

COOL AIR

INCORPORATED



Models

LBW-420-LEL (24 VDC powered)

Ammonia Leak Detector

CAUTION & SYMBOL DEFINITIONS:

CAUTION: Gives detailed description of different situations to avoid or not avoid for the proper operation of the equipment.



WARNING: RISK OF ELECTRIC SHOCK. DO NOT REMOVE COVER. NO USER SERVICEABLE PARTS INSIDE. REFER TO QUALIFIED SERVICE PERSONNEL.

AVIS: RISQUE DE CHOC ELECTRIQUE. NE PAS ENLEVER LE COUVERCLE. AUCUN ENTRETIEN DE PIECES INTERIEURES PAR L'USAGER. CONFIER L'ENTRETIEN AU PERSONNEL QUALIFIE.

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IMPORTANT—READ THIS FIRST

PLEASE READ AND UNDERSTAND THIS SECTION BEFORE INSTALLING AND OPERATING THE LBW- 420-LEL DETECTOR

CAUTION:

After applying power, test the detector to ensure it is operating correctly. Be sure the detector has been powered for at least 10 minutes before testing.

Do not store this manual inside the detector, as this might result in damage to components from excessive heat.

**ADEQUATELY COVER THE DETECTOR SENSOR
DURING WASHDOWN, AND AVOID SPRAYING THE
WASHDOWN LIQUID DIRECTLY ONTO THE SENSOR**

Avoiding unwanted Alarms or shutdowns

To avoid nuisance alarms, place the detector in service mode before:

- Programming the alarm set point.
- Performing maintenance, repairs, testing, or calibration.
- Performing refrigeration system maintenance.
- Removing the ammonia sensor.

INTRODUCTION

The Cool Air Incorporated LBW-420-LEL Detector is a state-of-the-art ammonia leak detector that detects and displays ammonia concentrations of 0 to 9.9%. It comes equipped with a long-life ammonia sensor that has a quick and accurate response to ammonia concentrations.

The Cool Air Incorporated LBW-420-LEL has a fully isolated DC to DC power supply, allowing the LBW-420-LEL to be powered from the same DC supply as the 4-20 mA monitoring circuits without concern for ground isolation.

The LBW-420-LEL requires a DC supply voltage between 18 and 36 volts DC.

The LBW-420-LEL can be configured to supply power to the 4-20 mA circuit(s) or can operate as a fully isolated 4-20 mA sensor. Refer to **4-20 mA Analog Outputs** for more details.

The Cool Air Incorporated LBW-420-LEL can be optionally equipped with an AC to DC converter to allow operating the detector with 100 to 240VAC input.

Once the detector senses ammonia at or above the ALARM set point, the relays will activate and stay activated until a relay reset is initiated (see “**Resetting the Relays**”)

STANDARD FEATURES

All LBW-420-LEL’s come with these additional standard features:

- Programmable Alarm set point.
- Selectable Service Mode timeout.
- Range selectable 4-20 mA analog output signals, for ammonia
- Normally-open, normally-closed contacts for shutting down compressors and closing valves.
- A NEMA 4X, UL-listed enclosure.

AVAILABLE OPTIONS

- A remote alarm light and horn box with a toggle switch to TEST/NORMAL/SILENCE the alarm.



Contact Cool Air Incorporated technical support for more detailed information, or for purchasing any of these options.

PARTS DESCRIPTION

Front Panel Display

The front panel display is comprised of a digital display and a series of labeled indicating LED's. The seven-segment, four-digit display indicates a variety of information, such as ammonia concentration and more, depending on the position of the rotary selector switch. Ammonia concentration is displayed in percent ammonia. The LED's provide an indication of ammonia concentration and alarm status at a glance.

Alarm indication
All Relays will be active when this is on.



Alarm disabled indication. All relays will be deactivated when this LED is on.

Two digit seven segment display. In normal operating mode this will display the ammonia concentration. It will also be use in setting options and calibration.

