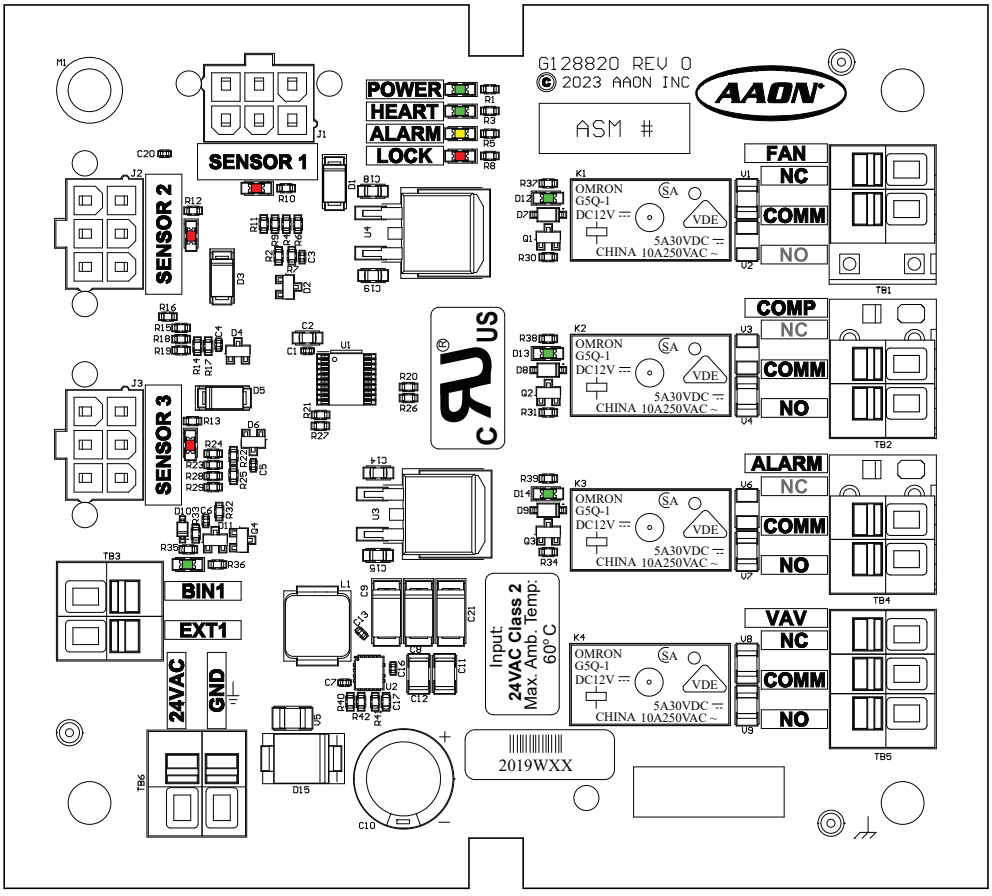
Compatible with
VCCX-454
Series

# A2L Mitigation Controller Technical Guide

ASM07563



| A2L MITIGATION CONTROLLER TECHNICAL GUIDE | |
|---|---|
| **REVISION AND DATE** | **CHANGE** |
| Rev. A, February 15, 2024 | Original |
| Rev. B, February 28, 2024 | updated wiring and configuration information for units with MODGAS |
| Rev. C, June 21, 2024 | updated cover and sensor bypass note |
| Rev. D, July 9. 2024 | updated wiring notation |
| Rev. E, October 10, 2024 | added troubleshooting for A2L sensor |

**This manual is available for download from www.aaon.com**

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### General

The A2L Mitigation Controller is part of the Refrigerant Detection system and is designed to detect A2L refrigerant leaks in the airstream and/or cabinet.

The A2L Mitigation Controller has three sensor inputs, one binary input and four relays.

### Powering Up

When the A2L Mitigation Controller is first powered up, the POWER LED should light up and stay on continuously and the HEART LED should pulse.

If it does not light up, verify the 24 VAC is connected to the controller, the wiring connections are tight, and they are wired for the correct polarity. The 24 VAC power must be connected so all ground wires remain common. If after making all these checks, the POWER LED does not light up, please contact AAON Controls Support for assistance.

