



VersaLabTM *free*

3 Tesla Cryogen-free VSM (Features/Specifications)

Quantum Design introduces its first *portable cryogen-free cryocooler-based* Vibrating Sample Magnetometer (VSM) – **VersaLab**. With a sensitivity of better than 10^{-6} emu/rt-Hz, this 3-tesla VSM has an experimental temperature range of 50 to 400 K.

As with all Quantum Design instruments, **VersaLab** VSM is a fully automated turnkey system with a user-friendly interface. **VersaLab** is specifically designed for magnetic characterization up to 3 tesla and over a wide temperature range without the need of liquid cryogens. **VersaLab** utilizes technology developed for Quantum Design's popular Physical Property Measurement System (PPMS[®]).

VersaLab gives the user:

- Free time while the automated instrument performs measurements
- Free space in the lab because of its compact size and portability
- Freedom from cooling water and high power requirements
- Freedom from liquid cryogens
- A single hardware configuration for all temperatures, fields, and magnetic moments

System Features

- Portable
- Small size
- Functional versatility
- Easy to install
- Powered from a single-phase outlet

System Availability

The **VersaLab** is also available without the VSM

Delivery of the **VersaLab** is currently about 8 months.

System Options Available

To increase the versatility of the **VersaLab**, Quantum Design has added other PPMS-based measurement systems to the **VersaLab**.
P531 VSM 1000 K Oven (February 2010)
P655A Heat Capacity
P605A Electrical Transport Option.



Preliminary Specifications:

Initial System Cool Down: ~ 10 hours

Temperature Control:

Temperature Range: 50 to 400 K
Cool Down Time (300 to 50K): ~90 minutes
Accuracy: $\pm 1\%$ up to full field (3 tesla)
Slew Rate: Minimum: 0.01 K/min.
Maximum: Varies with sample temperature
Stability: $\pm 0.02\%$

Magnet: ± 3 Tesla
Magnet Type: NbTi Superconducting
Field Homogeneity: 0.1% over 2.4 cm
Slew Rate: 0.1 to 300 Oe/sec.
Field Setting Resolution: 60 mOe
5 Gauss Line: within unit horizontally
within 6cm of the top
vertically

VSM measurement parameters:

VSM oscillation frequency (calibrated): 40 Hz
Range of 5 to 80 Hz
VSM oscillation amplitude (typical): 2 mm peak
Range of 0.1 mm - 5mm
Data rate and averaging window (typical): 1 sec
Range of 0.5 to 750 sec.
Coil set bore: 6mm (standard), 1.2cm (large bore optional)

Sensitivity using the above typical parameters and longitudinal coilset:

rms sensitivity: $< 10^{-6}$ emu **or** 0.5 % with 1 sec. averaging
Relative Noise: Larger of $(6 \times 10^{-7}$ emu + 3×10^{-7} emu/tesla)/ $\sqrt{\text{Hz}}$ or 0.5%/ $\sqrt{\text{Hz}}$

Accuracy:

Better than 1% or 6×10^{-6} emu with 1mm amplitude, whichever is greater
Largest measurable moment: $M_{\text{max}} [\text{emu}] = 40 / (\text{Peak Amplitude} [\text{mm}])$

Power Requirements: 190-240V, 50/60 Hz, 20 A, Single-phase (Note: User should have a dedicated outlet)

Power Consumption: 2.4 kVA maximum

Dimensions: 19" (48 cm) wide x 30" (76 cm) deep x 51.5" (131 cm) high with VSM head [40.5" (103 cm) high without VSM sample transport]

Weight: 190 pounds (86 kg)