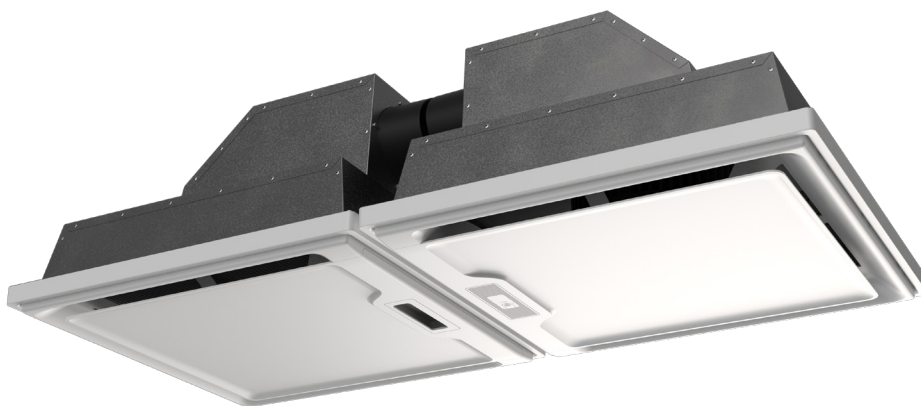




smartIAQ® and smartIAQ® GridSet™ Application Guide



ATTENTION: Please read carefully and save for future use.



Table of Contents

Introduction 3

How to use this guide..... 4

Product General Arrangements..... 5

Installation Configuration(s)..... 7

SIAQ Applications..... 9



Introduction:

smartIAQ™ is a portfolio of Intelligent Clean Air Systems that provide demand-driven air cleaning of the design compounds listed in ASHRAE standard 62.1-2019 and -2022 to achieve compliance with the Indoor Air Quality Procedure. smartIAQ products are designed to offset the high cost of conditioning excess outdoor air; making systems less costly to deploy and operate, delivering real ROI; all the while ensuring indoor air quality meets current standards.

For IAQP designs, smartIAQ has two basic models: The original smartIAQ, with Distributed (DIST) configurations which are standalone, or Centralized (CENT) which run in a sidestream configuration. The other model is the smartIAQ GridSet.

Firstly, decoupled and independent from an HVAC system, smartIAQ (SIAQ1) and smartIAQ GridSet (SIAQ2) are dedicated to ensuring clean air is delivered to the breathing zone when needed. With models configured to cover up to four (4) discrete zones, the SIAQ1-DIST-DC Series is designed to be installed above a drop ceiling or in plenum returns, the system can also be deployed on an open ceiling, in the space.

Alternatively, the SIAQ2 smartIAQ GridSet Series is designed to fit directly into a ceiling grid. It has filter and fan modules, both of which can be used in place of a standard 2' x 2' ceiling tile. No additional support is required, although there are facilities to provide such support if desired.

The SIAQ1-CENT-DC series integrates with an HVAC system, drawing air from the return duct or plenum in a side-stream configuration, before cleaning it and delivering it back to the HVAC return air stream.

In all cases, smartIAQ is powered by digital control, informed by a panel of solid state, calibrated, air quality sensors that manage the cleaned airflow.



How to use this guide

This document is provided in order to guide appropriate parties in how to design smartIAQ products into installations for reliable, repeatable outcomes.

This guide is intended to provide best practices for how to apply our equipment to a number of common building configurations.

As always, GPS Air is here to help with your challenging applications. If your situation is not covered by the guidelines in this document or you need assistance with complex layouts, please reach out to techsupport@gpsair.com or 980.279.5622

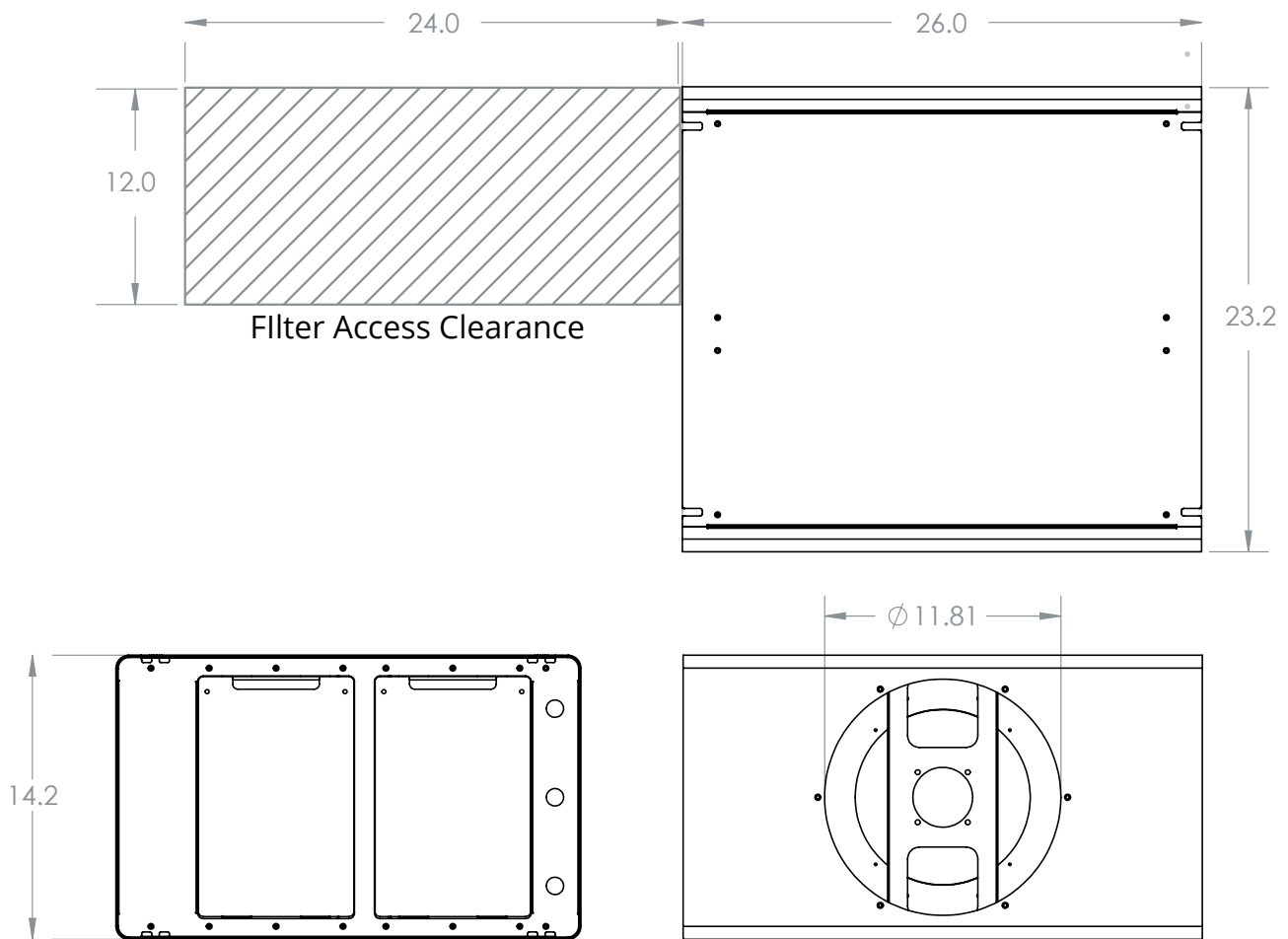


SmartIAQ General Arrangement

Below is a layout drawing providing general dimensional information, including clearance for filter changes.

Electronic drawings are available from gpsair.com in the following formats:

- RVT File (Architectural Revit File)
- SAT File (ACIS Compatible File)
- STEP file (3D Drawing file)

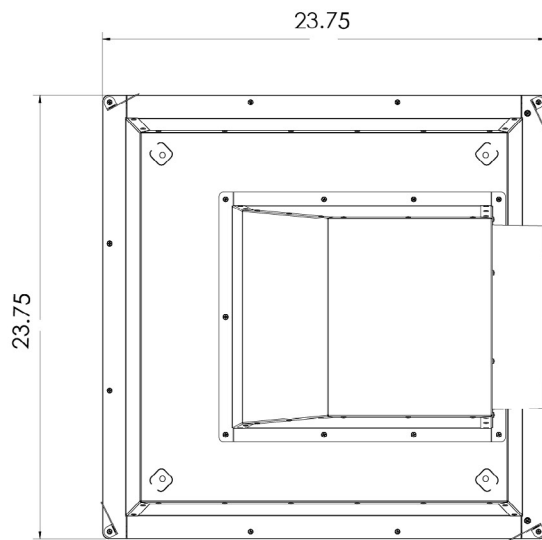


SmartIAQ GridSet General Arrangement

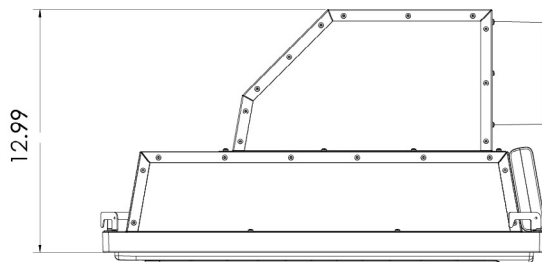
Below is a layout drawing providing general dimensional information.