### Operation

For the first five seconds after power up, the output for the alarms is disabled and the compressor is locked out until the sensors give a valid reading. After this delay, the mitigation controller will enter the normal state if no A2L refrigerant leak is detected.

The operation of the A2L Mitigation Controller is broken down into three states:

- Normal
- Alarm
- Lockout

#### Normal State

In normal operation, there are no sensor faults or leaks detected and all four relays are activated. This is the only state that the relays are activated.

**NOTE:** Any sensor inputs not populated with a sensor connection must have a G145190 Sensor Bypass Plug installed.

#### Alarm State

An alarm is triggered by any one or more of the attached sensors detecting a A2L refrigerant leak or by the controller not detecting a sensor connection in any of the three sensor inputs.

In the alarm state, the controller will enable the supply fan, disable the compressors, enable the alarm, and signal the external VAV system.

**CAUTION:** If the controller does not receive proof of flow within 2.5 minutes after enabling the fan in the alarm state, the controller will enter the lockout state.

The A2L Controller will remain in the alarm state for five minutes after the sensor is cleared before returning to normal operation.

A second A2L Mitigation Controller is used with a sensor located in the compressor cabinet. On units with gas heat a sensor would be located near the heat exchanger inlets.

If a cabinet sensor detects a A2L refrigerant leak the controller will disable the compressors, enable the alarm, and disable the heating through the VAV relay.

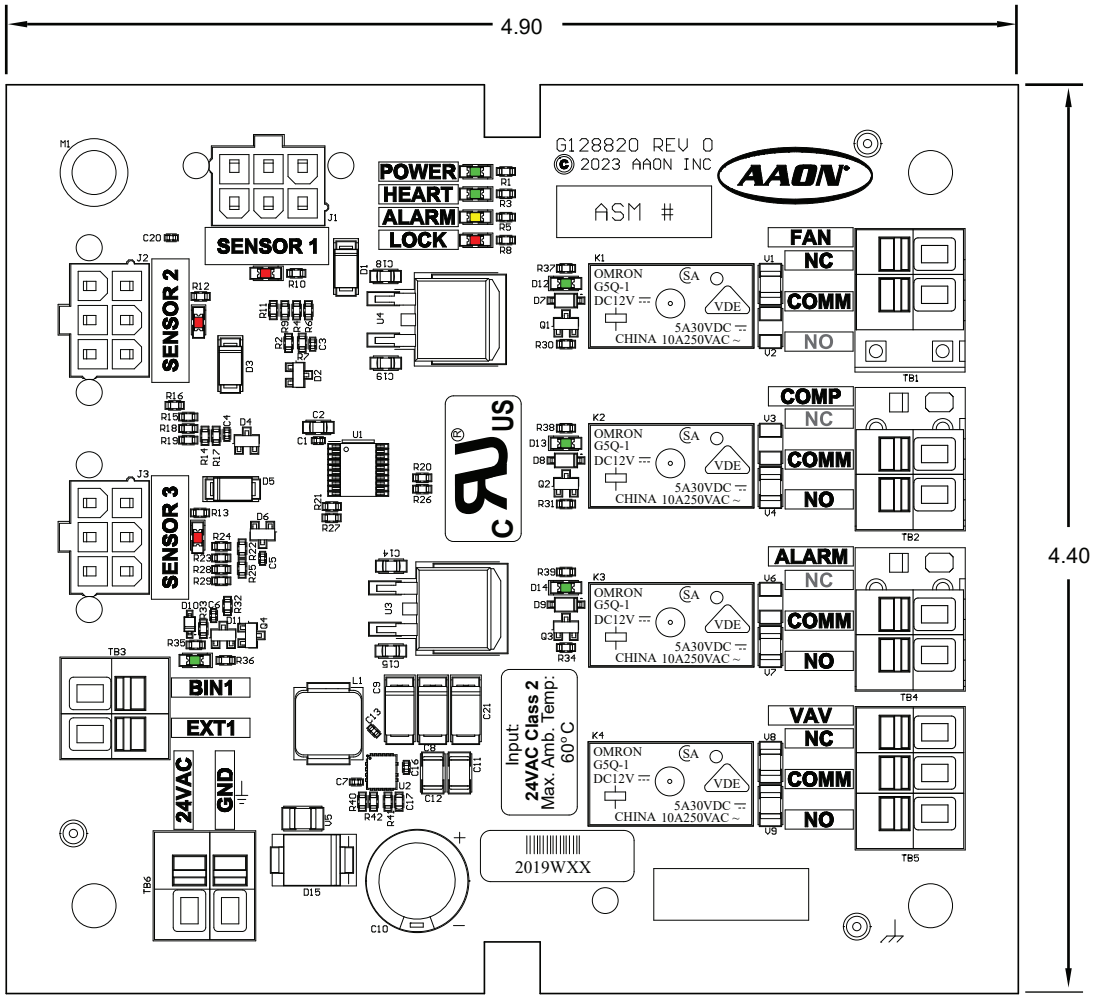
**NOTE:** The fan relay is not used on the A2L Mitigation Controller used for the cabinet leak detection.