Ammonia Sensor

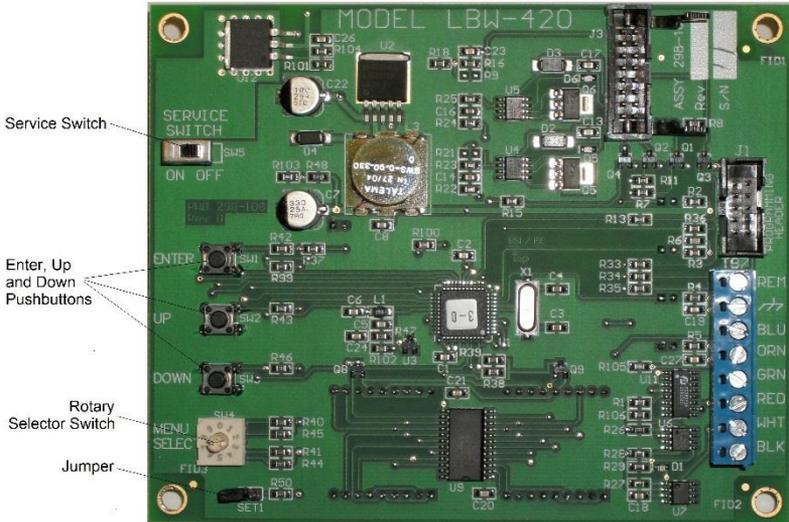
The detector comes with a long-life sensor that has a high sensitivity to ammonia with a quick response at levels above .1%.

Front Panel-Mounted Circuit Board

The front panel-mounted circuit board contains the controls necessary for programming and operating the detector. Each control is described in detail below. When the detector enclosure is open, this circuit board is on the left, attached to the front panel.

NOTE: The service switch may be a jumper instead of the switch.

LBW-420 and LBW-420-1 Ammonia Leak Detectors



Front Panel-Mounted Circuit Board

Service Jumper (Service Mode)

The detector can be set to one of two modes: normal operating mode or service mode. The detector is in normal operating mode when the service jumper is in the “OFF” position. When the service jumper is in the “ON” position, the detector continues to function as usual, however the alarm, pre-alarm, and auxiliary relays are disabled as well as the 4 to 20mA signal is set to 4ma (0%). This allows the detector to be serviced, tested, and calibrated without tripping the alarm relays and setting alarms or causing shutdowns.

When the detector is in the service mode, “Alarms Disabled” LED will be illuminated (service jumper “on”). This is done as a reminder to set the jumper back to “off” when service is done. If the service jumper is not returned to off it will automatically return to an as off state after a selected amount of time. The factory default is 15 minutes.

See “Setting the Service Mode Timeout”

The “ENTER”, “UP”, and “DOWN” Pushbuttons

The “UP” and “DOWN” buttons are used for setting the digital display to the desired value, and the “ENTER” button is used for programming a value previously set on the digital display. These buttons are used when programming: the set points, configuring other options, they are also used during calibration of the detector.

Rotary Selector Switch

The rotary selector switch (labeled “MENU SELECT” on the front panel-mounted circuit board) is used for performing functions such as:

- Setting the information displayed on the front panel
- Programming set point
- Displaying system information
- Calibrating the detector
- Resetting the relays

When the detector is in operation, this switch is typically set to position “0” to continuously display ammonia concentration.

Use the following chart to select the switch position for the desired function:

To:	Set the Rotary Selector Switch to:
Display ammonia concentration in percent	0
Display ammonia concentration in percent	1
Display the firmware revision	2
Program the ammonia alarm set point	3
Factory Use	4
Factory Use	5
Factory Use	6
Factory Use	7
Factory Use	8
Factory Use	9

Note: If the rotary selector switch is left in a position other than “0” for more than 5 minutes, the digital display will begin to display ammonia concentration. If this happens, return the selector switch to the “0” position, then set the switch to the desired position. For example, if you set the rotary selector switch to position “3” to program the alarm set point, and if, after 5 minutes of inactivity the display reverts to displaying ammonia concentration, move the switch to “0”, then back to “3” to continue programming the alarm set point.

