



Liquid Helium Level Instruments

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 instruments and sensors from 1" to 36" are stock items for quick delivery. Our experienced staff offers prompt repair service when needed. OEM instrument design and manufacturing partnerships are always welcomed if our standard products do not meet your needs.



APPLICATIONS

- *Magnetic Resonance Imaging Systems*
- *Scientific Laboratories*
- *University Research Groups*
- *Industrial Gas Producers / Distributors*

LIQUID HELIUM SENSOR OPTIONS

- *Spray-proof sensors for turbulent liquefier return chambers*
- *Vacuum-tight mounting connections*
- *High radiation environment sensors*

OUTPUT OPTIONS

AMI's Liquid Helium instruments (Models 135, 135-2K, and 136) may be configured with up to (1) Analog and (1) Digital output

- *Analog 0-10V Recorder output*
- *Analog 4-20mA output*
- *Digital RS-232, RS-422, or IEEE-488 (GPIB) output*
- *LabView drivers are supplied with all digital output options*





Model **135 & 135-2K** Liquid Helium Level Monitor



The Models 135 & 135-2K are advanced liquid helium level monitors which incorporate AMI's patented sample-and-hold design with automatic helium level sensor vacuum burnout protection. The Model 135 is ideal for operation in systems where it is important to monitor the liquid helium level while also minimizing the helium losses. The 135-2K has the additional ability to provide uninterrupted level readings over a temperate range of 1.8 to 4.2K. The Model 135-2K is ideal for operation in systems where it is important to monitor the liquid helium level where transitions through the Lambda Point are needed. AMI highly recommends using the specially designed 2K helium level sensor with the 135-2K instrument for best results.

FEATURES:

Minimal Liquid Helium Losses (Sample-and-Hold Sensing)

In order to minimize liquid helium loss, these instruments automatically energize the liquid helium level sensor at user set time intervals and monitor the normal (resistive) zone as it progresses from the top of the sensor toward the liquid surface. As soon as the normal zone reaches the liquid surface, the level reading is saved and the current in the sensor is turned off until the next sample interval occurs. An LED sensor current indicator is illuminated during each sample. Sample intervals are user set from the front panel between "0.0" (continuous reading) to "600.0" minutes or hours. A manual update switch provided on the front panel can also be set to obtain continuous readings during a helium transfer period or to manually force an immediate measurement.

High and Low Alarm Functions

These models add "High" and "Low" alarm setpoints which activate front panel LED warning indicators and rear panel relay outputs in the event of an overflow or liquid loss condition. The alarms also energize an audible warning which can be silenced from the front panel. "High" and "Low" setpoints are user set from 0 to 100 percent of sensor active length.

Sensor Burnout Protection

These instruments provide automatic helium level sensor vacuum burnout protection. A liquid helium level sensor energized in a vacuum environment will self-heat to the point of burnout within seconds. AMI's innovative microprocessor-based circuitry detects incipient sensor burnout and de-energizes the sensor before damage can occur. A 5% increase in sensor resistance will trigger this protection, causing the current to be switched off for 6 seconds before attempting to resume normal operation.

Ice Buildup Prevention

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.

Sensor Length

Sensors up to 80" in length are available. These instruments are easily reconfigured for different sensor lengths from the front panel without the need to recalibrate the instrument.

Low Excitation Current

AMI liquid helium level monitors use low excitation currents (<100mA) which results in lower helium consumption.

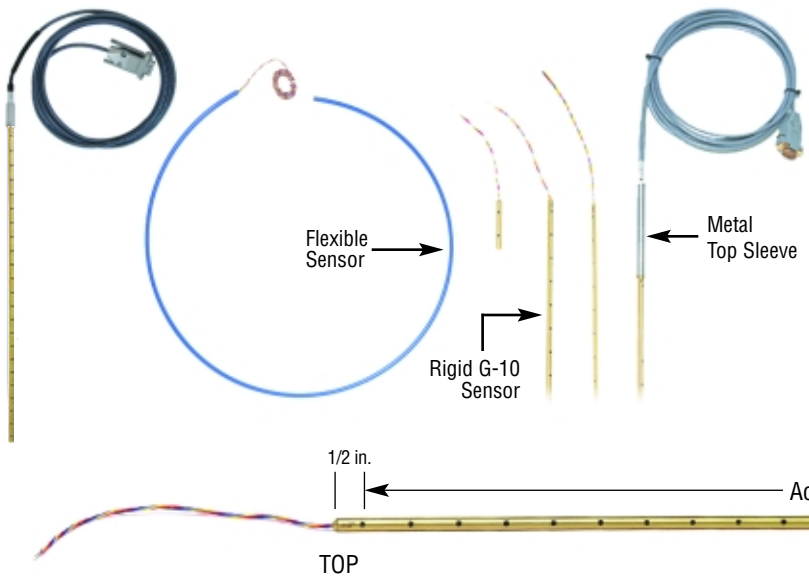
Model 136 Liquid Helium Level Controller