#### Lockout State

The A2L Mitigation Controller remains in the alarm state and must be power cycled before returning to normal operation.

**NOTE:** Only the A2L Mitigation Controller used for the air flow will trigger the lockout state.

## Dimensions




**Note:** All Dimensions are in inches.

**Figure 1: A2L Mitigation Controller Components**

# WIRING

## Important Wiring Considerations

| WIRING DETAILS | | | | |
|---|---|---|---|---|
| **Control Device** | **Voltage** | **VA Load** | **Temp** | **Humidity (Non-Condensing)** |
| **A2L Mitigation Controller** | 18-30 VAC | 5-24* | -22°F to 158°F | 0-95% RH |

*VA Load is dependent on sensor configuration.

**Table 1: Voltage and Environment Requirements**

## Wiring

The A2L Mitigation Controller and expansion modules must be connected to a 24 VAC power source of the proper size for the calculated VA load requirements. All transformer sizing should be based on the VA rating listed in **Table 1, this page**.

**WARNING:** When using a single transformer to power multiple controllers or expansion modules, the correct polarity must always be maintained between the boards. Failure to observe correct polarity will result in damage to the controller and expansion modules.

Please carefully read and apply the following information when wiring the A2L Mitigation Controller, RSMs, and expansion modules.

- All wiring is to be in accordance with local and national electrical codes and specifications.
- All 24 VAC wiring must be connected so that all ground wires remain common. Failure to follow this procedure can result in damage to the controller and connected devices.
- The minimum wire size for 24 VAC wiring is 18-gauge.
- The minimum wire size for all sensors is 24-gauge. Some sensors require two-conductor wire (for Sensor Bypass plug), and some require three-or four-conductor wire.
- Be sure all wiring connections are properly inserted into the terminal blocks. Do not allow wire strands to stick out and touch adjoining terminals which could potentially cause a short circuit.
- Before applying power to the A2L Mitigation Controller, recheck all wiring connections and terminations thoroughly.

## Inputs and Outputs

| ANALOG INPUTS | | |
|---|---|---|
| SENSOR # | PIN | NAME |
| 1 | 1 | Power (+12VDC) |
| | 2 | Signal In |
| | 3 | Not Used |
| | 4 | Not Used |
| | 5 | Signal Out |
| | 6 | GND |
| 2 | 1 | Power (+12VDC) |
| | 2 | Signal In |
| | 3 | Not Used |
| | 4 | Not Used |
| | 5 | Signal Out |
| | 6 | GND |
| 3 | 1 | Power (+12VDC) |
| | 2 | Signal In |
| | 3 | Not Used |
| | 4 | Not Used |
| | 5 | Signal Out |
| | 6 | GND |

