

COOL AIR

INCORPORATED



Digital Central Supervisory Alarm Panel

TABLE OF CONTENTS

IMPORTANT—READ THIS FIRST 4

CAUTIONS..... 4

STANDARD FEATURES..... 5

AVAILABLE OPTIONS 6

INSTALLATION AND SETUP..... 7

EXAMPLE APPLICATION..... 8

APPLYING POWER & PANEL SET-UP 11

 APPLY POWER TO THE PANEL BY PLUGGING THE SUPPLIED POWER CORD
 INTO A 115-VAC POWER SOURCE. 11

PROGRAMMING THE RANGE SELECTION 11

DESCRIPTION..... 13

FRONT PANEL DISPLAY..... 13

Early Warning Common Alarm Normal/Silent Switch..... 15

Increment & Decrement switches 15

Ammonia Leak Detector Indicators & Controls..... 16

CIRCUIT BOARDS AND TERMINATIONS..... 16

FRONT PANEL-MOUNTED CIRCUIT BOARDS..... 17

Control/Display Circuit Board 17

Light/Switch Circuit Board 19

REAR PANEL TERMINAL BOARD 19

CHECKING THE FIRMWARE VERSION 21

TESTING THE PANEL AND SYSTEM 22

APPENDIX C: TERMINAL BLOCKS 23

CONTROL BOARD TERMINALS..... 24

4-20 mA connection..... 26

APPENDIX D: TECHNICAL SUPPORT 28

E-MAIL: 28

WEBSITE: 28

WARRANTY..... 29

**DIGITAL CENTRAL SUPERVISORY ALARM PANEL
SPECIFICATIONS..... 30**

IMPORTANT—READ THIS FIRST

**PLEASE READ AND UNDERSTAND THIS SECTION BEFORE
INSTALLING AND OPERATING THE DIGITAL CENTRAL
SUPERVISORY ALARM PANEL**

CAUTIONS



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.

After previewing the section labeled “INSTALLATION & SET-UP” on page 8 of this manual, apply power and test the panel to make sure it is operating correctly.

DO NOT store this manual in the panel enclosure, as this might result in damage to components from excessive heat. If you would like this manual in a pdf format, please download it from our website @ www.coolairinc.com.

STANDARD FEATURES

The Cool Air Incorporated Digital Central Supervisory Alarm Panel (DCSAP) is designed to monitor 8, 16, 24, or 32 independent, ammonia leak detectors and provides a central location for monitoring alarms.

The panel comes with these additional standard features:

- Digital display to display the concentration level of connected ammonia detectors (only for detectors with a 4-20 mA output signal like the Cool Air Incorporated LBW-420/420-1 detectors).
- Audible and visible warnings of excess leak levels (Early Warning & Alarm) of any connected ammonia leak detector.
- Common relay for Early Warning and common relay for Alarm each with normally-open (N.O.), normally-closed (N.C.) dry-contacts to send a signal to a fire or security monitoring system.
- A safety-yellow, NEMA4X, UL-listed enclosure.

AVAILABLE OPTIONS

In addition to the standard features, the Digital Central Supervisory Alarm Panel can be equipped with these options:

- Fieldbus connection to communicate status and ammonia concentration levels (or 4-20 mA level) to connected building monitoring equipment. Models are available to support the following field buses.
- - Modbus RTU
 - ControlNet
 - Ethernet /IP

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

INSTALLATION AND SETUP

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

The DCSAP enclosure comes standard with built-in mounting feet. Make sure the panel is securely fastened to a solid surface. Also, allow room around the panel for conduit runs.