Caution: Before closing the detector enclosure, be sure to return the rotary selector switch to position “0” to correctly display ammonia concentration.

Additional functions are available through the rotary selector switch when the jumper (labeled “SET1”), located below the rotary selector switch on the front panel-mounted circuit board, is installed:

To:	Set the Rotary Selector Switch to:
Factory Use	0
Factory Use	1
Display the firmware revision	2
Program the ammonia sensor Range	3
Set the Service Mode Time out	4
Resetting the relays	5
Factory Use	6
Factory Use	7
Factory Use	8
Calibrate the detector	9

Enclosure-Mounted Circuit Board

The Enclosure Mounted Circuit board contains the relays, output contacts and termination points for connecting to external equipment. When the detector enclosure is open, this circuit board is on the rear wall of the enclosure. The enclosure-mounted circuit board is shown in the following picture and described in detail below.

Power (LBW-420-LEL)

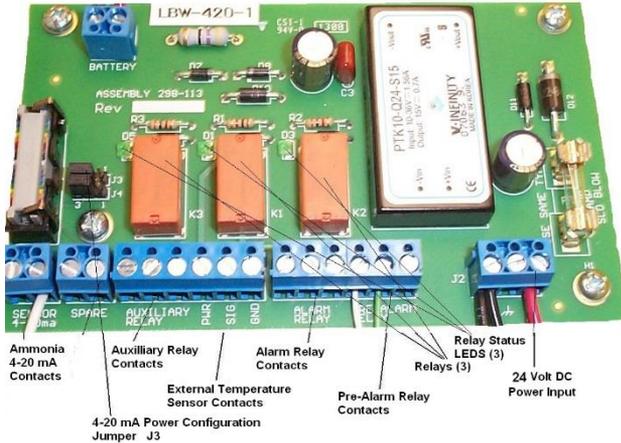
Power for the LBW-420-LEL must be a DC voltage between 18 and 30 volts with a current rating of at least 0.5 amps at 24 volts. Power is connected to terminal block J2.

Jumper J3, Ammonia signal (LBW-420-LEL only)

Jumper J3 (ammonia signal) configures the LBW-420-LEL to use either an external power supply for the Ammonia 4-20 mA circuit or to use an on board 30-volt DC supply for the 4-20 mA circuits. With the jumper in the leftmost position, connecting pins 2 to 3 (as shown in the picture on the next page) 4-20mA power is supplied by the on-board supply.

With the jumper in the rightmost position, connecting pins 2 to 1 (opposite of picture) 4-20 mA power must be supplied by an external supply.

LBW-420-1 Enclosure Mounted Circuit Board



Jumpers Required

Jumpers J3 must be installed in either position. If the jumper is removed, the 4-20 mA circuit(s) will not function.

Relays

The detector has three miniature printed circuit board relays: the alarm, pre-alarm (early warning), and the auxiliary relays. In the normal operating mode, the relays are energized in a normally-open state. If a loss of power to the detector occurs, the relays will de-energize and the alarms, if connected, will sound. When relays have been activated by an alarm condition they will need to be manually rest after conditions are returned to normal. (“**Resetting the Relays**”)

Relay Status LEDs

Each relay has a surface-mounted LED associated with it that indicates the status of the relay. A relay is energized (a non-alarm condition) when its LED is lighted (green), and de-energized (an alarm condition) when the LED is not lighted.