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- RVT File (Architectural Revit File)
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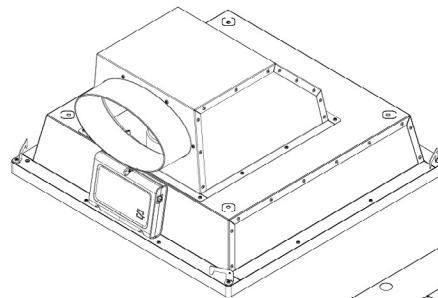


Plan View

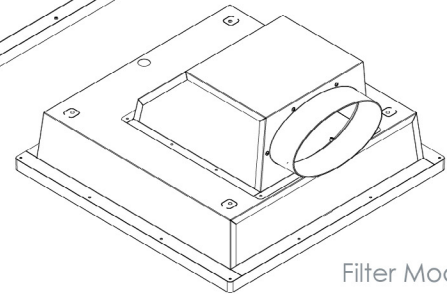


Side Elevation

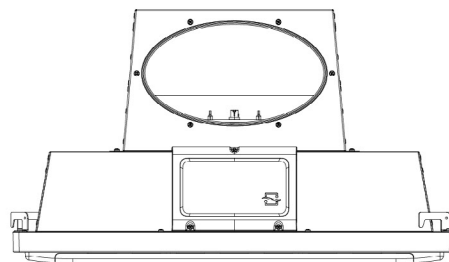
Power/Control unit on Fan Module only



Fan Module



Filter Module



End Elevation

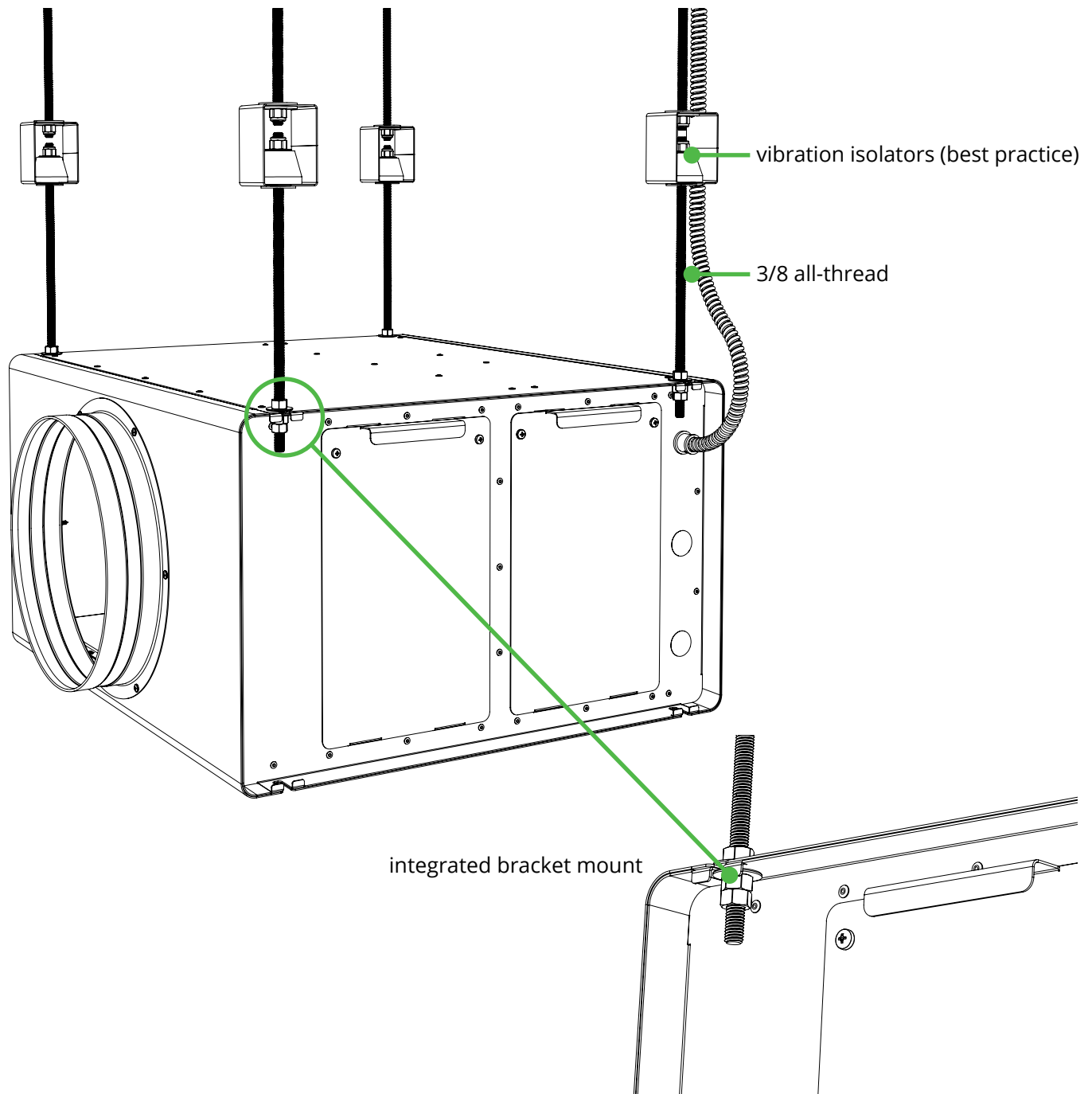
Overall dimensions representative of Fan and Filter Modules



smartIAQ Installation Configurations

This section provides a guide for manufacturer approved installation configurations when mounting smartIAQ products

Recommended all-thread 3/8-16, shown with vibration isolators (not-included), secured with lock-nuts or double nut locked. Use 1" OD washers to support/capture unit flange from above and below. Always consult the latest version of the Installation, Operation and Maintenance manual for the most up to date information.

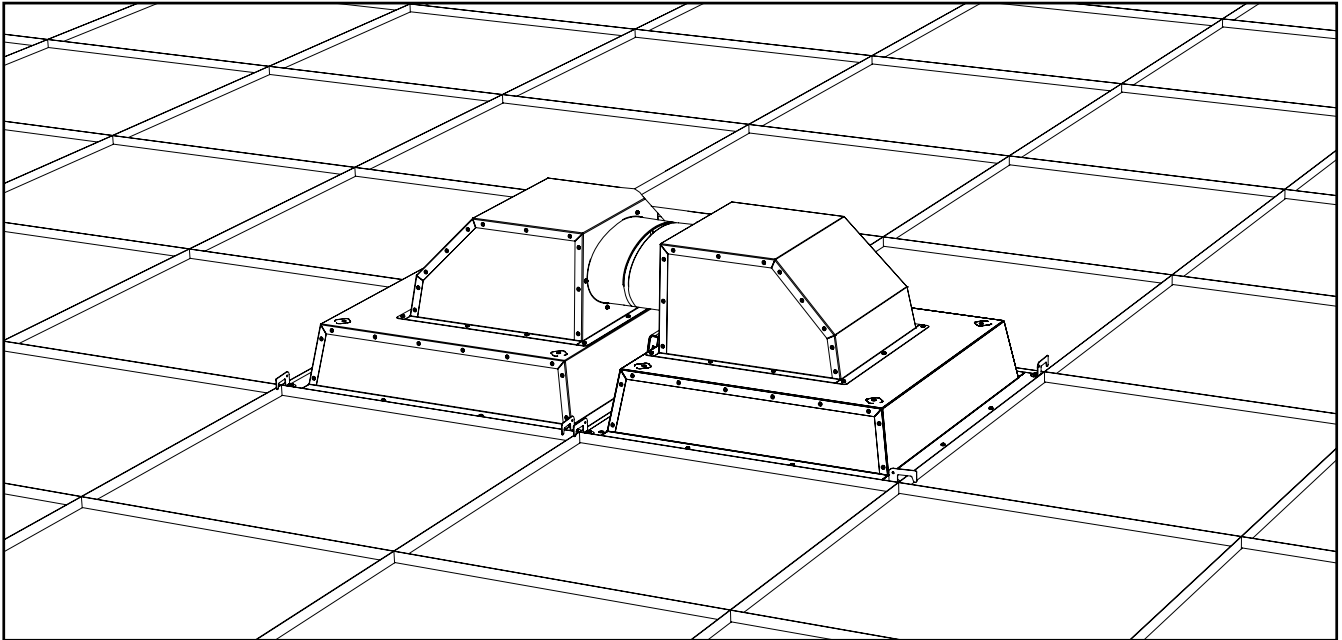


smartIAQ GridSet Installation Configurations

This section provides a guide for manufacturer approved installation configurations when mounting smartIAQ GridSet products

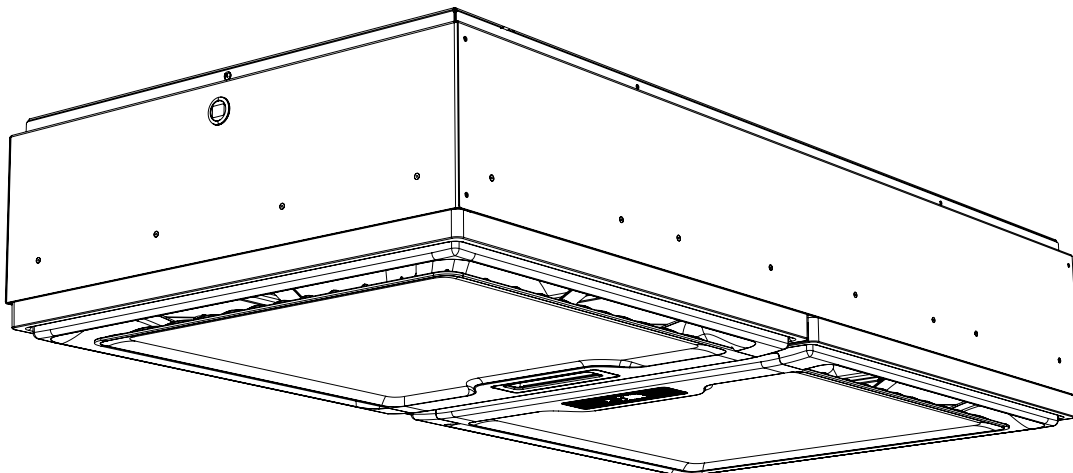
The standard recommended installation is to lay the fan and filter modules into a drop ceiling grid. Additional support can be applied using hanging wire or utilizing seismic clips if required. Always consult the latest version of the Installation, Operation and Maintenance manual for the most up to date information.

