

PS-HM-8425 Hall Measurement Package for the CRX-VF Probe Station

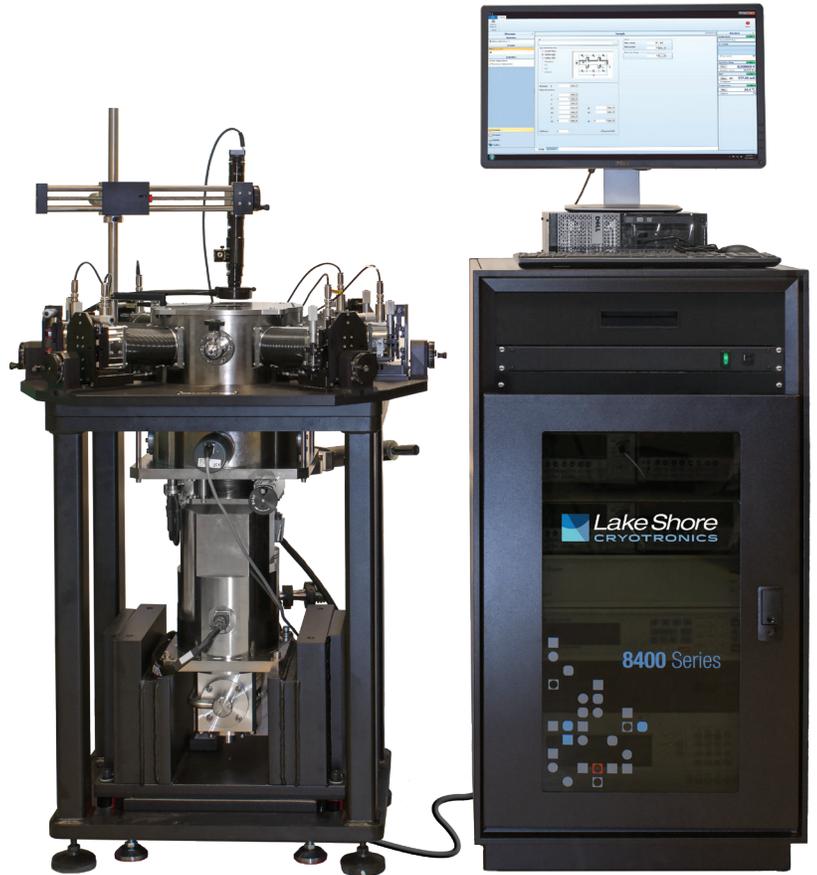
Easily add Hall measurement capabilities to your probe station

- A complete solution for enabling 8400 Series Hall measurement in your CRX-VF station
- Supports a range of DC Hall measurements on wafer-scale materials and structures as a function of temperature and field
- Includes all the instrumentation and software for facilitating Hall measurements
- Supports DC fields to 2 T and resistances from 0.5 mΩ to 100 GΩ
- Intuitive software provides easy system operation, data acquisition, and analysis
- Supports exporting of data for multi-carrier analysis
- 3-year standard warranty



Direct and derived measurements as a function of field and temperature

Hall voltage	Hall coefficient
IV curve measurements	Hall mobility
Resistance	Anomalous Hall effect (AHE)
Magnetoresistance	Carrier type, concentration, and density
Magnetotransport	



CRX-VF station expanded to show PS-HM-8425 console additions

Do more with your probe station

Expand your CRX-VF station to broaden your research capabilities. The PS-HM-8425 package provides all of the instrumentation and software of the Lake Shore 8400 Series so you can implement Hall effect measurement capabilities on your probe station.

With the package, you can run Hall voltage, Hall coefficient, Hall mobility, resistance, and IV curve measurements. Identify carriers of materials by their excitation energies and gain an understanding of dominating mechanisms, whether for Hall bar geometries or for performing gated Hall bar measurements.

The PS-HM-8425 also leverages the station's capabilities so you can:

- Measure full or partial Hall wafers up to 51 mm (2 in) in size
- Measure multiple samples, as opposed to a conventional Hall system, where only one sample can be loaded at a time
- Probe minute structures that are prone to contamination, reactive to air, or might require initial warming to drive out moisture
- Automate* temperature-dependent Hall measurements for greater lab efficiency
- Measure multilayer Hall structures as part of device development



For more information, contact your Lake Shore representative.

