

# 2003 Lakeshore VSM User Guide

## Volume A

### Introduction Equipment List



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**A newer version including some improvements is under construction.**

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NHMFL GAS HANDLING SYSTEM (Helium 4)  
NHMFL GAS HANDLING SYSTEM (Helium 3)

MISCELLANEOUS INFORMATION

## 1. INTRODUCTION:

### A. General Remarks

Proper operation of the VSM requires a very careful setup and alignment of the system. One should expect a noise level in the range of  $10^{-4}$  EMU if the system is aligned properly.

Essential setup steps:

1. In the initial setup of the VSM components (positioner, tripod stand and probe) are leveled and aligned in reference to the magnet, see Volume B, Section 3, INITIAL SETUP. This step is important to ensure that the sample rod can move freely without rubbing in the probe, which would result in noise and background levels in excess of  $10^{-2}$  EMU.
2. Centering the pick-up coils, see Volume B, Section 4, FINDING THE FIELD CENTER, is important when minimizing the noise pick-up from fluctuations in the magnet power supplies and during field sweeps. The field center also provides the least gradient and highest homogeneity for the sample.
3. The alignment of the VSM head, see Volume B, Section 5, SIGNAL CALIBRATION, is necessary to adjust for bends in the sample rod, especially when working with small signals. While it will require some patience after the initial setup, the adjustments in routine operation should be minor.
4. The calibration of the VSM, see Volume B, Section 5, SIGNAL CALIBRATION, output signal compensates for any deviations from a regular setup, i.e. when using the large bore head or a different probe. The verification of the calibration with reference to a standard sample is recommended after every initial setup. It will also give a reference point for the optimal sample position.

### B. Precautions

The VSM setup consists of several delicate components. Extreme care has to be taken not to damage those parts. Listed below are some precautions.

1. The vibrating head must be stored on the wooden support plate when not in use. Placing it on a flat surface would damage gears and adjustment screws on the bottom.
2. The vibrating head can only be lifted at the sides of the plastic bottom plate, not at the housing. It must not be tilted or moved in an abrupt manner.
3. Before removing the vibrating head, the sample rod must be taken out. Lifting the vibrating head with the sample rod in place will damage both components.
4. The sample rod must be handled with care. It must always be supported in a way that it does not bend. Never lift the sample rod up by only one end. The preferable way of transporting it is vertically.

5. When inserting the sample rod into the VSM head, no excessive force must be used. If the setup is correct, it will slide in and out easily. Slightly turning it will also help to guide it past edges in the probe.
6. The probe is a delicate piece of equipment. It should be stored, either vertically or horizontally, in manner that will not put stress on the probe or the pickup coils.