External Connections

Contacts for external connections:

- 4–20 mA outputs for ammonia level
- Auxiliary Relay contacts
- Alarm Relay contacts
- Pre-alarm Relay contacts
- LBW-420-LEL DC Power

4–20 mA Analog Outputs

The detector has a 4-20 mA analog output that allows it to communicate with external devices such as computers, PLCs, and digital displays. The output conforms to ISA S50.01 ratings, Type 2L and Type 2H (two-wire).

The ammonia level detector output current (TB2, “Sensor 4-20mA” terminals on lower left of Enclosure Mounted Circuit Board) is proportional to ammonia PPM with the proportionality constant dependent on the range. The PPM value can be determined using one of the following formulae:

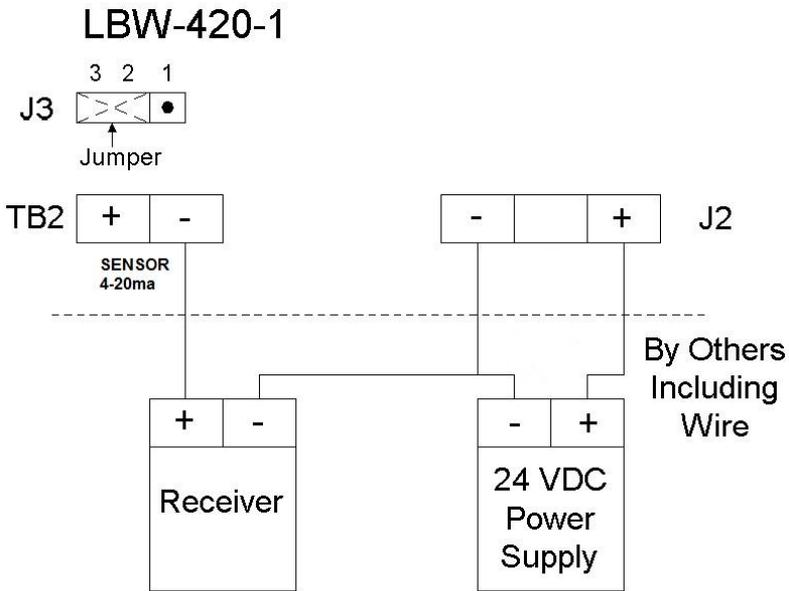
$$\begin{array}{ll} \% \text{ NH}_3 = .041667 (I - 4) & 0 \text{ to } 1\% \text{ Range} \\ \% \text{ NH}_3 = .083334 (I - 4) & 0 \text{ to } 2\% \text{ Range} \\ \% \text{ NH}_3 = .416667(I - 4) & 0 \text{ to } 10\% \text{ Range} \end{array}$$

Where % NH₃ equals ammonia concentration in percent and I equal the output current in mA. For example, if the current is 4 mA, then the ammonia concentration is 0 %. If the current is 20 mA, then the ammonia concentration is 1% PPM (1% range), 2% (2% range), and 10% (10% range)

4 to 20mA WIRING

Wiring Diagram: LBW-420-LEL with (1) – 24 VDC Power Supply

For this configuration, with the jumper J3 in the leftmost position (which connects pins 2 & 3) power for the 4-20 mA circuit is provided by the LBW-420-LEL. This circuit is shown below. The power supply must supply all power for the LBW-420-LEL plus the 4-20 mA circuit. Refer to the specifications page for the power requirements for the LBW-420-LEL. The voltage drops across the detector and the receiver together must not exceed the power supply voltage. This circuit is shown in figure 1 below:

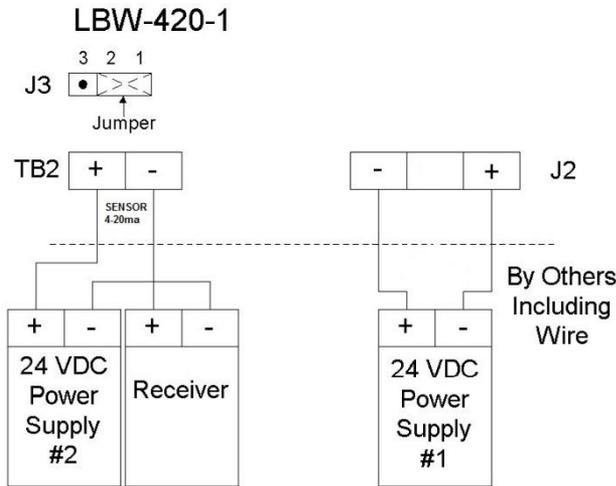


Typical 3 Wire Application
With 1 Power Supply

FIGURE 1

Wiring Diagram: LBW-420-LEL with (2) – 24 VDC Power Supplies

In this configuration, with the jumper J3 in the rightmost position (which connects pins 1 & 2), power for the LBW-420-LEL is supplied by the 24 VDC power supply #1 only. The power supply must supply all power for the LBW-420-LEL. Refer to the specifications page for the power requirements for the LBW-420-LEL. The power for the 4-20 mA circuit is supplied by the 24 VDC power supply #2. The 4-20 mA circuit is a simple series circuit that includes the LBW detector, a power supply, and the receiving device. It is recommended that a 24 VDC low-noise power supply be used for this application, although power supplies providing a minimum of 10 VDC to a maximum 30 VDC can be used. The voltage drop across the detector and the receiver together must not exceed the power supply voltage. This circuit is shown in Figure 2 below:



Typical 4 Wire Application
With 2 Power Supplies

FIGURE 2

For the LBW-420-LEL, the maximum allowable resistance in the receiving device must not exceed Rmax using this formula:

$$R_{max} = 50 (V_s - 7.5)$$

Where V_s is the supply voltage in volts DC for the 4-20 mA circuit. For example, with a supply voltage of 24 VDC, the maximum allowable resistance is 825 Ω .

INSTALLATION AND SETUP

Caution: Do not apply power to the detector until instructed to do so.

The detector comes with four mounting feet, packaged in the detector enclosure for shipment. Use the directions that accompany the mounting feet for mounting the detector enclosure.

The detector should be mounted in a location where ammonia leaks are most likely to occur, such as near valve groups, compressors, and refrigeration coils. Be sure the detector is visible and easily accessible. Avoid locating the detector where it might be damaged during wash-down.

When power is applied to the detector, it will immediately go into alarm status and the display will show an unusually large ammonia concentration. This is normal. When the sensor warms to normal operating temperature (usually about a minute) the detector will return to a non-alarm status. However, you will need reset the relays (see “**Resetting the Relays**”) as they are latched in the alarm condition until a manual reset is initiated. **For this reason, the detector should be placed in service mode before applying power to the detector to avoid unwanted alarm condition.**

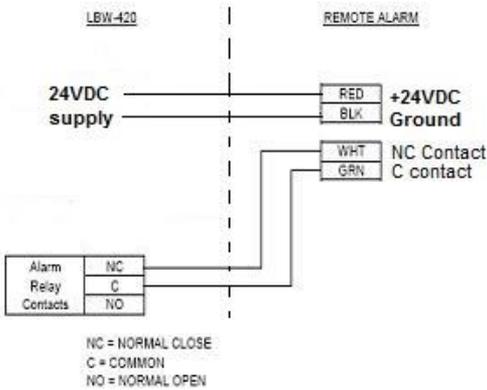
The detector is calibrated and programmed at the factory. To program the detector for its specific installation, follow these steps in the order given:

1. Open the detector enclosure and place the detector in service mode by moving the service jumper to the “ON” position.
2. Apply power to the detector and allow the sensor to warm to normal operating temperature (at normal operating temperature, the display will read “0” and Alarm LED will be unlit).
3. Program the ammonia Alarm set point. See the next section on programming the ammonia alarm set point.
4. Be sure the displayed ammonia concentration is below the programmed alarm set point, return the detector to normal operating mode by moving the service jumper to the “OFF” position.
5. Test the detector to ensure it is operating correctly (but allow at least 10 minutes after power is first applied to the detector before testing). See the section on testing the detector.