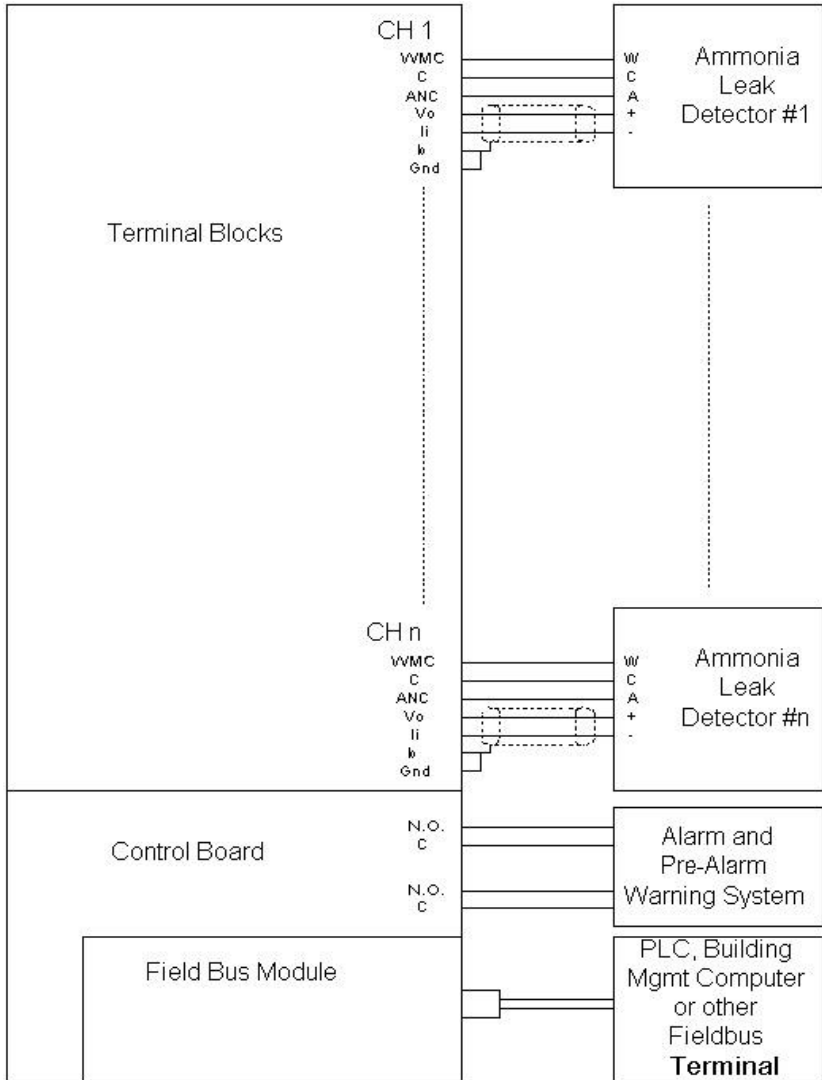
The panel should be mounted in a location where it is protected from the extremes of heat and cold, and protected from extreme radio frequency and/or electro-magnetic radiation. Avoid locating the panel where it might be damaged during washdown.

The panel operates, without modification and/or adjustment, on a specified range of supply voltages and frequencies. Refer to the specifications section for specific values and/or contact the Cool Air Incorporated technical support.

Following installation, the DCSAP, associated wiring, and ammonia leak detectors should be thoroughly tested to assure proper operation. Samples of ammonia should be introduced to each connected ammonia leak detector and proper operation of the warning and alarm contacts of the ammonia leak detector and related unit number of the DCSAP should be confirmed. If the ammonia leak detector is equipped with a 4-20 mA output connected to the DCSAP, appropriate indications of signal level should be confirmed at the ammonia leak detector and DCSAP and both digital indicators if so equipped.

Example Application

This Diagram shows an example DCSAP application.



Digital Central Supervisory Alarm Panel (DCSAP)

Wiring between the DCSAP and the ammonia leak detectors requires at least 5 conductors with at least one shielded pair. Minimum wire size is 28 AWG and maximum wire size is 14 AWG (0.3 to 1.4 mm dia) with the larger size limited by the terminal blocks on the DCSAP. Connections to a LBW-50 or LBW-RLV ammonia relief line gas detectors require 18 AWG wire minimum. One way to achieve the required connection is with a single cable with three shielded pairs in the cable. Shields should be connected to the ground terminal of the DCSAP and **SHOULD NOT** be connected to any other ground. Shields that are connected to more than one ground point can not function correctly to reduce noise, and can actually increase the noise level of the 4-20 mA signal.

Wire and/or cable must be selected and installed to comply with local codes and with the requirements of the installation (plenum or non-plenum etc.). One cable that meets the requirement is :

Belden 8777 (22 AWG, 7/30 stranded, 3 individual shielded pairs with 1 drain wire per pair) or equivalent.

This cable consists of 3 individual foil shielded pairs of wires: black & red, black & white, black & green. Each pair of foil wrapped wires contains a 22 AWG drain wire. The only drain that is used is the drain wire for the black & red pair of wires (4-20 ma signal lines).

DCSAP terminal block wiring:

1. Remove factory install wire jumper from Wnc -> Com -> Anc. DO NOT remove the factory jumper in location Io -> Gnd unless daisy chaining the 4-20 ma circuit to an external PLC.
2. Remove outer PVC insulation 2" back from end of cable.
3. Unwrap each signal pair foil shield 1" from cable end and discard.
4. Remove the shield drain wire from the black/white and black/green pair of wires.
5. Dress up the stripped back cable end with shrink tube (or electrical tape) to prevent any cable shorting to adjacent terminal block signals.
6. Strip back each wire ¼".
7. Install the wires into each terminal block using the table below:

Digital Central Supervisory Alarm Panel (DCSAP)

At LBW-420 end:

1. Remove outer PVC insulation 2” back from end of cable.
2. Unwrap each signal pair foil shield 1” from cable end.
3. Remove all drain wires.
4. Dress up the stripped back cable end with shrink tube (or electrical tape) to prevent any cable shorting to adjacent terminal block signals.
5. Strip back each wire ¼”.
6. Install wires into screw terminal blocks as shown below:

Wire pair	Color	DCSAP Terminal block pin	LBW-420 Terminal block pin
Black/red	Red	Vo	TB-2 (+)
Black/red	Black	Ii	TB-2 (-)
Black/White	White	Wnc	Pre-alarm Relay - NC
Black/White	Black	Com (2 wires)	Pre-alarm Relay - C
Black/Green	Green	Anc	Alarm - NC
Black/Green	Black	Com (2 wires)	Alarm - C
Shield wire	Bare	Gnd	Not connected

NOTE:

If an external PLC is to share a 4-20 ma circuit with the DCSAP :

1. Remove the factory jumper between the terminal block pins Io & Gnd.
2. Install a shielded 2 wire cable from terminal block Io to the PLC 4-20 ma + input.
3. Install the second cable wire from the PLC 4-20ma – input to DCSAP terminal block Gnd.
4. The 2 wire shielded cable must have the shield drain connected to a ground point at either end of the cable.

APPLYING POWER & PANEL SET-UP



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.

Apply power to the panel by plugging the supplied power cord into a 115-VAC power source.

Programming the Range Selection

There are six PPM (ammonia concentration) ranges available in the DCSAP which correspond to the six ranges available from the Cool Air LBW-420/420-1 ammonia leak detector(s). If the DCSAP and LBW-420/420-1's are purchased as a system from Cool Air Incorporated, both will be set to the appropriate range for the application and range selection will not be required in the field unless the LBW-420/420-1 range is changed.

If the DCSAP and ammonia leak detector(s) are purchased separately, it is necessary to confirm that the 4-20 mA circuit that connects the two units is scaled to same range in both units or to adjust the range in one or both units until they are both set to the same range.

CAUTION: If the DCSAP and ammonia leak detector 4-20 mA scale factors (range) are not the same, the PPM value indicated on the DCSAP 4-digit display and transmitted via the Fieldbus will not be correct. The range does not affect the 4-20 mA value transmitted via the Fieldbus.

Since it is possible for ammonia leak detectors on different channels to be set to different ranges, the range must be confirmed and/or adjusted for each channel.

Digital Central Supervisory Alarm Panel (DCSAP)

To determine the range for a DCSAP channel, first select the channel using the “Increment” and “Decrement” switches until the desired channel number is displayed on the small two digit display. Next, open the door, press the “Teach” button on upper left corner of the Display board (see illustration on page 11). The range value (OFF, r100, r250, r400, r500, r800, or r1000) will be displayed on the large four digit display.

To change the range, press and hold the “Teach” button, then use the “Increment” switch to cycle through the seven values (OFF, 100, 250, 400, 500, 800, or 1000) until the desired range is displayed on the large four digit display. When the desired range is displayed, release the “Teach” button.

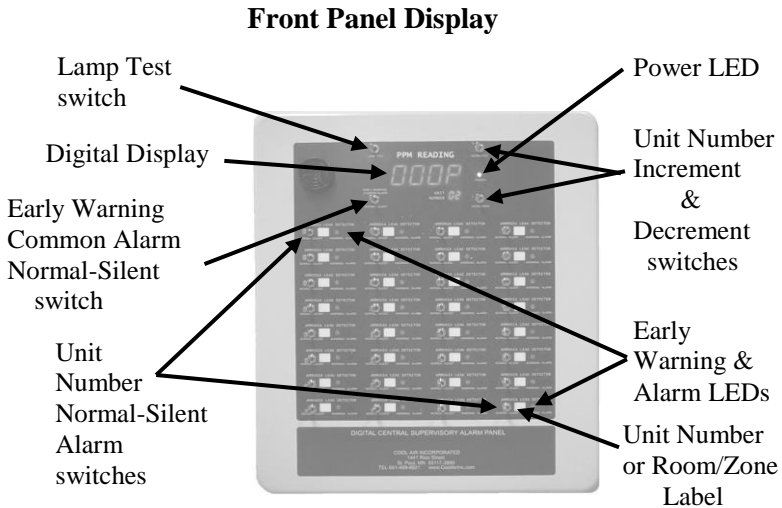
The available ranges and equivalent scale factors are shown in the following table.

Range	Scale Factor (PPM/mA)
IE3 (1000)	62.5
800	50
500	31.25
400	25
250	15.67
100	6.25
OFF	N/A

LBW-50 and LBW-RLV Ammonia leak detectors do not have a 4-20 mA signal, so the Range should be set to “OFF” for these and any other detectors that do not have a 4-20 mA signal. The Warning and Alarm indications will work normally. The large four digit display will not display a PPM value (---). Note that if any other range is selected for detectors that do not have a 4-20 mA signal, the large four digit display will indicate “Err1” for these channels.

