

**55957** The Hall Effect Setup is a very useful system for the laboratory. It is used for the study of Hall Effect in semiconductors. The Hall Effect is an important observation in material science. If electric current flows through a conductor in a magnetic field, the magnetic field exerts a transverse force on the moving charge carriers, which tends to push them to one side of the conductor, producing a measurable voltage between two sides of the conductor, this voltage is Hall Voltage.

Through this setup we can determine carrier density, mobility of charge carrier, Hall coefficient, Hall voltage etc. We can study the effect of temperature in semiconductor, relation between magnetic field and Hall voltage.

Setup consists of the following :

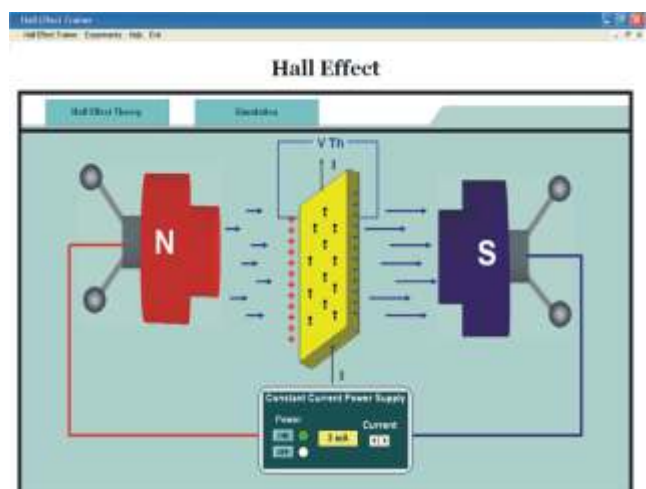
- Gauss and Tesla Meter (InAs probe)
- Measurement Unit
- Constant current power supply
- Electromagnet
- Hall probe with Oven

### Features

1. A complete set for the study of Hall Effect in semiconductor
2. A Hall Effect probe is provided with p type germanium crystal with oven
3. Measurement unit with LCD display and PC interface to measure Hall voltage and probe current
4. Provided with InAs sensor for measuring magnetic field
5. Constant current source provided with LCD display
6. Gauss and Tesla meter for measuring magnetic field with LCD display and PC interface facility
7. Provided with an Electromagnet

### Object

1. Measure the magnetic field by Gauss and Tesla meter
2. Find the poles of an electromagnet with the help of Hall probe and gauss meter
3. Measurement of Hall voltage
4. Calculate the charge carrier concentration density of semiconductor crystal
5. Calculate the Hall coefficient of Ge 'p' type crystal
6. Calculate the mobility of charge carrier particles
7. Study the Hall voltage as a function of current at constant magnetic field
8. Study the dependence of Hall effect coefficient on temperature
9. Study of Hall voltage as a function of magnetic field at constant current



Simulation Software

Note: Specifications are subject to change.

### Technical Specifications

#### 1) Gauss and Tesla meter

Microcontroller Based LCD Display for Measurement of Magnetic Field in Gauss and Tesla, With PC Interface facility.

Sensor	:	InAs for better sensitivity
Range	:	0-20kG
Special feature	:	Indicate the direction of the magnetic field
Mains	:	230V AC $\pm$ 10%, 50Hz
PC interface	:	RS232

#### 2) Measurement unit

Probe current	:	20mA (maximum)
Heater current	:	0-700mA
Temperature	:	0-100°C
Hall voltage	:	200mV (maximum)
Mains	:	230V AC $\pm$ 10%, 50Hz
PC interface	:	RS232 and USB

#### A) Hall probe

Crystal	:	p-type lightly doped
Resistivity	:	As on probe
Thickness	:	As on probe

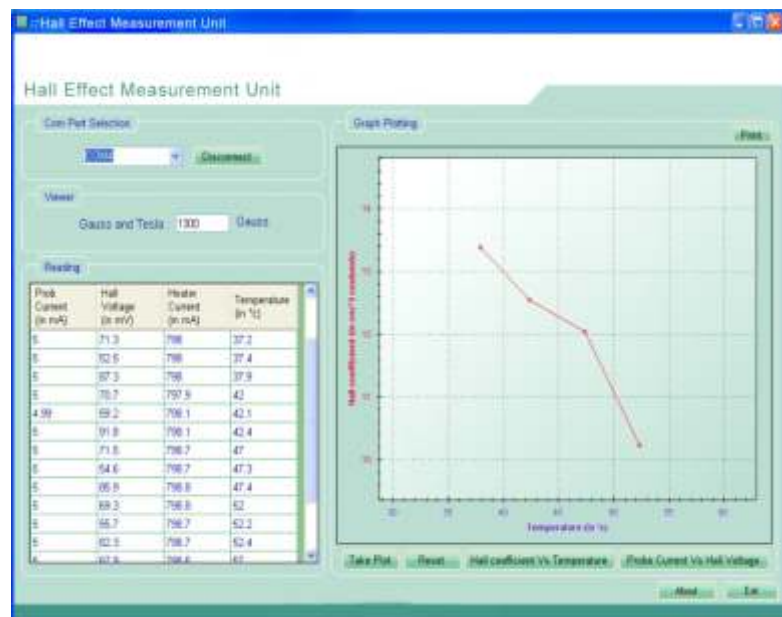
**B) Temperature Sensor** : Temperature is Measured with PT-100

#### 3) Constant Current Power Supply

Current range	:	0 to 3.5A
Output voltage	:	20V
Display	:	LCD, 16 x 2
Mains	:	230V AC $\pm$ 10%, 50Hz

#### 4) Electromagnet

Poles	:	25mm diameter
Coils	:	2 Nos.
Resistance	:	50 (approximate)
Input current	:	3.5A at 20V
Weight	:	16kg



Software Window

Note: Specifications are subject to change.