Standard drop ceiling configuration



Alternatively, there is a hard ceiling mounted version of smartIAQ GridSet that utilizes a frame fixed to the hard ceiling and then the GridSet unit is fixed to the frame.

Hard ceiling configuration



smartIAQ Applications

This section outlines a number of situations where smartIAQ units can be applied using the IAQP to reduce the requirement for outdoor air ventilation and thus reduce the size of ventilation equipment.

For each situation, diagrams illustrate how the smartIAQ unit either runs in parallel to or integrates with a revised HVAC system.

It is implicit that the initial case utilizes a minimum outdoor air flow prescribed by the Ventilation Rate Procedure in ASHRAE 62.1. The smartIAQ solutions utilize a reduced minimum outdoor air flow, supplemented by clean air as alternatively prescribed by the Indoor Air Quality Procedure also from ASHRAE 62.1

Configurations addressed in this section:

Standalone Ducted Return Applications

- 1 – Single Zone solutions
- 2 – Multiple Zones solutions

Standalone Plenum Return Applications

- 3 – Single Zone solutions
- 4 – Multiple Zones solutions

Fully Integrated Sidestream Applications

- 5 - Ducted / Plenum Return Multiple Zone solutions

Glossary of terms for schematics:

AHU = Air Handling Unit

CA = Cleaned Air - from smartIAQ units

DOAS = Dedicated Outside Air System

EA = Exhaust Air

IA = Indoor Air

OA = Outside Air

RA = Return Air

RAC - Return Air Cleaner

RFA = Relief Air

RTU = Rooftop Unit

SA = Supply Air

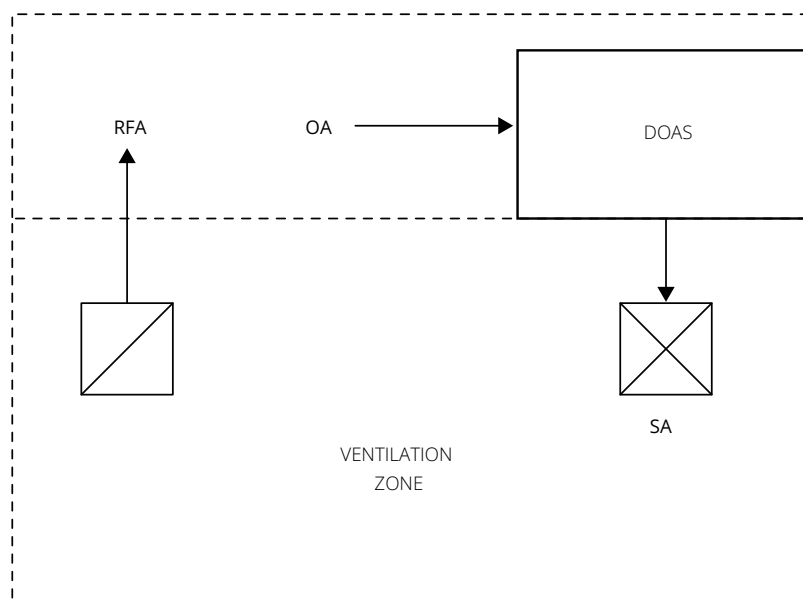
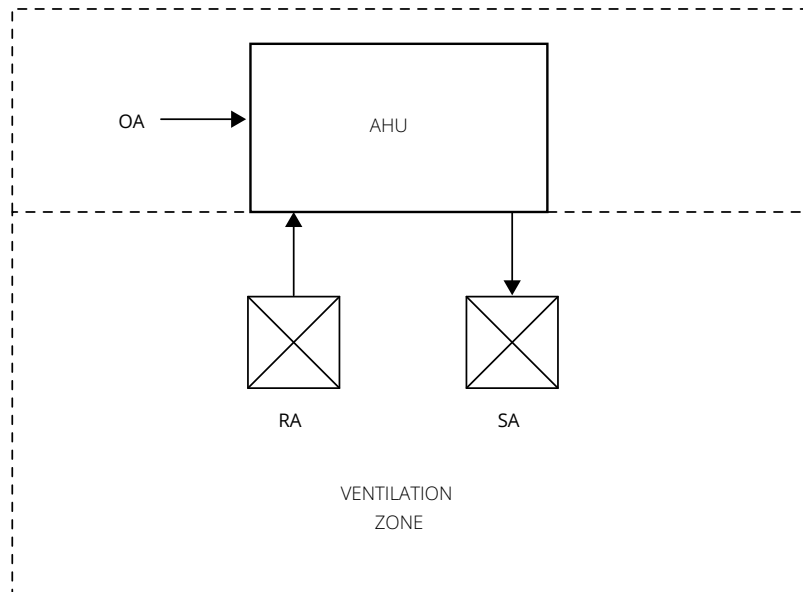


Ducted Returns

Application 1: DOAS (100% OA) or AHU (MIX of OA/RA) ducted to space

INITIAL VRP CONDITIONS:

1. Either of
 - a. DOAS supplies 100% Outside Air, or
 - b. AHU supplies a mix of Outdoor Air and Return Air
2. OA or OA/RA is conditioned and supplied directly to the ventilation zone



Ducted Returns

Solution 1a: smartIAQ GridSet unit with return and supply in a single zone

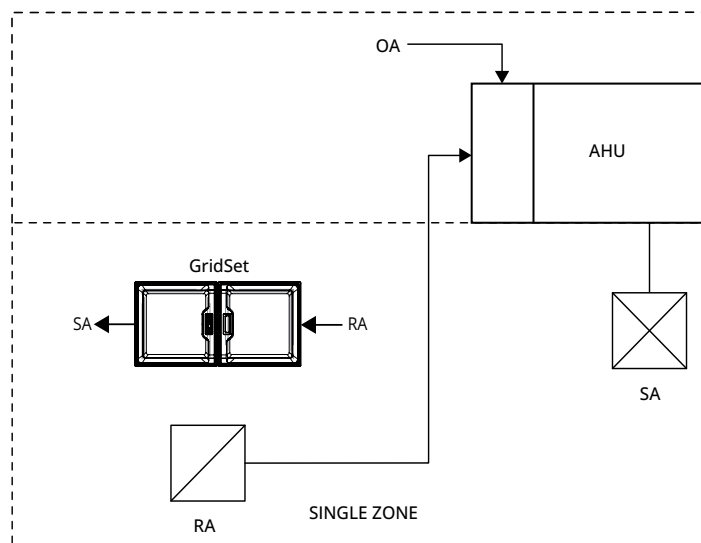
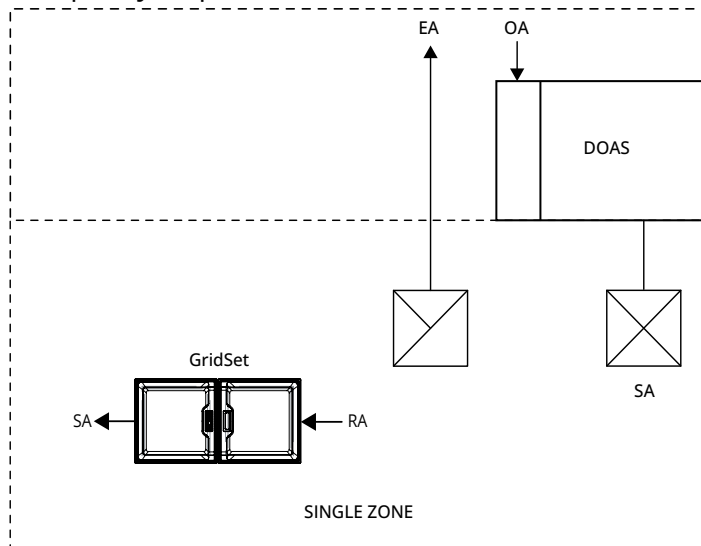
smartIAQ GridSet CONDITIONS:

1. SIAQ2-DIST1S-DC installed in drop ceiling operating in single zone.
2. DOAS or AHU providing conditioned Outside Air (and Return Air where applicable)

Note: Minimum OA and minimum CA flow rates are calculated using the smartIAQ Calculator, in accordance with ASHRAE 62.1– Indoor Air Quality Procedure

smartIAQ GridSet RESULTS:

1. Reduction in size of required DOAS or AHU.
2. Reduction in size of any additional heating and cooling equipment dedicated to this zone
3. Potential reduction in size of the system supply fan and respective ductwork.
4. Serving a single zone, smartIAQ GridSet can provide up to a maximum of 150 CFM of cleaned air as air quality requires.