When connecting an ammonia leak detector not manufactured by Cool Air Incorporated, the scale factor must match one of the available ranges. If not it is necessary to select the “OFF” mode for the channel. In the OFF mode, the Warning and Alarm indications will work normally. The large four digit display will not display a PPM value (----).

DESCRIPTION



FRONT PANEL CONTROLS & INDICATORS

Front Panel Display

The front panel display is comprised of two digital displays, a series of labeled indicating LEDs and several toggle switches. The large seven-segment, four-digit display indicates ammonia concentration for Cool Air model LBW-420 ammonia leak detectors (for other detectors with 4- 20 mA signals, the display shows a value proportional to the 4-20 mA signal). The smaller two-digit display indicates the unit number (detector) selected for display on the large display. Ammonia concentration is displayed in parts per million (“P”). The LEDs provide an indication of power, ammonia concentration, Early Warning, and Alarm status at a glance.

Switches in the upper portion of the panel are provided for “Lamp Test”, “Early Warning Common Alarm Normal-Silent” acknowledgement, and

Digital Central Supervisory Alarm Panel (DCSAP)

“Increment” and “Decrement” switches for selecting a unit number or programming the unit number range selection (see pages 20-21). Each unit number or room/zone (depends on how you label the panel) has an “Early Warning” and “Alarm” LED for indication of alarming status and a “Normal-Silent” switch for acknowledging and silencing an Alarm.

Four-Digit Main Display

The large four-digit, seven-segment display on the front panel shows the value of the ammonia concentration reported by the ammonia leak detector on the selected unit number. If the connected leak detector is a Cool Air Incorporated LBW-420/420-1, the display is scaled in PPM (parts-per-million) ammonia concentration. If the connected leak detector is another brand with a 4-20 mA output, the displayed value may not be scaled in PPM but will be proportional to the 4-20 mA output signal.

Cool Air Incorporated ammonia leak detectors that have a 4-20 mA output signal are scaled to a pre-calculated PPM/mA value, depending on the programmed range selection (see pages 20-21). As an example, if the range selection was programmed for factory default setting of 0-400 (r400) range, the corresponding PPM/mA would be 25 PPM and the milli-amp reading would be 4 mA. The PPM value will displayed on the four-digit display and the mA reading is measured with the appropriate meter.

Two-Digit Display

The smaller two digit seven segment display on the front panel shows the current selected unit number which is displayed on the large four-digit display.

Power LED

The green Power LED is on and lit whenever power is applied to the DCSAP.

Lamp Test Switch

The Lamp Test Switch is used to confirm that all lamps (LEDs) on the panel are functional. To test lamps, be sure that no Early Warnings or Alarms are active, then press and hold the Lamp Test Switch and confirm that all lamps light as intended. Note that all six digits on the two digital displays should indicate 8 (eight) with all decimal points on the four digit display also lit. If any lamp does not light when the Lamp Test Switch is operated the panel should be returned to Cool Air Inc. for service.

Lamps on the Display board will not respond to the Lamp Test Switch while an Early Warning or Alarm is active.

Note: The small two digit display does not have decimal points.

Early Warning Common Alarm Normal/Silent Switch

The Early Warning Common Alarm Normal/Silent switch is used when the Early Warning normal-close, dry-contact from any ammonia leak detector that is wired into the panel changes state from normal-close to open. To silence the panel alarm horn, move the switch to the right to the “silent” position. When the Early Warning condition is corrected, and the ammonia leak detector returns back to the normal operation, the panel alarm horn will sound again until the Early Warning Common Alarm Normal/Silent switch is returned to the left or “normal” position. .

Increment & Decrement switches

The Increment and Decrement momentary toggle switches are used to select the unit number (ammonia leak detector) to be displayed on the large digital display. The selected unit number is shown on the smaller two digit display. Momentarily pushing the Increment switch will increase the unit number by one, while momentarily pushing the Decrement switch will decrease the unit number by one.

Ammonia Leak Detector Indicators & Controls

When reviewing each ammonia leak detector that is wired into the panel, both (Early) “Warning” (yellow) and “Alarm” (red) LEDs are provided for quick indication of a detector’s Early Warning and Alarm status. A Normal-Silent switch is provided to silence the panel alarm horn when an ammonia detector reaches Alarm status. Once the Alarm condition has been corrected, the panel alarm horn will continue to sound until the Normal-Silent switch is returned to the normal position.

A Label area (white area between the Normal-Silent switch and the Warning/Alarm LEDs) is also provided for each ammonia detector. Labeling can either be by numbering each detector and/or by the area being monitored.

For correlation with the two-digit unit number display, and also for wiring purposes, the ammonia leak detectors on the front of the panel are numbered from left to right and from top to bottom. The top row is numbered from 1 to 4, the second row from 5 to 8 etc.