**Table 2: Analog Inputs Wiring**

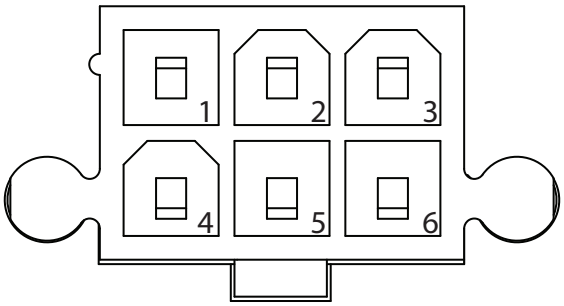



**Figure 2: Analog Input Pin Diagram**

| BINARY INPUTS | |
|---|---|
| INPUT | NAME |
| BIN1 | Fan Proof of Flow |
| EXT1 | Fan 24V |

**Table 3: Binary Inputs Wiring**

| RELAY INPUTS | | |
|---|---|---|
| NAME | PIN | NAME |
| FAN | NC | Fan - Normal condition held open |
| | COMM | Common |
| | NO | Not Available |
| COMP | NC | Not Available |
| | COMM | Common |
| | NO | Compressor - Normal condition held closed |
| ALARM | NC | Not Available |
| | COMM | Common |
| | NO | Alarm - Normal condition held closed |
| VAV | NC | VAV - Normal condition held open |
| | COMM | Common |
| | NO | VAV - Normal condition held closed |

