

HMS5000

HALL EFFECT MEASUREMENT SYSTEM



HIGHLIGHTS

- ▶ Compact Desktop Design
- ▶ Easy-to-Use
- ▶ Upgradeable system
- ▶ Several test modules

Specifications

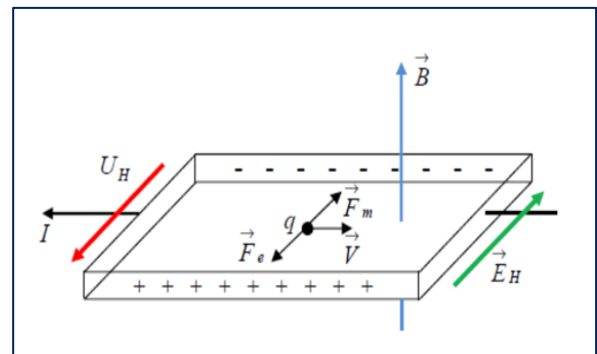
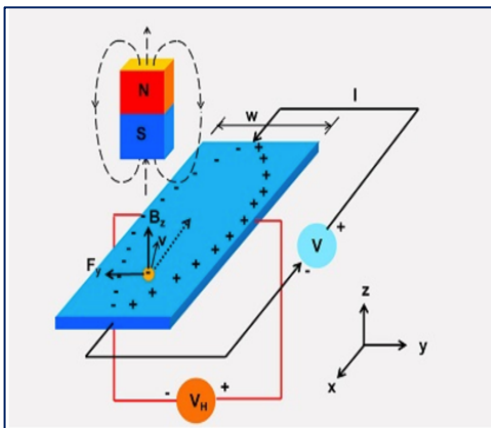
- ▶ 5x5 to 25x25mm
- ▶ Mobility: 1 to $10^7 \text{ cm}^2 \cdot \text{V} \cdot \text{s}^{-1}$
- ▶ Sheet resistance : 10^{-4} to $10^7 \Omega \cdot \text{cm}$
- ▶ Temperature: 77K to 770K

microworld®
Grenoble -FRANCE
Tel. +33 (0)4 76 56 16 17
Contact@microworld.eu
www.microworld.eu



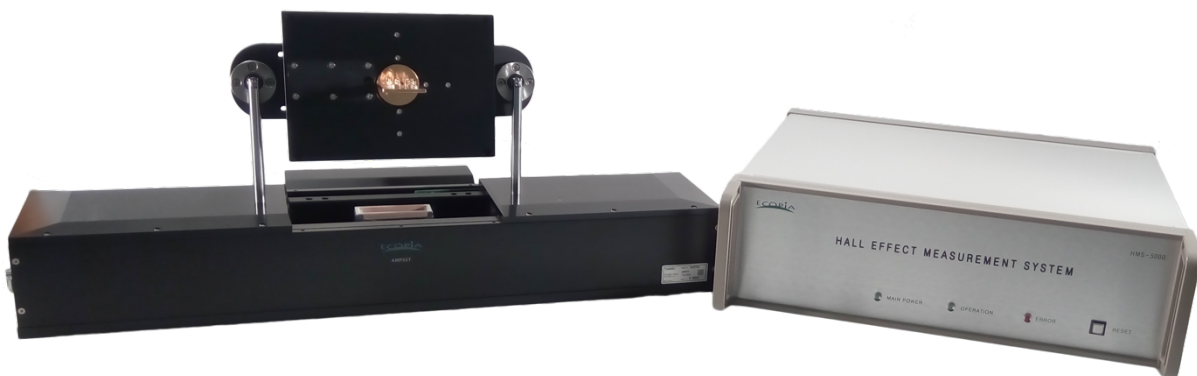
Hall Effect Measurement System is very useful for measuring Carrier Concentration, Mobility, Resistivity and Hall Coefficient that should be pre-checked in order to grasp the electrical specifications of semiconductor device. Therefore, it is essentially required system to understand the electrical characteristics of semiconductor device.

HMS series consist of constant current source , terminal conversion system by Van der Pauw technique, cold or hot temperature test system and magnetic flux density input system. So, it is well-established system that has all the things needed to Hall Effect Measurement System.



Hall effect Measurement Systems allow the ultra-fast characterization of several intrinsic parameters of conductive, semi-conductive materials. They use the Van Der Pauw method which is perfectly suited to thin film measurements and the Lorentz force in order to monitor around ten characteristics simultaneously under different environmental constraints.