CIRCUIT BOARDS AND TERMINATIONS



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.

Front Panel-Mounted Circuit Boards

The front panel-mounted circuit boards consist of a “control/display board” and one or more “combination switch & light boards”. The control/display board has two seven-segment LED displays and four toggle switches. It also provides the mounting and interface to the optional field bus interface module which mounts as a daughter board on the left end of the rear side of the control/display board. Field bus modules are specific to the selected bus and also require specific support firmware in the control panel.

The first “combination switch & light board” plugs into the bottom of the control/display board. Up to four switch & light boards can be plugged together to support 8, 16, 24 or 32 ammonia leak detectors, depending on the model that was purchased.

Control/Display Circuit Board

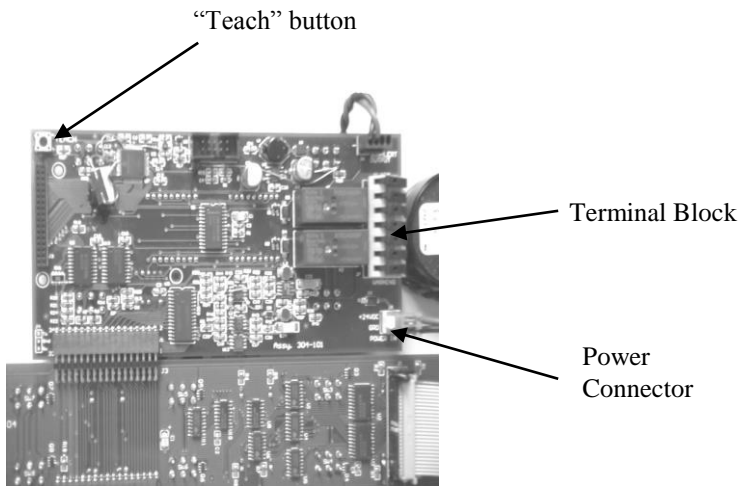
The Control/Display Circuit Board is where the logics for the DCSAP reside. The board not only provides the various control functions for the panel but also provides two digital displays for the unit number, concentration of ammonia in PPM, and any error codes. When the panel enclosure access door is opened, the control/display circuit board is located at the top of the access door.

The control/display circuit board has two cube relays mounted on the right-side board. The top relay is for the common Alarm and the bottom relay is for the common Early Warning. In the normal operating mode, the relays are energized in a normally-open state. If a loss of power to the panel occurs, the relays will de-energize and the alarms, if connected, will sound.

A terminal block is provided on the right-side of the Control/Display board for wiring into the common early warning and/or alarm relays. Seven terminals on the terminal block provide termination for a normally closed (N.C.), common, and normally open (N.O.) contact per relay with the center terminal not being used. Please refer to appendix C for detailed information on the terminal blocks and techniques for making connections.

Digital Central Supervisory Alarm Panel (DCSAP)

The momentary “Teach” button located in the upper, left-side corner is used for programming the ranges. With the all wiring properly terminated, power to the panel has been applied, and no error codes showing, simply press and hold the button. Use the Increment switch, to toggle through to the required range, and release the button. Remember, the range setpoint of the panel needs to match the range setpoint of the detector for the displays to match with each other. See the manual for the detector to program the the range setpoint. For detectors that do not have a 4-20 mA output, the range setpoint needs to be set to OFF. A series of horizontal lines will be shown on the panel display.



Control/Display Circuit Board

Light/Switch Circuit Board

The Light/Switch Circuit Board (s) is/are designed to plug into each other in a stacking fashion for up to a total of four boards (32 maximum unit numbers/ammonia leak detectors). The single/stacked Light/Switch board(s) is/are plugged into the Control/Display board to communicate signal and contact status to the control/display board. Each Light/Switch board is also connected to an adjacent rear panel Terminal board via a flat ribbon cable.

Each Light/Switch circuit board supports eight ammonia leak detectors with two LEDs (Early Warning & Alarm) and a Normal-Silent switch for each detector. LED and switch functionality is described in an earlier section of this manual under Ammonia Leak Detector Controls & Indicators (page 10).

