

# Liquid Helium Level Instruments

Versatile • Reliable • Affordable



**American Magnetics, Inc.**  
Excellence in Magnetics and Cryogenics

# Model 135 Liquid Helium Level Monitor

## Sample-and-Hold Level Sensing



The AMI family of liquid helium level instruments offer a wide range of solutions. All instruments pass a constant current through a superconducting Niobium Titanium (NbTi) filament and measure the resistance. The portion of the filament in liquid helium becomes superconducting (i.e. no resistance). The resulting resistance of the wire above the liquid is converted to a level signal. Advanced circuit designs offer our customers many advantages. Years of trouble free service are the result of rugged construction both inside and out. All our instruments and sensors from 1" to 36" are stock items for quick delivery. Our experienced staff offer prompt repair service when needed. OEM instrument design and manufacturing partnerships are always welcomed if our standard products do not meet your needs.

### The Model 135 incorporates all of the features described below.

- Not all sample-and-hold monitors are alike. AMI's patented circuit design (U.S. Patent No. 3,943,767) energizes the level sensor for the minimum amount of time required to obtain an accurate reading and automatically adjusts for any level sensor length, unlike other designs which energize the sensor for a fixed time interval. This ensures the least possible heat transfer to the liquid helium.
- "High/Low" alarm setpoints activate front panel LED warning indicators, audible alarms, and rear panel relay contacts. The audible alarms can be silenced from the front panel. The "High/Low" triggers are set by the user from the front panel from 0 - 100% of the level-sensor active length. Internal relay contacts are normally-open and accessed from the rear panel connector.
- Microprocessor-based electronics are accurate to within 0.5% or better of the sensor active length. Watchdog timer circuitry and low line voltage (brownout) detector prevent microprocessor lock-up and provide fail-safe operation.
- The use of 4-wire level sensors ensures accuracy by eliminating differing lead wire resistance that can be seen as a false signal on 3-wire devices.
- Can be used with liquid helium level-sensors up to 80 inches.
- Selectable continuous measurement or sample-and-hold modes with sample update switch.
- Fully adjustable sample intervals from 0 - 600 minutes or hours. The user can set sample interval from the front panel without the use of DIP switch settings.
- Level sensor burn-out protection detects excessive sensor resistance and de-energizes the sensor current before burnout can occur. Burn-outs can occur when a level reading is attempted in a vacuum environment without liquid helium on the sensor to dissipate the heat.
- Monitors are easily reconfigured for different sensor lengths from the front panel.
- Ultra-fast circuit takes multiple samples each second in the continuous mode and updates the display every 200 milliseconds.
- EEPROM maintains monitor calibration without the need of battery backup.
- AMI level monitors use internal power supplies and standard removable IEC320 computer line cords. This makes moving and keeping up with your instrument easy.
- Rugged metal chassis design can withstand years of abuse.
- The de-icing/dirty sensor feature gives the user an option to increase the sensor current for a short time at the beginning of each sample. This feature is sometimes useful for removing ice or other deposits from a sensor that may cause false readings.
- A floating sensor power supply provides safe operation by eliminating the possibility of a ground path between the sensor and dewar.
- Rack-mount kit easily converts table top monitors to single or side-by-side 19" x 3.5" EIA mounting. This option is supplied on the original monitor or can be field installed at a later date.

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#### Items included

- User Manual
- Sensor input mating connector
- IEC 320 power cord

#### Available options

- Computer interface: RS-232C or IEEE-488
  - Outputs: 0-10 Vdc or 4-2 0mA current loop
  - Rack mounting
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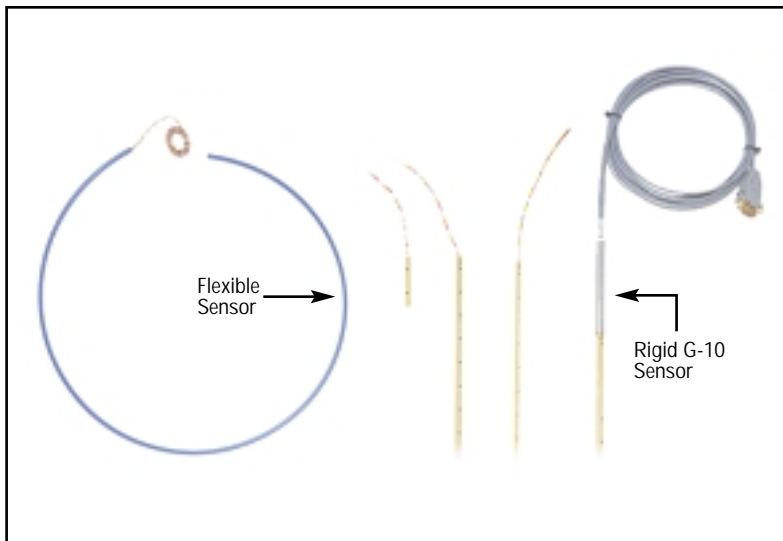
# Model 136 Liquid Helium Level Controller .....



