ACD

Advanced Calibration Designs, Inc.

Instruction Manual

Rev 1.0

genie QC-1

Ammonia Calibration Gas Generator

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Rev 1.0 - 3-1-13

Table of Contents

WARNING:

This instrument generates calibration gas for toxic gas detectors. The instruction manual should be read and understood prior to operation of the instrument. Failure to operate the instrument correctly can lead to improper calibrations.

This instrument conforms to the protection requirements of the **EC DIRECTIVE 89/336/EEC** on Electromagnetic Compatibility (EMC), in accordance with the provisions of Statutory Instrument 2372.

The following standards have been applied:

EN 50081-1 Emissions Standard (Residential Commercial and Light Industry)

EN 50082-1 Immunity Standard (Residential Commercial and Light Industry)

I. General Description

The GENie family of instruments consists of the GENie base unit (which provides a microprocessor based user interface and control system) and a source module (that determines the gas to be generated).

GENie Base Unit and **GENie QC-1 (NH3) Source Module** (front and rear view)

GENie Base Unit

Battery powered microprocessor based user interface and control system.

Power Source

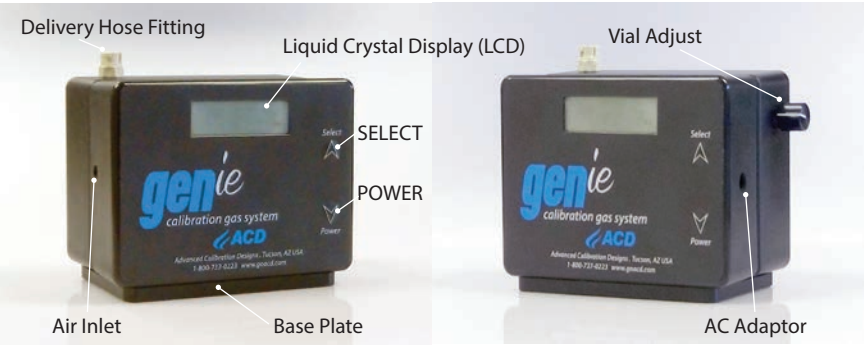
A set of four fully charged, **heavy duty alkaline** AA batteries provides approximately 6 hours of continuous operation at .5 LPM. **Note: Rechargeable or light duty batteries can be used, but they give significantly less operating time.**
An optional battery extender is available that utilizes eight AA type batteries and provides extended hours of operation.
Continuous operation power adaptors are also available for bench top operation (note adaptors are also available for international customers).

Microprocessor-Based Circuitry

The GENie base unit has microprocessor based circuitry that performs several different operations and offers the user many different features. The microprocessor tracks source and battery usage, monitors the air flow rate and controls the source and pump to give the selected ppm

and flow rate. In addition to English, every GENie QC-1 is capable of providing menu displays in French, German and Spanish.
See section IV. Menu Options for instructions on how to change the menu language.

Digital Display



The GENie base unit has a liquid crystal display (LCD) located on the front of the instrument. This display is protected by a thin, clear plastic cover that is part of the front membrane panel and may be replaced if it becomes scratched or unclear.

POWER and SELECT

The POWER and SELECT switches are momentary push button type switches activated through the front membrane panel. They are physical switches mounted directly on the circuit board.

Delivery Hose

The instrument comes standard with a five (5) foot long, ¼ inch diameter Teflon lined hose for delivering the gas to the sensor or calibration adaptor. The hose has a male quick connect adaptor for easy attachment to the instrument.

Internal Charcoal Filter

An internal charcoal filter is provided to scrub contaminated air. This filter should be replaced on a yearly basis at the time of calibration.

Mass Flow Sensor

The GENie main module has a built-in mass flow sensor that measures the flow rate of the instrument. This information is used in two ways. With the pump engaged, it is used to control the pump to the desired flow rate over a range of 0.2 to 1.0 LPM. With the pump disabled, it is used to measure the air flow rate drawn through the GENie by an external pump (for use with EC module only). This information is used to determine the source generation rate to achieve the desired ppm. The flow meter should be calibrated against a primary mass flow standard every 12 months.