*located indoors only



Ducted Returns

Solution 1b: smartIAQ Distributed unit with ducted return and ducted supply in a single zone

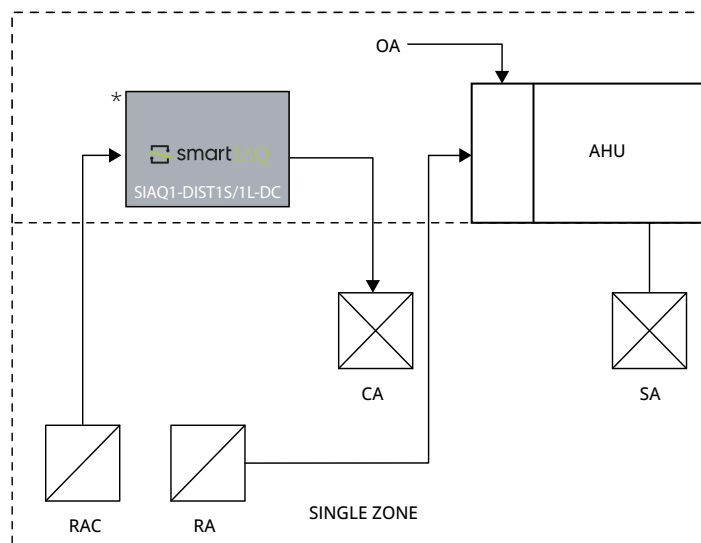
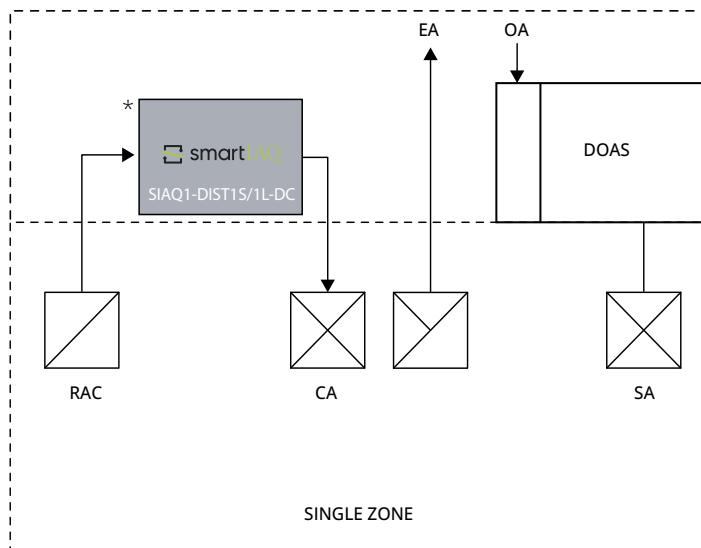
smartIAQ CONDITIONS:

1. SIAQ1-DIST1S/1L-DC installed either above drop ceiling or on hard ceiling in the space.
2. DOAS or AHU providing conditioned Outside Air (and Return Air where applicable)

Note: Minimum OA and minimum CA flow rates are calculated using the smartIAQ Calculator, in accordance with ASHRAE 62.1– Indoor Air Quality Procedure

smartIAQ RESULTS:

1. Reduction in size of required DOAS or AHU.
2. Reduction in size of any additional heating and cooling equipment dedicated to this zone
3. Potential reduction in size of the system supply fan and respective ductwork.
4. Serving a single zone, smartIAQ can provide up to a maximum of 500 CFM of cleaned air as air quality requires.



*located indoors only

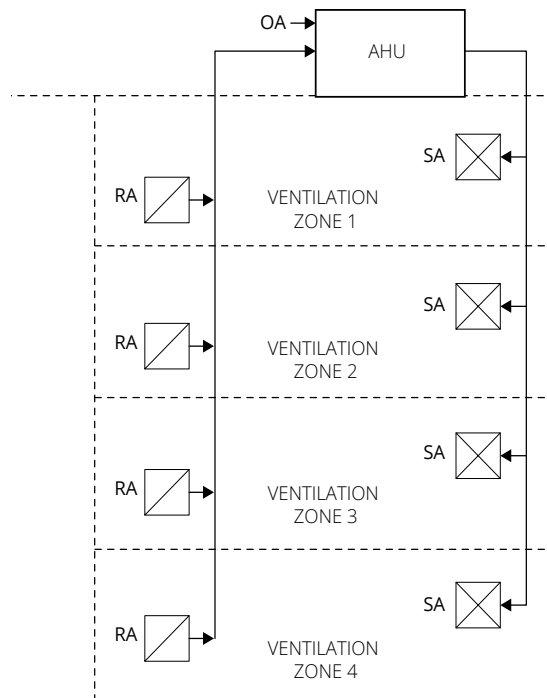
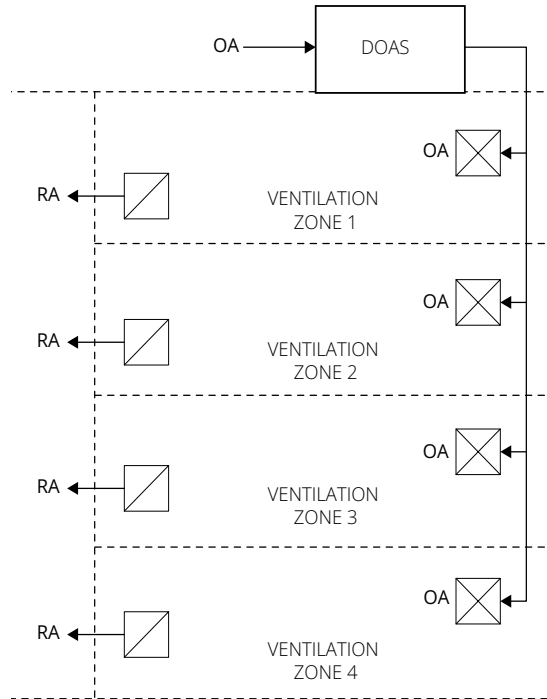


Ducted Returns

Application 2: DOAS (100% OA) or AHU (MIX of OA/RA) ducted to multiple spaces

INITIAL VRP CONDITIONS:

1. Either of:
 - a. DOAS supplies 100% Outside Air, or
 - b. AHU supplies a mix of Outdoor Air and Return Air
2. OA or OA/RA is conditioned and supplied directly to the multiple ventilation zones



Ducted Returns

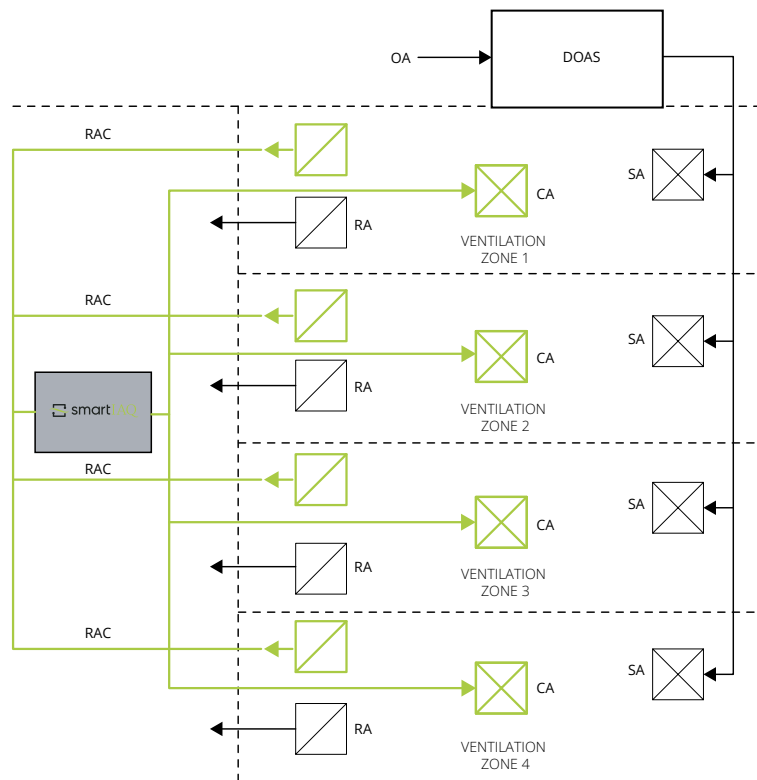
Solution 2: smartIAQ Distributed unit with ducted return and ducted supply to multiple zones

smartIAQ CONDITIONS:

1. SIAQ1-DIST2/3/4-DC installed either above drop ceiling or on hard ceiling in the space.
Alternate location could be common to zones, i.e. in a corridor.
 2. DOAS or AHU providing conditioned Outside Air (and Return Air where applicable)
- Note: Minimum OA and minimum CA flow rates are calculated using the smartIAQ Calculator , in accordance with ASHRAE 62.1– Indoor Air Quality Procedure

smartIAQ RESULTS:

1. Reduction in size of required DOAS or AHU.
2. Reduction in size of any additional heating and cooling equipment dedicated to this zone
3. Potential reduction in size of the system supply fan and respective ductwork.
4. Serving multiple zones, smartIAQ can provide up to the following amounts of cleaned air as air quality requires:
 - a. SIAQ1-DIST2-DC serving 2 zones = a maximum of 250CFM* of cleaned air
 - b. SIAQ1-DIST3-DC serving 3 zones = a maximum of 167CFM* of cleaned air
 - c. SIAQ1-DIST4-DC serving 4 zones = a maximum of 125CFM* of cleaned air

