smartIAQ

Installation, Operation & Maintenance Manual

IOM

Application Guide

Please read entire manual before use.
Thank you for purchasing a smartIAQ® intelligent air cleaning system from GPS Air®.

What's Included
Before you start, confirm the contents of your shipment. Each smartIAQ will consist of the following:
1. smartIAQ intelligent air cleaning system, dependent on model purchased (see table below).
2. Installation, Operation & Maintenance Manual
3. One (1) Particulate Filter
4. Either one (1) or two (2) Molecular Filter(s), dependent on model purchased
5. Two (2) Duct Connector Adapter Flanges

Not Included
1. Electrical wiring, junction box, or receptacle to provide power to the smartIAQ unit
2. 1/2" trade size conduit fitting or grommet for incoming power connection
3. All thread mounting rod with appropriate hardware
4. Vibration isolation devices

Model Numbers

SIAQ1-DIST1S	**Standard Single (1) Zone Distribution Unit** (less than 1,000 sqft in area)
SIAQ1-DIST1L	**Large Single (1) Zone Distribution Unit** (greater than 1,000 sqft in area)
SIAQ1-DIST2	Two (2) Zone Distribution Unit
SIAQ1-DIST3	Three (3) Zone Distribution Unit
SIAQ1-DIST4	Four (4) Zone Distribution Unit
SIAQ1-CENT	Centralized Side Stream Unit
SIAQ1-PERF	Performance IAQ Unit

Location

⚠️ • In open spaces, the smartIAQ shall be installed such that it is at least 7.5' above the floor.
• Must be secured to a hard surface using appropriate all thread and isolation hangers
• Do not insert hands or materials into the inlet and outlet
• Installation must be in accordance with local electrical wiring regulations.
• Do not allow anything to obstruct the fan or diffuser grille.
• Installation and maintenance must be performed by a trained professional.
• NOT to be mounted directly on a drop ceiling.

THIS AIR CLEANER SHALL NOT BE INSTALLED ON THE HOT-AIR SIDE OF DUCT-TYPE SYSTEMS
NE PAS INSTALLER CE FILTRE ÉLECTROSTATIQUE DANS LE COURANT D'AIR CHAUD D'UN APPAREIL DE CHAUFFAGE

Safety Instructions

• WARNING - RISK OF ELECTRIC SHOCK - These servicing instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.
• This product is to be located so that connection can be made to the source of electrical supply without the use of an extension cord.
• Disconnect power supply before servicing.

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Installation

Duct Ring Adapter Flange

1. Remove the 2 duct ring adapter flanges located at the inlet and outlet. Rotate each one so the flange is facing outwards. Use the 6 screws and attach them securely with a screwdriver.
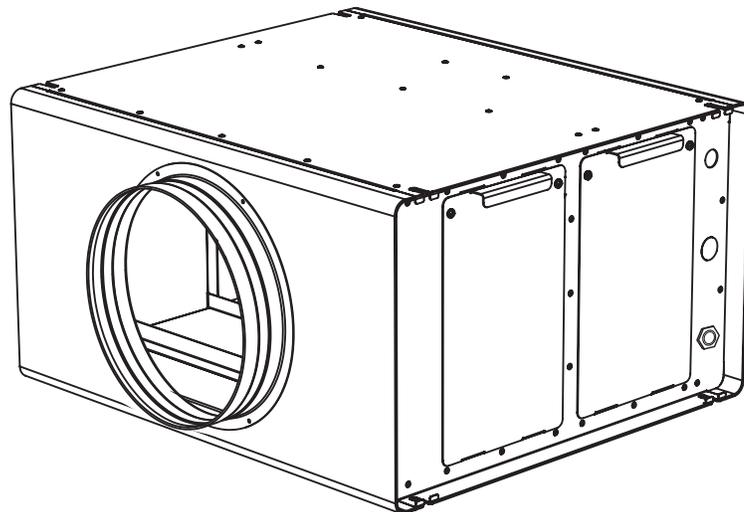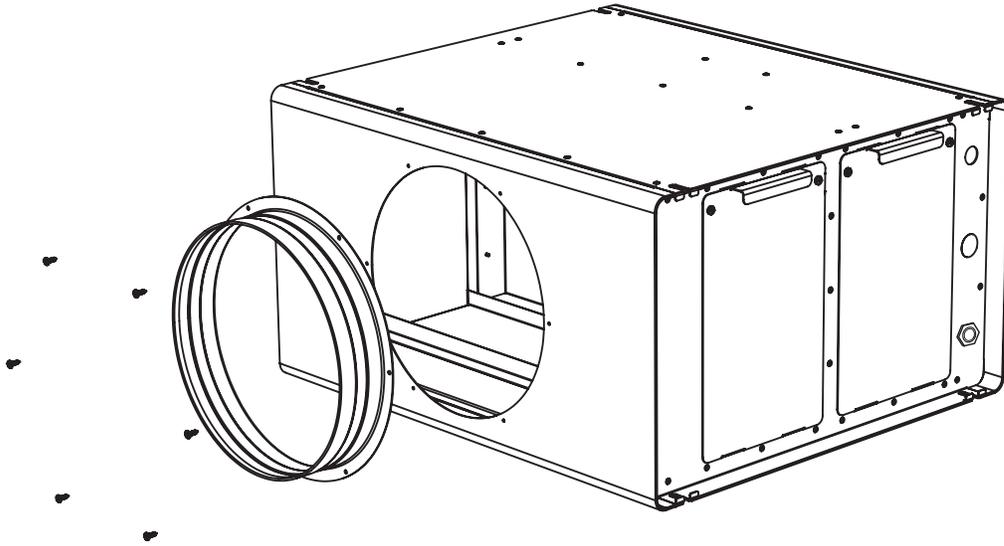
Integrated Mounting Brackets

