

1. Introduction

1.1 Features: CTS24 Digital Tesla meter is one of our products series after CTS3, it has a unique selection system, a large measurement range, an interchangeable probe. It is composed of meter and probe (also called Hall sensor) and is one of the widely used tools in the field of magnetism measurement. The arithmetic amplifier is used in the meter's circuit, especially the amplifier's circuit adopts integrated arithmetic amplifier IC7650 that holds the characteristics of high-plus and low-floating. The meter possesses pretty appearance, light weight and is equipped with a LED display and operated conveniently.

1.2 Application

CTS24 Hall effect Tesla meter is a novel and widespread measurement instrument allowing customers to measure the surface magnetism and DC magnetic field. The accuracy is $\pm 1\%$. For bulk magnetic material, customers can use its fast separating system to select. The meter is one of the widely used tools in the field of magnetism measurement.

1.3 Main Technical specifications

Range: 0~0.1T~1T~10T

Basic error: $\pm(0.5\%$ of reading, $\pm 0.5\%$ of full scale)(10T is for reference, not for check)

Resolution: 10-4T

Zero floating: < 3 within 30 minutes

Ambient Temperature: 5~40°C

Relative Humidity: 20%~80%(no condensation)

Power Supply: 220V $\pm 10\%$ 50Hz $\pm 3\%$

Overall Dimension: 230mmX291mmX70mm

Voltage: 1.5KV

Weight: 2KG

Display: 3 1/2 LED

The probe of the meter is interchangeable and the meter itself has the function of separating selection.

2. Working principle

2.1 Principle

CTS24 Digital Tesla is designed according to the principle of Hall effect. When a constant current is forced through the magnetic material, a positive proportion of Hall voltage will be occurred, on this principle, the measurement of the magnetic field can be done.

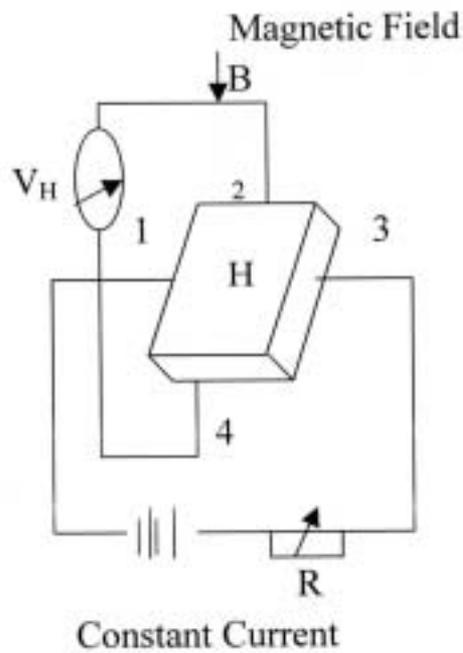
Hall voltage $V_H = S_H \times I \times B \times \sin$

S_H : sensitivity of Hall element (mV/mA x T)

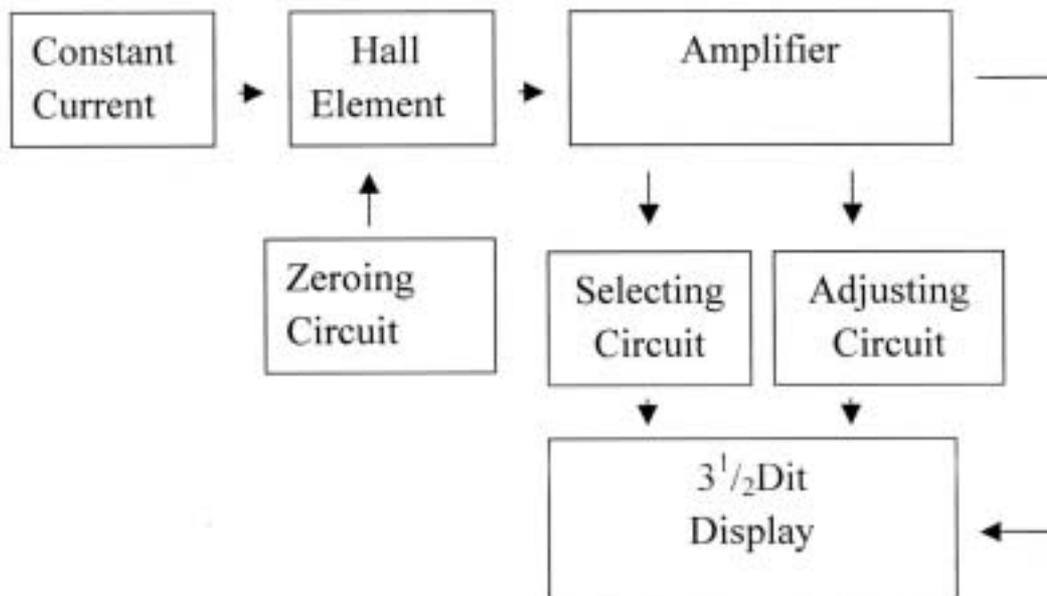
I : Current at control end (mA)

