

The Sensor News



Educational Publication By Cool Air Incorporated

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QUALITY AMMONIA LEAK DETECTION SYSTEMS & EQUIPMENT

Special points of interest:

- *Testing* your ammonia leak detector once a month, ensures a properly operating unit.
- *Calibrating* your ammonia leak detector once a year, ensures that the unit will not give you nuisance trips.
- When *calibrating*, order and use a new test bottle, per leak detector, each year.

Hello & Happy New Year from the Cool Air Incorporated !!

Hi Folks,

Hope your holidays were a great one! If you hadn't already noticed, the staff at Cool Air Incorporated was readily available during the long holidays to service your ammonia leak detection needs. New for 2008 (besides the information listed below) is the introduction of 'The Sensor News'. This will be an educational publication that Cool Air Incorporated plans on sending out 2-3 times a year. Our purpose for this publication is to keep you updated on the latest and greatest from Cool Air Incorporated, ammonia leak detection system selection, installation and service, and

many other useful bits of information for ammonia leak detection. Some of the articles that you will find in this first issue are: new 2008 updates to our Cool Air Incorporated product line, why ammonia leak detectors are needed in a facility, best location for an ammonia sensor, testing and calibration information for the LBW-50 and 420, and finally the 2008 conventions that we will be attending this year. Since 'The Sensor News' is going to be an educational publication, please contact us via phone @ 651-487-8844, fax @ 651-487-8857, and/or e-mail @ info@coolairinc.com for ques-

tions/suggestions/comments for future issues. We want to make this publication as interactive as possible and we are interested in your thoughts for future articles.

Thank you & Have a Great Year in 2008!

- Cool Air Incorporated

What's New for 2008 from Cool Air Incorporated

About 6-years ago or so, Cool Air Inc. introduced the LBW-420 ammonia leak detector. This unit was developed due to customer demand for an ammonia leak detector that could not only display the ammonia concentration in parts per million (PPM) but output a 4-20 mA signal. This signal would follow the PPM reading on the LBW-420. Not too long after the introduction of the LBW-420 ammonia leak detector, we introduced the Digital Central Supervisory Alarm Panel (DCSAP). This panel allows for the convenience of a central location

for monitoring all of the leak detectors that are attached to it. For 2008, Cool Air Incorporated has updated the LBW-420 to operate on a 24 VAC/VDC power supply. This will allow for a 24 VDC power supply to the LBW-420 for the circuit board operation and the 4-20 mA current loop *without* interference. In addition, the DCSAP will be updated so that it can provide the power supply for all of the ammonia leak detectors attached to it. Contact Cool Air Incorporated for more information.



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Part 1: Why Do I Need An Ammonia Leak Detector?

In December of 2007, we received a phone call from a refrigeration contractor who's customer asked this very question, "Why do I need an ammonia leak detector?" Since the contractor was doing their very best to accommodate their customer, and needing a 'detailed' answer to the question, they contacted Cool Air Inc. First, thanks for the call! We are always available to assist with ammonia leak detection questions. Second, back to the question!

Of course, our first reaction to the question was, "Why not!" But this was probably not going to be a justified answer for the customer. Better yet, we could send a disaster photo like the one at the left to emphasize our point. Again, this still may not be enough information. At this point, we could quote some of the key portions of several codes, standards, and/or best practice guidelines for ammonia refrigeration facilities:

- **Local & International Codes:** Building, mechanical, fire, and/or insurance underwriters. Most of these codes establish specific requirements for control and alarm actions based on certain levels of ammonia concentrations measured in various areas of a facility (i.e.: food preparation rooms, engine rooms, coolers, freezers, etc.).
- **EPA General Duty Clause Requirements states:** The owners & operators....have a general duty....to design and maintain a safe facility.
- **ANSI/ASHRAE Standard 15-2004 & Appendix B:**

7.2.2 (4): Refrigerant detectors are installed with the sensing location and alarm level as required in refrigerating machinery rooms in accordance with 8.11.2.1.

8.11.2.1: Each refrigerating machinery room shall contain a leak detector, located in an area where refrigerant from a leak will concentrate, that actuates an alarm and mechanical ventilationat a value not greater than the corresponding TLV-TWA (or toxicity measure consistent therewith). The alarm shall annunciate visual and audible alarms inside refrigerating machinery room and outside each entrance to the refrigerating machinery room.....Alarms set at other levels (such as IDLH¹) and automatic reset alarms are permitted in addition to those required by this section.

8.11.2.1 *Exception (a):* For ammonia, refer to 8.12 (g).

8.12 (g) *Exception:* When ammonia is used, the requirements of Class 1, Division 2, of the NEC² shall not apply providing that the requirements of 8.12 (h) are met.

8.12 (h): When ammonia is used, the machinery room is not required to meet Class 1, Division 2, of the NEC² providing (1) the mechanical ventilation system in the machinery room is run continuously and failure of the mechanical actuates an alarm or (2) the machinery is equipped with a detector conforming to 8.11.2.1 except the detector shall alarm at 1000 ppm (or less).

