

# Guide Specifications

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## Active Flow Controller (AFC)

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### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. The Active Flow Controller (AFC) shall automatically monitor the differential pressure between inside and outside the containment structure. The AFC shall then control the cooling equipment fan speed accordingly in order to right-size the cooling unit airflow to match the airflow of the IT equipment. For more information please refer to the EcoAisle Active Flow Controller User Manual.

#### 1.02 DESIGN REQUIREMENTS

- A. The system is described in the following specification as manufactured by Schneider Electric.
  - 1. Model: \_\_\_\_\_
  - 2. Aisle Configuration: \_\_\_\_\_ Hot/Cold
  - 3. IT Air quantity: \_\_\_\_\_ L/s (CFM)
  - 4. Cooling Air quantity: \_\_\_\_\_ L/s (CFM)
  - 5. Internal Pressure: \_\_\_\_\_ kPa (psig)
  - 6. External Pressure: \_\_\_\_\_ kPa (psig)
  - 7. Electrical supply: \_\_\_\_\_ V, \_\_\_\_\_ ph, 50/60 Hz

#### 1.03 SUBMITTALS

- A. Submittals are provided with the proposal and shall include: control data, electrical data, physical data, electrical connection drawing.

### PART 2 - PRODUCTS

#### 2.01 COMPATIBILITY

- A. A-Link (InRow)
- B. MODBUS (Room cooling and third party cooling devices)

#### 2.02 CONTROLLER OPERATION

- A. The AFC shall operate as a differential pressure indicator and controller.
- B. LED Indication
  - 1. The controller shall display three identical visual indicators. The indicators shall be visible from top, bottom, and front views of the AFC and shall be visible in a rack mounted position.
  - 2. The indicator shall display the differential pressure status via LED:
    - a. Green (Indicates that cooling system and server airflow are balanced)
    - b. Red (Indicates that server airflow is greater than available cooler airflow)
    - c. Blue (Indicates that measured containment system cooling airflow is significantly greater than server airflow)
  - 3. The AFC shall have the ability to be used solely for its indication functionality (no fan speed control) if desired
  - 4. In synchronize mode, multiple AFC units can be grouped to share the same status based off the location of worst case pressure differential detection.
- C. Control
  - 1. The controller shall strive to maintain a green indication (i.e. balanced airflow) at all times by adjusting cooling unit fan speed.
  - 2. The control function shall be overridden by the cooling equipment in the event maximum cooling is required.

## 2.03 SETPOINTS & THRESHOLDS

- A. There are five settings to choose from when configuring the controller. A Positive or Slightly Positive setting is sometimes desirable for Cold Aisle Containment applications while a Negative or Slightly Negative setting is sometimes desirable for Hot Aisle Containment applications.

<b>Setting</b>	Blue LED	SETPOINT – Green LED	Red LED
Positive	>-0.008 ±3%	0.004 ±0.0004"	>0.016 ±3%
Slightly Positive	>-0.010 ±3%	0.002 ±0.0004"	>0.014 ±3%
<b>Zero</b>	<b>&gt;-0.012 ±3%</b>	<b>0.000 ±0.0004"</b>	<b>&gt;0.012 ±3%</b>
Slightly Negative	>-0.014 ±3%	-0.004 ±0.0004"	>0.010 ±3%
Negative	>-0.016 ±3%	-0.002 ±0.0004"	>0.08 ±3%

## 2.04 INSTALLATION CONSIDERATIONS

- A. Quantity of AFC units shall be determined by the configuration of the aisle containment system, airflow patterns, and installed equipment.
  - 1. There shall be at least one AFC per containment system, preferably two.
  - 2. The necessary number of AFC units shall depend on the length of the aisle.
  - 3. In rare installations an AFC may be required in the center of the aisle.

## 2.05 MOUNTING SYSTEM

- A. Location of the controller shall be determined by the configuration of the aisle containment system, airflow patterns, and installed equipment:
  - 1. Door header structure: Shall be the preferred location for installing the AFC.
  - 2. Ceiling Panels: If conditions prevent installing AFC units in the door header, install them in a rack.
  - 3. Rack: If conditions prevent installing AFC units in the ceiling panels, install them in a rack.
  - 4. Duct: When air is provided by a remote cooling unit, duct mounting may give the most accurate measurement of airflow.
- B. All locations shall contain ready-made mounting brackets for the controller. Basic tools may be required for cutting panels, etc. Optional mounting kit SKU is ACAC22001

## 2.06 DIP SWITCH BANKS

- A. Switch Bank 1 shall be used for terminating or unterminating a MODBUS circuit
- B. Switch Bank 2 shall be used to configure:
  - 1. Hot/Cold Aisle
  - 2. Baud 9600 / 19200 Building Management System
  - 3. Even/Odd/None/Reserved Parity Building Management System
- C. Switch Bank 3 shall be used to configure a MODBUS slave mode

## 2.07 COMMUNICATION

- A. Door switch sensors – used to deactivate the AFC when EcoAisle doors are open to prevent false readings
- B. AFC sensors shall be connected in series to the cooling system through the AFC A-Link ports, forming an A-Link BUS for communication between AFC sensors.
- C. AFC sensors that are installed at the end of the A-Link BUS shall have a terminator in the unused port.
- D. It is not recommended to install AFC sensors in series at the end of the A-Link BUS without using a DC power supply.

## 2.08 SYNCRONIZATION

- A. If more than one AFC is present in an air containment system, they can be grouped to share their measurements and status. This is not required for proper operation, however it does allow for consistent status reporting for all AFC units sharing a common environment.

## 2.09 INDICATOR

- A. Lighting shall be integrated into the bottom of the cooling unit. It shall be low energy consuming LED lighting that is controlled via a motion detection sensor on the bottom of the unit.

## 2.10 PRESSURE SAMPLING

- A. The AFC features four sensing ports – two front and two rear.
- B. Pressure sampling tubes are optional and are contained in ACAC22001. Pressure sampling extension tubes effectively move the ports to remote locations to avoid erroneous readings caused by local air disturbances. Since installations differ, whether tubes are used and their location results from individual needs.

## 2.11 POWER INPUT

- A. One AFC unit can be powered per InRow cooling unit.
- B. One external power supply (AP9505I) can power up to five AFC units via A-Link bus.

## **PART 3 - EXECUTION**

### 3.01 INSTALLING ACTIVE FLOW CONTROLLER UNITS

- A. General
  - 1. Install AFC in accordance with manufacturers unpacking and installation instructions and guidelines. Securely attach in locations indicated. Maintain manufacturers recommended service clearances.
- B. Electrical
  - 1. Install and connect electrical devices furnished by manufacturer that are field installed per installation instructions and wiring diagrams supplied with the equipment. Ensure the electrical schematic of the system is submitted to electrical contractor for reference.
- C. Sampling Tubes
  - 1. Ensure sampling tubes are not kinked or placed in turbulent areas.

### 3.02 FIELD QUALITY CONTROL

- A. Startup AFC units per guidance provided in the User Manual.