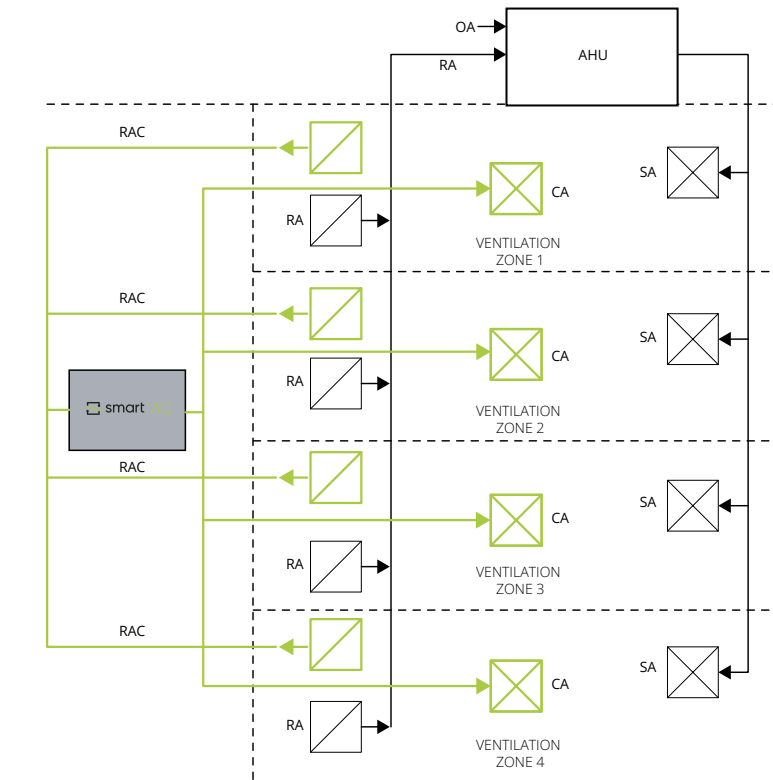


* Duct size may impact delivered airflow.



Ducted Returns

Solution 2: smartIAQ Distributed unit with ducted return and ducted supply to multiple zones (Continued)



* Duct size may impact delivered airflow.

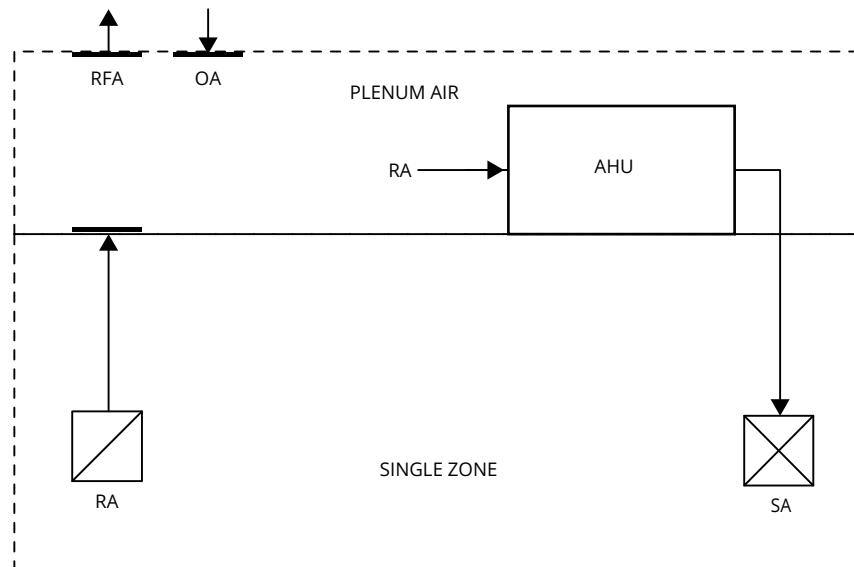


Plenum Returns

Application 3. AHU Plenum return (100% MIX of OA/RA) ducted to space (single zone)

INITIAL VRP CONDITIONS:

1. AHU supplies a mix of Outdoor Air and Return Air
2. OA/RA is conditioned and supplied directly to the ventilation zone



Plenum Returns

Solution 3a. smartIAQ GridSet unit with return and supply in a single zone

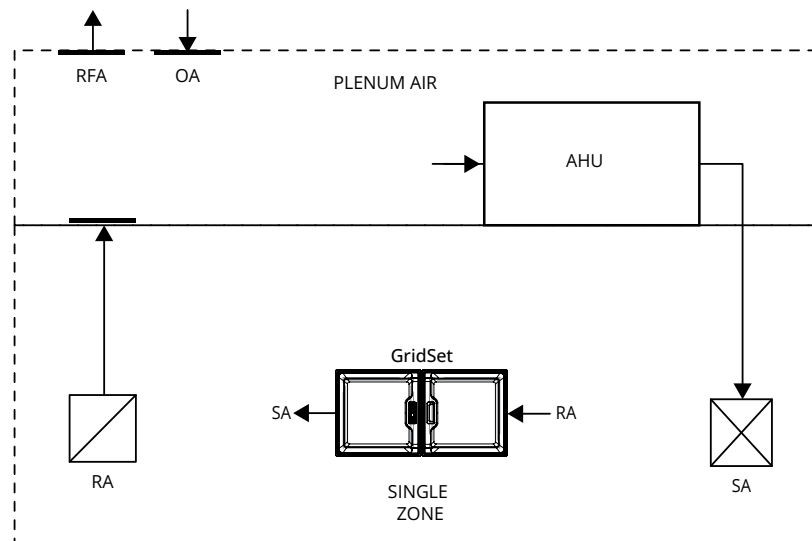
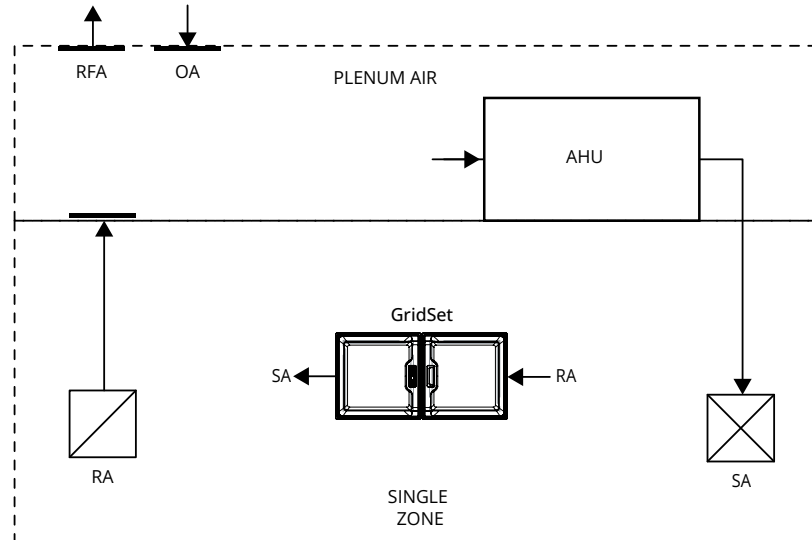
smartIAQ GridSet CONDITIONS:

1. SIAQ2-DIST1S-DC installed in drop ceiling in a plenum space operating in a single zone.
2. AHU providing conditioned blend of Outside Air and Return Air.

Note: Minimum OA and minimum CA flow rates are calculated using the smartIAQ Calculator, in accordance with ASHRAE 62.1– Indoor Air Quality Procedure

smartIAQ GridSet RESULTS:

1. Reduction in size of required AHU.
2. Reduction in size of any additional heating and cooling equipment dedicated to this zone
3. Potential reduction in size of the system supply fan and respective ductwork.
4. Serving a single zone, smartIAQ GridSet can provide up to a maximum of 150 CFM of cleaned air as air quality requires.



Plenum Returns

Solution 3b. smartIAQ Distributed unit with plenum return and ducted supply in a single zone

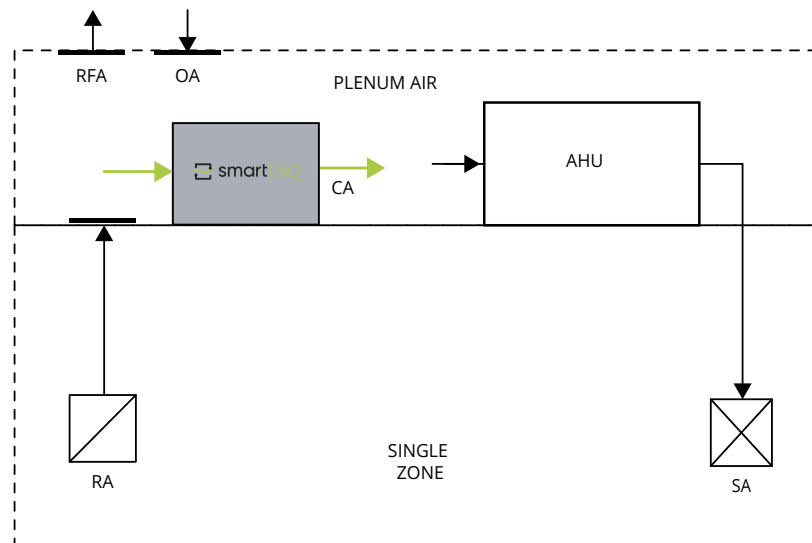
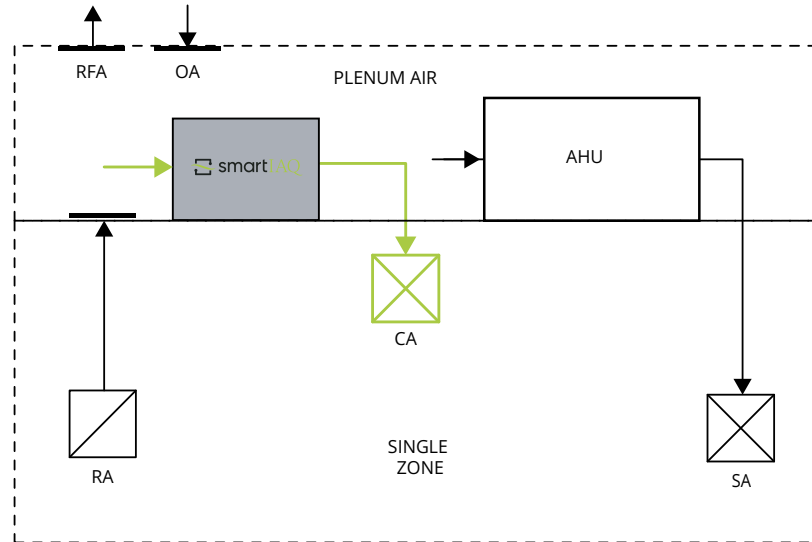
smartIAQ CONDITIONS:

1. SIAQ1-DIST1S/1L-DC installed above drop ceiling in a plenum space above a single zone.
2. AHU providing conditioned blend of Outside Air and Return Air.

Note: Minimum OA and minimum CA flow rates are calculated using the smartIAQ Calculator, in accordance with ASHRAE 62.1– Indoor Air Quality Procedure

smartIAQ RESULTS:

1. Reduction in size of required AHU.
2. Reduction in size of any additional heating and cooling equipment dedicated to this zone
3. Potential reduction in size of the system supply fan and respective ductwork.
4. Serving a single zone, smartIAQ can provide up to a maximum of 500 CFM of cleaned air as air quality requires.

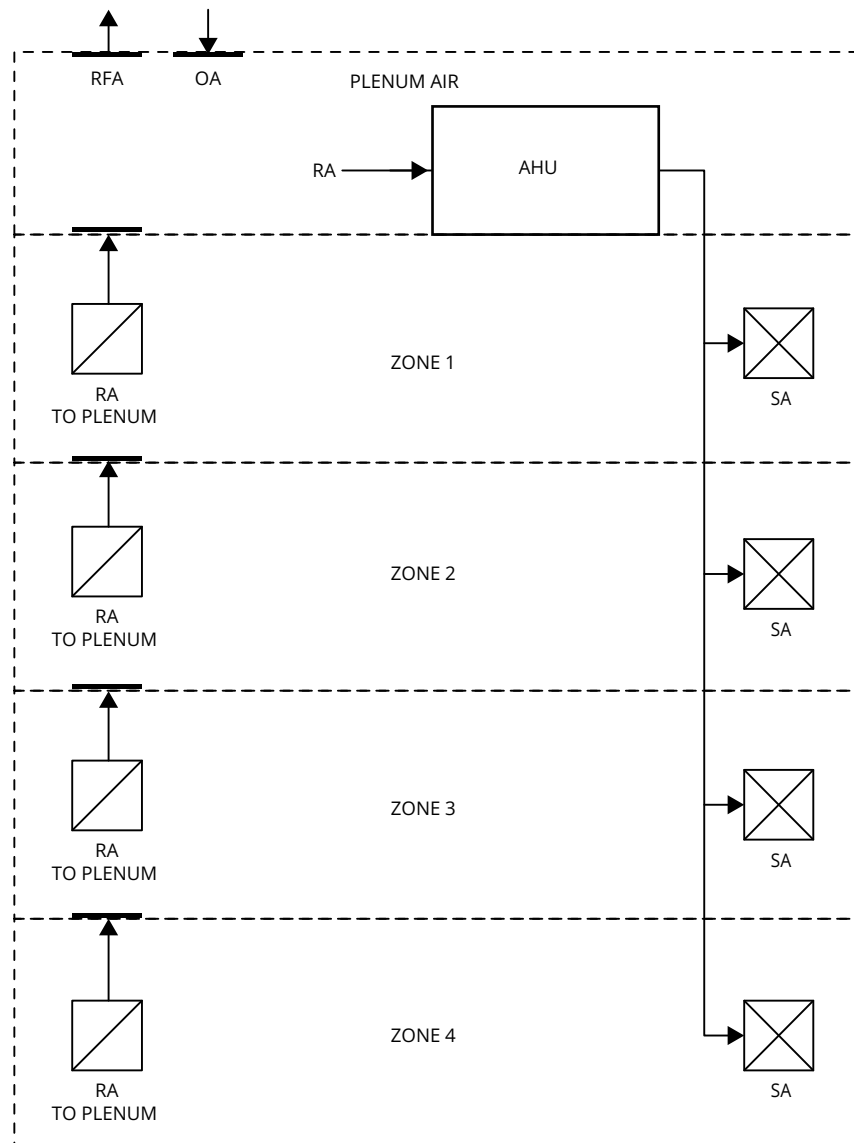


Plenum Returns

Application 4. Plenum Return and Ducted Supply to multiple zones

INITIAL VRP CONDITIONS:

1. AHU supplies a mix of Outdoor Air and Return Air
2. OA/RA is conditioned and supplied directly to the multiple ventilation zones



Plenum Returns

Solution 4a. smartIAQ Distributed unit with plenum return and ducted supply in to multiple zones

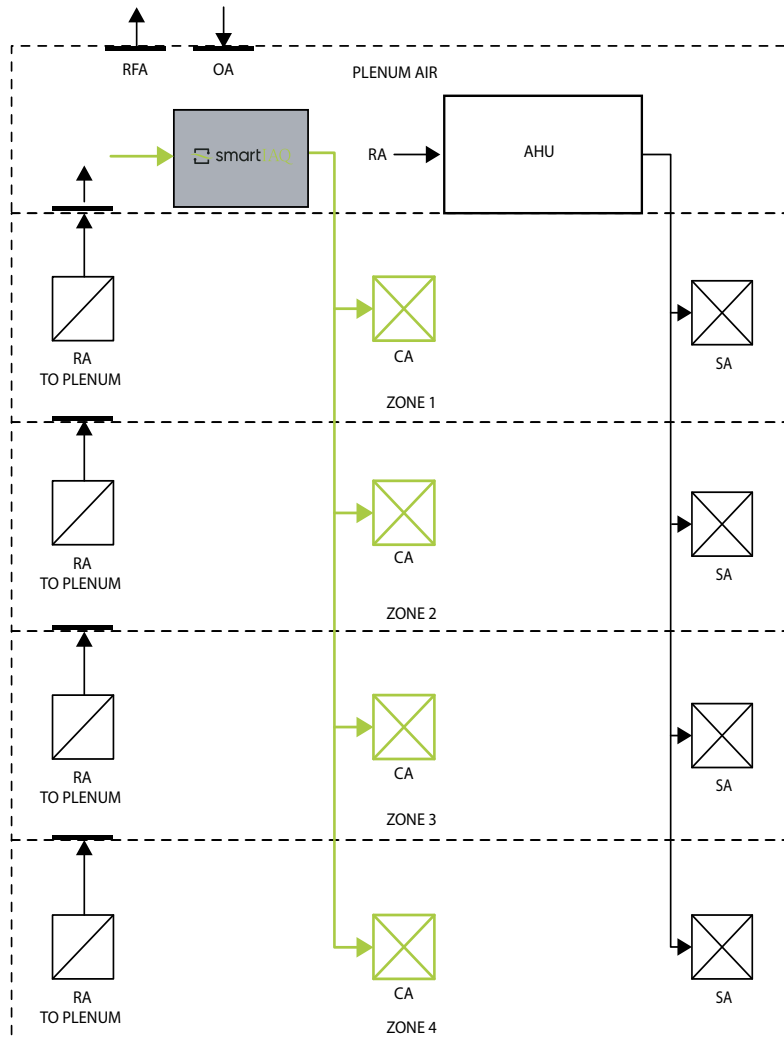
smartIAQ CONDITIONS:

1. SIAQ1-DIST2/3/4-DC installed above a drop ceiling in a plenum space above multiple zones.
2. AHU providing conditioned blend of Outside Air and Return Air

Note: Minimum OA and minimum CA flow rates are calculated using the smartIAQ Calculator, in accordance with ASHRAE 62.1– Indoor Air Quality Procedure

smartIAQ RESULTS:

1. Reduction in size of required DOAS or AHU.
2. Reduction in size of any additional heating and cooling equipment dedicated to this zone
3. Potential reduction in size of the system supply fan and respective ductwork.
4. Serving multiple zones, smartIAQ can provide up to the following amounts of cleaned air as air quality requires:
 - a. SIAQ1-DIST2-DC serving 2 zones = a maximum of 250CFM^* of cleaned air
 - b. SIAQ1-DIST3-DC serving 3 zones = a maximum of 167CFM^* of cleaned air
 - c. SIAQ1-DIST4-DC serving 4 zones = a maximum of 125CFM^* of cleaned air



* Duct size may impact delivered airflow.