There are eight (8) integrated mounting brackets. Four are located on the top and four are located on the bottom. They provide flexibility for different installation needs depending on the situation. The image below is the most common way of installing the product. The following hardware is recommended but not supplied: all-thread 3/8-16, shown with vibration isolators, secured with lock-nuts or double nut locked. Use 1" OD washers to support/capture unit flange from above and below.
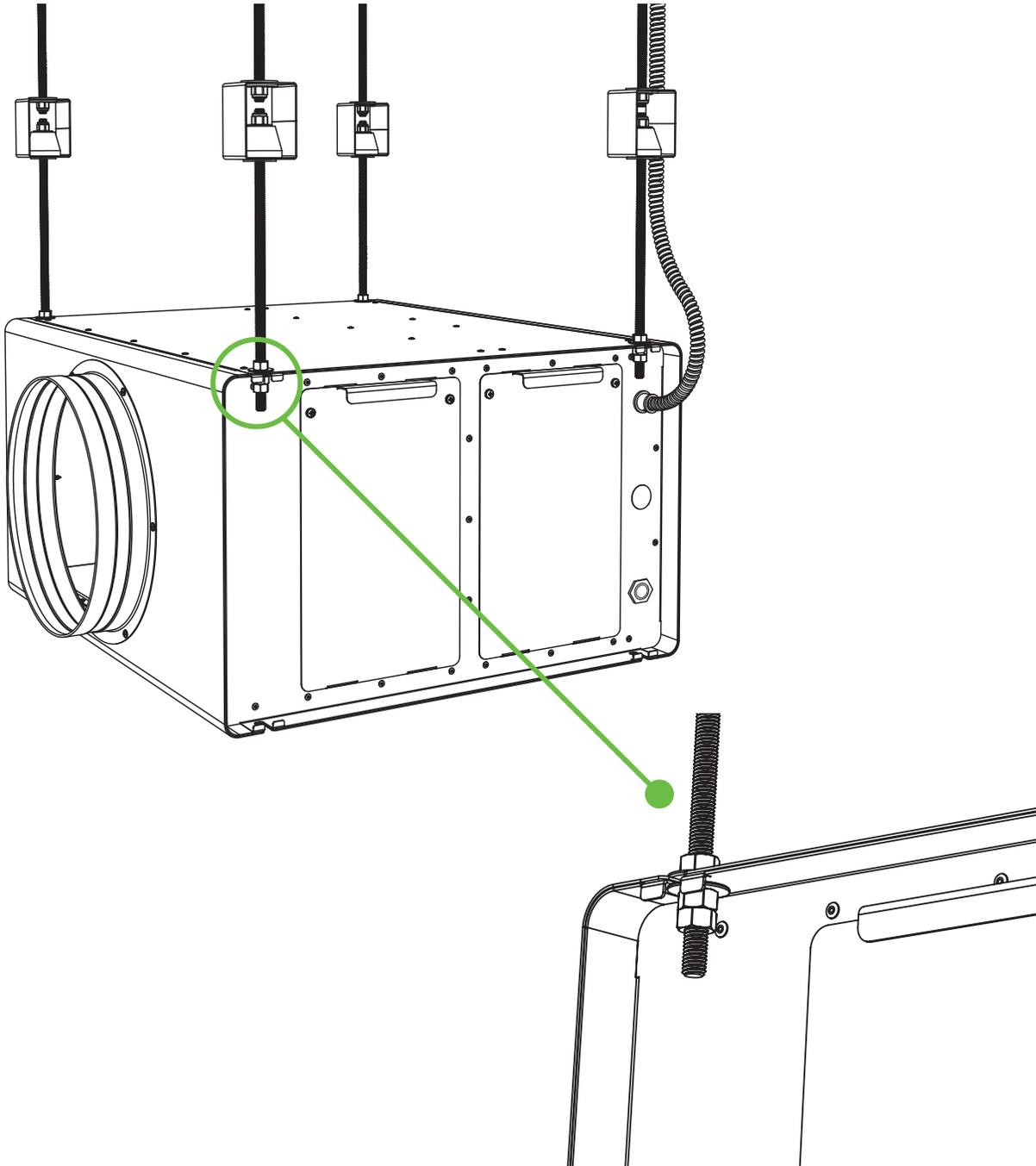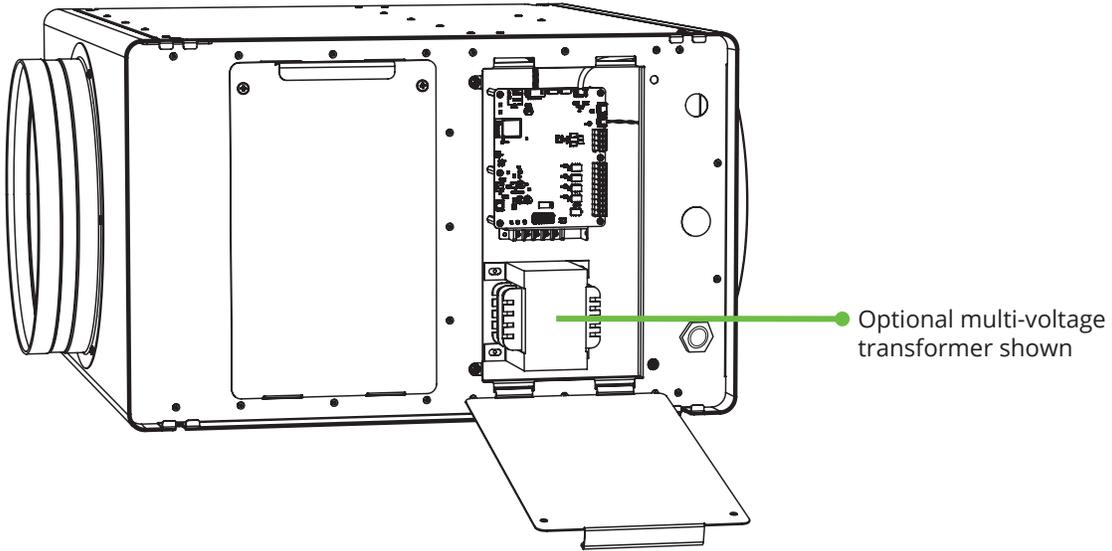
Duct Assembly

1. smartIAQ is supplied with 12" diameter supply and return connections. Large diameters and progressive turns ensure low static pressure penalties. The unit can sustain up to an additional 0.8" of static pressure, which means that smaller diameter ducts can be accommodated. The additional 0.8" of static pressure limit, can also be utilized to guide the maximum added duct length of an installation.