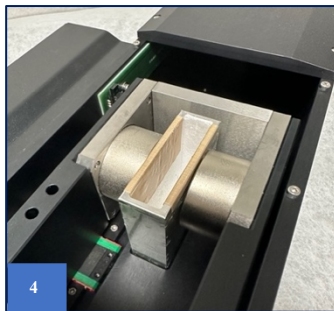
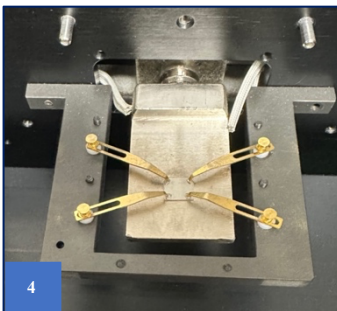
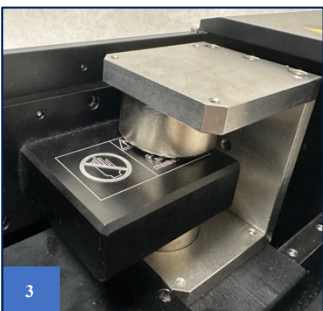
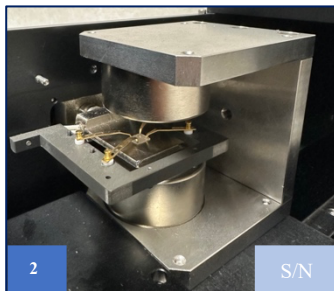
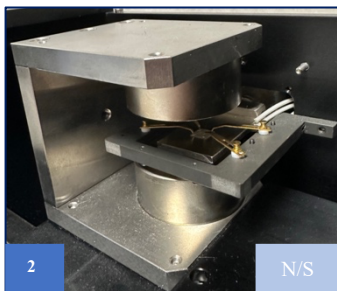
Thanks to several temperature module, the equipment permit to monitor the internal electrical parameters of a layer under different environmental constraints



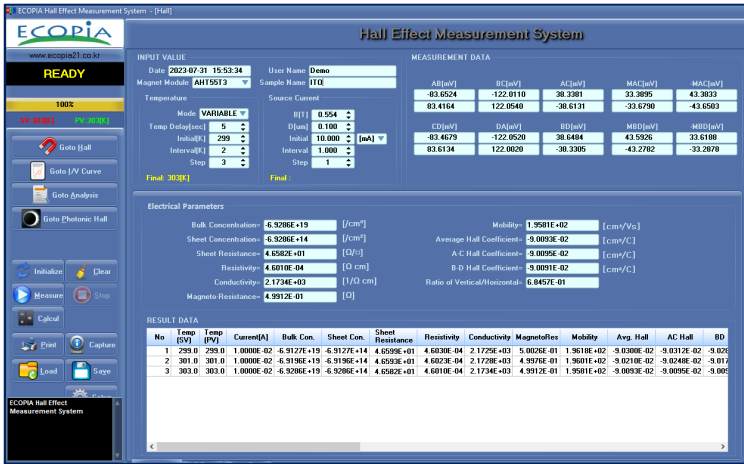
Technical specifications :

| | |
|-------------------------|--|
| Sample size | 5x5mm to 25x25mm |
| Sample thickness max | 2.5 mm |
| Sample material | Si, SiGe, SiC, GaAs, InGaAs, InPGaN, AlZnO, FeCdTe, ZnO... |
| Magnetic field | 0.5T |
| Magnet resolution | +/- 0.03T |
| Magnet type | Permanent |
| Magnet material | Neodym |
| Magnet movement | Automatic |
| Temperature range | 77K to 770K |
| Temperature ramp | Yes |
| SMU | Internal |
| Current range | 1nA to 20mA |
| Shette resistance range | 10^{-4} to $10^7 \Omega.cm$ |
| Concentration range | 10^7 to $10^{21} cm^{-3}$ |
| Mobility range | 1 to $10^7 cm^2.V^{-1}.s^{-1}$ |
| Software | Windows |
| Data expot | .csv |

- ▶ Gap between round magnet : 26mm / Round magnet diameter 50mm (1)
- ▶ Magnet moves automatically from N/S position to S/N by controlling on software PC (2)
- ▶ Cover the cap (chamber) to flow gas inside and to prevent air flow cooling (3)
- ▶ Sample holder or LN2 tank were integrated with the magnet kit (4)



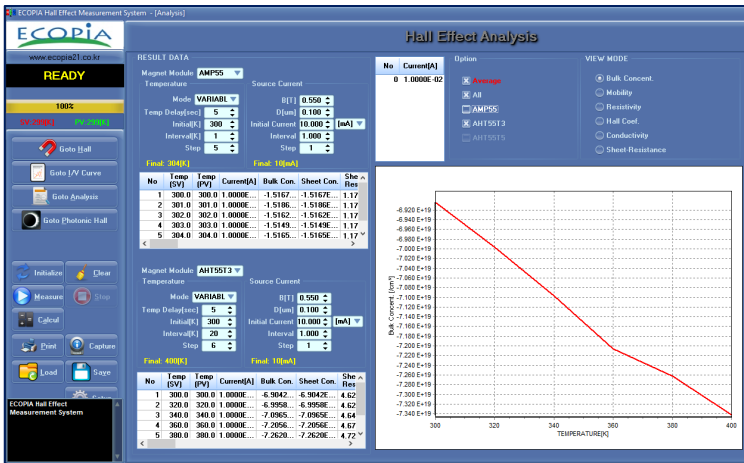
Software :