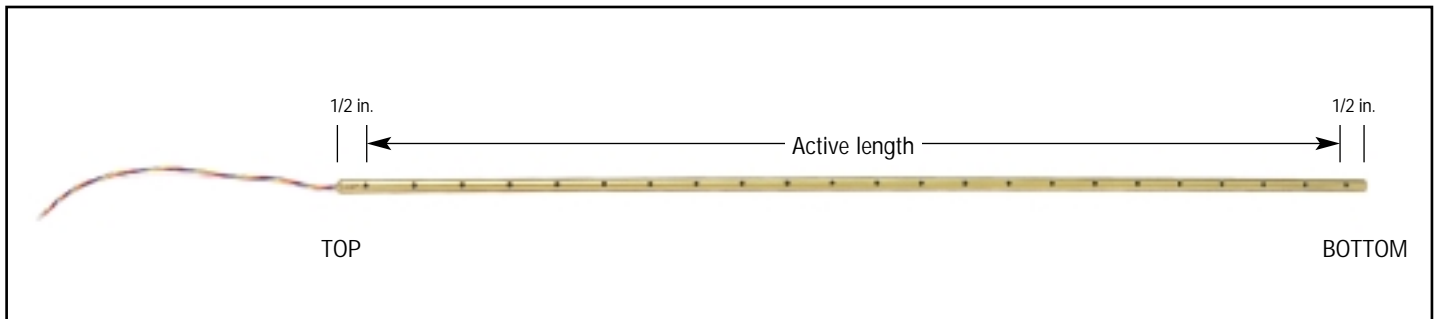
## Sample-and-Hold Level Sensing +Automated level control functions+

The Model 136 incorporates all of the features of the Model 135, plus an added level control function. The Model 136 controller is designed for use in unattended liquid helium level control systems. Two independent setpoints "A" and "B" are set by the user from the front panel from 0 - 100% of the level sensor active length. When the liquid helium level drops to the "B" setpoint, the rear panel power receptacle is energized until the liquid helium level reaches the "A" setpoint. The controller output voltage is the same as the input AC line voltage.

## Liquid Helium Level Sensors .....



AMI offers a full line of 4-wire liquid helium level sensors that are rugged and offer low liquid helium consumption. Standard and custom designs are available. Standard AMI sensors are constructed of 1/4" G-10 phenolic tubing with optional sizes of 3/16", 3/8" and 1/2" available. Flexible sensors of 5/16" diameter tubing are standard items for applications where the sensor must conform to the curvature of a horizontal axis dewar such as MR systems. Standard lead wires are 28 AWG Teflon insulated copper wire. Standard sensor lead wire length is 6 inches with longer lengths and lead wire types available upon request.



### **NEXT DAY SENSOR SHIPMENTS!**

AMI stocks 1/4" OD rigid sensors in active lengths from 1" to 36" in increments of 1". Custom sensors are available upon request (metallic sleeves, custom connectors, etc.).

# Model 110A Liquid Helium Level Meter .....



## Economic Level Sensing

This rugged economical design is a classic. With a quick 'flip of the switch' a user can easily determine the level of liquid helium in their dewar. A large analog display clearly shows the level from 0-100% and is easily read from a distance. The Model 110A can be used with any AMI liquid helium level sensor up to 60" and comes with a standard 0-10 V recorder output on the rear panel.

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### Items included

- User Manual
- Sensor Input mating connector
- IEC 320 power cord

### Available options

- Rack mounting
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## Portable Solutions .....

