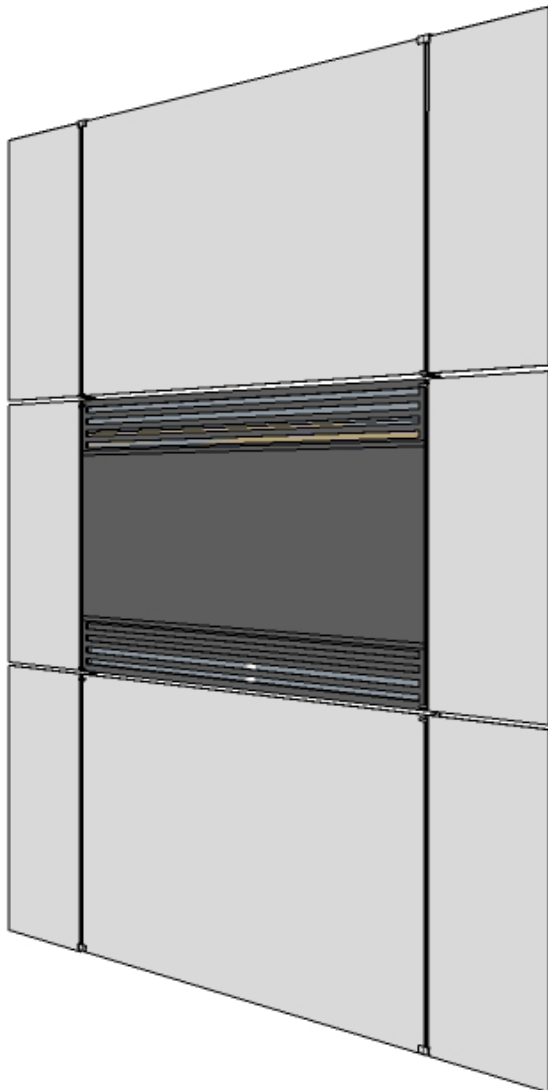


AirFlowTM Panels RS-Series

Rain Screen Panel with
Integral Energy Recovery Ventilation

Technical, Installation, Operations,
and Maintenance Manual



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General Safety Information

Only qualified personnel should install this system. Personnel should have a clear understanding of these instructions and should be aware of general safety precautions. Improper installation can result in electric shock, possible injury due to coming in contact with moving parts, as well as other potential hazards. Other considerations may be required if high winds or seismic activity are present. If more information is needed, contact a licensed professional engineer before moving forward.

! DANGER !

Always disconnect power before working on or near this equipment. Lock and tag the disconnect switch or breaker to prevent accidental power up.

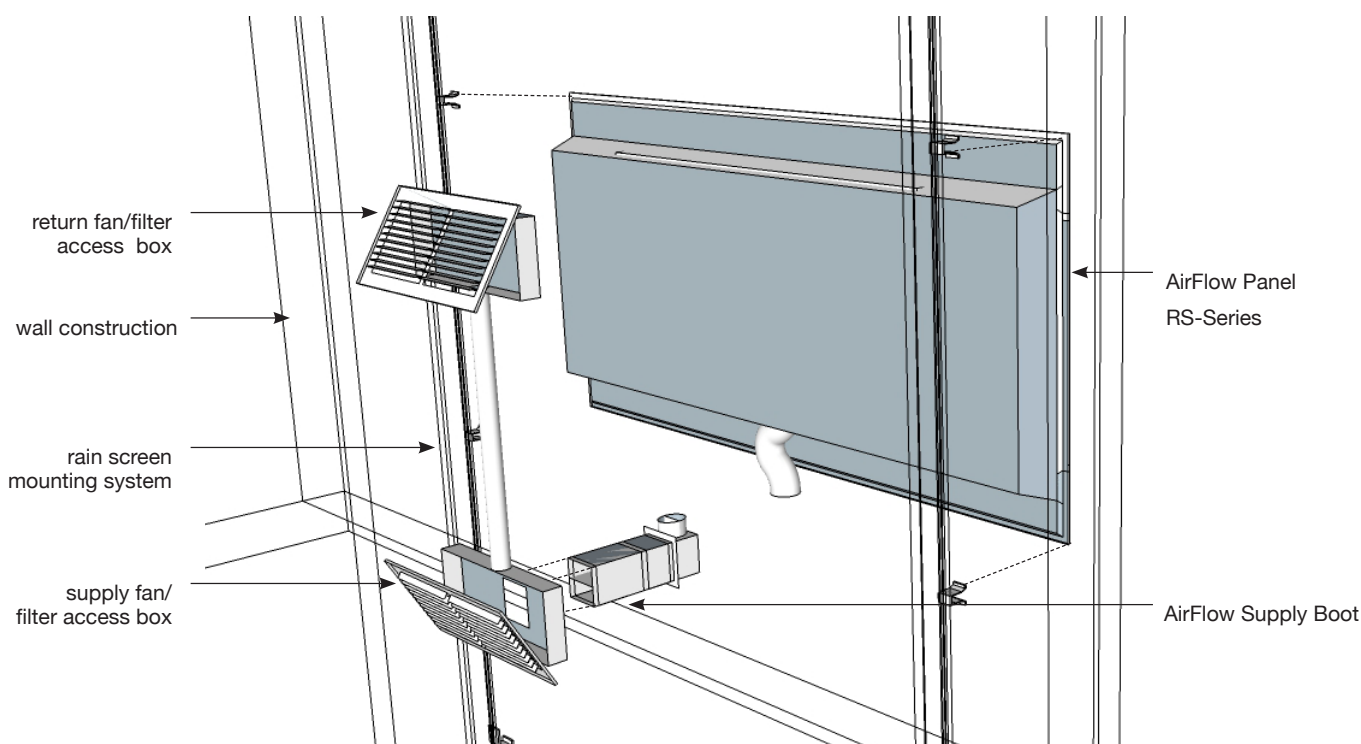
1. Follow all local electrical and safety codes as well as the National Electric Code (NEC), the National Fire Protection Agency (NFPA) where applicable.
2. All moving parts must be free to rotate without striking or rubbing any stationary objects.
3. Unit must be securely and adequately grounded (earthed).
4. Do not spin fans faster than maximum cataloged fan RPM. Adjustments to fan speed significantly effect motor load. If the fan RPM is changed, the motor current should be checked to make sure it is not exceeding the motor nameplate amps.
5. Do not allow the power cables to kink or come in contact with oil, grease, hot surfaces or chemicals. Replace cord immediately if damaged.
6. Verify that the power source is compatible with the equipment.
7. Never attempt to access the unit while fans are running.