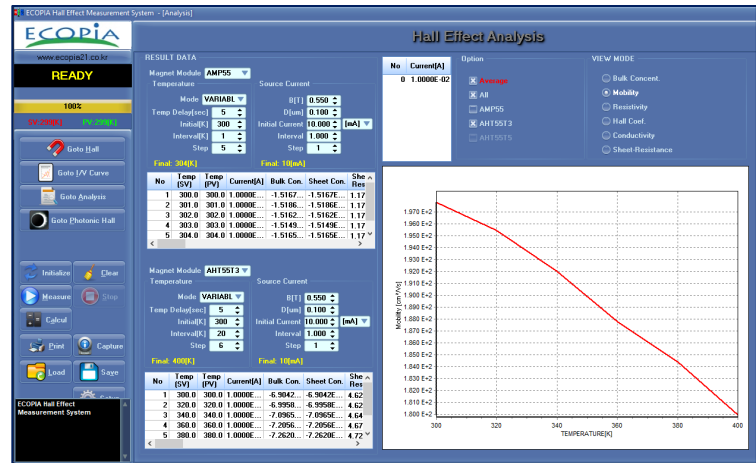
- Temp setup
- Exact magnet value
- Current setup
- Sample thickness



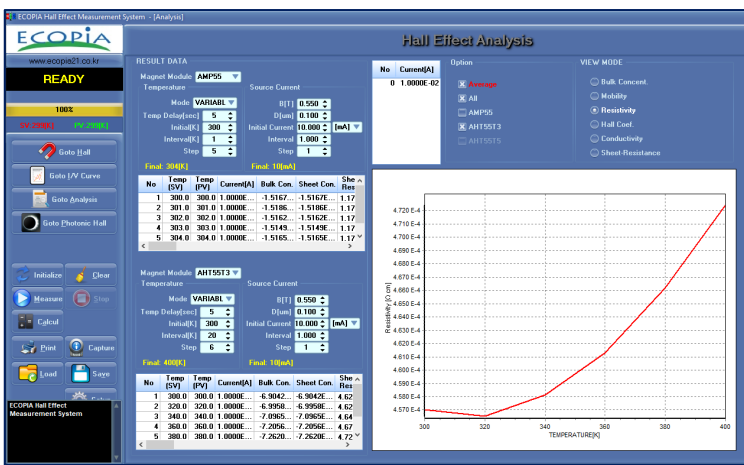
- I(V) curve
- I(R) curve
- Check ohmic contact



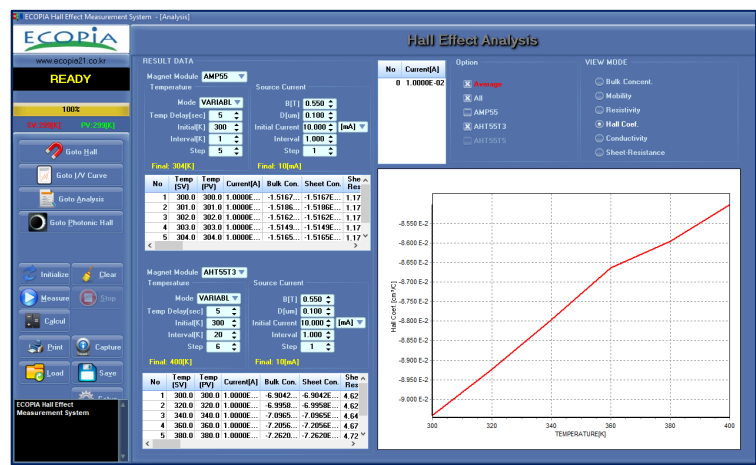
- Bulk concentration vs Temp
- Magneto resistance



- Mobility vs Temp
- Sheet resistance vs Temp



- Resistivity vs Temp
- Conductivity vs Temp



- Hall coeff vs Temp
- Vertical/Horizontal Hall coeff ratio

Temperature Magnet Kit

| Module | Temperature | HMS5000 | HMS5300 | HMS5500 |
|-------------------|--------------|---------|---------|---------|
| AMP55T - RTSK | 77K or 300K | ✓ | ✓ | ✓ |
| AMP55T – SH80350R | 77K to 350K | ✓ | ✓ | ✓ |
| AHT55T3 | 300K to 570K | | ✓ | ✓ |
| AHT55T5 | 300K to 770K | | | ✓ |

▶ **AMP55T-RTSK:**



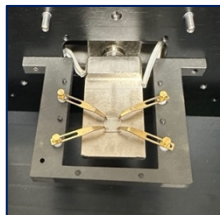
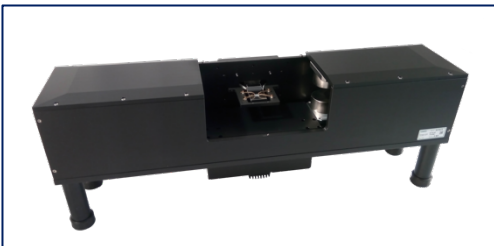
- Several sample holder compatible (See SPCB brochure)
- -196°C or ambient

▶ **AMP55T-SH80350R:**



- Adjustable sample holder pin
- From -196°C to 70°C
- Temperature regulation system

▶ **AHT55T3 / AHT55T5 :**



- Adjustable sample holder pin
- From -196°C to 300°C (T3)
- From -196°C to 500°C (T5)