If installing duct work to the smartIAQ, it is recommended to use 12" diameter duct. Ducting can be slipped over the duct rings, and self tapping screws used to attach securely. A flexible duct connector between the rigid duct and the smartIAQ unit is also recommended.
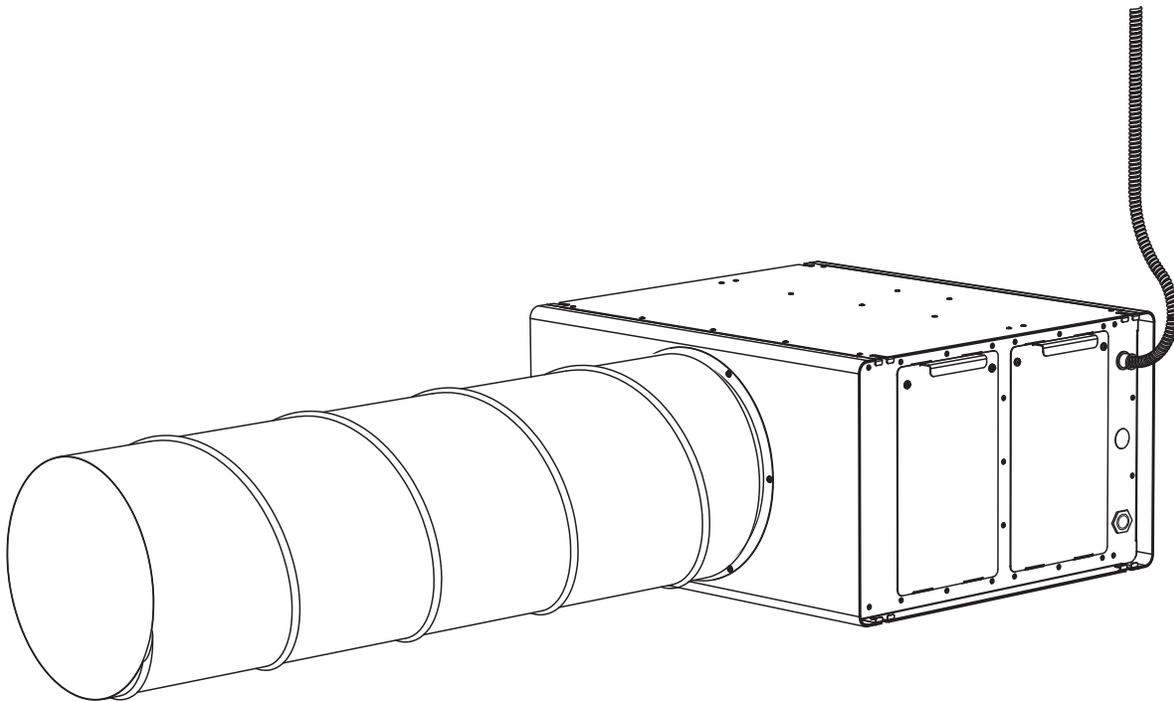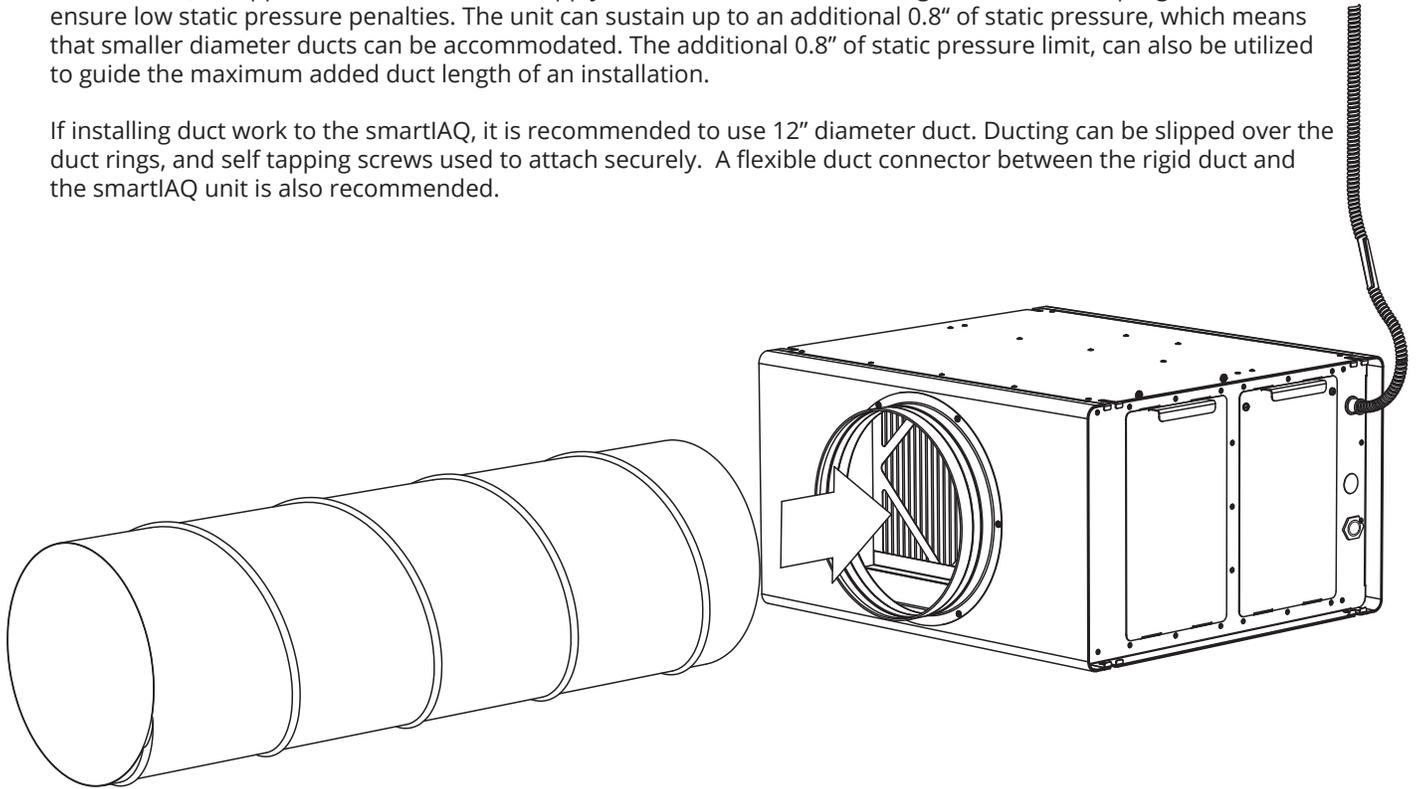
Wiring

1. Open the electrical door panel by removing the two screws to access the control board

Optional multi-voltage transformer shown

2. Route the wires as shown in the control board diagram below,

Only connection required to be made

smartIAQ SENSOR

BLOWER CONTROL

BLOWER POWER

120V AC IN

SD CARD

EXP2 EXP1

EXT

Ionizer 12V DC

SIDE STREAM FLOW SWITCH

PWR ON

FAULT

FILTER

AIR

INHIBIT

12V DC

L N G V- V+

5A FUSE

Main Input Voltage:
120 VAC, 50 /60 Hz

Optional Input Voltage 208 / 230 /
277 / 347 VAC, 50 /60 Hz
(via transformer kit)

