

# INSTALLATION, OPERATION AND MAINTENANCE

## INSTRUCTIONS FOR THE AMI

### MODEL 160

#### LIQUID HELIUM LEVEL SUPERCONDUCTING DIPSTICK

##### I. INTRODUCTION

The American Magnetics, Inc. (AMI) Model 160 Liquid Helium Level Superconducting Dipstick is designed for measuring the level of liquid helium in storage dewars that are accessible from the top. The dipstick is a cost effective, low loss, accurate alternative to flutter tubes and carbon resistor liquid helium level measuring devices.

Each Model 160 consists of a superconducting point sensor mounted on an extension tube and a detachable electronics enclosure.

##### II. SPECIFICATIONS

Sensor Diameter	0.25 Inch
Extension Tube Diameter	0.25 Inch
Sensor Active Region	0.1 Inch
Sensor and Extension Tube Overall Length	72 Inches
(Custom Lengths may be provided at the customers request.)	
Cable Length	8.5 Feet
Electronics Enclosure Dimensions	2-3/8" W x 4-1/4"L x 1-1/8" H
Total Weight	12 Ounces
Accuracy	+/- 0.1 Inch
Repeatability	+/- 0.1 Inch

##### III. INSTALLATION

1. Carefully remove the sensor from the shipping tube and the electronics enclosure from its packaging material.

*NOTE: Save the PVC shipping tube as a handy storage container and to protect your dipstick from damage when not in use.*

2. Inspect the sensor and electronics enclosure for any physical damage that may have occurred during shipment.

***NOTE:** If there is any shipping damage save all packaging material and contact the shipper's representative to file a damage claim. Do not return any damaged material to AMI unless prior authorization has been received (see Section VIII).*

3. Plug the connector at the end of the sensor cable into the mating receptacle located at the end of the electronics enclosure.

#### **IV. OPERATION**

1. Place the toggle switch on the electronics enclosure to the GAS DETECT position. The green POWER LED should be illuminated indicating that the Model 160 is energized and battery voltage is sufficient for proper operation. The red ALARM LED should be illuminated indicating an alarm condition since the dipstick is in a gas (not in liquid helium). The audible alarm should be sounding indicating an alarm.
2. Place the toggle switch on the electronics enclosure to the LIQUID DETECT position. The green POWER LED should remain illuminated and the red ALARM LED, along with the audible alarm, should go out since the dipstick is not in liquid helium.

***NOTE:** The Model 160 dipstick incorporates an automatic power indicator shutoff circuit in the event of low battery power. When the battery has reached a preset voltage level the circuit will prevent the power LED from lighting up. The unit may still work with the power LED off, but it is recommended that the battery be changed at this point.*

3. Ensure your helium storage vessel is properly vented and has an access slightly larger than the sensor. The Model 160 dipstick is designed to use the transfer tube port in a standard portable helium dewar.

***CAUTION:** Due to the length and small diameter of the dipstick, if inserting the dipstick in a close tolerance opening, be careful not to apply any lateral force to the dipstick to prevent any damage.*

***►WARNING:** Always lower the warm dipstick into the storage container very slowly to ensure that pressure buildup in the storage container is not excessive. Failure to do so could result in equipment damage and/or personnel injury.*

4. Slowly lower the dipstick until it touches the surface of the liquid helium. The audible alarm will sound and the red ALARM LED will illuminate. Place the toggle switch to the GAS DETECT position, the alarms should go out, and continue to lower the dipstick until it reaches the bottom of the dewar. Mark the tube at a known reference point with a

binder clip. Very slowly raise the dipstick until the audible signal is heard and the red ALARM LED illuminates indicating the sensor is slightly above the surface of the liquid helium. Mark the position with a second binder clip.

*NOTE: The dipstick can be raised and lowered much faster than the response time of the instrument. Therefore, in order to assure the most accurate reading the dipstick should be slowly lowered and raised at the liquid interface two or three times or until a very small movement causes the audible signal to turn on and off.*

5. Place the toggle switch in the OFF position to de-energize the instrument.
6. Remove the dipstick, measure the distance between the two binder clips and use the conversion charts provided on the helium container.

*NOTE: Be sure to turn the power off when not in use. Failure to do so will result in a short battery life.*

*CAUTION: Do not bend, flex or impact a cold sensor or extension tube. While cold, the sensor and tube are very brittle and may be damaged unless handled carefully.*

## **V. MAINTENANCE**

The Model 160 will provide years of useful service if operated in accordance with these instructions. The only maintenance required is replacement of the battery when a low power condition is indicated (see Section IV, Item 1, Note).

### **BATTERY REPLACEMENT-**

1. Open the battery compartment on the back of the unit by sliding the compartment door in the direction indicated. Lift out and unclip the battery.
2. Replace the battery with a Duracell MN 1604 or equivalent commercially available battery.
3. Replace the cover and briefly turn the toggle switch to the GAS DETECT position and ensure the red ALARM LED and the green POWER LED is illuminated and the audible alarm is sounding.

*NOTE: The sensor and extension is a sealed unit and internal repair or service is not feasible. Replacement sensors are*

*available from AMI. Replacement sensors are provided with cable and connector ready to plug into the electronics enclosure.*

Calibration or adjustment of the electronics is not required.

## **VI. TROUBLESHOOTING**

1. No level indication:
  - a. Ensure there is liquid helium in the container being measured.
  - b. Ensure the toggle switch is placed in the proper position.
  - c. Ensure the battery has sufficient power by observing the green POWER LED is illuminated.
  - d. Ensure there is no ice formation or foreign matter around the sensor.
  - e. Ensure the connector is properly plugged into the electronics enclosure.

If the cause of the problem can not be found contact an AMI service representative at (865) 482-1056.

## **VII. WARRANTY**

All products manufactured by AMI are warranted to be free of defects in materials and workmanship and to perform as specified for a period of one year from date of shipment. In the event of a failure occurring during normal use. AMI, at its option, will repair or replace all products or components that fail under warranty, and such repair or replacement shall constitute a fulfillment of all AMI liabilities with respect to its products. Since, however, AMI does not have control over the installation conditions or the use to which its products are put, no warranty can be made of fitness for a particular purpose, and AMI cannot be liable for special or consequential damages. All warranty repairs are F.O.B. Oak Ridge, Tennessee, USA.

## **VIII. RETURN AUTHORIZATION**

Items to be returned to AMI for repair (warranty or otherwise) require a return authorization number to ensure your order will receive the proper attention. Please call an AMI representative at (865) 482-1056 for a return authorization before shipping any item back to us.