System Interface Bus

The center of the GENie system of products is the module expansion bus. This proprietary interface bus is what allows the GENie base unit to interface with an ever expanding family of product modules. Each source module provides the base unit with information pertaining to calibration, life of unit, gas type etc. It is important that these contacts remain clean and undamaged throughout the life of the instrument. If communication between the modules is ever corrupted, the unit will display the 'source not found' error and turn itself off.

GENie QC-1 Module

Fast warm-up time allows the instrument to be turned off between remotely located sensors saving battery life and avoiding generation of unwanted gas. The GENie QC-1 module uses the following components to produce the calibration gas/air mixture:

Internal Micro Pump

A small, rotary vane, micro air pump draws in ambient air to blend with the generated gas.

Ultraviolet Light Source

The ultraviolet light source is calibrated at the factory. Each source has a built-in memory chip that tells the main GENie instrument what type and range of gas can be generated and how much source life is remaining. This source should be calibrated at the factory annually or

at 100 hours of operation whichever comes first. The estimated life of the light source is 500 hours of operation.

Photo Ionization Detector

The QC-1 version of the GENie family utilizes an internal photo ionization detector coupled with the ACD family of QC vials to produce accurate reliable concentrations of your selected gas. Initially available with ammonia, the QC-1 relies on flow and sensor feedback to produce selectable concentrations from 10 to 150 PPM.

Nylon Carrying Case

The GENie QC-1 comes with a convenient, durable, nylon carrying case. It is adjustable to be worn as a hip pack, or the belt strap can be reattached to be worn around the neck or over the shoulder. The front of the carrying case is clear plastic, allowing the unit to be operated while within the case, and there are convenient side pockets for storage of additional sources, the delivery hose or a battery extender pack.

III. Operation

The GENie QC-1 utilizes the ACD quick check vials as a gas source. To begin operation take one of the QC vials for ammonia and break the internal glass vial to release the gas. Slide open the GENie base unit and insert the vial into the unit as shown below. The vial should 'snap' into place. Then return the base plate by sliding it back till it 'latches' into place.

To start the instrument, press and hold the POWER switch, located in the lower right of the front of the instrument, until the display reads **GENie QC-1**, approximately five (5) seconds. Release the switch immediately thereafter.

The instrument will sequence through several screens as follows:

GENie 1.0 QC-1 Copyright 2012

Please Note: If you would like to change the language of the menus, see section IV. Menu Options: Foreign Language Option, for instructions.

The instrument will display the serial number and source number, followed by the manufactured date. The calibration date is the date the instrument was last calibrated.

Serial# 0000001 Source# 000001
Manufactured 01 Jan 2012
Calibration Date 01 Jan 2012

The display will change to simply display the concentration as shown below.

100 PPM NH3 Select to change

If the instrument is unable to achieve the selected concentration one of the following screens may present accompanied by an audible beep.

100 PPM NH3 Low PPM warning

100 PPM NH3 High PPM warning

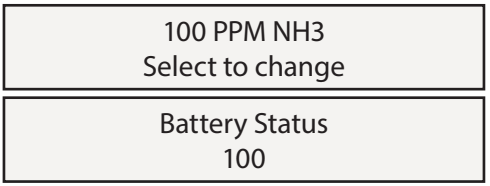
If the Low PPM warning message is present open the vial adjust slightly by rotating it clockwise to allow additional gas to enter the system. (Note: the adjustment is a ¼ turn.) If the High PPM warning message is present slightly close the vial adjust by rotating it counter clockwise as shown in the image to the right.

When the instrument has stabilized, the display will change to read concentration of gas being generated and the flow rate as shown below.

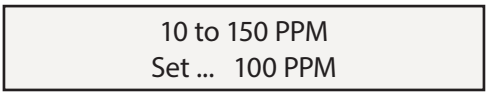
100 PPM NH3 @ .50 LPM

The position of the vial adjust is a rough adjustment depending on the concentration you have selected. The instrument with adjust flow to obtain the exact concentration. In general a more open vial adjust will result in a higher flow rate and a more closed vial adjust will result in a lower flow rate. If at any time the unit is unable to produce the exact concentration selected you will be notified with the above menu accompanied by the audible beep.