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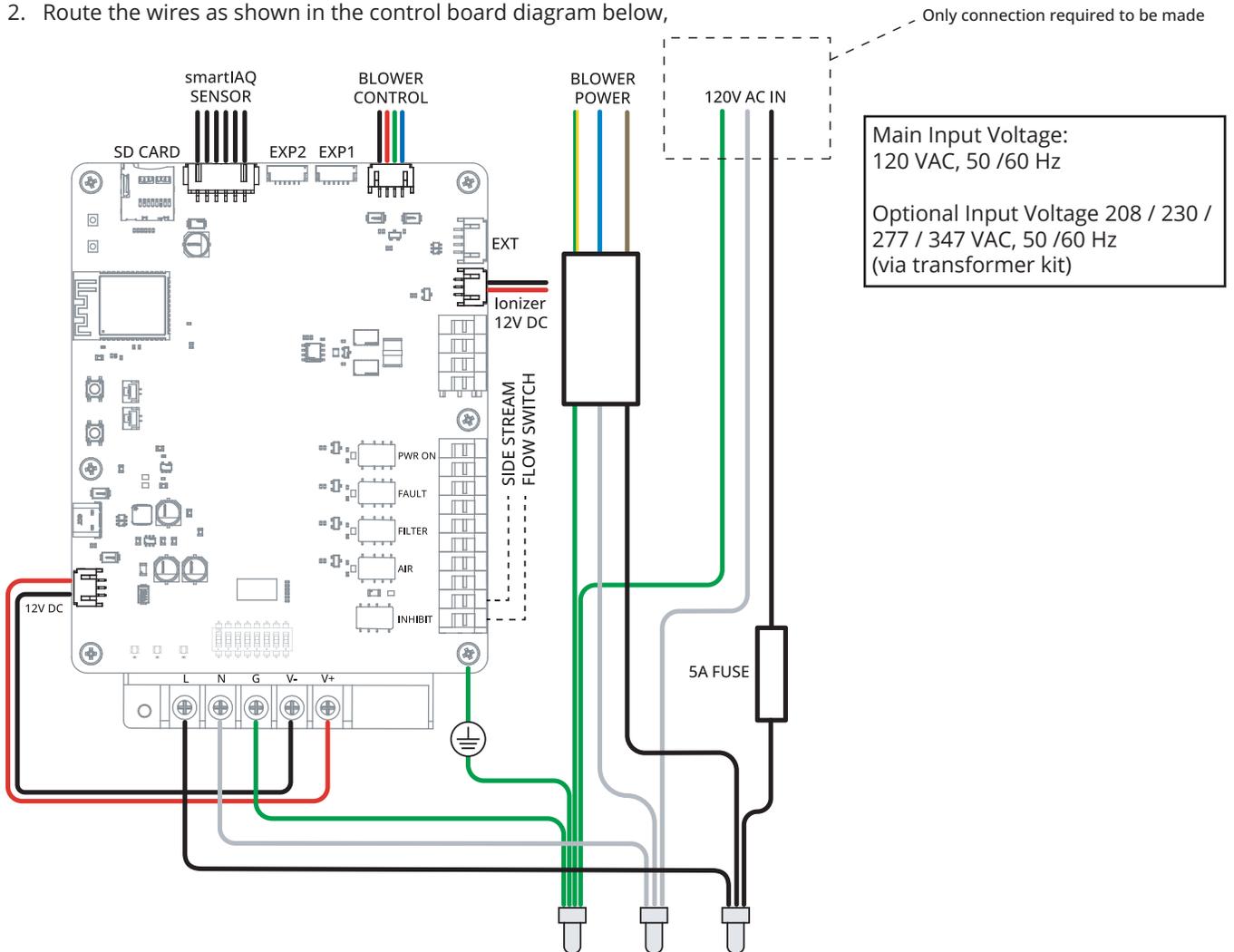
Relays

Power On Relay Operation
The "PWR" or "Power On" relay contacts are activated when the unit is powered and fully operational. This relay indicates that power is applied and the unit has successfully booted and is running; it does not merely indicate the presence of power.
The available relay contacts are dry contacts, with a contact voltage rating of 250 VAC and a maximum current rating of 2 Amps.

Fault Relay Operation
The "FAULT" relay contacts are activated when the unit encounters an error condition that requires inspection or troubleshooting.
The available relay contacts are dry contacts, with a contact voltage rating of 250 VAC and a maximum current rating of 2 Amps.

Filter Relay Operation
The "FILTER" relay contacts are activated when the unit's filters requires changing. This relay provides a clear indication that maintenance is needed to replace the filters to ensure optimal unit performance.
The available relay contacts are dry contacts, with a contact voltage rating of 250 VAC and a maximum current rating of 2 Amps.

Air Relay Operation
The "AIR" relay contacts are activated during specific air quality conditions that require attention beyond the system's normal capabilities. The operation of this relay depends on the monitoring mode in use:
1. Normal Operation Mode: The relay is activated when the air quality being monitored exceeds the selected threshold for a specified period of time. This indicates an abnormal air quality "event" that may require intervention beyond the system's built-in capabilities
2. CO_2 Activated Mode: The relay is activated when CO_2 levels exceed the selected threshold for a specified period of time. This indicates that additional action may be required to reduce CO_2 concentrations effectively.

The available relay contacts are dry contacts, with a contact voltage rating of 250 VAC and a maximum current rating of 2 Amps.

Inhibit Relay Operation
The device is equipped with "Inhibit" contacts, designed to allow remote disabling of the unit's internal fan.
The available connections include an excitation voltage (+5V), which provides the necessary power for the control circuit, and an input signal (0-5V) used to determine whether the fan should be disabled. When the input signal receives an appropriate voltage level, it triggers the system to stop the fan. The connector type accepts 14-20 AWG wire. When the input is activated, the unit's fan will be disabled, effectively stopping airflow.

The Inhibit Relay is also used for connecting the flow switch utilized in Centralized units (see later).

Note: When inhibited, the unit is not "OFF", but the fan operation is disabled. When conducting maintenance, please disable input power entirely and follow correct lock-out tag-out procedure.
For proper operation, ensure that only dry contacts are used to connect to the input signal, as using powered contacts or contacts with voltage potentials may cause unintended behavior, such as erratic fan operation or permanent damage to the control circuitry.