Product Overview

The AirFlow RS-Series Panel is a hybrid building envelope / ventilation product. It provides preconditioned outdoor air to the building interior directly through the enclosure at distributed locations via a large-scale, ultra-efficient heat and moisture exchanger integrated into rain screen wall panels at selected locations within the building envelope system.

AirFlow RS-Series Panels (Rain Screen) are designed for use as a part of an external wall cladding in conjunction with conventional rain screen panels. The panels are available in dimensions and mounting systems to make them compatible with most commercial rainscreen systems. They are available in finishes to match commercially available products, including Kynar coatings, shadowbox glazing, and stone or metal veneers.

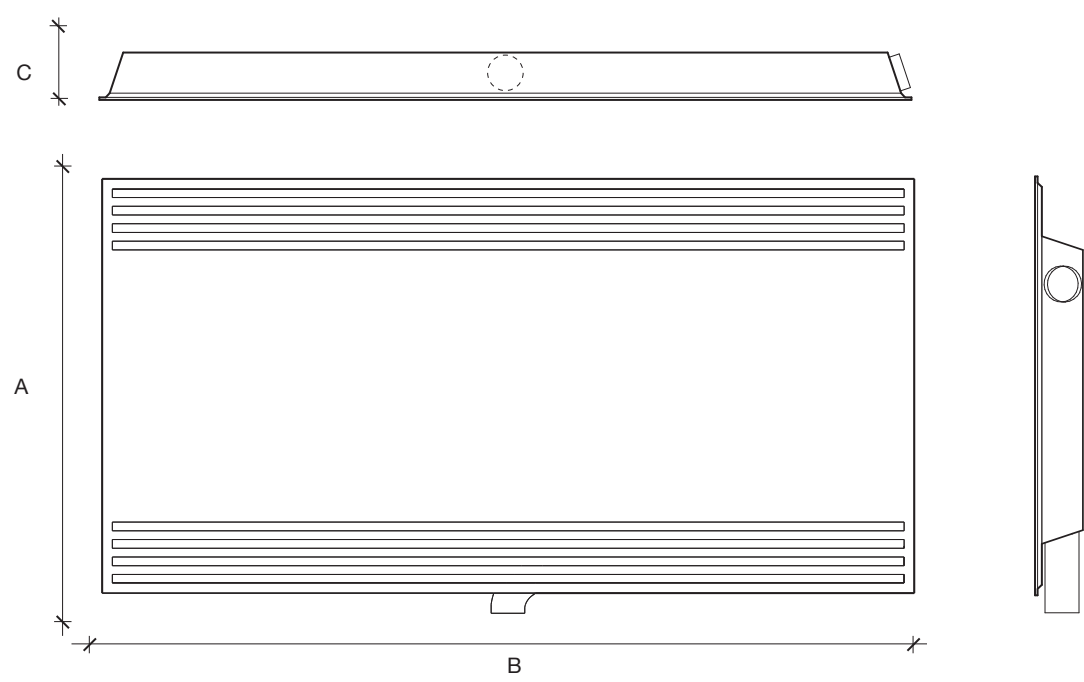
AirFlow RS-Series Panels may be located at strategic points throughout the building envelope to provide controllable, energy efficient outdoor air directly to occupied areas of the building. With optional integral dehumidification and reheat coils, the panels can provide precise control over supply air temperature and humidity, enabling them to operate completely independently of centralized HVAC systems. AirFlow Panels offer a more energy efficient alternative to centralized Dedicated Outdoor Air Systems (DOAS). Together with radiant cooling and heating, fan coil units, or small VAV systems, AirFlow Panels create the optimal low-energy building ventilation system for new construction and retrofit applications.



Technical

Supply Air Flow Volume.....	50 - 200 cfm (23 - 95 L/S)
Energy Exchange System.....	Proprietary counter-flow/cross-flow enthalpic or thermal-only exchanger core: engineered, proprietary composite. Available in sensible and latent or sensible-only transfer.
Certified Performance.....	See Certifications and Ratings section
Dampers.....	Gravity-operated backflow prevention
Heating / Cooling Coils.....	Available as options
Defrost.....	Passive frost-free operation under most conditions.
Access.....	Hinged louver to provide access to filters and fans. Removable rear housing to provide access to exchanger core.
Duct Connections.....	None required
Insulation.....	Minimum 1" (25 mm) thickness foam insulation throughout
Electrical.....	12V DC nominal supply (standard). Other voltages supplied to rated connection points may be specified.
Fans.....	Compact, efficient, and quiet fan array, 300 W, 12 VDC
Filters.....	MERV13 (Class F7) cleanable polyester filters for both exhaust and fresh air streams to fit within 2" (50 mm) filter rack
Mounting.....	Compatible with commercial-grade rain screen mounting systems.
Controls.....	4-wire 12 VDC interface to building controls system