1.1 EQUIPMENT MODIFICATIONS:

A. Modifications

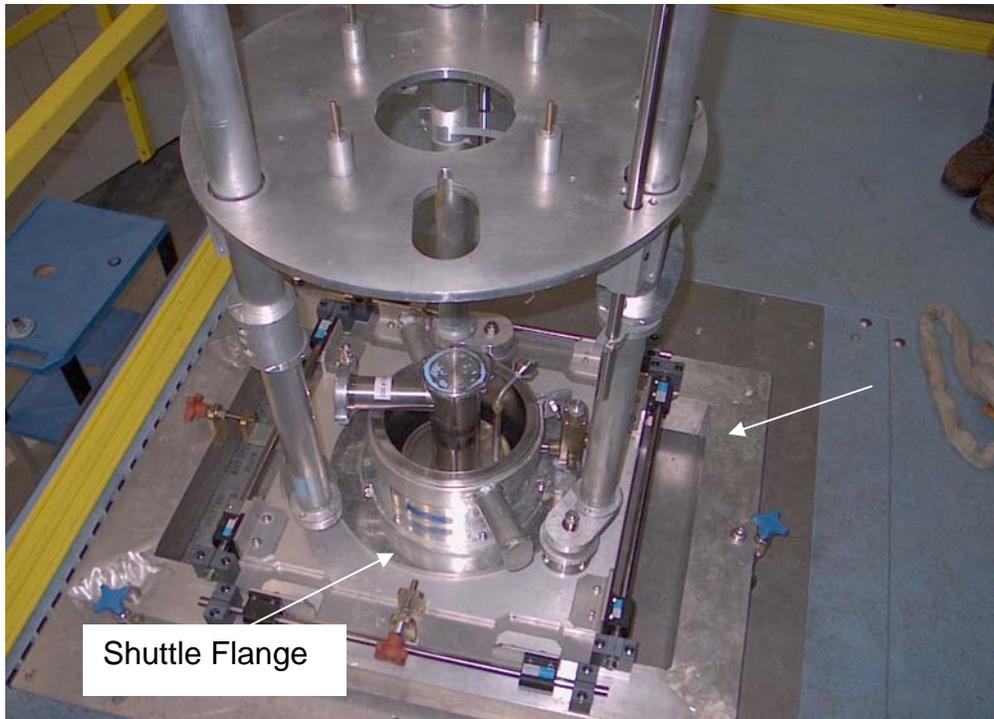


Figure 1 (Dewar Positioner)



Figure 2 (Shuttle Flange)

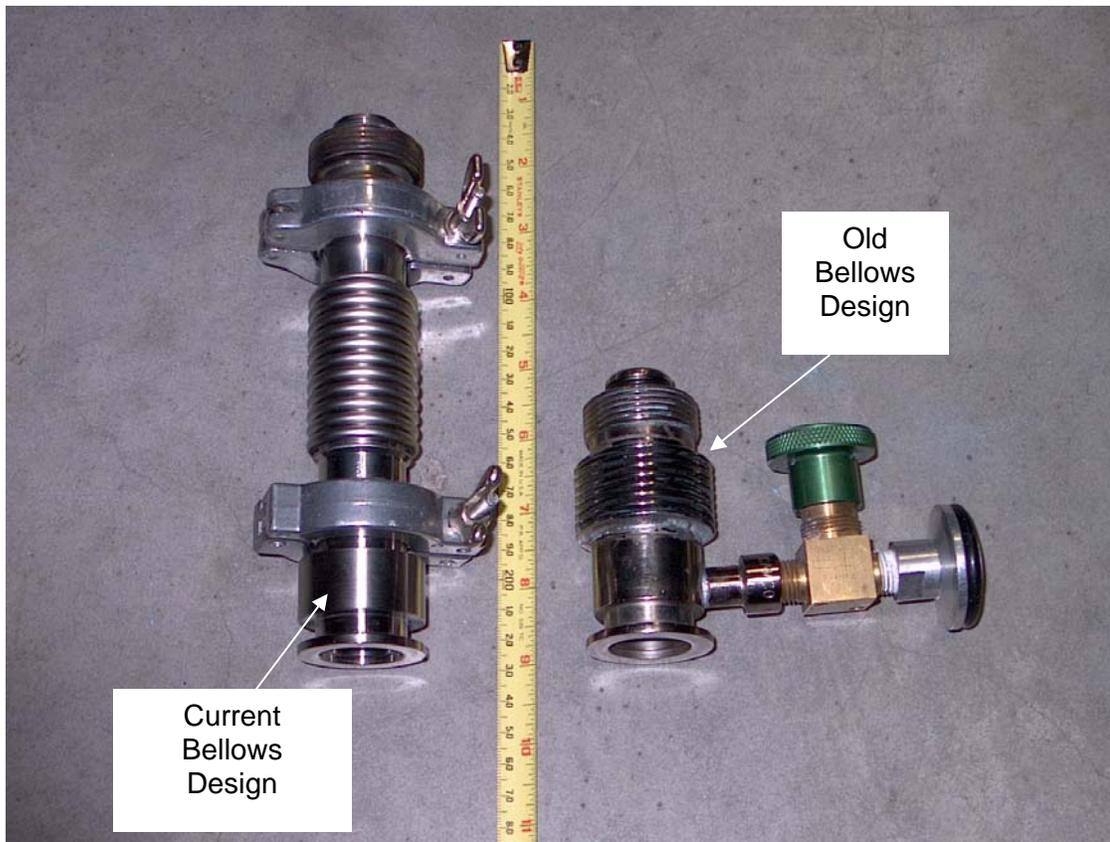


Figure 3 (Probe Bellows)