B : Magnet Field (T)

The angle between element and magnetic field, when it is upright $\sin 90 = 1$



2.2 The frame chart of the working principle of digital Tesla meter:



When Hall element H is placed in the magnetic induction field with intensity B and connect a constant current I through end 1 and 3, then a voltage V_H would be occurred between end 2 and 4, after amplified by the arithmetic amplifier, it outputs to the display and the relevant readings of magnetic field intensity will be displayed on the LED.

3. Operating Instructions

3.1 Description: All of the switches of CTS24 are on the surface.

Power Switch—Press down the switch to turn on the meter

Range Selector---Total Three shifts:0. 1T, 1T and 10T

The max range of 0.1T shift is 0.2T(1999)

The max range of 1T shift is 2T(1999)

The max range of 10T shift is 20T(1999)

Adjust Switch---Press this switch to adjust the Hall Probe's constant value.

Hall Probe Connector---connect the meter to the Hall Probe.

Zeroing knob ---It is composed of Coarse knob and Fine knob, first turn the coarse knob and then the Fine knob to till the display indicates zero.

Select knob---When turning the knob till the meter display 1000, if the field intensity is smaller than 0.1T, the indicator light is off; if the field intensity measured is larger than 0.1T, the indicator light is on.

3.2 Operating Procedures

- 1) Connect the meter to the power supply, then connect the probe to the meter.
- 2) Press down the Power Switch to turn on the meter and ± 000 should appear on the display, if not, adjust the Zeroing Knob.
- 3) Selecting the Rang Selector according the intensity of the magnetic field measured, 0.1T shift should be the basic range. Press down the 0.1T shift, and ± 000 should appear on the display, if not, adjust the Zeroing Knob.
- 4) Press down the Adjust Switch, then adjusts the Adjust knob to display the constant value of the probe.
- 5) Warm up the meter for thirty minutes and meanwhile adjust the Zeroing Knob to keep the display always indicating ± 000
- 6) Take off the protection of the probe and lightly put the Hall Probe in the magnetic field to be measured, the readings on the display are the intensity of the magnetism measured.
- 7) Every time the range is shifted, the Hall probe should be taken away from magnetic field and readjust to zero.
- 8) If want to select the magnetic field, Press down the Select switch, adjust the Select knob to display ± 000 . If the magnetic field intensity measured exceeds the value you just selected, the indicator light will be on.

3.3 The readings of CTS24 Hall effect Digital Tesla meter:

(1) Measure in 10T Range

Readings displayed	Intensity of field measured
000	0T
010	0.1T(1×10^3 Gs)
100	1T(1×10^4 Gs)
1000	10T(1×10^5 Gs)

(2) Measure in 1T Range

Readings displayed	Intensity of field measured
000	0T
100	0.1T(1×10^3 Gs)
1000	1T(1×10^4 Gs)

(3) Measure in 0.1T Range

Readings displayed	Intensity of field measured
000	0T
100	0.01T(1×10^2 Gs)
1000	0.1T(1×10^3 Gs)

4.Maintenance and Cautions:

The warranty period of this instrument is 18 months. For any damages, malfunctions that not caused by customer's misuse during the warranty period, the manufacturer is responsible to repair, replace or change.

- 1) Care must be taken when use the Hall probe of the meter, the protection jacket of Hall probe is taken off always when it is used because it is a very fragile element.
 - 2) If no display after connection to the power supply and turning on, please check the fuse; If ruined, please change it, or else treat it as it is out of order.
 - 3) Avoid using the meter out of the specified environment.
 - 4) Avoid falling down or putting it near strong disturbing during the operation.
 - 5) Hall probe should be prevented from falling down, pressure, shock, corrosion, etc.
4. Content of the packing

- 1) Digital tesla meter
- 2) Instruction Manual
- 3) Certificate of quality
- 4) Hall Probe
- 5) Power connecting line
- 6) Fuse