Rear Panel Terminal Board

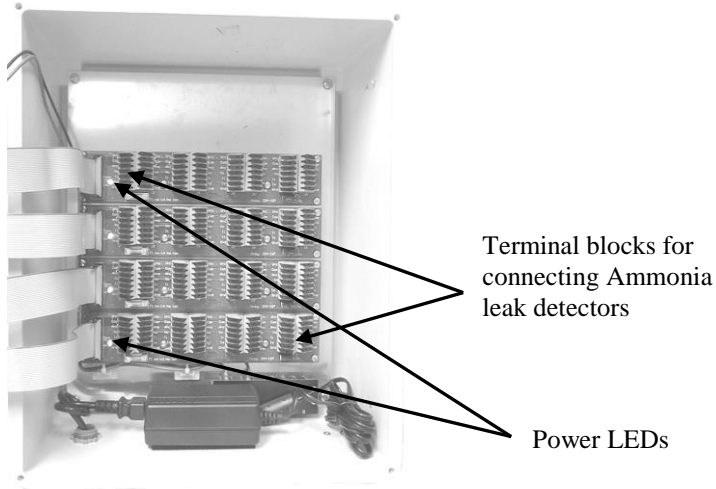
The modular “Terminal Board(s)” are mounted in the rear panel of the enclosure and provide a convenient point to connect wiring from the remotely located ammonia leak detectors. Outputs from the Terminal Boards are wired to the Light/Switch boards via flat ribbon cables.



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.

Enclosure-Mounted Circuit Board



Each Terminal Board contains eight terminal blocks, one for each of eight connected ammonia leak detectors. Please refer to appendix C for detailed information on the terminal blocks and techniques for making connections.

Each Terminal Board has a green LED that is lit to indicate that power is applied to the board.

Terminal block channels are numbered from left to right and from top to bottom. The first row of terminal blocks is numbered from 1 to 8, the second row from 9 to 16 etc.

Checking the Firmware Version

To display the firmware version, first open the door, press the “Teach” button on upper left corner of the Display board (see illustration on page 11). The range value (OFF, r100, r250, r400, r500, r800, r1000) will be displayed on the large four digit display. While holding the “Teach” button, switch the “Lamp Test” switch. The firmware version will be displayed on the large four digit display (as an example “1-0” would be for version 1.0).

Appendix A: Error Codes

In some conditions a code will be displayed on the four digit LED display to indicate the condition as an aid in troubleshooting. The codes are described in the following table

Error Code	Description
Err1	Selected channel less than 3.5 mA on 4-20 mA circuit.
Err2	Selected channel greater than 20.4 mA on 4-20 mA circuit
Err3	Range selection error.
ErrF	Fault in Fieldbus module (only occurs after power off reset).

Appendix B: 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 panel. At a minimum, the system must be tested after installation (allow at least 8 hours after first applying power to the Ammonia leak detectors), and at least once a month thereafter to ensure the panel and system are operating correctly.

All tests must be recorded on an appropriate log sheet.

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

Testing the Panel and System

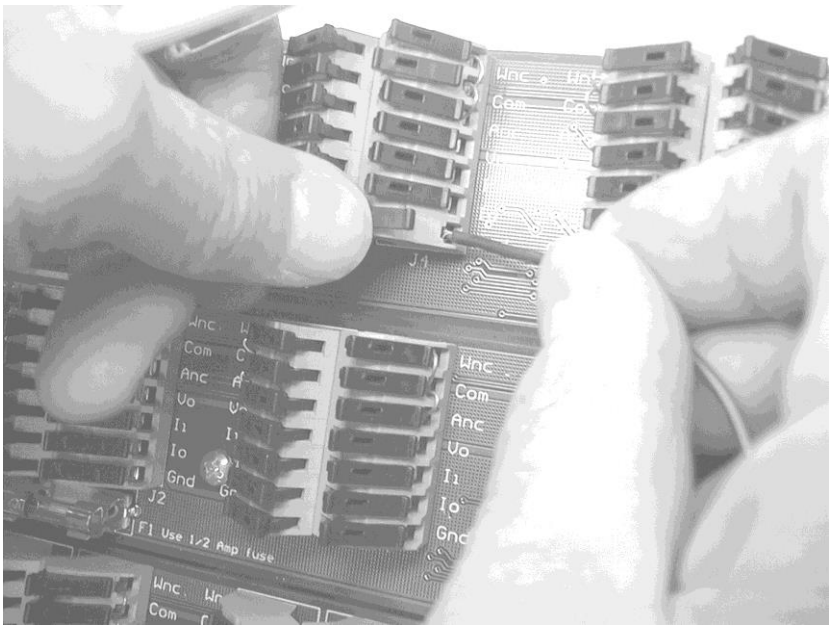
To test the panel and system, follow these steps:

1. At each Ammonia leak detector, hold a sample bottle of ammonia of concentration between 50 and 200 PPM over the sensor.
2. Check the:
 - LEDs on the Ammonia leak detector and on the Digital Central Supervisory Alarm Panel and be sure they operate according to the pre-alarm (early warning) and alarm set points. Also check the status via the Fieldbus (if so equipped).
 - Check the Digital display on the Ammonia leak detector and on the Digital Central Supervisory Alarm Panel and be sure both show an increasing concentration of ammonia. Also check the value via the Fieldbus (if so equipped).
3. Remove the ammonia sample and confirm that the warning and alarm contacts and digital indications all return to normal. Confirm that status and digital values monitored via the Fieldbus also return to normal (if so equipped). Testing is now complete

Appendix C: Terminal Blocks

Terminal blocks are spring loaded to accept stripped wires without additional tools and without requiring tightening of screws. Terminal blocks will accept solid or stranded wire from 28 AWG to 14 AWG (0.3 to 1.4 mm dia.). Wire should be stripped 1/4 inch. A finger or a medium sized flat blade screwdriver or similar blunt tool can be used to momentarily open the terminal for insertion of the wire as shown in the illustration. After inserting the wire, release the tool to clamp the wire in the terminal block. Gently pull on the wire to confirm that it is properly clamped in the terminal.