Wiring Continued

3. Route the cable through one of the 3 knockouts on the front panel.
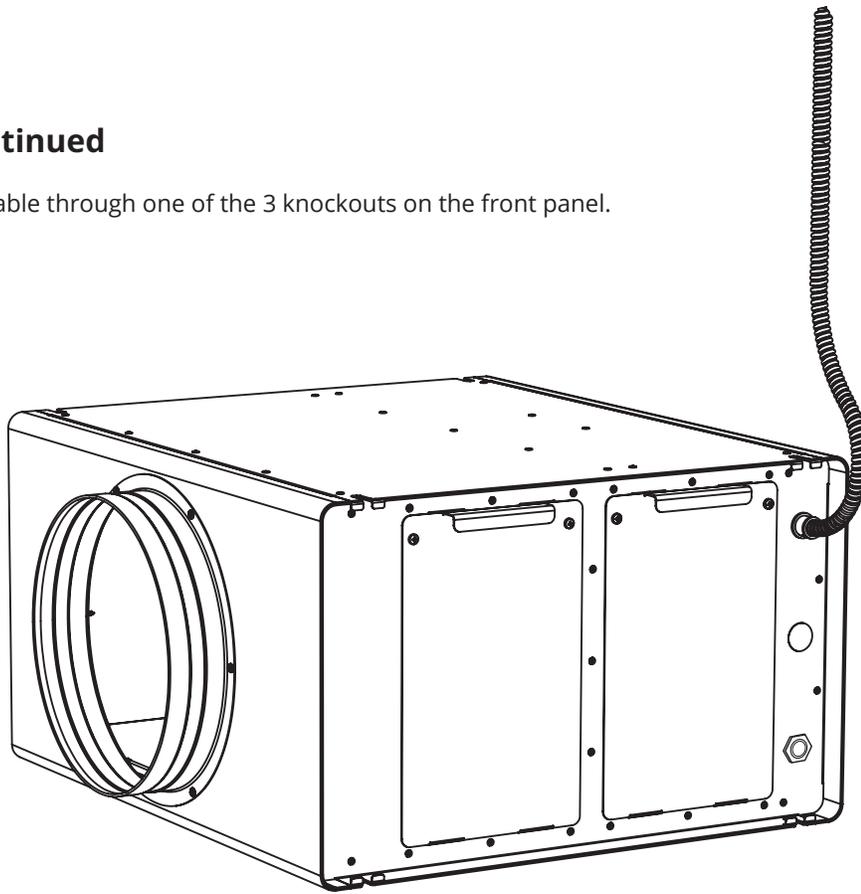
Filter Install
Note: Both Particle and Molecular filters are provided with the unit (may ship in separate container).

1. Open the filter door by removing the two screws located at the top of the door. Discard any temporary filters from inside the filter chamber (Typically marked with 'Dispose of this item') .
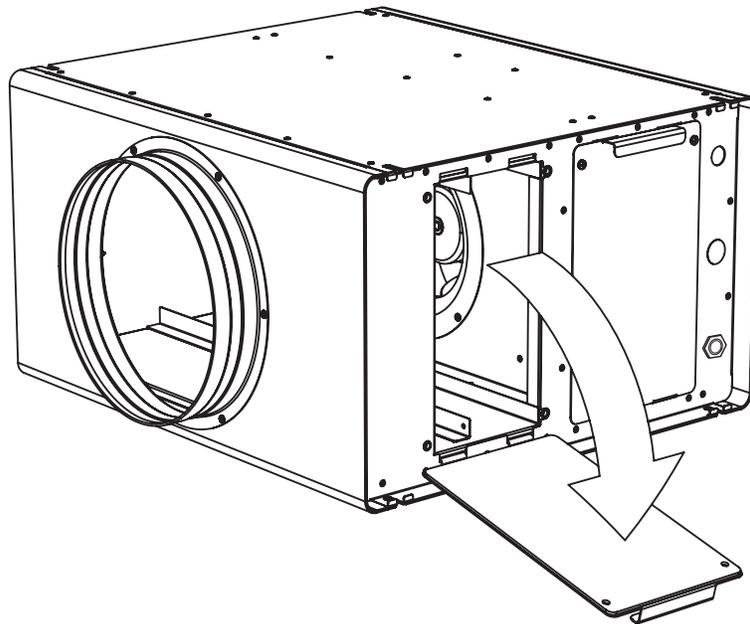
smartIAQ

2. Insert the the molecular and particle filters provided for the smartIAQ. Make sure that any molecular filters are located closest to the fan inlet and the particle filter is closest to the smartIAQ unit inlet.

Particle Filter   Molecular Filter
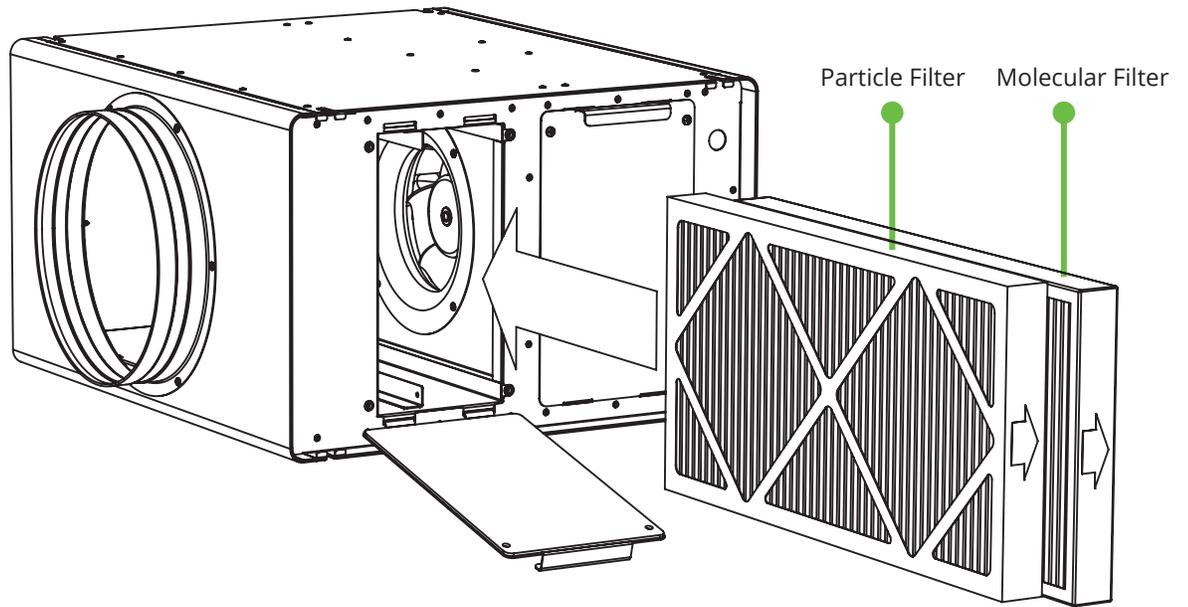
3. Use the two magnetic filter guides to hold the filters in place. Locate them at the top and the bottom and press them firmly against the filters.