The power of the Hall measurement software

The solution adds several instruments to your CRX-VF console, including a switch matrix, current source, and voltmeter. However, the real power is provided in the 8400 Series HMS software, which is on a PC that ships with the package.

This next-generation Hall measurement software enables easy system operation, provides a suite of data acquisition and analysis tools, and allows you to control field, sample temperature, and sample excitation while running Hall measurements in an automated fashion.*

The screenshot shows the 'Results' window of the 8400 HMS software. It displays a 'Hall Measurement' summary with 'Final average' and 'Intermediate results' tables. The 'Final average' table shows parameters like Resistance [Ω], Voltage [V], Current [A], and Current lead voltage [DC V] for two geometries (A and B). The 'Intermediate results' table provides detailed data for four different measurement points (R2134, R2341, R4312, R4323) across various parameters including Resistance, Voltage, Current, and Current lead voltage. An 'Environment' table at the bottom shows the measurement date and time.

Example of a 8400 HMS measurement results screen

Notable software features:

- Supports van der Pauw and Hall bar measurements, and measuring samples with gated Hall bars to account for gate bias—ideal for device-level material measurement.
- Create a variable temperature Hall measurement with just three clicks of a mouse.
- Start and end a measurement at your convenience, as well as set up time loops to repeat measurements according to a schedule.
- Easily insert a resistance measurement into a Hall measurement sequence.
- Use quick commands to “Go to Temperature,” “Go to Field,” “Go to GBV” (gate bias voltage), and “Wait,” to let the system pause and settle before continuing
- Perform resistance measurements at the start of an experiment—very useful when you need to do a quick, initial sample check to determine usable current, for instance.
- Supports data export for multi-carrier analysis.

For more about the 8400 Series software, visit www.lakeshore.com.

Minimum CRX-VF configuration requirements

The CRX-VF probe station must be configured with the following minimal hardware configuration:

- 4 probe arms (MMS-09) with probe body mounts (ZN50-55i) and cabling (ZN50C-T)
- Isolated sample holder (SH-1.25-I or SH-2.00-I)
- FT-TRIAx feedthrough

Ordering information

PS-HM-8425 Hall measurement package for CRX-VF

Part number
PS-HM-8425

Description
Hall measurement package for CRX-VF, factory-installed. Provides required measurement instrumentation and 8400 HMS series software to enable Hall measurements; adds the measurement capabilities of the Model 8425 HMS to the CRX-VF probe station over 10 K to 400 K temperature range, with 2 T field over entire range; resistance measurement capability 0.5 mΩ to 10 MΩ; package ships with all required instrumentation and cabling: PC with 8400 Series system software, Model 776 switch matrix, Model 142 power amplifier, KI6220 current source, KI2182A voltmeter, software keys, plus 7 ZN50R-CVT-25-W-AU probes; must specify 1-ph line voltage (100, 120, 220 CE, 240 CE VAC) at time of order

PS-HM-8425-FI
Hall measurement package for CRX-VF, field-installed. Adds the 8425 HMS measurement capability to an existing CRX-VF probe station; see PS-HM-8425 for package contents details; package ships with a new measurement console and requires that the existing CRX-VF instrumentation be transferred to this new console as part of installation; must specify 1-ph line voltage (100, 120, 220 CE, 240 CE VAC) at time of order

Sample measurement options for PS-HM-8425

Part number
84-HBM

Description
Hall bar measurement: 6 total probe arms are required for Hall bar measurement, option provides two additional arms (each is MMS-09 with cabling ZN50C-T and probe mount ZN50-55i), software is already enabled, factory- or field-installed

84031
High resistance measurement: provides resistance measurement range from 10 kΩ up to 100 GΩ, includes KI6514 electrometer and other hardware, factory-installed

84031-FI
High resistance measurement, same as 84031 but field-installed

84032P
Gate bias voltage measurement: includes KI6487 voltage source and SH-2.00-T-VF triaxial 51 mm sample holder, factory-installed

84032P-FI
Gate bias voltage measurement, same as 84032P but field-installed

750QMSA
QMSA® software option

* Manual adjustment of the probe station's heat switch is required at several temperature points.

For more information, contact your Lake Shore representative.