Plenum Returns

Solution 4b. smartIAQ Distributed unit with plenum return and plenum supply in to multiple zones

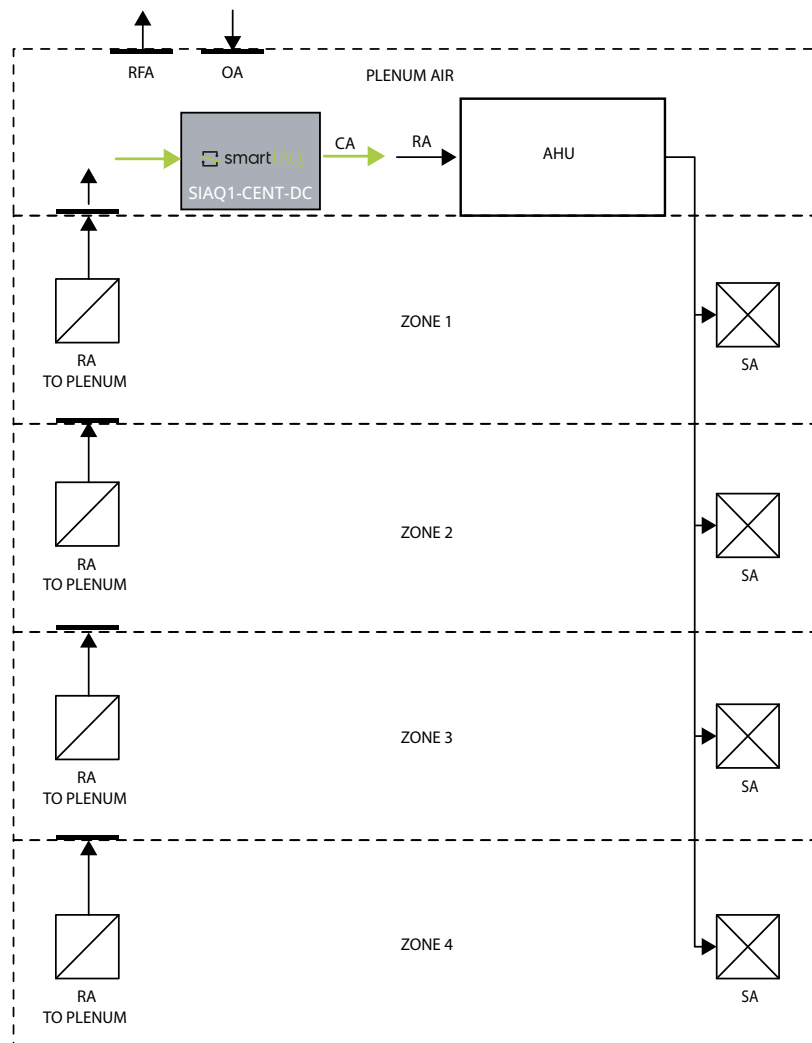
smartIAQ CONDITIONS:

1. SIAQ1-DIST2/3/4-DC installed above a drop ceiling in a plenum space above multiple zones.
2. AHU providing conditioned blend of Outside Air and Return Air

Note: Minimum OA and minimum CA flow rates are calculated using the smartIAQ Calculator, in accordance with ASHRAE 62.1– Indoor Air Quality Procedure

smartIAQ RESULTS:

1. Reduction in size of required DOAS or AHU.
2. Reduction in size of any additional heating and cooling equipment dedicated to this zone
3. Potential reduction in size of the system supply fan and respective ductwork.
4. Serving multiple zones, smartIAQ can provide up to the following amounts of cleaned air as air quality requires:
 - a. SIAQ1-DIST2-DC serving 2 zones = a maximum of 250CFM^* of cleaned air
 - b. SIAQ1-DIST3-DC serving 3 zones = a maximum of 167CFM^* of cleaned air
 - c. SIAQ1-DIST4-DC serving 4 zones = a maximum of 125CFM^* of cleaned air

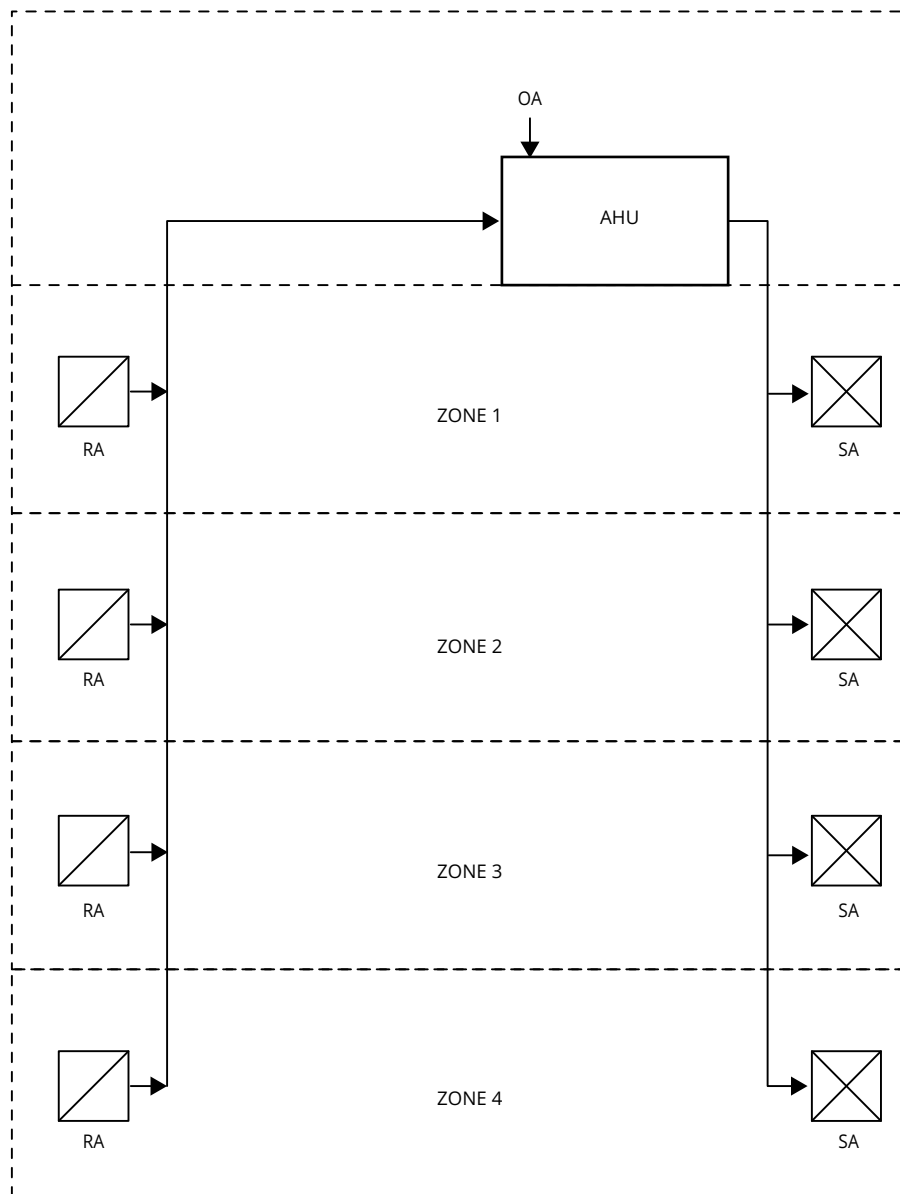


Fully Integrated

Application 5: Mixed Air System - Ducted Return

INITIAL VRP CONDITIONS:

1. AHU or RTU is supplying Mixed Air (OA + RA).
2. Can be Constant Volume (CV) or Variable Air Volume (VAV).
3. Outside air to AHU/RTU is provided locally or is decoupled.
4. Return Air provided to AHU/RTU through ducted Return Air system



Fully Integrated

Solution 5: smartIAQ Centralized unit in sidestream configuration with Ducted Return

smartIAQ CONDITIONS:

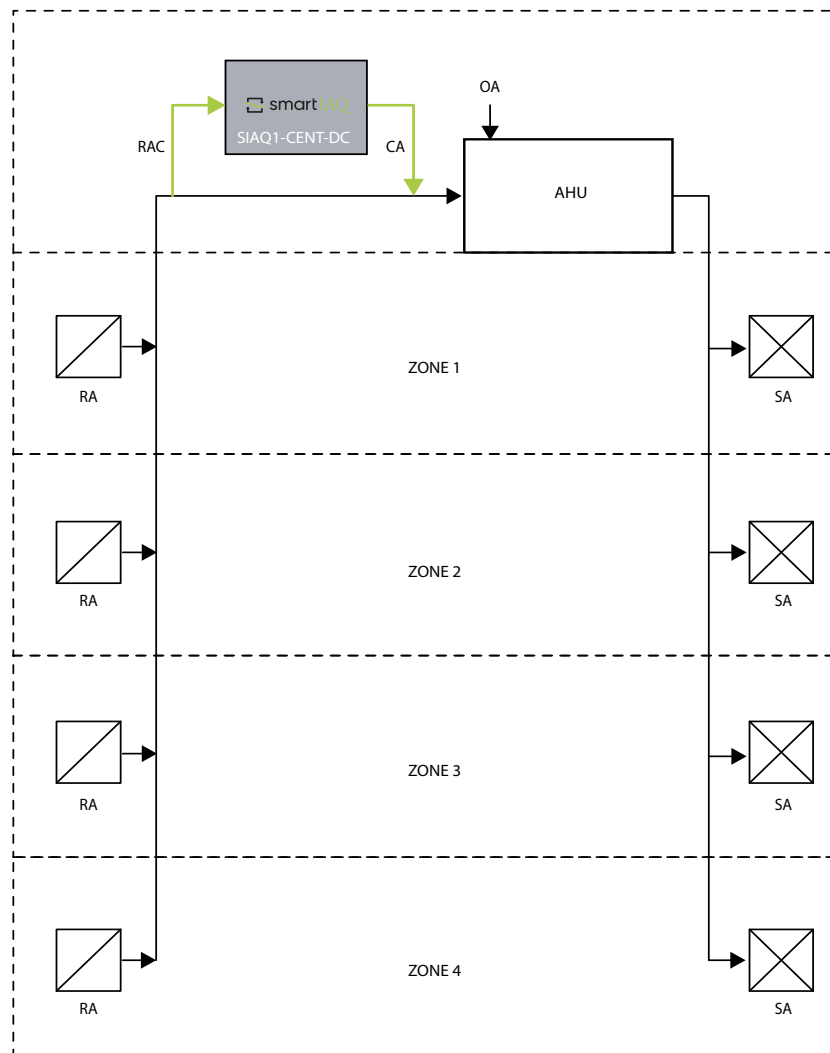
1. SIAQ1-CENT-DC installed in sidestream configuration on the ducted return air for centralized HVAC system.