Magnetic Filter
Guides
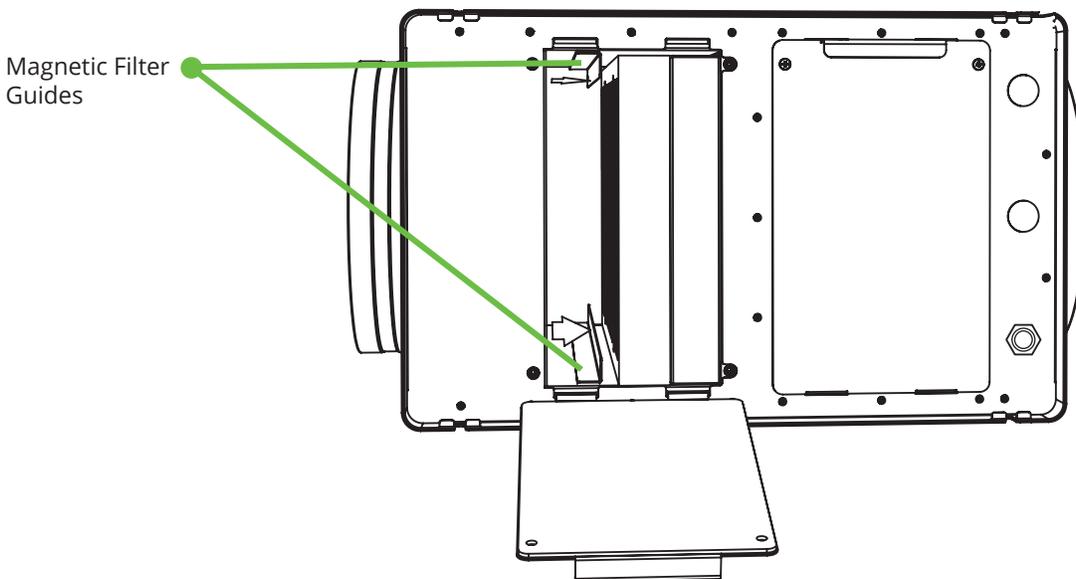
4. Close the filter door and secure tightly with the provided screws.
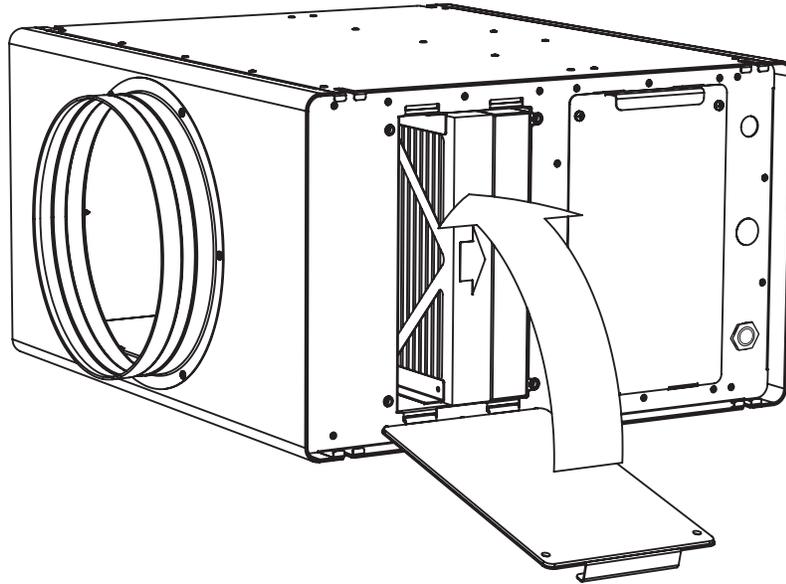
5. Once the door is closed press the filter button located on the bottom right. Hold until the light there is a flashing yellow light to confirm it has been reset.

Filter reset button

Wiring of Flow Switch (Centralized Units)

The Centralized units is designed to run in parallel to the ducted HVAC system. As such it is recommended that the unit only run when the HVAC system is operating. To this end Centralized systems are provided with a pressure based flow switch which should be installed in the HVAC duct system and wired back to the smartIAQ control panel.

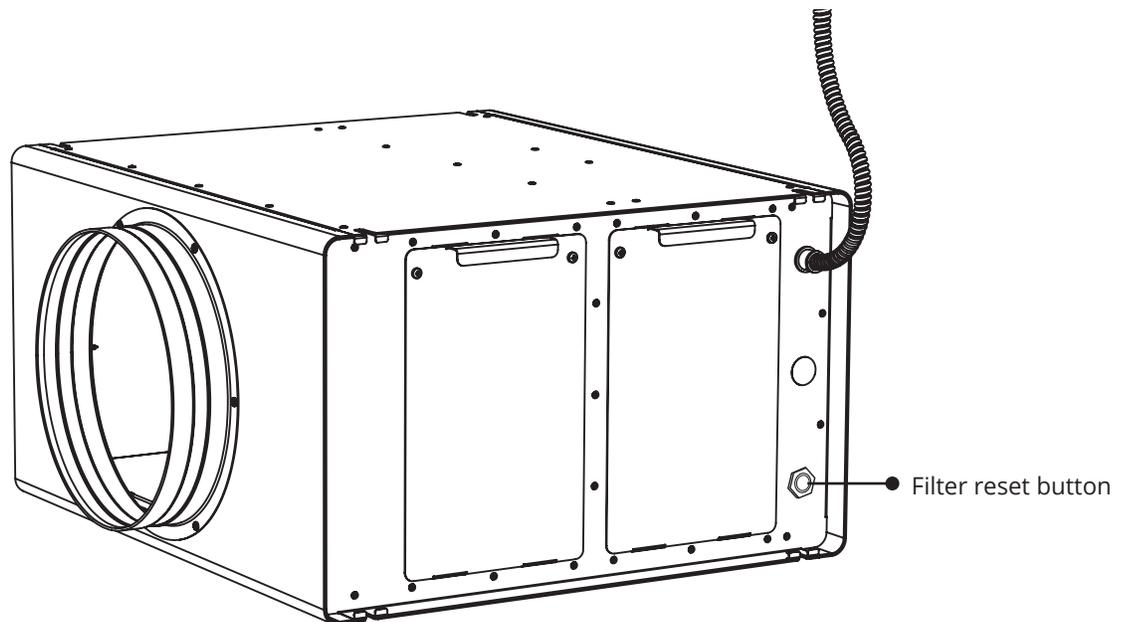The switch connects into the 'Inhibit' terminal on the control PCBA as detailed following.