IDLH¹: Immediately Dangerous to Life and Health (Ammonia, 500 ppm, IIR, 1999)

NEC²: National Electrical Code, 2002

As you can see above, there are various codes, standards, and/or best practice guidelines that govern the use of an ammonia leak detector. For Part 1 of this discussion, we chose some of the more obvious information that is available for review. In our next newsletter, Part 2 will explore several other areas of interest.

In conclusion, an ammonia leak detection system functions as an important part, for the safe operation of your facility. Ammonia leak detectors are used to insure the safety of the occupants, signal the emergency ventilation and alarms, support an emergency response plan, support ammonia equipment operation and maintenance (such as pressure relief monitoring with the LBW-50-RLV, see photo at left), and shutdown electrical equipment during a major release. Contact us today, to review your ammonia leak detection needs.



"Success covers a multitude of blunders."

-George Bernard Shaw



LBW-50-RLV relief line ammonia leak detector

CALIBRATION/TESTING PROCEDURE FOR THE MODEL **LBW-50**

FIELD CALIBRATION:

Visually inspect the leak detector for any corrosion, damage, etc. that could possibly affect the calibration procedure.

Make sure that the leak detector is powered up for a minimum of 8-hours before the calibration procedure is performed.

Push the test button and make sure that all of the LED lamps light up.

Place a new ammonia test bottle (100 PPM) over the solid-state sensor and after 30-45 seconds the first LED lamp (top light) should light up. Also, the alarm and auxiliary relays should energize at this time. Remember, during the calibration procedure, the early warning LED lamp (second lamp from the bottom) will light up, and the early warning relay will energize, at 50 PPM. This is a factory set, non-adjustable setting.

Adjust the sensitivity potentiometer (right potentiometer) until the alarm LED lamp just begins to light up. Turning the adjustment clockwise will cause the LED lamps to light up from the bottom to the top. Turning the adjustment counter-clockwise will cause the LED lamps to light up from the top to the bottom.

Remove the ammonia test bottle, tighten the cap on the bottle, check-off the schedule number on the bottle, and enter the information on the attached log form.

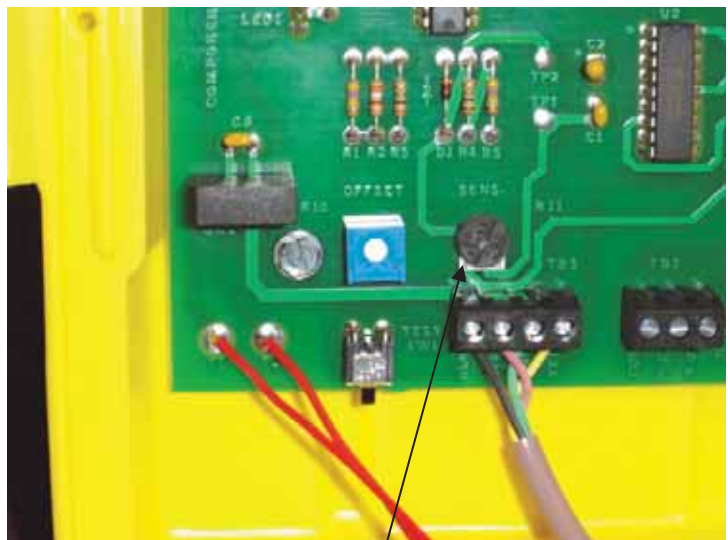
Congratulations! You have successfully calibrated your Cool Air Incorporated LBW-50 Ammonia Leak Detector. We recommend this calibration to be performed once a year using a new ammonia test bottle. These can be purchased from your local Cool Air Incorporated distributor.

FIELD TESTING:

We recommend testing *not* calibrating your ammonia leak detector once every month using the ammonia test bottle. For your convenience, there are numbers to check off on the ammonia test bottle for each month of testing. After one year, purchase a new ammonia test bottle, follow the calibration procedure above, and then use the same bottle for testing your ammonia leak detector throughout the year.



Test bottle placement for the LBW-50.



Calibration adjustment potentiometer (SENS.) for the LBW-50.

LBW-420: TEST & CALIBRATION

Be sure to follow all codes and company procedures that pertain to the maintenance, repair, testing, and calibration of all safety equipment, including this detector. At a minimum, the detector must be tested after installation (allow at least 8 hours after first applying power to the detector), and at least once a month thereafter to ensure it is operating correctly. Also, the detector must be calibrated at least once a year to ensure it is detecting and displaying ammonia concentration accurately.

At the time of calibration, it is highly recommended to use a new test bottle of ammonia that can be purchased from Cool Air Inc. or their distributors. The detector is initially calibrated and programmed at the factory. However, if a new ammonia sensor is installed, the detector must be reprogrammed with the new sensor group number and recalibrated. All tests and calibrations must be recorded on an appropriate log sheet.

Not installing, maintaining, testing, or calibrating the detector according to the schedules and procedures in this manual will automatically void the warranty.