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

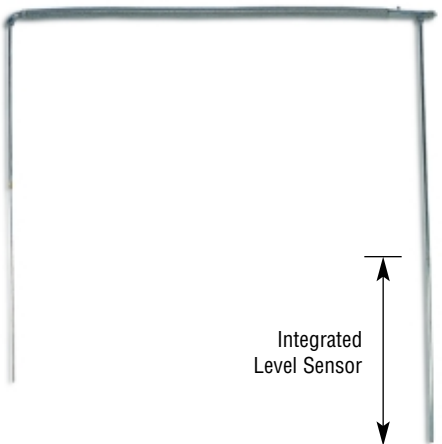
The Model 136 incorporates all of the features of the Model 135, plus an added level control function. The Model 136 controller is designed for use in unattended liquid helium level control systems. Two independent setpoints "A" and "B" are set by the user from the front panel from 0 - 100% of the level 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 voltage

Liquid Helium Level Sensors



AMI offers a full line of 4-wire liquid helium level sensors. 4-wire sensors insure accuracy by eliminating differing lead wire resistance; a common cause of false signals with 3-wire sensors. AMI sensors are constructed of G-10 tubing with sizes of 3/16", 1/4", and 3/8". Flexible sensors of 3/32" or 5/16" diameter tubing are available 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. Other lead wires available.

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 super-insulation, 60 inch dewar legs, a 60 inch flexible section and is designed such that the sensor is field replaceable. When used with the affordable, hand-held Model 150, you have an incredibly versatile liquid helium transfer system.

Model 110 Liquid Helium Level Meter



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 110 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.

Portable Solutions

Model 150 Portable Liquid Helium Level Meter

The Model 150 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.



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 at the end of a rigid 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 pre-determined level in the liquid helium. When the liquid drops to where the sensor becomes exposed to the gas, the alarm 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.





Specifications

Liquid Helium Level Meters and Monitors

	Model 110	Models 135 & 135-2K	Model 136
Input Power	115/230 or 100/200 Vac \pm 10%, 50-60Hz	115/230 or 100/200 Vac \pm 10%, 50-60Hz	115/230 or 100/200 Vac \pm 10%, 50-60Hz
Instrument Temperature Range	15-50°C non-condensing	15-50°C non-condensing	15-50°C non-condensing
Measurement Range	0-60 inches	0-80 inches (up to 60"@100Vac)	0-80 inches (up to 60"@100Vac)
Display Type	Analog Meter	3.5 digit LED	3.5 digit LED
Display Accuracy	\pm 2% of full scale	\pm 0.1% of active sensor length	\pm 0.1% of active sensor length
Display Units	% only	%, inches, or cm	%, inches, or cm
Alarms	N/A	Audible, LED	Audible, LED
Alarm Relay	N/A	10VA SPST (NO) @ 0.5A max. current	10VA SPST (NO) @ 0.5A max. current
Controller Output	N/A	N/A	AC Line Voltage @ 1A max. current
Analog Signal Options	0-10V standard (0-100mV optional)	0-10V or 4-20mA	0-10V or 4-20mA
Digital Signal Options	N/A	RS-232, RS-422 or IEEE-488	RS-232, RS-422 or IEEE-488
Dimensions (HxWxD)	3.8" x 8.4" x 10.75" (3.5" x 19" x 10.75" – rack mount)	3.8" x 8.4" x 10.75" (3.5" x 19" x 10.75" – rack mount)	3.8" x 8.4" x 10.75" (3.5" x 19" x 10.75" – rack mount)
Weight	4.0 lbs. (4.7 lbs. rack mount)	4.3 lbs. (5.0 lbs. rack mount)	4.3 lbs. (5.0 lbs. rack mount)

Portable Liquid Helium Level Devices

	Model 150	Model 160
Input Power	Lead-acid battery pack with wall-mounted recharger	9V battery
Instrument Temperature Range	15-50°C, non-condensing	15-50°C, non-condensing
Measurement Range	0-60 inches	72" extension, 0.1" point sensor
Display Type	3.5 digit LCD	Audible & LED Alarms
Display Accuracy	\pm 0.5% of full scale	\pm 0.1"
Dimensions (H x W x D)	6.25" x 3.13" x 2.25"	1.5" x 2.5" x 4.25"
Weight	2.0 lbs.	12 oz.

Liquid Helium Level Sensors

	Active Length	Overall Length	Lead Wire Length	Sensor Current	Sensor Resistance	Diameter
G-10 Stick	1-80"	Active + 1"	6" standard	75mA	11.4 Ω /in.@ 20K 13.3 Ω /in.@ 300K	3/16" (36" max.), 1/4" (standard), 3/8"
Flexible Tubing	1-80"	Active + 2"	6" standard	75mA	11.4 Ω /in.@ 20K 13.3 Ω /in.@ 300K	5/16"
Miniature Flexible Tubing	1-80"	Active + 1"	6" standard	75mA	11.4 Ω /in.@ 20K 13.3 Ω /in.@ 300K	3/32"