Ducted Return Systems

Ducted Return, Single RTU

Return

smartIAQ

INHIB
(NO)

RTU

Supply Duct

dP Flow
Switch

NC   C   NO

Switch Wiring
Not Polarity Specific
18-22 AWG
Do not exceed 75 feet of wire length
Wire switches as Normally Closed
5VDC power supplied by smartIAQ
Follow mounting requirements in switch installation instructions

Ducted Return, Multi RTU

Return

smartIAQ

INHIB
(NO)

RTU

Supply Duct

dP Flow
Switch #1

NC   C   NO

Switch Wiring
Not Polarity Specific
18-22 AWG
Do not exceed 75 feet of wire length
Wire switches as Normally Closed
5VDC power supplied by smartIAQ
Follow mounting requirements in switch installation instructions

Return

RTU

Supply Duct

dP Flow
Switch #2

Wiring of Flow Switch (continued)

Plenum Return Systems

Plenum Return, single RTU

smartIAQ

INHIB
(NO)

Plenum Return

RTU

Supply Duct

dP Flow
Switch #1

NC   C   NO

Switch Wiring
Not Polarity Specific
18-22 AWG
Do not exceed 75 feet of wire length
Wire switches as Normally Closed
5VDC power supplied by smartIAQ
Follow mounting requirements in switch installation instructions

Plenum Return, Multi RTU

Plenum Return

RTU #1

Supply Duct

dP Flow
Switch #1

NC   C   NO

Switch Wiring
Not Polarity Specific
18-22 AWG
Do not exceed 75 feet of wire length
Wire switches as Normally Closed
5VDC power supplied by smartIAQ
Follow mounting requirements in switch installation instructions

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INHIB
(NO)

Plenum Return

RTU #2

Supply Duct

dP Flow
Switch #2

Overview of the RGB LED

Your system features three RGB LEDs, each serving a distinct purpose:
- • LED 1 (LEFT): System Status Indicator – Confirms that the system is powered on and functioning correctly.
- • LED 2 (CENTER): Air Quality Indicator – Displays real-time air quality levels and the system's air-cleaning efforts.
- • LED 3 (RIGHT): Error Indicator – Alerts you to any active system errors through specific color-coded blinking patterns.

LED 1: System Status Indicator

Purpose: Indicates that the system is operational.
Behavior:
- • Breathing White Light: LED 1 emits a smooth, pulsating white light that gradually brightens and dims in a continuous loop.
- • Normal Operation: When LED 1 displays the breathing white light, the system is functioning properly without critical errors.

Note: If LED 1 is not displaying the breathing white light, verify that the system is connected to a power source and turned on.

LED 2: Air Quality Indicator

Purpose: Provides a visual representation of the current air quality and reflects the system's air-cleaning efforts.
Behavior:
- • Dynamic Color Changes: LED 2 changes color based on real-time air quality readings.
- • Color Spectrum:
- • Green: Indicates excellent air quality; minimal air-cleaning is required.
- • Red: Indicates poor air quality; maximum air-cleaning efforts are in progress.
- • Gradient Transition: The LED transitions smoothly through 100 color variations between green and red, allowing you to gauge the air quality precisely.

Use Case: This feature helps you quickly assess the air quality and the system's performance at a glance. This feature is of particular use for troubleshooting or monitoring purposes.

LED 3: Error Indicator

Purpose: Alerts you to any active system errors through specific color-coded blinking patterns.
Understanding Error Codes
Behavior:
- • Color and Blink Patterns: Each error type is represented by LED 3 blinking a certain number of times in a specific color.
Pattern Structure:
- • LED Color: Represents the category or severity of the error.
- • Number of Blinks: Corresponds to the specific error code within that category.
- • Sequence Repetition: After each error code is displayed, there is a brief pause before the sequence repeats, allowing you to count the blinks accurately.

Error Severity Levels:
- • Critical Errors: Indicate severe issues that require immediate attention.
- • Degraded Performance: The system is operational but with reduced functionality.
- • Warnings: Potential issues that do not immediately affect system operation but should be addressed to prevent future problems.
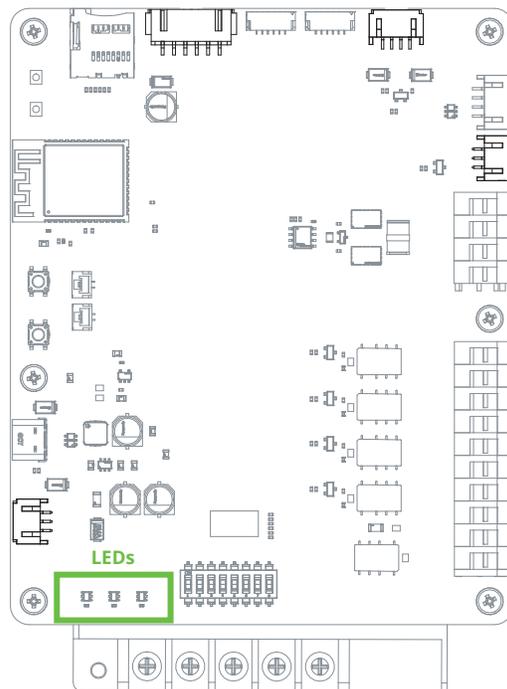
Summary Table of Error Codes

CRITICAL

Error Code	LED Color	Blinks	Description
1	Red	3	Expander Error
21	Blue	3	Fan Control Error
22	Blue	4	Fan Tachometer Error
23	Blue	5	Fan Speed Low
255	Red	2	Unknown Error