Figure 4.1 (VSM Tripod Turn Handle) Figure 4.2 (VSM Transfer Slot)

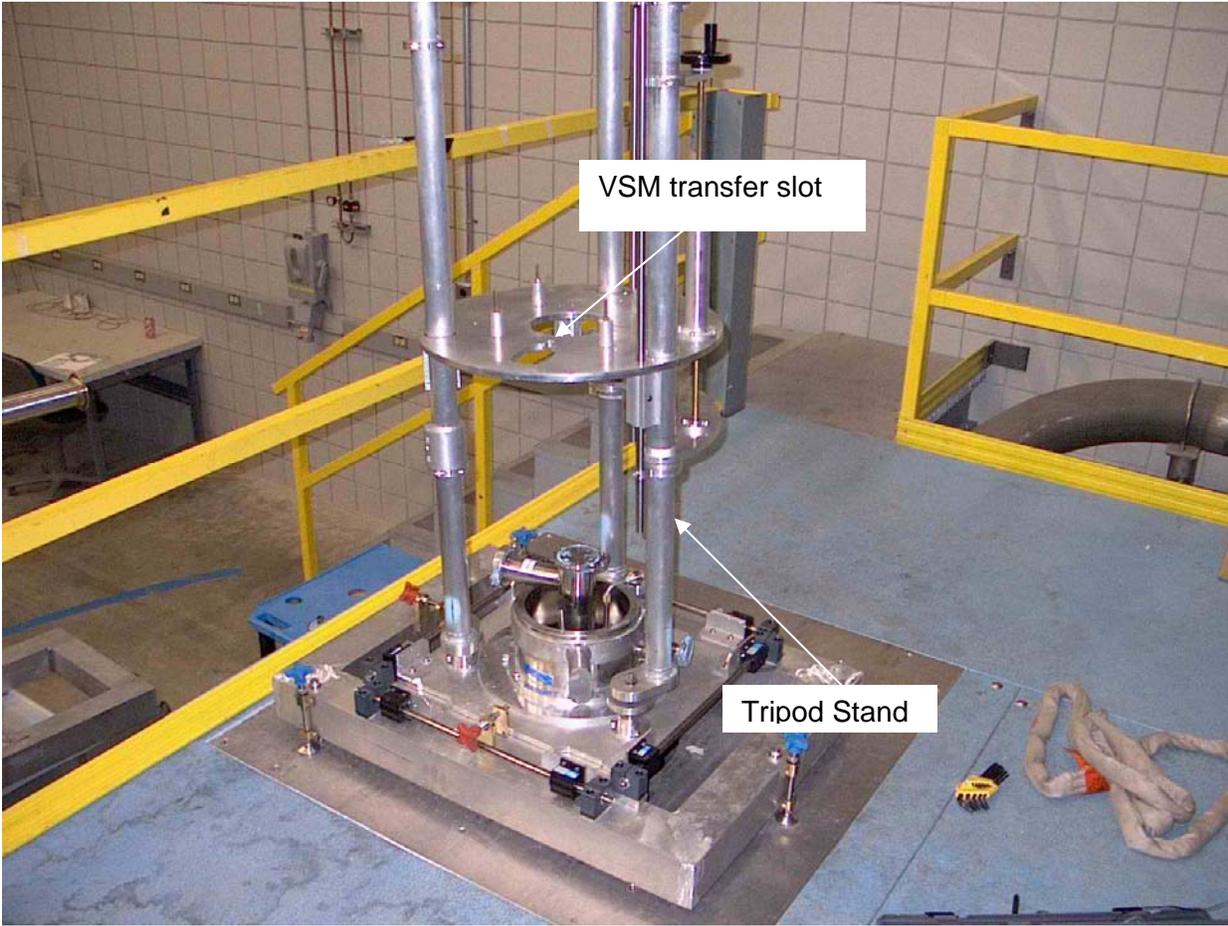


Figure 4.3 (VSM Tripod Stand)