Technical Specifications

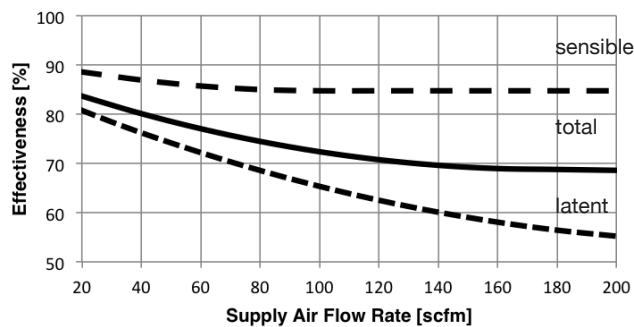


Dimensions

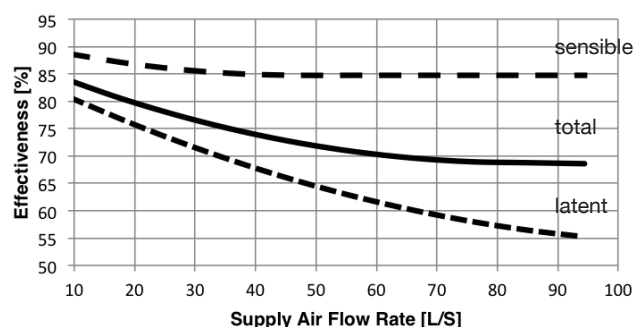
	Minimum	Maximum
Dimension A	54 " (1370 mm)	168" (4250 mm)
Dimension B	33" (830 mm)	96" (2440 mm)
Dimension C	4" (100 mm = standard)	10" (2540 mm)
Unit Weight	125 lbs (57 kg)	475 lbs (215 kg)

Performance Data

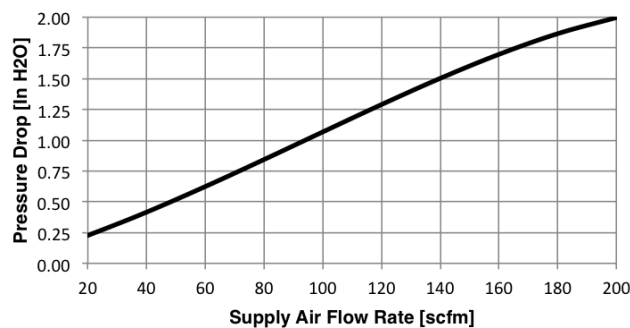
Latent Effectiveness, Sensible Effectiveness, Internal Static Pressure
AirFlow Panel™ performance data for Sensible Effectiveness, Latent Effectiveness, and total internal static pressure drop are given in the tables and charts. The performance data has been laboratory-validated by independent third-party entities and is given at standard conditions per AHRI Standard 1060. Due to continuing product development, specifications are subject to change without notice



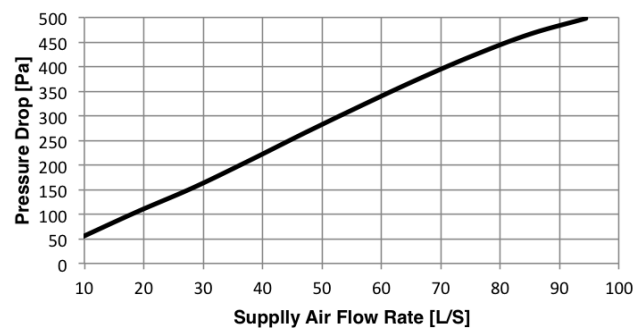
Energy Performance



Energy Performance [SI]



Ventilation Performance



Ventilation Performance [SI]

Performance Data

Ventilation and Energy Performance Data Summary

Supply Air Flow Rate	(scfm)	20	60	100	140	180
	[l/s]	9.4	28.3	47.2	66.1	85
Total Static Pressure Drop	(in H2O)	0.22	0.62	1.07	1.5	1.87
	[Pa]	53	154	266	374	466
Total Effectiveness	%	83.8	77	72.4	69.8	68.8
Sensible Effectiveness	%	88.6	85.7	84.7	84.7	84.7

Outlet Condiitons at various operational conditions

Supply Flow Rate

SCFM	20	60	100	140	180
l/s	9.4	28.3	47.2	66.1	85
Inlet Condition	Outlet Condition				
78 F / 25.6 C	75.2 F / 24.0 C	75.3 F / 24.0 C	75.3 F / 24.1 C	75.3 F / 24.1 C	75.3 F / 24.1 C
50% / 10.3 g/kg	54.7% / 10.2 g/kg	54.6% / 10.2 g/kg	54.5% / 10.2 g/kg	54.5% / 10.2 g/kg	54.5% / 10.2 g/kg
80 F / 26.7 C	75.3 F / 24.1 C	75.5 F / 24.1 C	75.5 F / 24.2 C	75.5 F / 24.2 C	75.6 F / 24.2 C
55% / 12.1 g/kg	55.5% / 10.4 g/kg	56.7% / 10.7 g/kg	57.1% / 10.8 g/kg	57.4% / 10.9 g/kg	57.6% / 10.9 g/kg
85 F / 29.4 C	75.7 F / 24.3 C	75.9 F / 24.4 C	76.0 F / 24.5 C	76.1 F / 24.5 C	76.2 F / 24.5 C
60% / 15.6 g/kg	57.0% / 10.8 g/kg	60.4% / 11.6 g/kg	61.7% / 11.9 g/kg	62.5% / 12.1 g/kg	63.1% / 12.2 g/kg
90 F / 32.2 C	76.0 F / 24.4 C	76.4 F / 24.7 C	76.5 F / 24.7 C	76.6 F / 24.8 C	76.7 F / 24.8 C
65% / 19.9 g/kg	59.0% / 11.4 g/kg	65.0% / 12.7 g/kg	67.4% / 13.2 g/kg	68.8% / 13.6 g/kg	69.8% / 13.8 g/kg
90 F / 32.2 C	76.0 F / 24.4 C	76.4 F / 24.7 C	76.5 F / 24.7 C	76.6 F / 24.8 C	76.7 F / 24.8 C
75% / 23.1 g/kg	60.9 % / 11.7 g/kg	69.1% / 13.5 g/kg	72.3% / 14.2 g/kg	74.3% / 14.7 g/kg	75.7% / 15.0 g/kg
100F / 37.8 C	76.7 F / 24.8 C	77.3 F / 25.2 C	77.6 F / 25.3 C	77.7 F / 25.4 C	77.9 F / 25.5 C
55% / 23.0 g/kg	59.5% / 11.7 g/kg	66.9% / 13.5 g/kg	69.8% / 14.2 g/kg	71.5% / 14.7 g/kg	72.7% / 15.0 g/kg