DEGRADED

Error Code	LED Color	Blinks	Description
2	Orange	2	SCD Initialization Error
3	Orange	3	SFA Initialization Error
4	Orange	4	SEN Initialization Error
5	Blue	2	Relay Error
31	Green	2	No Sensors Available

WARNING

Error Code	LED Color	Blinks	Description
32	Green	3	SCD Read Error
33	Green	4	SFA Read Error
34	Green	5	SEN Read Error
41	Pink	2	Configuration Error
42	Pink	3	SD Card Error
51	Purple	2	Carbon Filter Expired
52	Purple	3	Particle Filter Expired

Using the LEDs for Troubleshooting

Follow these steps to interpret the LED indicators and troubleshoot any issues:

Step 1: Observe the LED Indicators

- LED 1 (System Status): Check if it displays the breathing white light.
- If Not: Ensure the system is powered on and connected properly.
- LED 2 (Air Quality): Note the color displayed.
- Green: Air quality is excellent.
- Red: Air quality is poor; the system is working at maximum capacity.
- LED 3 (Error Indicator): Look for any blinking patterns.
- If Blinking: Proceed to Step 2 to identify the error.

Step 2: Identify the Error

- Count the Number of Blinks: Observe how many times LED 3 blinks before it pauses.
- Note the LED Color: Identify the color of the blinking LED.
- Match to Error Code: Refer to the Summary Table of Error Codes to find the corresponding error.

Step 3: Take Appropriate Action

- Seek Assistance if Needed: If the problem persists after troubleshooting, contact our technical support team.

Important Notes

- Regular Maintenance: Perform routine maintenance, such as cleaning filters and inspecting components, to prevent errors.
- Power Cycling: For temporary issues, restarting the system can often resolve errors.
- Safety Precautions: Always disconnect the power before performing hardware checks or replacements to avoid electrical hazards.

DIP SWITCH SETTINGS

Your device is equipped with a set of eight DIP switches located on the control board, allowing you to customize various operational parameters to suit your specific needs. These switches should not be used unless modifying default operation is desired.

Overview of DIP Switches

DIP Switch Number	Function	Default Setting
1	Administrative Settings	Model Dependent
2	Administrative Settings	Model Dependent
3	Administrative Settings	Model Dependent
4	Reserved for Future Use	Off (0)
5	"AIR" Relay Output Mode	Off (0)
6	Manual Mode Activation	Off (0)
7	Eco-Mode Activation	On (1)
8	Bipolar Ionizer Activation	On (1)
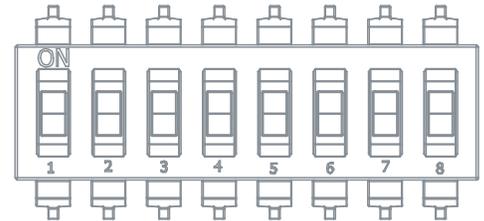
Note: DIP switches are numbered from 1 to 8, with switch 1 being the leftmost switch when facing the device.

Administrative Settings (DIP Switches 1–3)

Purpose: Currently reserved for administrative purposes.
Recommendation: Keep these switches in their original positions (as delivered) unless instructed otherwise in future updates.

"AIR" Relay Output Mode (DIP Switch 5)

Purpose: Determines the trigger condition for the "AIR" relay output.
Settings:
- Off (0) Position:
  - The "AIR" relay activates when the air quality metrics have been above (indicating poor air quality) the specified thresholds for a certain duration.
  - Use this setting to adjust environmental controls based on general air quality metrics.
- On (1) Position:
  - The "AIR" relay activates when CO_2 readings have been above the specified threshold for a certain duration.
  - This setting allows adjustments to the space based specifically on CO_2 levels.

Use Case: Select the appropriate mode depending on whether you want the relay to respond to overall air quality or specifically to CO_2 levels.

Eco-Mode Activation (DIP Switch 7)

Purpose: Enables or disables Eco-mode, conserving energy when the space is unoccupied.
Settings:
- On (1) Position (Eco-mode Enabled, Default Setting):
  - The unit will not run when CO_2 levels are below a predefined threshold, indicating the space is likely unoccupied.
  - This helps save energy by preventing unnecessary operation.
- Off (0) Position (Eco-mode Disabled):
  - The unit operates regardless of CO_2 levels, continuously monitoring and cleaning the air.

Bipolar Ionizer Activation (DIP Switch 8)

Purpose: Controls the activation of the onboard NPBI bipolar ionizer.
Settings:
>   Off (0) Position (Ionizer Disabled):
>   • The bipolar ionizer is turned off.
>   On (1) Position (Ionizer Enabled):
>   • The bipolar ionizer is activated, enhancing air purification by releasing ions that neutralize pollutants.

Additional DIP Switches

Manual Mode Activation (DIP Switch 6)

Purpose: Switches the system between Manual and Automatic operation modes.
Settings:
>   Off (0) Position (Automatic Mode, Default Setting):
>   • The system operates automatically based on sensor readings and predefined thresholds.
>   On (1) Position (Manual Mode):
>   • Allows for manual control of certain system functions.

Reserved for Future Use (DIP Switch 4)

Purpose: Currently unused and reserved for future functionality.
Recommendation: Keep this switch in the Off (0) position unless instructed otherwise in future updates.

How to Adjust DIP Switch Settings

1. Power Off the Device: Before adjusting any DIP switches, ensure the device is turned off to prevent any electrical issues.

2. Locate the DIP Switches: The DIP switches are typically found on the side or back of the device. They are small switches grouped together in a block.

3. Use a Small Tool: Use a small flathead screwdriver or a similar tool to gently flip the switches to the desired position.

4. Set the Switches According to Your Preferences: Refer to the descriptions above to configure the switches as needed.

5. Power On the Device: After adjusting the switches, turn the device back on. The new settings will take effect upon startup.

Caution: Always handle the DIP switches carefully to avoid damaging them. Ensure they are fully in the On or Off position.

Troubleshooting

1. Unit will not power up:
   a. Confirm proper voltage is applied to the correct terminal(s).
   b. Try disconnecting and re-applying the power source.

2. If the unit does not operate properly after verifying the above instructions please contact GPS Air for additional assistance.

Product Documentation

The information provided in this manual is up to date at the time of printing. Any revisions to this document will supersede the content included. For the latest applicable version of this manual, visit our website or utilize the QR code.

IOM

QR code for application guidance. please contact GPS Air for additional assistance.

Application Guide

VERIFIED
ZERO OZONE

MEETS UL 2998
DOES NOT EMIT MORE THAN
0.005 PPM AS TESTED
PER UL 867

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