**Table 4: Relay Inputs Wiring**

## Wiring Diagram

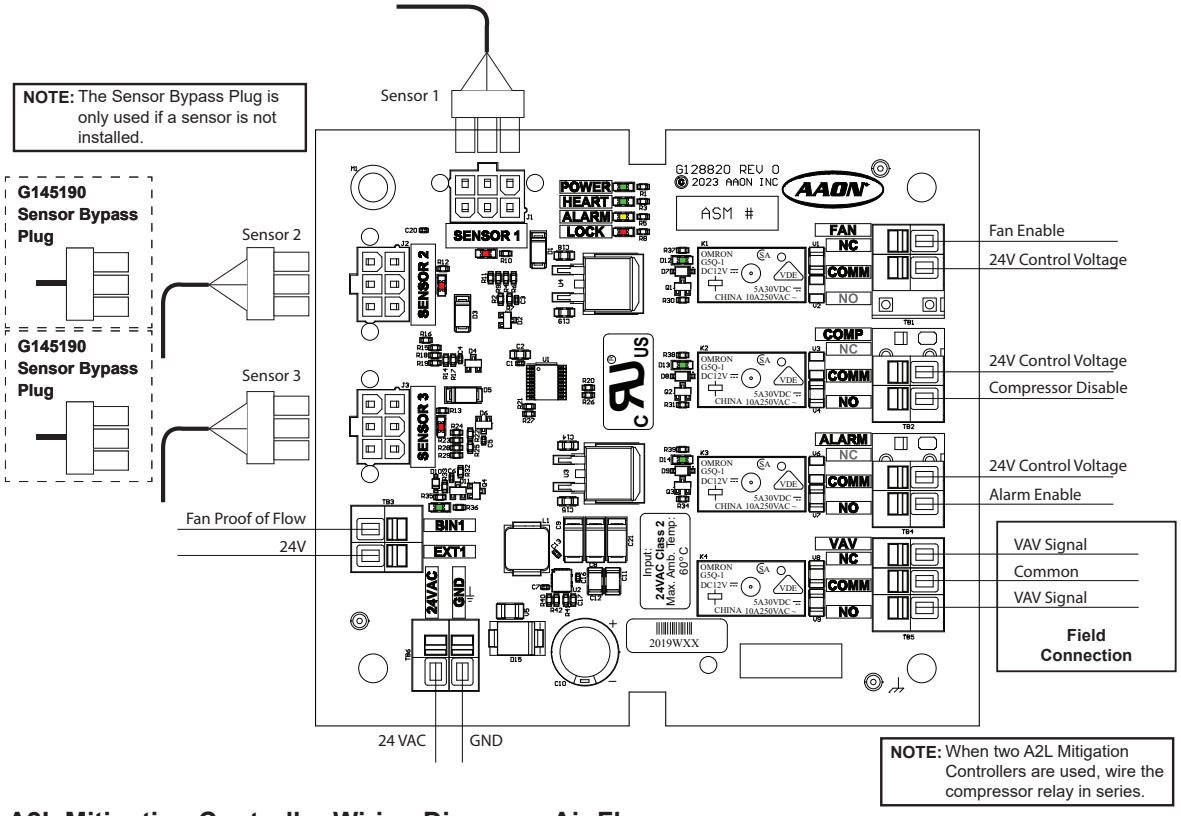



**Figure 3: A2L Mitigation Controller Wiring Diagram - Air Flow**

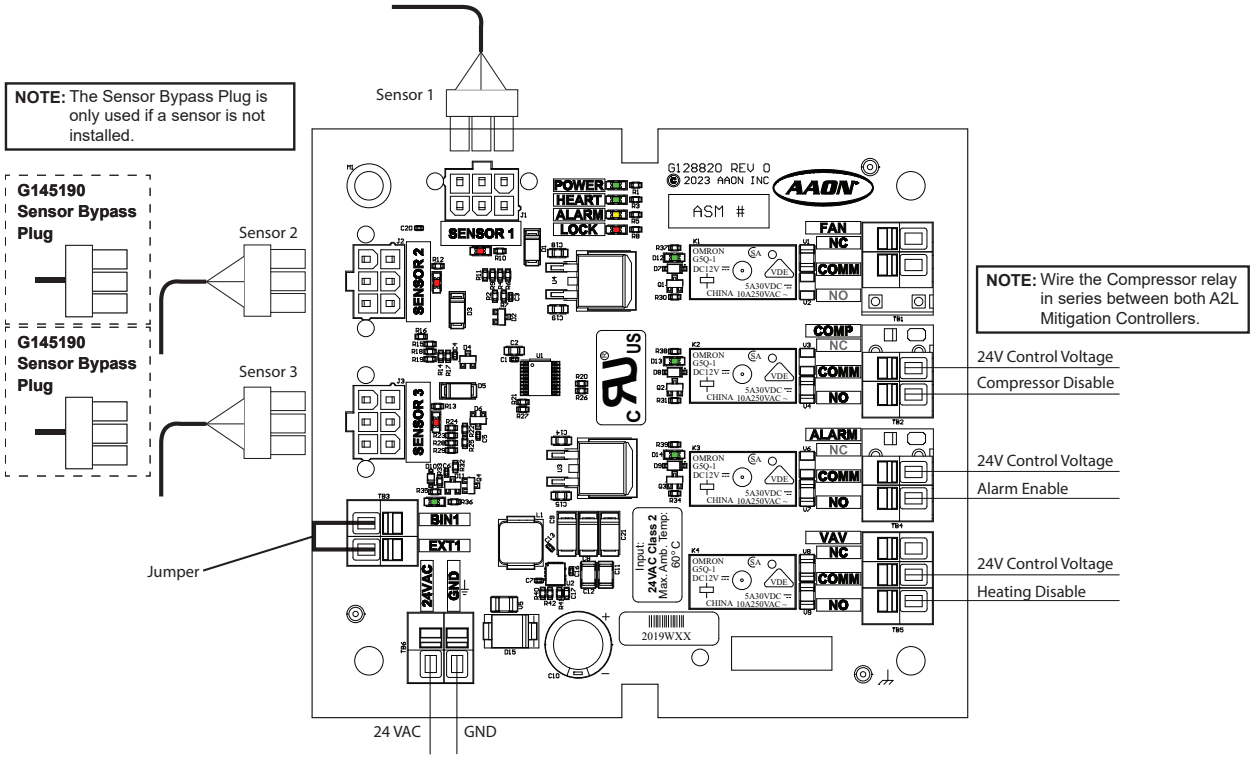



**Figure 4: A2L Mitigation Controller Wiring Diagram - Cabinet**

## Wiring Diagram

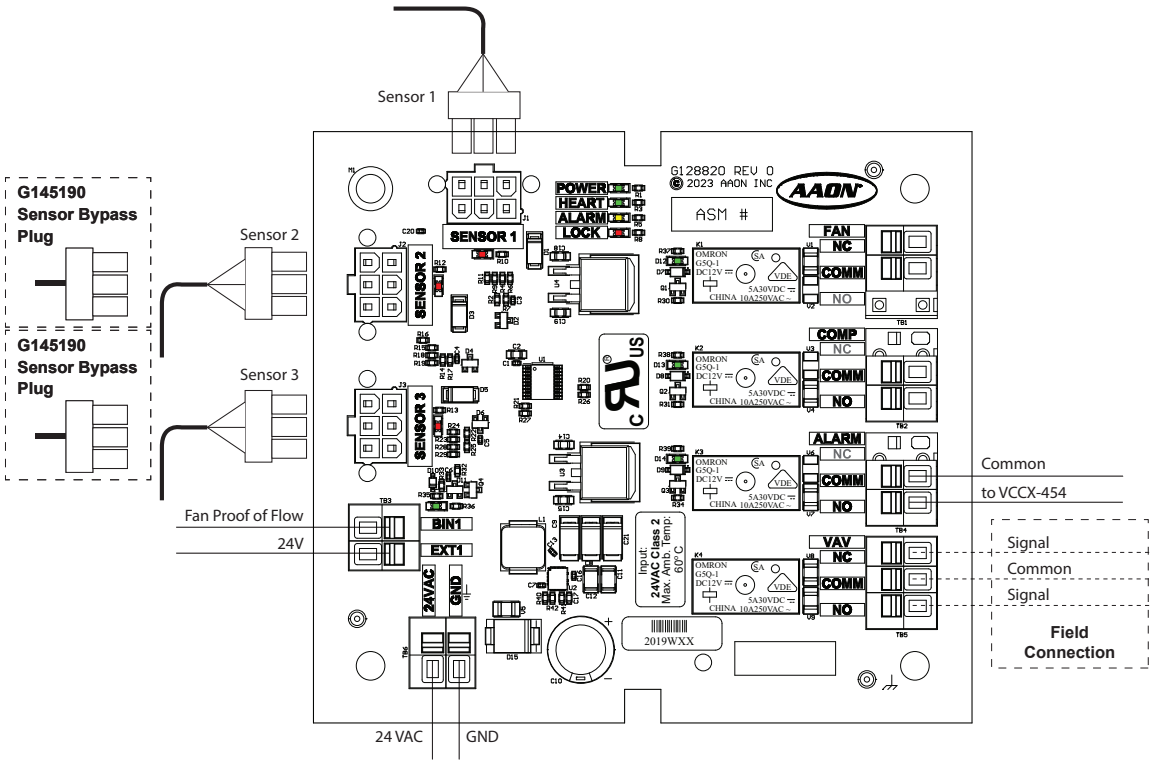



**Figure 5: A2L Mitigation Controller Wiring - Connected to VCCX-454**

## OMNIMATE® Connector

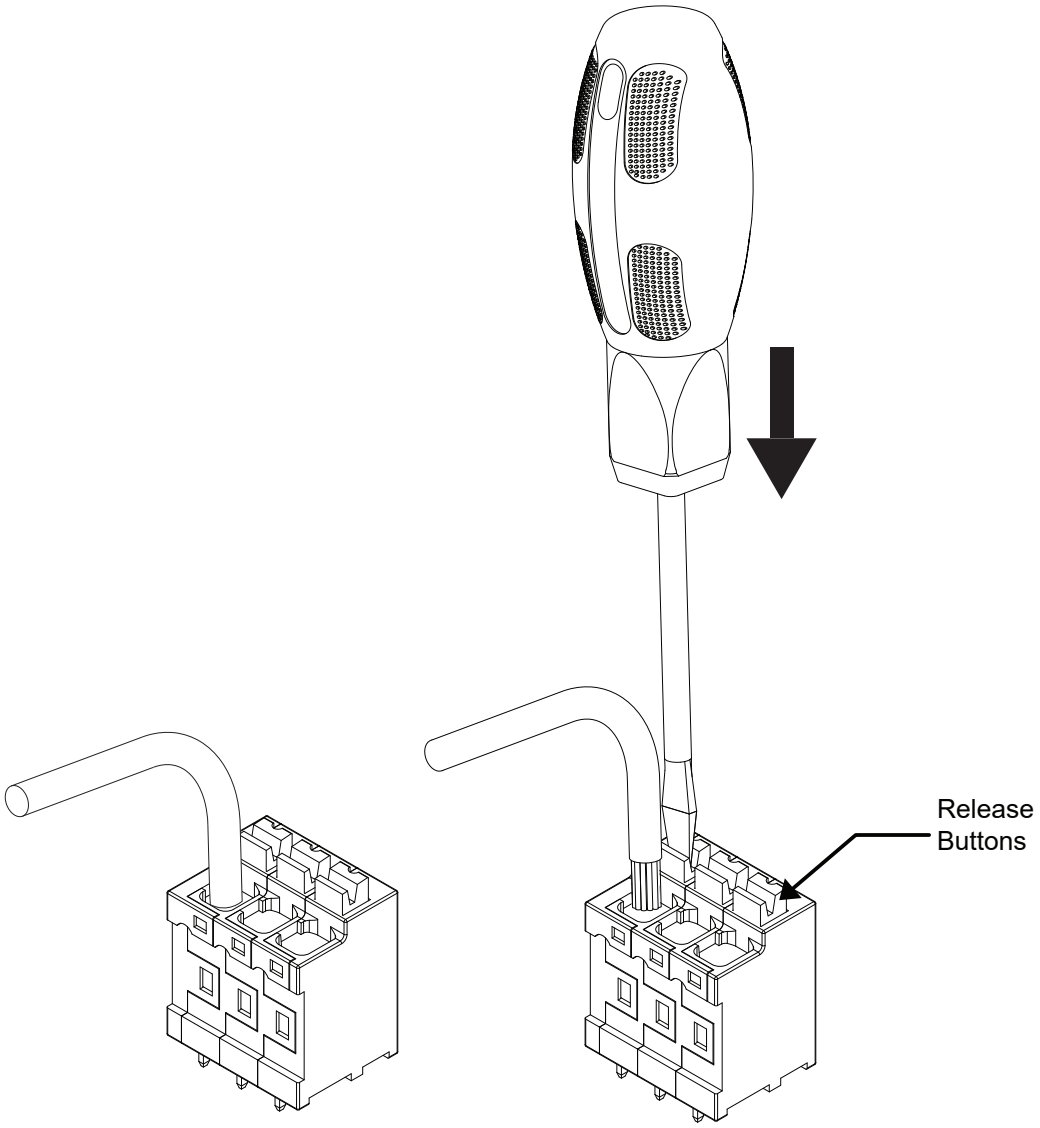



**Figure 6: OMNIMATE Connector Instructions**

## A2L Mitigation Controller LEDs

The A2L Mitigation Controller is equipped with LEDs that can be used to verify operation and perform troubleshooting.

### Operation LEDs

**POWER -** This green LED indicates that 24 VAC power has been applied to the controller.

**HEART -** This green LED blinks steady once a second when the board is powered and operating normally.

**ALARM -** This yellow LED indicates the board is in the fault state.

**LOCKOUT -** This red LED indicates the controller is in a lockout state. The controller must be power cycled before it can resume normal operation.

### Sensor LEDs

The three red Sensor LEDs indicates the attached sensor detects a fault or the sensor is not connected.

### Binary LEDs

The BIN1 LED indicates the Fan Proof of Flow contact is closed.

### Relay LEDs

If the three green LEDs are not lit, the controller is in the fault status or in the five second startup window.