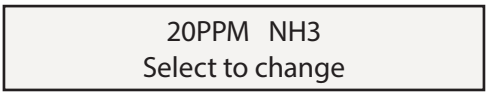
At any time during operation, pressing the select switch will result in the following series of menus.



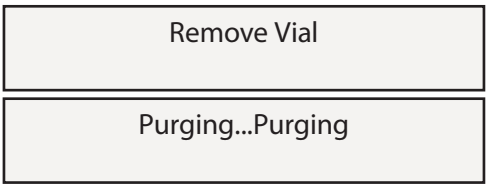
When the concentration is displayed with the 'Select to change' indication, pressing the select button will result in the following display.



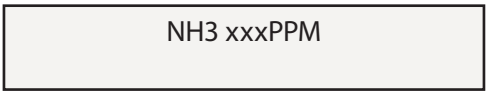
At this point pressing the up or down arrows will result in the output changing accordingly. Pressing the down arrow will scroll the output down from 150 PPM to 10 PPM. When the desired concentration is displayed simply release the buttons. The unit will 'time out' and return to normal operation displaying the source life and battery status before returning to display the new concentration. You are ready to calibrate.



When your calibration is complete simply press and hold the power button for approx. 5 seconds to turn the instrument off.



The bottom screen will briefly display



until the PPM level purges to an acceptable level or 30 seconds has

expired before powering down. It is strongly recommended that the vial be removed and discarded prior to turning the unit off at the end of the day.

IV. Menu Options: Foreign Language Option

The menu options can be adjusted to read in German, French, or Spanish. To change the language, start the unit as you normally would. When the GENie screen appears,

GENie QC-1 Copyright 2012

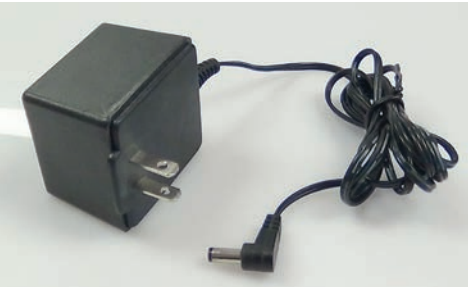
press the SELECT button. This will bring up the following screen (note: the Select button must be pressed quickly before the above screen transitions):

English Select to Change

Press the SELECT button to choose the preferred language. Each time the select button is pressed the language will continue to scroll through the four possible options. When the language is displayed, press the POWER button to continue with the start up sequence.

V. Optional Items

AC Adapter



The GENie QC-1 may also be operated from an AC adaptor. The AC adaptor converts the AC voltage supplied from the main power lines in lieu of the batteries. The adaptor plugs into the instrument from the side of the case directly into the power board and is independent of polarity. If needed, contact the factory for exact specifications of the AC adaptor.

DC Battery Extender

The GENie QC-1 unit may also be operated from an external battery extender unit. Designed to fit into the pocket of the fanny pack, the battery extender utilizes eight AA batteries to provide approximately 14 hours of continuous operation.

Hard Body Instrument Case

A water resistant, padded instrument case is available for storage and shipping of the GENie QC-1. The case is made out of rugged, high impact resistant plastic and will help protect the instrument in harsh environments. The foam insert may be customized to hold additional items like spare batteries or sources.

Extension Hoses

Longer sample hoses may be purchased for use with the GENie QC-1 in lengths up to 20 feet. Note: the internal pump may not be capable of overcoming flow restrictions associated with extreme hose lengths.

VI. Maintenance

If the instrument is returned on an annual basis to maintain NIST certification, the charcoal filter will be replaced by the factory.

Battery Replacement

To access the GENie battery compartment, the base module must be separated from the source module. This is accomplished by slightly pulling down on the base plate to release the latching mechanism and sliding the base plate in the direction of the arrows as shown below.

With the base plate out of the way it is now possible to disengage the source module. This is accomplished by sliding the source module downward (relative to the base unit) as shown.

The source module is now disengaged from the base module and can be pulled away revealing the battery compartment.

To reinstall the source module onto the base module, take the following steps: Align the air inlet fitting and the locking pins into the eyelet holes as shown. Press the two units together and slide the source module upwards (relative to the base module) to lock it in place. The two units should be flush and tightly secured at this point, then simply slide the base plate back into position until it latches.