### Model 150A Portable Liquid Helium Level Meter

The Model 150A is ideal for use with helium storage dewars on loading docks, in storage rooms, or in remote locations where line power is unavailable. This meter works with any AMI 4-wire helium sensor up to 60 inches active sensing length. The hand-held meter has a 3.5 digit LCD readout and an accuracy of 0.5%. Power is provided by a sealed lead/acid battery pack. The battery can be charged to 70% capacity within 5 hours. A fully charged battery is good for hundreds of readings and can be stored for up to one year, at room temperature, before recharging is needed.



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### Items included:

- User Manual
  - Battery charger
  - Sensor input cable with mating connector
  - Sealed lead/acid battery
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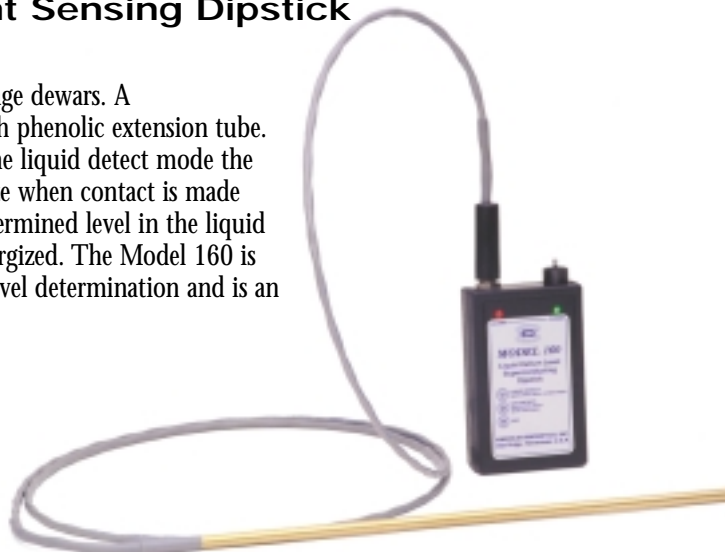
### Model 160 Liquid Helium Point Sensing Dipstick

The Model 160 is designed for measuring the level of liquid helium in storage dewars. A superconducting point sensor is mounted on the end of a 72 inch x 1/4 inch phenolic extension tube. The user can choose two modes of operation to detect the liquid level. In the liquid detect mode the sensor is lowered into the dewar and an audible alarm and LED will energize when contact is made with the liquid. In the gas detect mode the dipstick can be fixed at a predetermined level in the liquid helium. When the sensor becomes exposed to the gas the alarms will be energized. The Model 160 is powered by one standard 9 volt battery. This device offers highly accurate level determination and is an excellent alternative to unreliable flutter tubes or carbon resistor devices.

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### Items included:

- User Manual
  - 72" x 1/4" extension tube with point sensor
  - 9 volt battery
  - 6 feet of cable and mating connector
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# Specifications

## Liquid Helium Level Meters and Monitors

	Model 110A	Model 135	Model 136
Level Range	0-60 inches	0-80 inches	0-80 inches
Display Type	analog meter	3.5 digit LED	3.5 digit LED
Electronic Display	±2% of full scale	±0.1% of active sensor length	±0.1% of active sensor length
Input Power	115/230 or 100/200 VAC ±10%, 50-60Hz	115/230 or 100/200 VAC ±10%, 50-60Hz	115/230 or 100/200 VAC ±10%, 50-60Hz
Readout Units	% only	%, inches, or cm	%, inches, or cm
Sample Interval Time	N/A	0-600 minutes or hours	0-600 minutes or hours
Alarms	N/A	audible + LED	audible + LED
Alarm Relay Contact Rating	N/A	normally-open 10 VA @ .5A max. current	normally-open 10 VA @ .5A max. current
Controller Output	N/A	N/A	1 A max. @ AC line voltage
Signal Output Options	0-10 V standard (0-100 mV optional)	0-10 V or 4-20 mA	0-10 V or 4-20 mA
Dimensions H x W x D	3.8" x 8.4" x 10.75" standard 3.5" x 19" x 10.75" rack mount	3.8" x 8.4" x 10.75" standard 3.5" x 19" x 10.75" rack mount	3.8" x 8.4" x 10.75" standard 3.5" x 19" x 10.75" rack mount
Weight	4.0 lbs. standard 4.7 lbs. rack mount	4.3 lbs. standard 5.0 lbs. rack mount	4.3 lbs. standard 5.0 lbs. rack mount
Operating Environment	15-50°C non-condensing	15-50°C non-condensing	15-50°C non-condensing