Testing the Detector :

To test the detector, follow these steps:

1. Open the detector enclosure and slide the service switch to the "ON" position.
2. Hold a sample bottle of ammonia of concentration between 50 and 200 ppm over the sensor.
3. Check the:
 - LEDs on the front panel display and be sure they operate according to the pre-alarm (early warning) and alarm set points.
 - Digital display and be sure it shows an increasing concentration of ammonia.
 - 4-20 mA output signal to be sure it is accurate.
4. Remove the ammonia sample.

Calibrating the Detector :

Follow these instructions to calibrate the detector:

1. Find the sensor group number associated with the installed sensor. The sensor group number is a number from 1 to 6, followed by a dash and a letter, from A to C. An example sensor group number is 3-C.
2. Open the detector enclosure and slide the service switch to the "ON" position.
3. Install the jumper on the jumper pins (labeled "SET1") located below the rotary selector switch on the front panel-mounted circuit board.
4. Turn the rotary selector switch to position "8". Press the "UP" or "DOWN" button until the correct sensor group number is displayed on the front panel digital display.
5. Press and hold the "ENTER" button for at least 2 seconds.
6. Set the rotary selector switch to position "9".
7. Take a sample bottle of known ammonia concentration and wipe clean the inside and outside surface of its neck. Hold the bottle over the sensor **until a stable ammonia concentration reading is displayed**. It might take several minutes for the reading to stabilize.
8. Continue to hold the sample bottle over the sensor, and press the "UP" or "DOWN" button until the display indicates the concentration of the known sample. For example, if the sample ammonia concentration is 100 ppm, press the "UP" or "DOWN" button until the display indicates 100 ppm.
9. Press and hold the "ENTER" button for at least 2 seconds.
10. Remove the sample bottle and the calibration jumper.
11. **Wait until the ammonia concentration reading is below the pre-alarm set point**, then set the rotary selector switch to the desired position (typically "0" or "1").
12. Slide the service switch to the "OFF" position and close the detector enclosure. Calibration is now complete.

LBW-420 Pictures



Test bottle placement for the LBW-420.



Test bottle placement for the LBW-420 remote sensor.

Velcro strap is used to secure test bottle.



Adjustment switch/buttons and jumper for the LBW-420.

Part 1: Location, Location, Location!

All too often, we receive numerous phone calls and/or e-mails regarding the proper location of an ammonia sensor. Remember, each sensor is supported by the detector enclosure that houses the electronics (i.e.: dry-contacts for pre-alarm and alarm, 4-20 mA signal, PPM display, etc.). Either the entire detector enclosure/sensor combo is located near a potential leak source or the sensor can be remotely located (up to 500 feet) from the detector enclosure near the leak source. Here are some general considerations for sensor location:

- As close to a potential ammonia leak source, as possible.
- Air movement/dilution.
- Out of 'harm's way' (i.e.: washdown areas, fork lifts, etc.)
- Possible electromagnetic fields or radio frequency interference.

Gas-phase or vapor ammonia is slightly lighter than air. It will have the natural tendency to float upwards. Theoretically, the sensor should be located above potential leak source. In reality, this may not always be true due to other constraints (i.e.: other equipment in the way, too high of a location, etc.).

If the air movement or velocity is too high, there is a potential for the ammonia sample to be diluted and an erroneous reading and/or nuisance alarm may occur.

Washdown areas, forklift traffic, and other types of physical damage pose a new set of problems for sensor location. These items need to be identified and addressed. As an example, in a washdown area, it is highly recommended that you use our leak detectors which are housed in a NEMA 4X box and our optional stainless-steel washdown tube for this application. This way the detector enclosure and sensor are protected from the direct spray of water during a washdown.

It has been very rare for our leak detectors to have been adversely affected by electromagnetic fields and/or radio frequency interference. This should not be an issue if the leak detectors are properly installed and wired by qualified personnel. In the case of a remote sensor, remote light & horn, or wiring the current loop to a central supervisory alarm panel, we recommend the use of shielded cable to minimize any electrical 'noises' that could affect the sensor operation.

Hopefully, the above information is helpful for locating an ammonia sensor. In Part 2, we will further define different types of application and/or installation.

In summary, sensor placement is important for the proper performance of a leak detector. If you have comments, suggestions, and or questions, please contact us at Cool Air Incorporated.

"No man is a failure who has friends!"

- Clarence the Angel to George Baily in "It's A Wonderful Life"



Ammonia leak detector installed in an engine room.



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We are on the Web!

www.coolairinc.com



2008 Convention Schedule

International Institute of Ammonia Refrigeration (IIAR)
March 16–19, 2008
Broadmoor Hotel
Colorado Springs, CO USA



Cool Air Incorporated convention booth

International Association of Refrigerated Warehouses (IARW-WFLO-IRTA)
April 19–24, 2008
Marco Island Marriott Beach Resort, Golf Club, & Spa
Marco Island, FL USA



Refrigerating Engineers & Technicians Association (RETA)
September 23–26, 2008
Hershey Lodge & Convention Center
Hershey, PA USA

