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Van der Pauw

Ecopia HMS-3000 Hall Measurement System



The Ecopia HMS-3000 Hall Measurement System is a complete system for measuring the resistivity, carrier concentration, P/N type, and mobility of semiconductors. The HMS-3000 includes software with I-V curve capability. The systems can be used to characterize various materials including silicon, compound semiconductors, metal layers, oxides, etc., at room temperature and 77K (liquid nitrogen temperature).

Characteristics

Compact Desktop Model - Permanent magnets and a small circuit system are used instead of an electric magnet system and a bulky constant current source, producing a compact, desktop design.

Simplicity and Accuracy 5 Stage current ranges reduce the allowance error to a minimum.

Simple Operation - Speedy Data Results Data is input by a simple operation providing bulk/sheet carrier concentration, mobility, Hall coefficient, bulk resistivity, conductivity, magnetoresistance, and alpha (Vertical/Horizontal ratio of resistance).

Web Page: <http://www.fourpointprobes.com/ecopia.html>

Complete Brochure: http://www.fourpointprobes.com/hms3000_brochure.pdf

Specifications:

Size (W × D × H): 320 x 300 x 105 mm (Constant Current Supply / Meter System)

Weight: 7.7kg (without package)

Maximum sample size: Small board – 6 mm x 6mm, Large Board - 20 mm x 20 mm.

Measurement Temperature: 300K, 77K (Liquid Nitrogen) Cool-down time: 10 sec.

Measurement Materials: All semiconductors including Si, SiGe, SiC, GaAs, InGaAs, InP, GaN (N Type & P Type can be measured). Data input of depth enables comprehensive measurement of the whole material.

Resistivity Range: 10^{-4} to 10^7 (Ohms-cm)

Magnet : Permanent magnet (diameter: 30 mm)

Magnet Flux Density: 0.55T nominal +/-1% of marked value Stability: 2% over 1 years Uniformity: +/- 1% over 20mm diameter from center Pole Gap: 26 mm

Alternative field strengths available as options: 0.27, 0.31, 0.37T, 1.0T

Current source: Range: 1nA-20mA Compliance: 12V

Mobility: ($\text{cm}^2/\text{Volt}\cdot\text{sec}$) $2 \sim 10^7$ (including low temperature)

Density (cm^{-3}): $10^7 \sim 10^{21}$

Voltage measurements: Input impedance: 2×10^7 Input voltage range: +/-12V

Sample input: Sample boards—3 types, i.e., Small board, Large board, Device board

Contact switching: Mechanical Relay

Product Specifications

① Common Specifications.

1) General Factors

Input Current	Resistivity ($\Omega \cdot \text{cm}$)	Concentration ($1/\text{cm}^3$)	Mobility ($\text{cm}^2/\text{Volt} \cdot \text{sec}$)	Magnetic Flux Density(T)	Temperature (K)	Sample Measurement Board
1nA - 20mA	$10^{-4} \sim 10^7$	$10^7 \sim 10^{21}$	$1 \sim 10^7$	0.27 0.31 0.37 0.55 1	77 300	PCB Sample Board 6mm×6mm 20mm×20mm Spring Clip Board



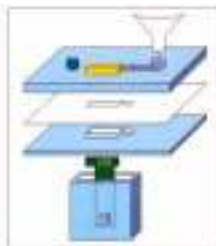
Sample kit with 0.55 Tesla magnet comes standard with the system.



PCB Sample Holder (Green-6mm, 20mm×20mm)



Magnetic flux density input system: 0.55T, 1.0T



Low temperature measurement system (77K, 300K)



The Spring Clip Board is for use with the 0.55 Tesla magnet kit (not the 1.0T) and it has spring loaded clips and spring loaded tips to make contact without using bonding wires. (When using the Spring Clip Board, usually the contacts must still be annealed with a conductive material such as indium to insure good probe contact)

Ecopia offers a 1.0 Tesla permanent magnet sample holder kit with lid for use at room temperature only.