Remote Alarm Installation

Remote Alarm provides audible and visible alarms of the LBW-420-LEL at a remote location. This wiring diagram shows the connections from the LBW-420-LEL to the Remote Alarm. Power for the Remote Alarm is derived from LBW-420-LEL TB7 on the Front Panel Circuit Board. An alarm signal is derived from the LBW-420-LEL enclosure-mounted circuit board. The Remote Alarm device is pictured next to the wiring diagram

LBW-420 to RA Wiring



PROGRAMMING AND OPERATION

The LBW-420-LEL detector is easy to program and operate. Follow the instructions in this section to:

- Program the ammonia alarm set point
- Set the 4 to 20mA range
- Set the Service mode time out

Programming the Ammonia Alarm Set Point

The Alarm set point can be set from .1% to 9.9% in .1% increments.

1. Open the detector enclosure and move the service jumper to the “ON” position.
2. Set the rotary selector switch to position “3”.
3. Press the “UP” or “DOWN” button until the desired set point concentration in % is displayed.
4. Press and hold the “ENTER” button for at least 2 seconds. The new set point is now programmed.
5. Return the rotary selector switch to the desired position.
6. **Be sure the ammonia concentration reading is below the alarm set point**, then move the service jumper to the “OFF” position and close the detector enclosure.

Resetting the Relays (for use only when the ammonia concentration is below the alarm set point)

If the detector has gone into an alarm condition (at or above the Ammonia Alarm Set point) the relays will activate and stay activated until this manual reset procedure is completed.

1. Install the jumper on the jumper pins (labeled “SET1”) located below the rotary selector switch on the front panel-mounted circuit board.
2. Set the rotary selector switch to position “5”. The display will indicate the current ammonia concentration in percentage.
3. Press the “ENTER” button for two seconds. The relays should reset to their normal operating condition.

Programming the 4-20 mA range

The ammonia level 4-20 mA signal can be scaled to one of three ranges, either 0-1% (r.1), 0-2% (r.2), or 0-10% (r.3). To program the 4-20 mA range, follow these steps:

1. Open the detector enclosure and move the service jumper to the “ON” position.
2. Install the jumper on the jumper pins (labeled “SET1”) located below the rotary switch on the front panel-mounted circuit board.
3. Set the rotary selector switch to position “3”. The display will indicate the current range, either “r.1 (0 to 1% range), “r.2” (0 to 2% range), “or “r.3” (0 to 10% range).
4. Press the “UP” or “DOWN” button until the display indicates the desired range.
5. Press and hold the “ENTER” button for at least 2 seconds. The new range is now programmed.
6. Remove the jumper and return the rotary selector switch to the desired position.
7. Move the service jumper to the “OFF” position and close the detector enclosure.

Setting the Service Mode Timeout

If the service jumper is not returned to off, you can change how long the detector stays in service mode before returning to normal operating mode.

With the SET jumper on and the Rotary Switch in position 4 you can use the up and down buttons to select either;

- 1.5d – After 15 minutes in the on position the detector will return to normal mode.
- 3.0d – After 30 minutes in the on position the detector will return to normal mode.
- 4.5d – After 45 minutes in the on position the detector will return to normal mode.
- 6.0d – After 60 minutes in the on position the detector will return to normal mode.

Once you have selected the desired service mode timeout you must hold the ENTER button for two seconds before removing the SET 1 jumper or changing the rotary switch.

Failure indicators

If the detector display is behaving erratically and going in and out of alarm, the sensor or sensor adaptor board may be disconnected or defective.

TEST AND 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 10 minutes 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.

The detector is initially calibrated and programmed at the factory. However, if a new ammonia sensor is installed, the detector must be recalibrated. All tests and calibrations must be recorded.

