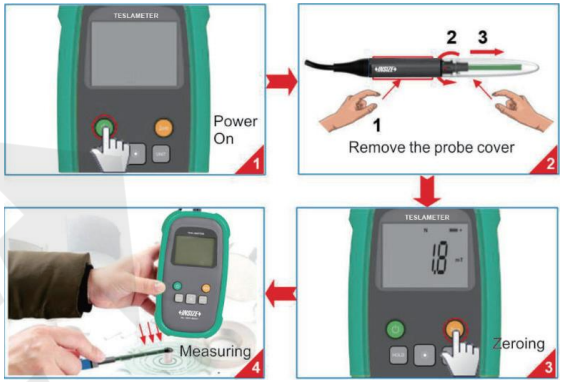

Fig 3.4 Schematic diagram of basic measurement steps

No.	Step	Description
1	Power on	Press the power switch button, start to warm up for 3 minutes.
2	Remove the probe cover	As shown in the second step of the above figure (see 3.4.1 for details) 1. Pinch the probe handle inside the red frame with one hand and the probe cover with the other hand; 2. Rotate the probe cover in the direction shown in the figure (or the direction marked on the probe cover); 3. When rotating to the point where it cannot be rotated, pull out the probe cover to remove it
3	Zeroing	Move the probe away from the magnetic field (or put it in the magnetic shielding cavity), observe the screen to see if the display is 0.0mT. If it is not 0.0mT, press 'ZERO' to reset.
4	Measuring	Place the probe in the magnetic field to be measure and close to the sample surface (make the direction of the magnetic field perpendicular to the TEST surface of the Hall probe), and read the magnetic induction value after the value is stable, see 3.4.3 for details. If you want to measure the maximum value, press the 'HOLD' button to automatically hold the maximum value.

3.4 Precaution for using Hall Probe

3.4.1 Remove /install the probe cover

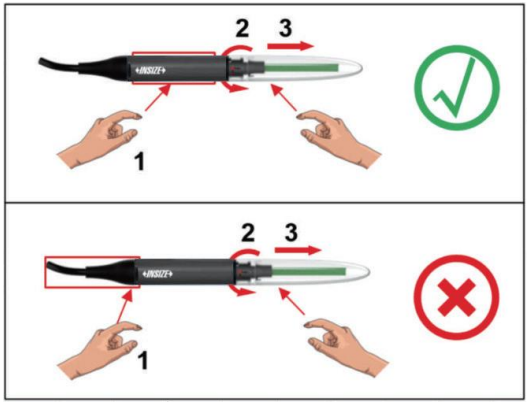

Fig 3.5 Precaution when removing the probe cover

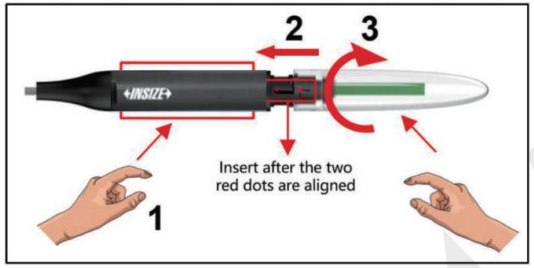

Fig 3.6 Install the probe cover

CAUTION

Precautions when removing or installing the probe cover:
Take off the probe cover as shown in the second step in '3.3 Basic Measurement Procedures'.
When pulling out the probe cover, do not pinch the position as shown in Figure 3.5.

As shown in Figure 3.6, the steps to install the probe cover are:
1. Pinch the handle position in the red box with one hand and hold the probe cover with the other hand.
2. The red dot on the probe cover should be aligned with the red dot on the probe before inserting.
3. Then rotate the probe cover in the direction as shown in the figure and stop turning when there is a snapping sound, The probe cover has been installed properly.