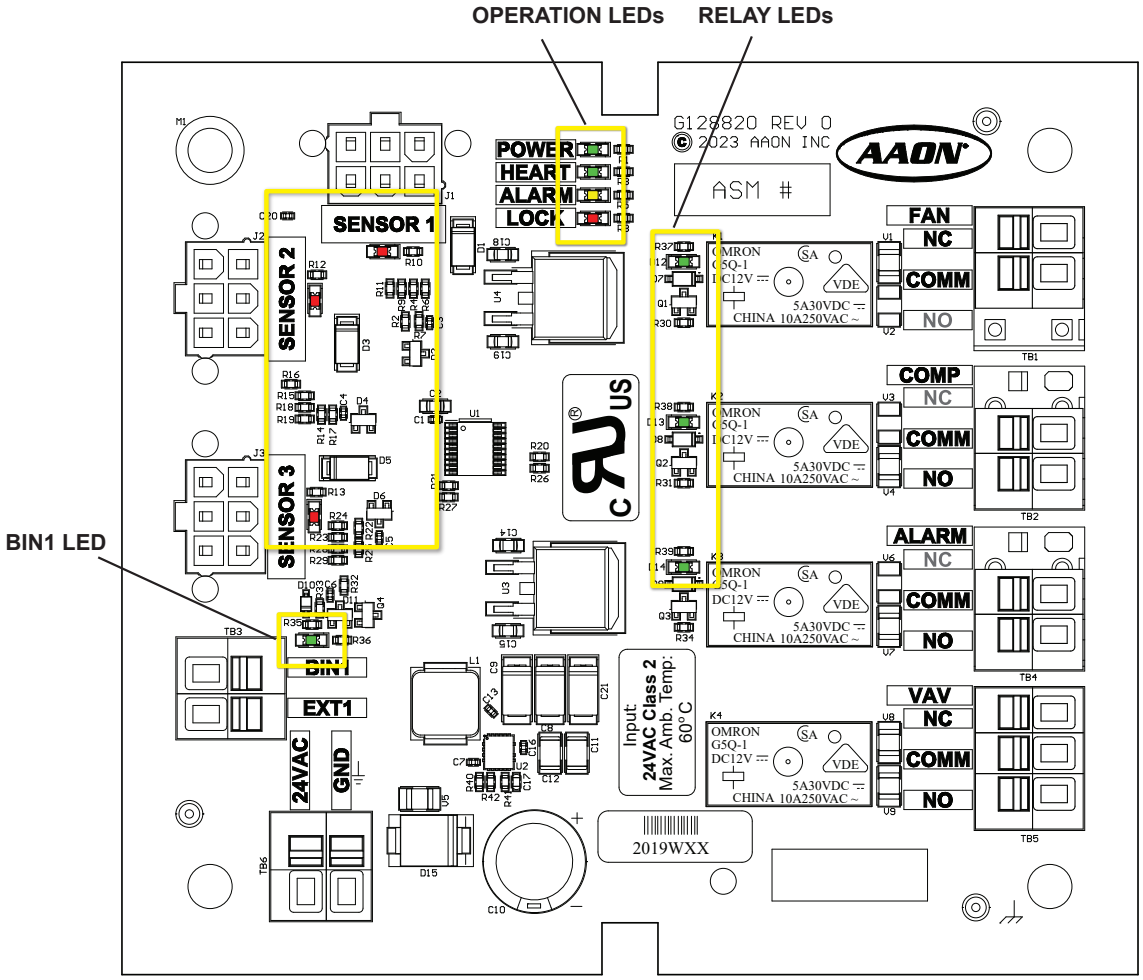



**Figure 7: A2L Controller LED Locations**

## A2L Gas Sensor

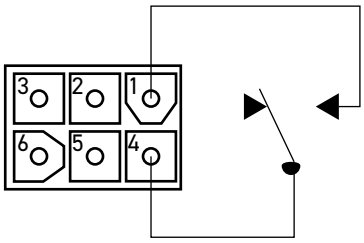
### Wiring

The A2L gas sensor is wired as shown on **Figure 8, this page.**

### LED Lights

When the sensor is powered up, an LED will indicate the sensor status. While the sensor is mounted, the LED will backlight the sensor and be visible by reflection from the mounting service. It has four possible states:

- Solid Green: Sensor power-up and self test.
- Blinking Green: Normal Operation
- Solid Red: Alarm sate - gas detected
- Blinking red: Sensor fault




**NOTES:** Relay Dry Contacts showin in Normall Open Unenergized State.
Relay is energized on power up when not in alarm state.
Relay is de-energized in alarm or no power state.

**Figure 8: A2L Gas Sensor Connector Pinout**

# A2L Mitigation Controller Technical Guide

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**AAON Controls Support:**
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www.aaon.com/aaon-controls-technical-support

**AAON Factory Technical Support:**
918-382-6450 | techsupport@aaon.com

**NOTE:** Before calling Technical Support, please have the model and serial number of the unit available.

**PARTS:** For replacement parts, please contact your local AAON Representative.

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