Note: Return Air Conditions: T = 75 F / 23.9 C , 55% RH, 10.2 g/kg

Installation

External Rain Screen Cladding

The AirFlow RS Panel is designed to transfer wind loads to the supporting structure in a manner similar to the balance of the rain screen system. The panels and their respective sub-framing are not designed to contribute to the structural stability of the building.

The contractor, designers, and installers must be clear on the location of the building envelope drainage plane. The drainage plane exists behind the AirFlow Panel and rain screen system where the weather resistant barrier (WRB) is applied to the sheathing, not at the face of the panels (or in the panel reveals).

Due to free-flowing air in the cavity behind the panels, the AirFlow RS panel system requires a complete weather resistant barrier on any wall which it is installed. The integrity of the WRB design can be verified by water testing the walls after the WRB is installed and prior to the application of the rainscreen panel system. In the area where panels are being installed, the building envelope including the AirFlow Supply Boot elements should be completely weather tight prior to the installation of the AirFlow RS system.

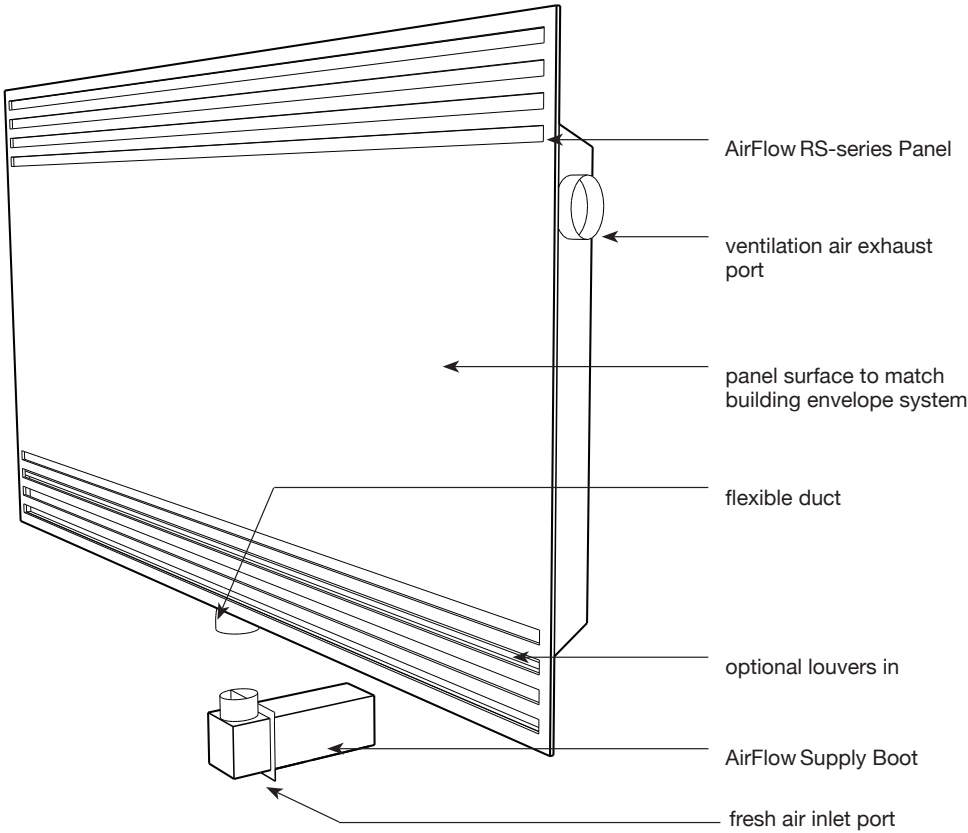
The envelope does not rely on the face panel (AirFlow RS) for watertightness.