Alternately, the black lever on the terminal can be pushed further in the direction shown (or lifted from the lower end) until it goes over center and remains open until being returned to its closed position after inserting the wire.



Control Board Terminals

Terminals on the Control Board provide connection to the Common Alarm and Common Warning relays. The table indicates the function of each terminal.

Terminal	Location	Function
1	Top	Alarm N.C. (opens on alarm on any channel)
2		Common Alarm terminal
3		Alarm N.O (closes on alarm on any channel)
4		Not used
5		Warning N.C. (opens on alarm on any channel)
6		Common warning terminal
7	Bottom	Warning N.O (closes on alarm on any channel)

Alarm contacts switch on alarm and return to normal when signal is acknowledged, contacts switch again when alarm signal is removed and return to normal when acknowledge switch is returned to normal.

Warning contacts switch on warning signal , contacts switch again when warning signal is removed. Warning contacts do not respond to the acknowledge switch position.

Rear Panel Terminal Board Terminals

Terminals on the Rear Panel Terminal Board provide connection points to connect Ammonia leak detectors. A terminal block is provided for each Leak Detector. Each terminal block is arranged and labeled per the following table.

Terminal	Label	Function
1	Wnc	Warning contact. Connect to Leak Detector contact that opens on warning or pre-alarm
2	Com	Common Alarm - Warning terminal
3	Anc	Alarm contact. Connect to Leak Detector contact that opens on Alarm
4	Vo	Vo 24 VDC (nominal) for 4-20 mA circuit
5	Ii	+ terminal for 4-20 mA circuit
6	Io	- terminal for 4-20 mA circuit
7	Gnd	Common "GND" terminal for 24 VDC (Vo) supplies

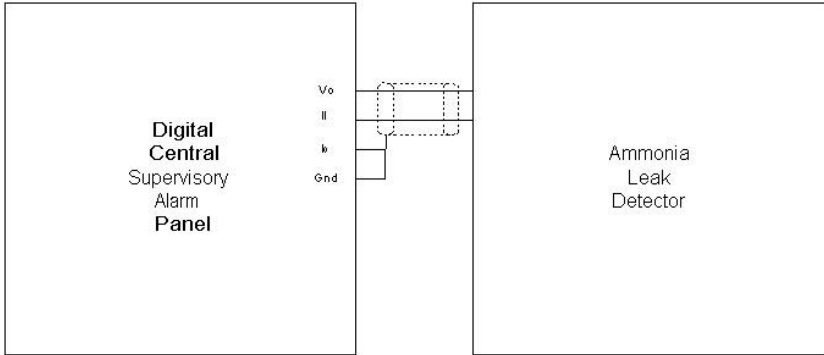
The top three terminals on each terminal block provide connection points for normally closed "Warning" and "Alarm" contacts from the associated Ammonia leak detector. The upper terminal connects to the "Warning" contact in the Ammonia leak detector, the second terminal connects to the common contact terminal while the third terminal connects to the "Alarm" contact in the Ammonia leak detector. All Cool Air Inc. Ammonia leak detectors have normally closed warning and alarm contacts. For connections to other Ammonia leak detectors that may lack one of these contacts or may have normally open contacts, please consult a qualified Electrical Engineer or other qualified design source.

The bottom four terminals are provided to connect a 4-20 mA signal from the Ammonia leak detector. The 4-20 mA signal is connected to the I1 and I0 terminals. The V0 and Gnd terminals provide a power supply for the 4-20 mA circuit if required. Several alternate 4-20 mA circuit connections are shown below.