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 move the service jumper to the “ON” position, if needed. This step disables the Pre-Alarm, Alarm, and Auxiliary relays so that any attached strobe lights, horns, and/or monitoring systems are not activated. In some applications, if alarming is required, leave the service jumper in the “OFF” position.
2. Attach the calibration adaptor to the sensor and flow the test gas at no greater than .5Lpm.
3. Check the following:
 - When the ammonia concentration reaches the Alarm set point the Alarm LED (red) will blink.
 - Digital display shows an increasing concentration of ammonia in PPM.

- 4-20 mA output signal shows an increasing value that corresponds to the digital display.
4. Remove the ammonia sample.
 5. **Wait until the ammonia concentration reading is below the alarm set point**, then move the service jumper to the “OFF” position and close the detector enclosure. Remember, this step is only required if the service jumper was moved to the “ON” position in step # 1 above. Testing is now complete.

Calibrating the Detector

Follow these instructions to calibrate the detector:

4. Open the detector enclosure and move the service jumper to the “ON” position, if needed. This step deactivates the pre-alarm, Alarm, and Auxiliary relays so that any attached strobe lights, horns, and/or monitoring systems are not activated. In some applications, if alarming is required, leave the service jumper in the “OFF” position.
5. Install the jumper on the jumper pins (labeled “SET1”) located below the rotary selector switch on the front panel-mounted circuit board.
6. Set the rotary selector switch to position “9”.
7. Attach the calibration adaptor to the sensor and flow the calibration gas at no greater than .5Lpm **until a stable ammonia concentration reading is displayed** (this should be no longer than 60 seconds)
8. Press the “UP” or “DOWN” button until the display indicates the concentration of the known sample. For example, if the sample ammonia concentration is 1%, press the “UP” or “DOWN” button until the display indicates 1.0.
9. Press and hold the “ENTER” button for at least 2 seconds.
10. Remove the Calibration gas, calibration adaptor, and the calibration jumper.
11. **Wait until the ammonia concentration reading is below the alarm set point**, then set the rotary selector switch to the desired position (typically “0” or “1”).
12. Move the service jumper to the “OFF” position and close the detector enclosure. Remember, this step is only required if the service jumper was moved to the “ON” position in step # 2 above. Calibration is now complete.

TECHNICAL SUPPORT

For technical support, contact Cool Air Incorporated using any of these methods:

Contact: Technical support
Phone: (763) 205-0844 (USA)
Fax: (763) 432-9295 (USA)
E-mail: info@coolairinc.com
Web site: www.coolairinc.com
Address: Cool Air Incorporated
1544 134th Ave NE
Ham Lake, MN 55304
USA

WARRANTY

36-Month Limited Warranty & Limitation of Liability

1. Limited Warranty

Cool Air Incorporated (CAI) warrants to the original purchaser and/or ultimate customer (“Purchaser”) of CAI ammonia leak detector (“Product”) that if any part thereof proves to be defective in material or workmanship within thirty-six (36) months from the date of shipment, such defective part will be repaired or replaced, free of charge, at CAI’s discretion if shipped prepaid to CAI at 1544 134th Avenue NE, Ham Lake, MN 55304, in a package equal to or in the original package. Before making the return shipment, contact CAI @ 763-205-0844 to request an RMA # to be prominently displayed on the returned package. The product shall be returned freight prepaid and repaired or replaced if it is determined by CAI that the part(s) failed due to defective materials or workmanship. The repair or replacement of any such defective part shall be CAI’s sole and exclusive responsibility under this limited warranty.

2. Inclusions:

A. As of September 2, 2014, the defined Product that is covered by this thirty-six (36) month limited warranty is the LBW-50, LBW-420-LEL, LBW-RLV, LBW-420, LBW-WATCHMAN, and DCSAP.

B. If an ammonia gas sensor is part of the Product, the ammonia gas sensor is covered by the same thirty-six (36) month limited warranty offered by CAI.