Design of the Rain Screen Cladding System

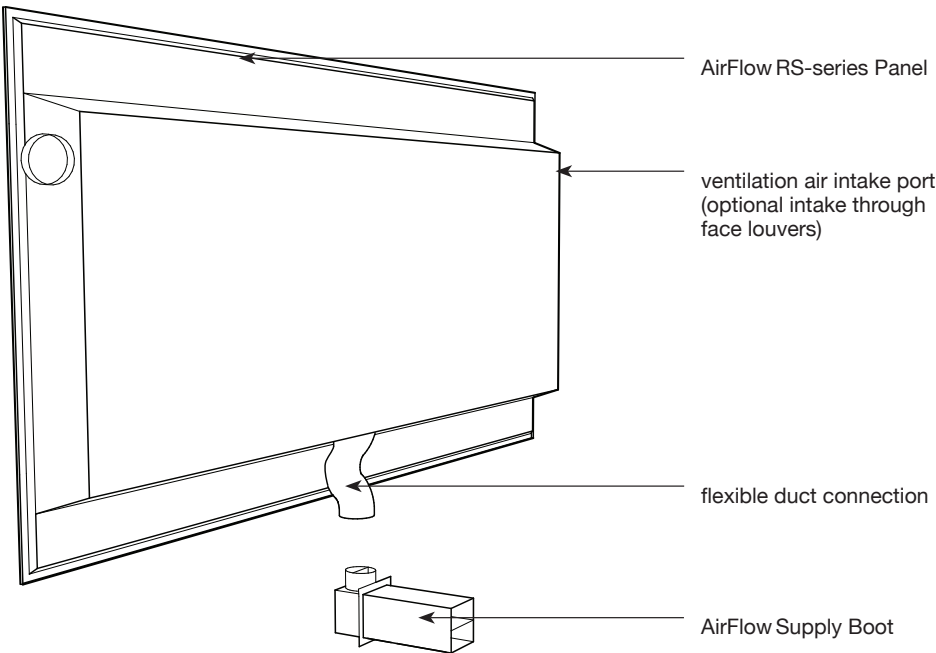
Prior to installing the AirFlow RS system, verify the building is properly protected with a weather resistant barrier (WRB). Special attention should be taken at areas where the WRB is interrupted, including at the AirFlow Supply Boot locations. Penetrations (interruptions) include but are not limited to: flashings, windows, doors, scuppers, electrical boxes, pipe penetrations, etc.

Ventilation spaces should allow for uninhibited vertical airflow. The design of the AirFlow RS rainscreen system allows it to be fastened directly to the wall framing, furring strips, or to be adapted to most proprietary mounting systems. Achieving a ventilation compartment is accomplished by spacing the system from the wall. Without this essential spacing, the system will not breathe correctly and will likely trap water, condensation, or other moisture. For proper ventilation, the system must be installed with offset clips at every fastening point, which, aside from providing this essential ventilation, will allow for minor adjustments to compensate for slight inconsistencies in the substrate; keeping the panel faces on the same plane.