3.4.2 The difference between radial / axial probe

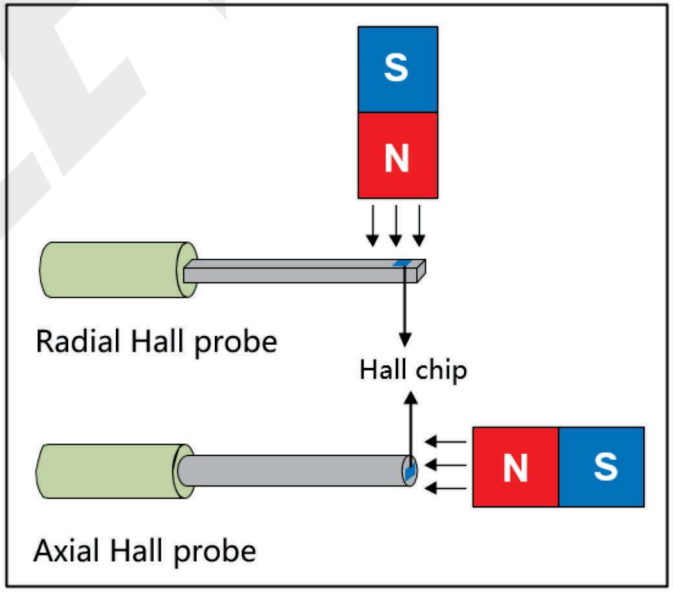

Fig 3.7 The difference between radial / axial probe

3.4.3 Selection of probe measurement location

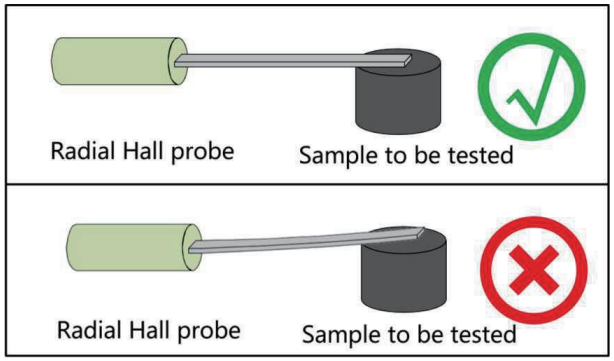

Fig 3.8 Notes on the use of radial Hall probe

Fig 3.9 Schematic diagram of radial Hall probe

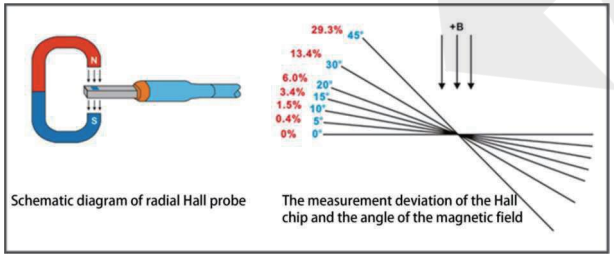

Fig 3.10 Schematic diagram of radial Hall probe measuring magnetic field

CAUTION

Precautions for using Hall probe:

* When measuring permanent magnets, the Hall sensor should be placed as close to the surface of the sample as possible. The farther away from the sample surface, the magnetic field will attenuate more and the smaller value will be measured, as shown in figure 3.8 above.

* When the Hall chip is close to the sample surface, DO NOT press with force, otherwise it may be damaged, as shown in Figure 3.8 below.

* The Hall chip is marked with TEST on the side that faces the sample during measurement; the other side is marked with a scale, which is convenient for comparing distances during operation, as shown in Figure 3.9.

* When measuring the magnetic field, make sure to keep the Hall chip plane perpendicular to the magnetic field, if the magnetic field is not perpendicular tot he sensor, measurement errors will be introduced, as shown in the figure of Figure 3.10, even if it deviates by 5°, a measurement error of 0.4% will occur.

3.5 Magnetic shielding cavity (optional)

Fig 3.11 Magnetic shielding cavity

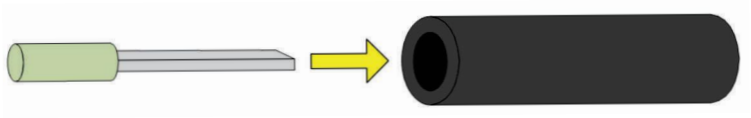

Fig 3.12 Instruction of using the magnetic shielding cavity

* Small size and light weight (about 1 kg), easy to carry.
* The cavity is made of high-permeability shielding material, which can fully eliminate the influence of geomagnetic filed.
* The magnetic field inside the cavity is less than 10^{-6} T, which can be regarded as zero magnetic field.
* The device is suitable for calibrating zero drift of the teslameter.

4. Troubleshooting

Description	Solution
Can't turn on the meter	Please check whether there are batteries in the batterty compartment or whether the batteries are sufficient.
Automatically shut down after using	The meter will automatically shut down after 5 minutes without operation when the auto power-off function is enabled. If the meter shuts down within 5 minutes, the batteries may be insufficient, please replace with new batteries.
Reading keeps changing radomly	Please check whether the probe is inserted tightly