VII. Troubleshooting

No Power to Instrument

Ensure that the POWER switch is pressed for five (5) seconds minimum.

The most common failure mode is that the batteries are dead. Try replacing the batteries with new alkaline batteries or try powering the unit from the AC power adaptor or battery extender (if available).
If the unit is being operated from the external battery extender, make sure that the power switch on the battery extender is in the 'ON' position.

'**Low PPM / High PPM warning**' accompanied by an audible beep.

The unit will produce this warning whenever the selected concentration is unobtainable through the instruments control. Simply open or close the vial adjust knob to correct. If the vial is nearly expired it is possible that the vial may need to be replaced with a fresh vial to obtain higher concentrations.

Sample draw instruments can be calibrated utilizing the GENie QC-1 by filling a gas bag and drawing the calibration gas from the bag.

'**No Source Found!**' accompanied by an audible beep.

If the source is not initially detected by the processor, the unit will display 'No Source Found' and immediately shut down. This failure can happen because a connection to the source is not made, or due to a failure of the circuit board on the generating source. Remove the source. Ensure that the electrical contacts are clean, then re-attach source.

'**Source Cal Req'd**' accompanied by an audible beep.

The source calibration life has expired and the display will show **'Source Cal Req'd'**. Return the instrument to ACD for calibration. (note the unit will still function normally in spite of calibration frequency being exceeded.)

'**Battery is low!**' accompanied by an audible beep.

Replace the batteries or switch to AC power.

VIII. Standard Warranty

ACD will warrant gas calibration equipment manufactured and sold by us to be free from defects in materials, workmanship and performance for a period of one year from date of shipment. Any parts found defective within that period will be repaired or replaced, at our option, free of charge, F.O.B. factory. This warranty does not apply to those items which by their nature are subject to deterioration or consumption in normal service, and which must be cleaned, repaired, or replaced on a routine basis.

Warranty is voided by abuse including rough handling, mechanical damage, alteration, or repair procedures not in accordance with the instruction manual. This warranty indicates the full extent of our liability, and ACD is not responsible for removal or replacement cost, local repair costs, transportation costs or contingent expenses incurred without our prior approval.

ACD, Inc.'s obligation under this warranty shall be limited to repairing or replacing, and returning any product which shall be returned to ACD, Inc. at its manufacturing facilities, with transportation charges prepaid, and which ACD, Inc.'s Material Review Board examination shall disclose to its satisfaction to have been defective.

This warranty is expressed in lieu of any and all other warranties and representations, expressed or implied, and all other obligations or liabilities on the part of ACD, Inc. including, but not limited to, the warranty of fitness for a particular purpose. In no event shall ACD, Inc. be liable for direct, incidental or consequential loss or damage of any kind connected with the use of its products or failure of its products to function or operate properly.

IX. Accessory Items / Parts List

The following items are available as accessories for the GENie QC-1 instrument.

Hard body case	730-0615-00
Nylon carrying case, GENie	730-0201-00
External battery extender	362-0010-00
Continuous operation adaptor, 115VAC with US plug (also available for international customers, please specify)	362-0600-00
Outlet fitting, body (1/8 NPT) quick connect	113-0400-00
Hose connector, insert (hose barb) quick connect	113-0402-00
Tool, ACD magnetic tip screwdriver	243-0101-00
Hose, with quick connect, 5'	715-0405-0X
O3 Module for GENie System	750-0202-02
EC Module for GENie System (complete with 500 ppm H2 generating cell)	750-0202-01

X. Specifications

Ammonia (NH3)	10 to 150 ppm
Air Flow Rate (with internal pump)	Variable
Source Life	8 hours use per vial max.
Warm-up time (to 90%)	< 30 seconds
L x W x H	5'W x 3.88'H x 3.13'D
Weight	2 lb. (1360 g)
Operating Temperature	0° C to 50° C
Relative Humidity (intermittent use)	0 -100%
Accuracy	±10%
Repeatability	±5%
Battery Power	4 alkaline 'AA'
Battery Life	Approx. 5 hours

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