## Portable Liquid Helium Level Devices

	Model 150A Level Meter	Model 160 Point Sensing Dipstick
Level Range	0-60 inches	72" extension, 0.1" point sensor
Display Type	3.5 digit LCD	audible and LED alarms
Electronic Accuracy	±0.5% of full scale	±0.1 inch
Input Power	sealed lead-acid battery pack with wall mount recharger	standard 9 volt battery
Dimensions	6.25" H x 3.13" W x 2.25" D	1.5" H x 2.5" W x 4.25" D
Weight	2.0 pounds (including battery)	12 oz. (including battery)
Operating Environment	15-50°C non-condensing	15-50°C non-condensing

## Liquid Helium Level Sensors

	Active Lengths	Overall Length	Lead Wire Length	Sensor Current	Sensor Resistance	Diameters
G-10 Stick	1-80"	active +1"	6" standard	75 mA	11.4 Ω/in. @ 20K 13.3 Ω/in @ 300K	3/16" 1/4" standard 3/8"
Flexible Tubing	1-80"	active +2"	6" standard	75 mA	11.4 Ω/in. @ 20K 13.3 Ω/in @ 300K	5/16"
Miniature Flexible Tubing	1-80"	active +1"	6" standard	75 mA	11.4 Ω/in. @ 20K 13.3 Ω/in @ 300K	3/32"

## Liquid Helium Transfer Line with Built-In Level Sensor

This innovative design incorporates a standard AMI liquid helium level-sensor into the lower 22 inches of the supply side transfer leg. This allows the user to monitor the decreasing helium level in the supply dewar and stop the transfer before hot gas is blown into the target dewar. Any AMI liquid helium level instrument can be used to monitor the level via the signal cable attached to a 4-pin electrical connector on the transfer line. The transfer line is vacuum jacketed with superinsulation, 60 inch dewar legs, a 60 inch flexible section and is designed such that the sensor is field replaceable.

### Items included

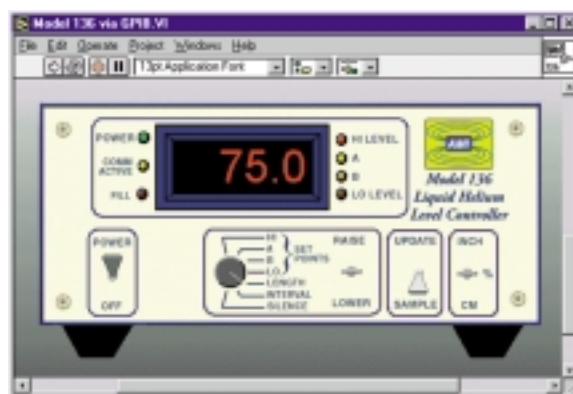
- User Manual
- Detachable vacuum evacuation valve
- Signal cable with mating connectors

Integrated  
Level Sensor



## Digital Computer Interface

The computer interface options allow computer monitoring and control of the liquid level, sensor length calibration, high/low alarm setpoints, level control setpoints, and sampling interval. Computer interface options are supplied with free virtual instrument (VI) drivers for National Instruments LabVIEW™ software for Windows™ version 3.1 and above. Use of the RS-232 or IEEE-488 interface options do not require LabVIEW. The LabVIEW drivers can be completely customized by the user.



For over 25 years, American Magnetics, Inc. has been a leading supplier of liquid helium level instruments and sensors. In addition, a complete line of instruments and sensors is offered for other cryogenic gases. Our instruments are used worldwide by thousands of users in a wide array of applications.

Some of the applications include:

- Magnetics Resonance Imaging Systems
- Scientific Laboratories
- University Physics Departments
- Industrial Gas Producers and Distributors

AMI's liquid helium level instrumentation is based upon measuring the resistance in a Nb-Ti superconducting filament. External communications and control options include 0-10 Volt recorder output, 4-20 mA output, and RS-232 or IEEE-488.

AMI's affordable line of cryogenic level instruments are designed for maximum flexibility and years of trouble-free service. Custom products and system solutions can be designed for your specific needs. Our worldwide network of sales engineers provide local service. For further information please call or visit our World Wide Web site.



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