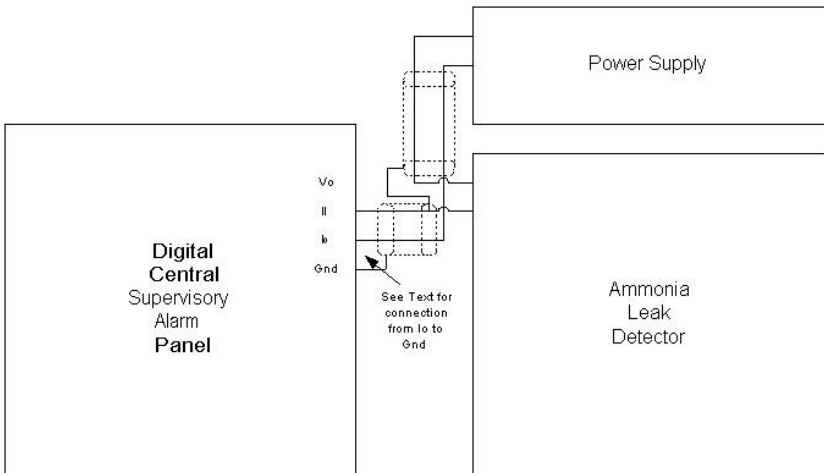
Digital Central Supervisory Alarm Panel (DCSAP)

4-20 mA connection

The 4-20 mA output is a simple series circuit that includes an Ammonia leak detector and the Digital Central Supervisory Alarm Panel, a power supply, and the 4-20 mA receiving device. Two versions of the circuit are shown below.



4-20 mA Circuit Using Internal Power Supply



4-20 mA Circuit Using External Power Supply

Digital Central Supervisory Alarm Panel (DCSAP)

Using the internal power supply is preferred, but the external power supply connection is available for those situations where other circuit considerations make an external supply preferable.

When using an external power supply, it is not required that I_o be connected to Gnd , however, the voltage between I_o and Gnd must not exceed 24 VDC.

For best noise immunity, use shielded wire for 4-20 mA circuits. Connect shields (but do not ground) at any location where cables tie together as shown on the “External Power Supply” example. Ground the shield at the Central Supervisory Panel only (Single Point Ground for Shield).

If an external Power Supply is used, it is recommended that it be a 24 VDC low-noise power supply for this application, although power supplies providing a minimum of 8 VDC to a maximum 30 VDC can be used. The voltage drop across the detector, Digital Central Supervisory Alarm Panel and any other devices in the circuit must not exceed the power supply voltage.

The Digital Central Supervisory Alarm Panel presents a resistance of 100 (nominal) ohms to the 4-20 mA circuit resulting in a voltage drop of 2 volts at 20 mA.

Appendix D: TECHNICAL SUPPORT

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

Contact: Customer Service

Phone: (763) 205-0844 (USA)

Fax: (763) 432-9295 (USA)

E-mail: info@coolairinc.com

Website: www.coolairinc.com

Address: Cool Air Incorporated
1544 134th Avenue NE
Ham Lake, MN 55304
USA

WARRANTY

The Digital Central Supervisory Alarm Panel comes with a 12-month warranty from the time of purchase.

Cool Air Incorporated guarantees that the Digital Central Supervisory Alarm Panel, when connected to and operated in accordance with the instructions contained in this manual, will perform in accordance with the warranty expressed on the cover of the panel. Not installing, maintaining, repairing, or operating the panel in accordance with the instructions in this manual will automatically void the warranty.

Cool Air Incorporated will not be held liable for any losses, liabilities, judgments, attorney fees, claims, or damages, including incidental and consequential damages.

THE PANEL MUST BE TESTED AT LEAST ONCE A MONTH TO ENSURE IT IS OPERATING ACCURATELY AND CORRECTLY. TEST AND CALIBRATION RECORDS MUST BE RECORDED ON APPROPRIATE LOG SHEETS.

**DIGITAL CENTRAL SUPERVISORY ALARM PANEL
SPECIFICATIONS**

Display	0.8", 7-segment LED, 4-digit 0.X", 7-segment LED, 2 digit channel indicator
Controls	Lamp test momentary toggle switch Common Warning silence switch Increment, and Decrement channel momentary toggle switches Alarm silence toggle switch for each channel.
Relays	Alarm, and pre-alarm, 5A, form C (SPDT), normally-open, normally-closed, energized in normal (non-alarm or warning) state
Outputs	Contacts for: alarm, and pre-alarm.
Operating temperature	-50°F to 125°F
Operating humidity	5% to 95% RH, non-condensing
Power Requirements	100 to 240 VAC 47 to 63 Hz 1.2 A Max at 115 VAC 0.6 A Max at 230 VAC 40 A Max Inrush at 115 V cold start 80 A Max Inrush at 230 V cold start
Dimensions	8, 16, 24, or 32-zone models: 14"H x 12"W x 6"D
Weight (net not shipping)	DCSAP-8: 11 lbs. DCSAP-16: 11.5 lbs. DCSAP-24: 12 lbs. DCSAP-32: 12.5 lbs.
Enclosure	NEMA 4 rated, UL listed
Options	Optional Fieldbus connection.



**QUALITY AMMONIA LEAK DETECTION
SYSTEMS & EQUIPMENT**

1544 134th Ave. NE, Ham Lake, MN 55304 USA

Phone (763) 205-0844 Fax (763) 432-9295

E-mail: info@coolairinc.com

Website: coolairinc.com