Exterior Panel Face Axonometric view

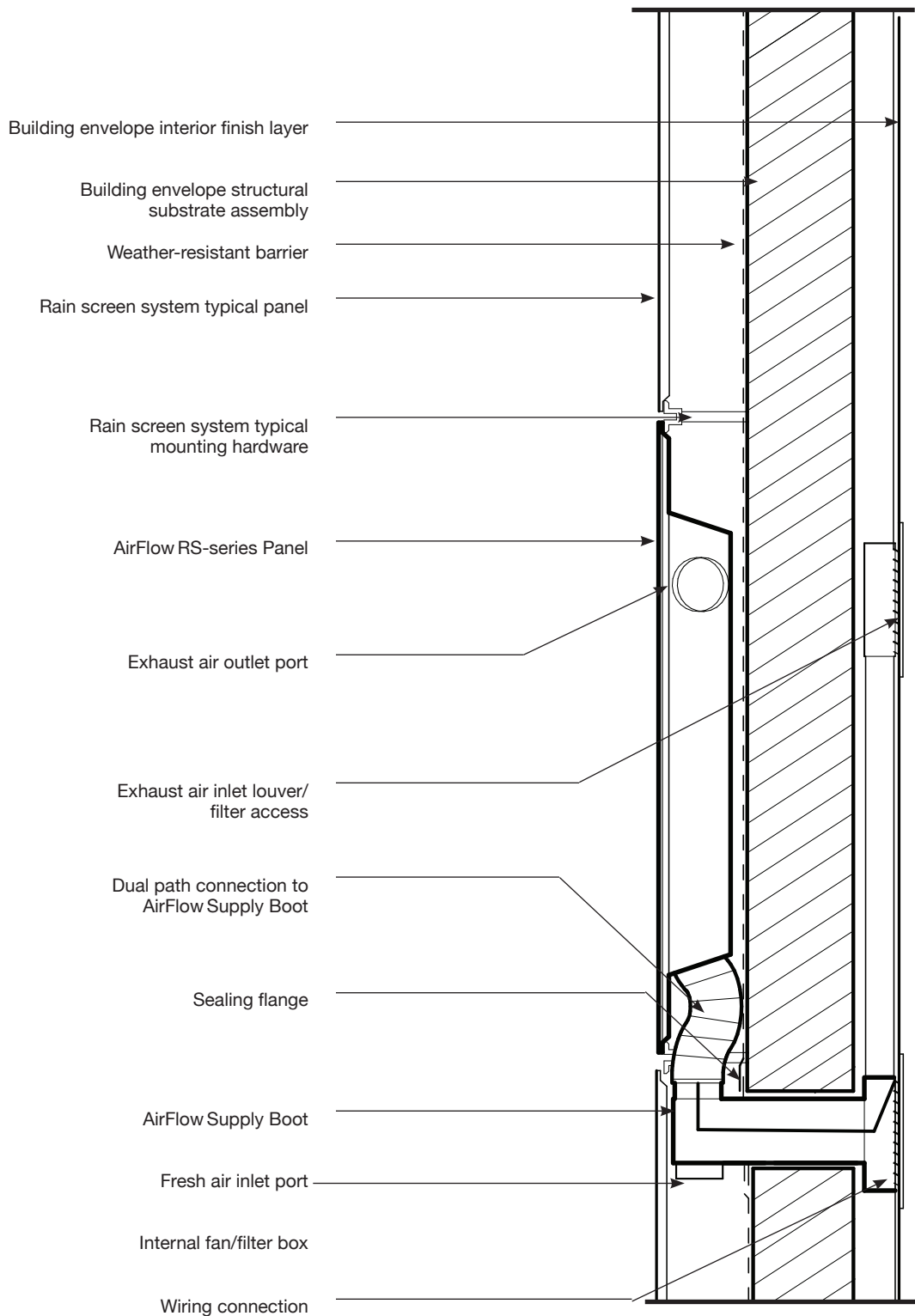


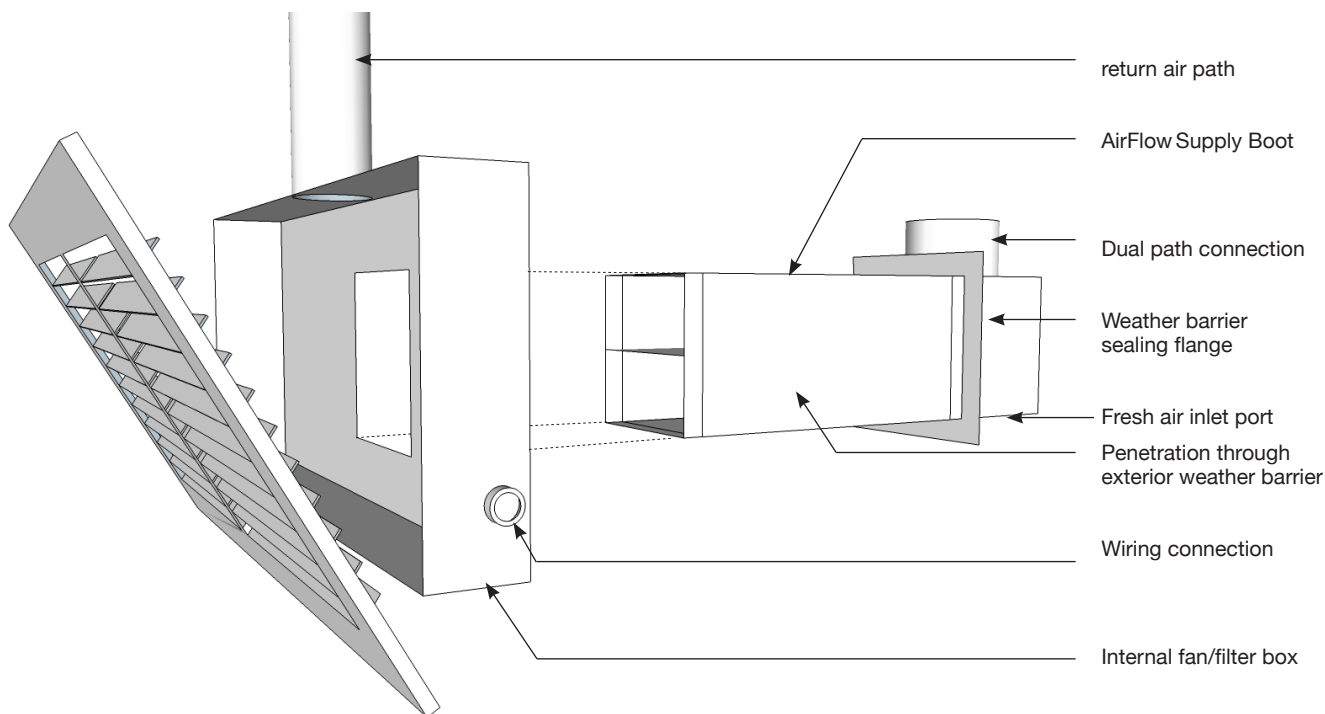
Interior Panel Face Axonometric view



Installation

Typical AirFlow RS-Series Panel Wall Section



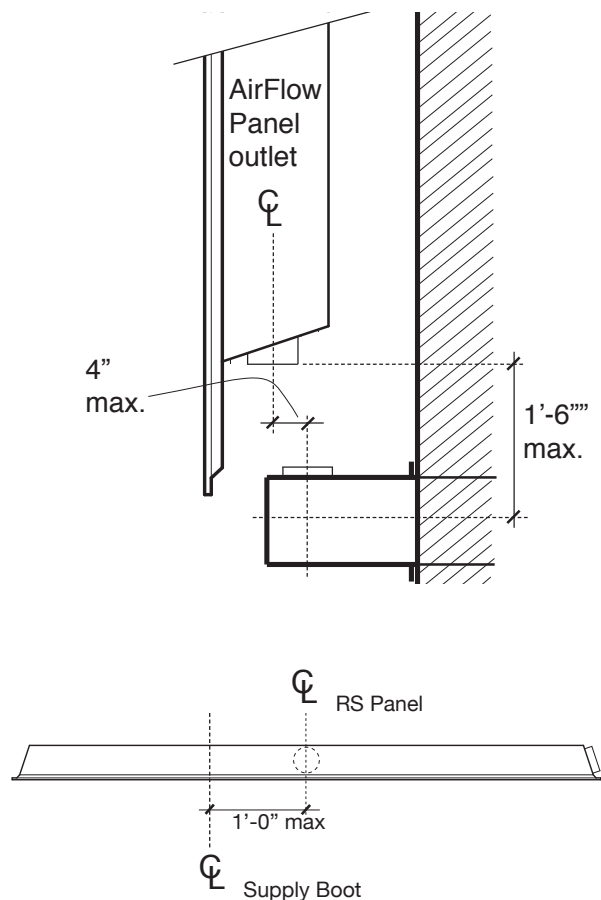


Installing the AirFlow Boot

Each AirFlow RS Series panel requires a dedicated Airflow Supply Boot. The Boot must be installed and properly sealed as a weather barrier penetration prior to the installation of the AirFlow Panel. See drawings for recommended spacing and locations of the AirFlow Supply Boot with respect to Panel locations.