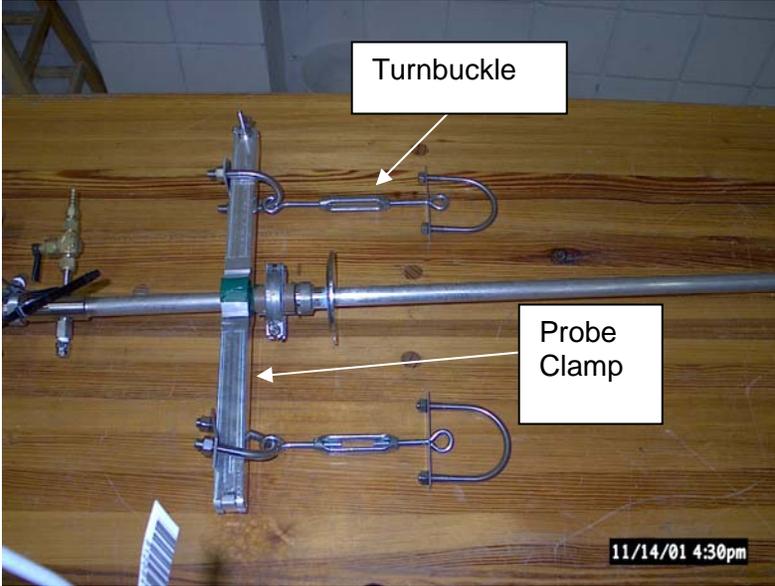


Figure 4.4 (Probe clamp/w turnbuckles)

## 2. EQUIPMENT LIST:

Note (1):

All the necessary equipment is located in or outside Room OP-124. Contact support personnel for assistance.



Figure 5 (General Storage Area)



Figure 5.1 (Inside OP-124)



Figure 5.2 (Inside OP-124)



Figure 5.3 (Storage Cabinet / VSM Cart, OP-124)



Figure 6 (Turbo Pump)



Figure 7 (Dewars)

## A. Necessary Equipment

Vibrating head	located in VSM storage cabinet
Probe	located next to VSM storage cabinet or on VSM cart
Sample rod (2) piece	smaller piece located in VSM Toolbox larger piece located in gray pipe with black stopper
Sample holders	located in VSM toolbox inside VSM Storage cabinet
VSM Controller	located on VSM cart
VSM Controller cables	located in VSM storage cabinet (2) – from the controller to the head (1) – from the controller to the 19-pin breakout box
Multimeter	located in general storage area Keithley, HP, other
Temperature controller cables	located in general storage area  voltmeter to the VSM controller heater cable from the temperature controller to the 19-pin breakout box
19-pin breakout box	located in general storage area
VSM Tripod	located on VSM cart or next to VSM Storage cabinet
6" centering plate	cabinet
Probe clamp/w turnbuckles	located on VSM cart, cabinet
Cable ties	located on VSM cart, cabine
Janice Dewar	located outside general storage area
He level meter	located in general storage area
Vacuum pump	located in general storage area
Gas handling valves	located in VSM storage cabinet
Probe clamp	located in VSM storage cabinet

Shuttle Flange

located in cell or dewar storage

**B. Necessary Tools**

Note (2):

The VSM toolbox should have all the necessary tools for installation.

Set of hex keys

Screwdrivers (slotted miniature and mid-size)

Level

Flash light and mirror

Tape measure