2. AHU providing conditioned blend of Outside Air and Return Air

Note: Minimum OA and minimum CA flow rates are calculated using the smartIAQ Calculator, in accordance with ASHRAE 62.1– Indoor Air Quality Procedure. smartIAQ calculator will determine number of units required. Larger systems may need multiple units running in parallel.

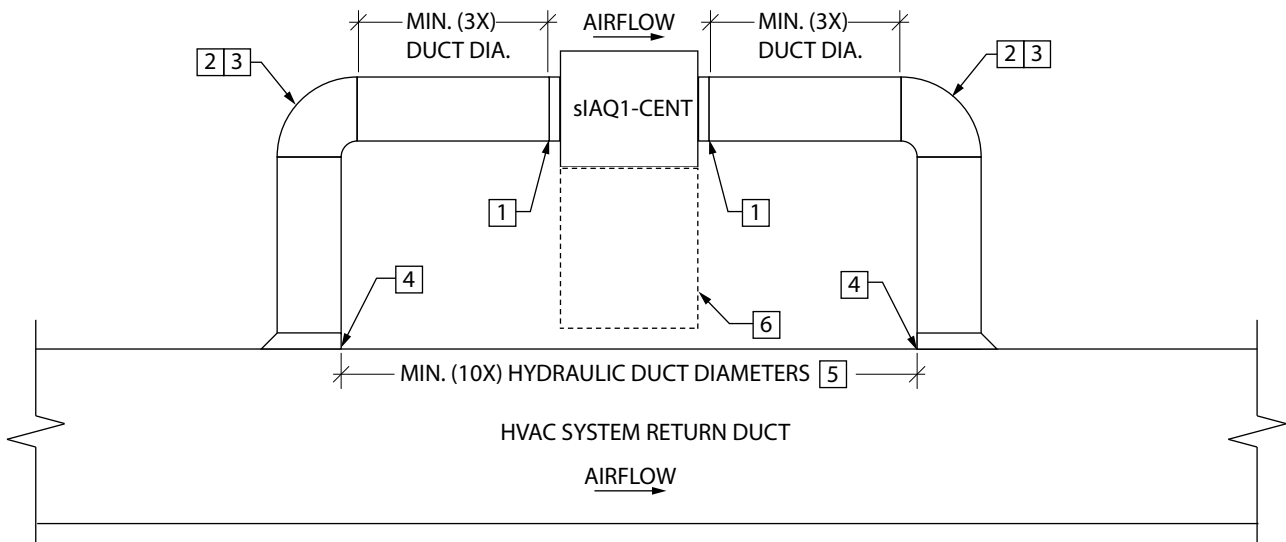
smartIAQ RESULT:

1. Reduction in size of required AHU.
2. Reduction in size of any additional heating and cooling equipment dedicated to this zone
3. Potential reduction in size of the system supply fan and respective ductwork.
4. Serving multiple zones, smartIAQ can provide up to a maximum of 700CFM of cleaned air as air quality requires.



smartIAQ Centralized unit in sidestream configuration for multiple zones

smartIAQ - sIAQ1-CENT-DC Sidestream Application installation recommendations



NOTES: [X]

1. PROVIDE FLEXIBLE DUCT CONNECTOR BETWEEN RIGID DUCT AND smartIAQ INLET/OUTLET
2. PROVIDE SMOOTH RADIUS ELBOW FOR ROUND DUCT 90° TURNS
3. PROVIDE MITERED ELBOW WITH TURNING VANES FOR RECTANGULAR DUCT 90° TURNS
4. PROVIDE HIGH EFFICIENCY TAKEOFF FOR DUCT CONNECTION TO HVAC RETURN DUCT
5. NUMBER OF HYDRAULIC DUCT DIAMETERS SHALL REFER TO THE smartIAQ SIDESTREAM DUCTWORK SIZE, NOT THE HVAC SYSTEM RETURN DUCT SIZE
6. MAINTAIN 30 INCH CLEARANCE FOR FILTER CHANGE/MAINTENANCE

HYDRAULIC DUCT DIAMETER

$$D_H = \frac{4 \times (\text{FLOW AREA})}{\text{PERIMETER}}$$

NOTE: FOR ROUND DUCT, HYDRAULIC DUCT DIAMETER EQUALS DUCT DIAMETER



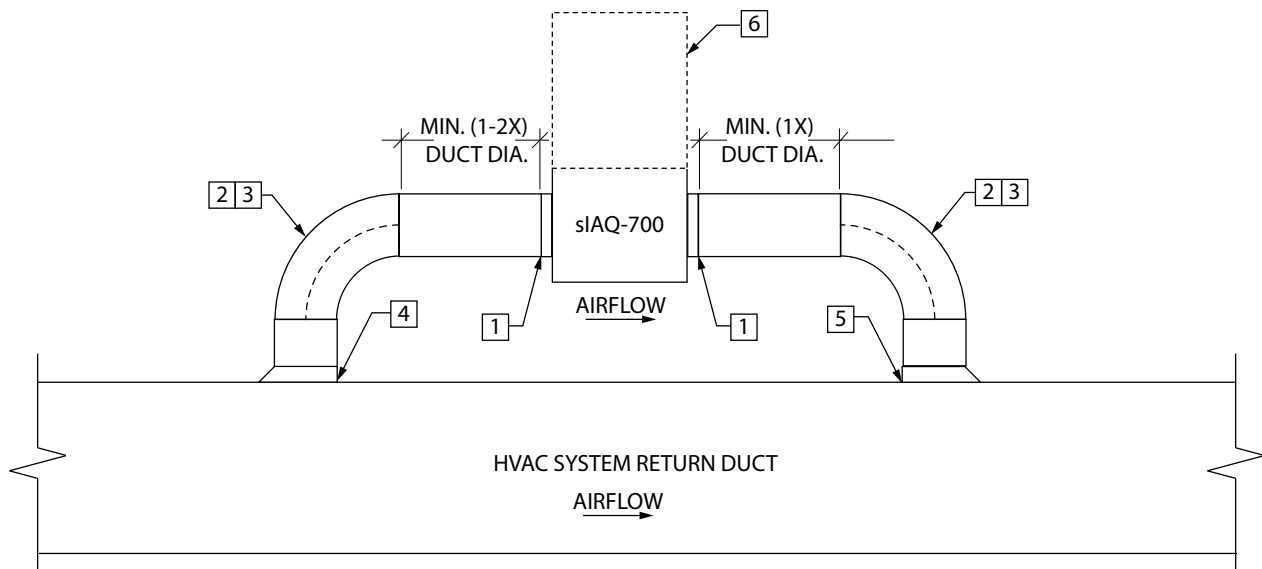
smartIAQ Centralized unit in sidestream configuration for multiple zones Alternate configurations

smartIAQ - sIAQ1-CENT-DC Sidestream Application alternate installation.

Where the three-duct-diameter spacing shown in the preceding design cannot be achieved because of space constraints, a compact alternative may be considered for the Centralized smartIAQ when used in a sidestream configuration.

The alternative arrangement should maintain use of 12-inch ductwork, smooth high-efficiency 45-degree flush takeoffs, long-radius elbows and a downstream-directed flush return connection to promote stable airflow, minimize main-duct disturbance, and reduce treated-air recirculation.

The smartIAQ unit can also be oriented such that the filter access door can face away from the main duct allowing for closer



NOTES: [X]

1. PROVIDE FLEXIBLE DUCT CONNECTOR BETWEEN RIGID DUCT AND smartIAQ INLET/OUTLET
2. PROVIDE LONGER SMOOTH RADIUS ELBOW FOR ROUND DUCT 90° TURNS (R/D > 1.5)
3. PROVIDE MITERED ELBOW WITH TURNING VANES FOR RECTANGULAR DUCT 90° TURNS
4. PROVIDE HIGH EFFICIENCY 45° TAKEOFF FOR DUCT CONNECTION TO HVAC RETURN DUCT
5. PROVIDE A DIRECTED FLUSH RETURN CONNECTION OR HIGH EFFICIENCY 45° TAKEOFF FOR RETURN TO MAIN HVAC TRUNK
6. MAINTAIN 30 INCH CLEARANCE FOR FILTER CHANGE/MAINTENANCE

HYDRAULIC DUCT DIAMETER

$$D_H = \frac{4 \times (\text{FLOW AREA})}{\text{PERIMETER}}$$



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