Installing the AirFlow Panel

The installer of the AirFlow Panels needs to ensure full coordination of with the installation of the balance of the rain screen panel system, the panel mounting system and hardware, and the AirFlow Supply Boot elements. Note the importance of correct installation sequencing. AirFlow RS Series panels are typically installed first followed by their connections to the AirFlow Supply boots. The balance of the rain screen system is then executed.



Installation

Delivery, Site Handling & Storage

Upon arrival of your order, inventory and inspect each panel and all accessories, and note any damage to panels, packaging, or accessories. If there are any signs of damage, note the bill of lading at the time of delivery. Failure to do so can make it difficult to file a freight claim. Send a list of damaged materials to AirFlow Panels™ and contact your AirFlow Panels™ representative for further instructions. It is crucial that damaged panels, accessories, or packaging be reported to AirFlow Panels as soon as they are discovered.

AirFlow RS-Series panels should be transported using AirFlow Panels™ standard pallets. Bailing bands are to be removed upon delivery. Lift the panels from each stack individually, taking care not to scratch or damage any adjacent panels when removing panels from the stack.

Panels can be stored vertically on a flat surface free of debris, or kept on pallets with supports at 12 inches on center or less. All horizontal surfaces, including panels and pallets, should be covered with a clean membrane or board to protect the panels from damage. Unwrapped stacks should be covered with plastic sheeting in order to minimize damage from dirt and moisture. Remember to remove bailing bands prior to storage.

Panels need to be stored in an area that is well covered from the elements, cool, ventilated, and dry.

Preparing Panels for Use

Pay close attention to the direction of the material during installation and field fabrication. AirFlow RS-Series panels are typically finished to match to balance of the rains screen panel system on the job. Any directionality to the finish of the AirFlow RS-Series should be noted and coordinated during installation with the balance of the rain screen panel system.

Avoid any cutting, routing, and drilling of the AirFlow RS-Series panels housing. Always handle panels to avoid scratching the panel finish.

Inspecting the Building

The building substrate must be plumb and square.

A panel system installed out of plumb will result in inconsistent grid lines, as well as improper alignment at windows, doors, corners, and other transitional areas. Panels installed on an inconsistent substrate will most likely need to be re-installed. Please make sure to verify the condition of the substrate to receive the panels before proceeding.

Vertical Conditions

Start by running plumb lines or a laser at all panel transitions. This is done to determine the proper distance for shims before installing the panel system. Also locate a base control line (starting elevation and angle benchmark) to help keep the panel system square & level.

Horizontal Conditions

Install the first AirFlow™ panel in its designated location. Proper mounting of the first panel helps with the alignment of adjacent panels. Install the panel at the lowest point to meet your control line with the backside of the system slightly proud of the plumb line. This will establish a critical, and accurate, starting point. It is essential to the installation process that the first panel be positioned correctly, and installed square and plumb.

Alignment & Consistency

After the AirFlow™ panels are installed, continue with adjacent panels in the same manner along the control line(s). Verify the panels' spacing often. If panels are installed with incorrect spacing, they will likely need to be re-adjusted to align properly.

Panel Clips

When installing the panel clips, verify that their locations and fastening details are in conformance with structural and balance of rains screen system requirements. The clips attach to the building's framing and clip spacing may vary depending on your project's engineering requirements. Once the panel clips are attached, the panel is ready to install. Leave the protective film in place until the adjacent panels are installed, however, note that exposure to sunlight is not recommended as the protective film may cause color variation.

Fastening

Fasten the clip firmly to the wall, tightening the fasteners no more than a half turn beyond snug. Be careful not to over-torque the fasteners, as this may result in the fastener shearing and can strip the framing. Always make sure fastener size and spacing is in accordance with the engineering requirements for the specific project.

Panel Sequencing

Because they require connection to the AirFlow Supply Boot, AirFlow RS Series panels are installed prior to remaining panels. Develop a written plan or sketch that takes panel installation sequence into consideration, and periodically evaluate the panel placement plan to avoid unforeseen circumstances.

Panel Connection

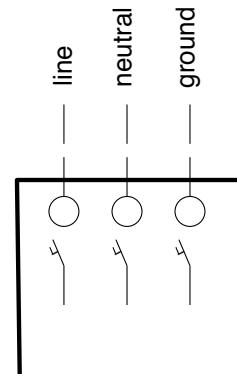
Once the AirFlow RS Series panel has been installed, adjusted, and locked into position, connect the outlet flange on the AirFlow Panel to the mouth of the AirFlow Supply Boot using flexible ductwork. A leakage test should be performed at this point. Once the AirFlow Panel connection is complete, the installation may proceed on the balance of rain screen panels on the project.

Panel Protective Film

It is important to remove the protective film for each section of adjacent panels immediately after the installation is complete for that section. Extra attention is required in areas receiving a large amount of sunlight. Too much exposure may cause panel color variation. In addition, removing the film regularly allows for further inspection of the panels condition before moving to the next section.

Electrical Connection

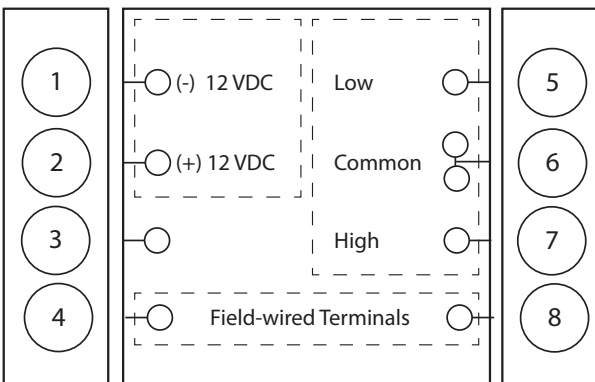
Units are available in different voltages. Units are supplied with factory disconnect switch fed through a knockout on panel edge. Use copper conductors only. All field wiring must comply with local codes.