C. In order for this thirty-six (36) month limited warranty to be fully effective, the Purchaser shall be responsible for following the manufacturer’s recommended monthly bump testing in highly critical areas, every 3-months bump testing in non-critical areas, and annual or twelve (12) month calibration service, which shall include proof of recordkeeping for testing and calibration by the Purchaser.

3. Exclusions:

A. If an ammonia gas sensor is covered by this thirty-six (36) month limited warranty, the ammonia gas sensor shall

be subject to inspection by CAI for abuse, misuse, negligence, damage by accident, abnormal conditions of operation, handling or use by the Purchaser. Should such inspection indicate that the ammonia sensor has prematurely failed due to abuse, misuse, negligence, or damage by accident or abnormal conditions of operation, handling or use by the Purchaser, this limited warranty shall not apply to the ammonia gas sensor.

B. This thirty-six (36) month limited warranty does not cover consumable items such as back-up batteries or ammonia test bottles.

4. **Warranty Limitation, Inclusions, & Exclusions:**
Cool Air Incorporated shall have no further obligation under this limited warranty. All warranty obligations of Cool Air Incorporated are extinguishable if the Product has been subject to abuse, misuse, negligence, or damage by accident or abnormal conditions of operation, handling or use by the Purchaser or if the Purchaser fails to perform any duties set forth in this limited warranty or if the Product has not been operated in accordance with the instructions, or if the Product serial number has been removed or altered.

6. **Disclaimer of Unstated Warranties**
THE WARRANTY PRINTED ABOVE IS THE ONLY WARRANTY APPLICABLE TO THIS PURCHASE. ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED

7. Limitation of Liability

IT IS UNDERSTOOD AND AGREED THAT COOL AIR INCORPORATED'S LIABILITY, WHETHER IN CONTRACT, IN TORT, UNDER ANY WARRANTY, IN NEGLIGENCE OR OTHERWISE SHALL NOT EXCEED THE AMOUNT OF THE PURCHASE PRICE PAID BY THE PURCHASER FOR THE PRODUCT AND UNDER NO CIRCUMSTANCES SHALL COOL AIR INCORPORATED BE LIABLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES. THE PRICE STATED FOR THE PRODUCT IS A CONSIDERATION LIMITING COOL AIR INCORPORATEDS' LIABILITY. NO ACTION, REGARDLESS OF FORM, ARISING OUT OF THE TRANSACTIONS UNDER THIS WARRANTY MAY BE BROUGHT BY THE PURCHASER MORE THAN FIVE YEARS AFTER CAUSE OF ACTIONS HAS OCCURRED.

LBW-420-LEL and LBW-420-LEL SPECIFICATIONS

Ammonia Detection Sensitivity	0 to 10%
Display	0.8", 7-segment LED, 4-digit
Controls	Service mode jumper Enter, Up, and Down pushbuttons Rotary selector switch Jumper
Ammonia Sensor	Ammonia gas sensing head
Relays	Alarm, pre-alarm, and Aux Form C (SPDT), normally-open, normally-closed, energized in normally-open state Contact rating: 5A, 120 VAC or 24 VDC
Outputs	Contacts for: alarm, pre-alarm, and auxiliary relays, 4-20 mA DC, conforming to S50.01 ratings, Type 2L and Type 2H
Operating Temperature	40°F to 110°F
Operating Humidity	5% to 95% RH, non-condensing
Power Requirements	LBW-420-LEL 24 Volts DC, 18 – 36, +/- 10% 0.25 Amps max.
Dimensions	9½"H x 8"W x 4½"D
Weight	6 lbs.
Enclosure	NEMA 4X rated, UL listed
Pollution Degree	1
Options	1. 100 to 240VAC to 24VDC power supply 2. Remote alarm light and horn unit with box, cable, & TEST/NORMAL/SILENCE toggle switch.

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