120 V nom. hard wire connection

Controls

A low voltage remote control wiring interface is provided on the unit. The installer must provide wiring for the controls that may be supplied optionally. The optional wall controls require a four-wire LVT 24 gauge (or equivalent). This control is 12 VDC. Other terminals are 24 VAC or dry contact control. A low voltage remote control wiring interface is provided on the unit. The installer must provide wiring for the controls that may be supplied optionally. The optional wall controls require a four-wire LVT 24 gauge (or equivalent). This control is 12 VDC. Other terminals are 24 VAC or dry contact control.



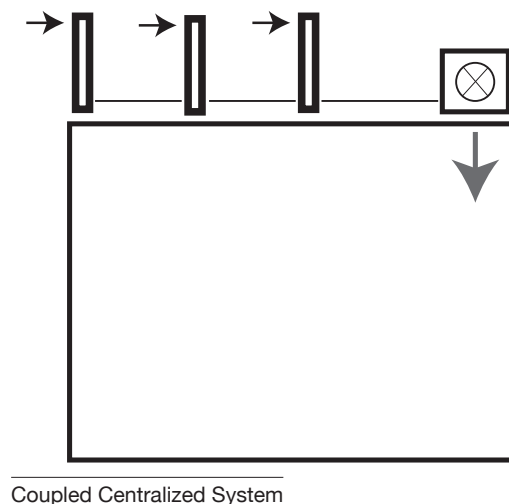
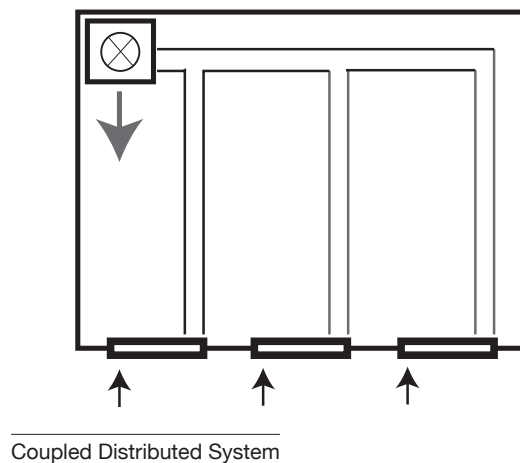
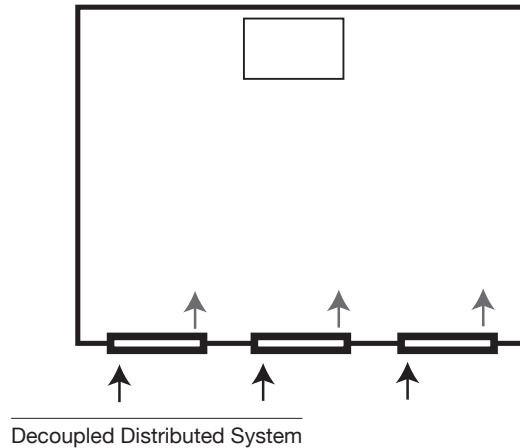
System Architectures

Configuration Options

AirFlow™ RS-Series Panels may be used to introduce outdoor air directly to the indoor space. The energy recovery core provides pre-conditioning of outdoor air, causing it to approach indoor air conditions prior to its entry into the space. Optional integral heating and cooling coils provide precise control over temperature and humidity of entering outdoor air if required. The decoupled, distributed configuration of AirFlow Panels allows the designer great freedom in locating and controlling the flow of fresh, preconditioned outdoor air to occupied zones. This configuration is ideal as a replacement for Dedicated Outdoor Air Systems (DOAS). It also works exceptionally well with low-energy radiant cooling and heating systems.

AirFlow™ RS-Series panels may also be installed in a coupled configuration, with the outdoor airstream connected to a centrally-located dehumidification control point via ductwork or plenum. This arrangement allows the designer to locate the panels in parts of the facade where they are most effective.

AirFlow™ RS-Series panels may be configured in a centralized, coupled configuration for direct connection to a central AHU or other air conditioning system. In this configuration, the panels may serve as an ideal rooftop screen, meeting code requirements for visual mitigation of rooftop equipment while still providing the benefits of the AirFlow™ Panel system.



Operation & Maintenance

In order to insure optimal performance, maintain AirFlow RS-Series Panels as described below:

! WARNING !

Risk of Electric Shock or Injury

Before servicing or cleaning the unit, unplug the unit line cord.

Make sure the unit is not running before opening the housing.

Service Filters Regularly:

Service filters every 6 months when the unit is in regular use or as needed to keep them reasonably clean.

1. Release cam latch to swing supply diffuser open
2. Remove filter clips on supply and return filters
3. Vacuum with a hose attachment
4. Re-install filters and filter clips
5. Close supply diffuser and latch into place

Note

The filters should be replaced after they have been cleaned several times. Filters must be used or the face of the energy exchange core will become blocked by dust. The filters supplied in the unit are usually able to keep the energy exchange core clear for many months. Finer filters can be used but must be cleaned more often.

Condensation and Drainage

The energy exchanger core within the AirFlow RS-Series panel uses an air-to-air non-condensing technology. Water vapor is transferred between air streams via a mechanism of adsorption of the water vapor onto the membrane, diffusion of the water vapor through the membrane, and desorption of the water vapor into the opposing air stream. The moisture remains in vapor form, and no condensation occurs as a part of the exchange.

architectural applications



architectural applications

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