PART 2 PRODUCTS

2.01 SECTION INCLUDES
- A. Acceptable Manufacturers
  1. GreenTrol Automation, Inc.
  2. Approved performance equal
- B. Products Included in this Section
  1. Outside Airflow Controller with Airflow Output and Airflow Alarming Capability

2.02 ACCEPTABLE MANUFACTURERS
- A. Greentrol Automation, Inc. model OAC-5000 is the basis of design.
  1. Basis of Design and Acceptable Manufacturers
     a. Substitution requests for acceptance less than 30 days prior to bid date or products submitted in non-conformance with the requirements of this specification will not be considered.
        1) For any product to be considered for substitution, a written document shall be submitted to the engineer detailing exceptions and compliance, section-by-section with supporting documentation, before an approval will be considered.
        2) Any product submitted as an equal shall be expected to comply with all performance capabilities and functional aspects of this specification.
        3) Submitting vendors will also be required to present a functioning demonstration sample for review in the specifying engineer's office. Nonfunctioning samples will not be considered, and submissions will be rejected.
     b. Excluded devices:
        1) Controller/transmitters that utilize pitot tubes, pitot arrays, flow rings, flow crosses and other differential pressure measurement devices to determine the volumetric airflow rate.
- B. Products approved as equals that comply with all requirements in this section.
  1. [list approved equals here that comply with ALL requirements of this section]

2.03 PRODUCTS INCLUDED IN THIS SECTION
- A. Outdoor Airflow Controller with integrated airflow and temperature sensor(s)
  1. General
     a. Provide one OAC-5000 for each measurement location provided on the plans, schedules and/or control diagrams to determine and maintain the outdoor airflow rate at each measurement location.
     b. Each OAC-5000 shall be factory assembled and include one or two thermal dispersion airflow measurement probe(s) with connecting cable and plug, a microprocessor-based transmitter/controller with LCD display, and analog airflow output.
  2. Airflow Measurement Sensor Probe
     a. The sensor probe shall be constructed of mill finish, 6063 aluminum alloy tube.
     b. Each sensor probe shall be provided with an integral, FEP jacket, plenum rated CMP/CL2P, UL/cUL Listed cable with a connector plug for connection to the transmitter/controller.
     c. Each sensor probe shall contain one or more independently wired sensing nodes.
     d. Each sensor node shall be provided with one bead-in-glass, hermetically sealed self-heated thermistor and one bead-in-glass temperature sensing thermistor potted in a marine grade waterproof epoxy.
        1) Devices that use epoxy or glass encapsulated chips as the self-heated thermistor are not acceptable.
     e. Each sensor probe shall be calibrated at a minimum of 7 calibration points to volumetric airflow standards in wind tunnels specific for each size provided.
  3. Transmitter/Controller
     a. The transmitter/controller shall determine the volumetric airflow rate and maintain a user-specified airflow setpoint whenever a control activation signal is provided.
     b. The transmitter/controller shall be capable of providing a high and/or low airflow alarm.
     c. The transmitter/controller shall be provided with a 16-character, alpha-numeric, LCD display.
        1) The airflow rate, temperature, airflow alarm and system status alarm shall be visible on the display.
     d. The transmitter/controller shall have the ability to accept a binary, analog, or network input to set control mode.

 

e. The transmitter/controller shall have the ability to control the CFM setpoint via airflow levels, analog or network CO2 sensors, or approved network occupancy counters for DCV applications.
f. The transmitter/controller shall be provided with one field selectable (0-10 or 2-10 VDC), scalable, analog output signal linearly proportional to the airflow rate for connection to the B.A.S. or other monitoring device, when required.
g. The transmitter/controller shall be provided with one contact closure relay for airflow alarming for LEED and/or ASHRAE 189.1 compliance.
h. The transmitter/controller shall use a “watchdog” timer circuit to ensure continuous operation after a brown-out or power failure.

4. Sequence of Operations
   a. The transmitter/controller shall have the ability to implement one of the following control methods.
      1) Maintain a user defined airflow setpoint
      2) Maintain a user defined CO2 level by resetting the outdoor airflow setpoint (CO2 sensor required)
      3) Maintain a calculated outdoor airflow setpoint based on the estimated ventilation zone population (CO2 sensor required)
      4) Maintain a calculated outdoor airflow setpoint based on the occupancy counter population (approved occupancy counter required)
      5) Maintain a fixed damper position (no control)
   b. The control mode trigger source shall be [select one of the following]
      1) the thermostat signal for compressor on
      2) the thermostat signal for fan on
      3) the thermostat signal for occupancy true
      4) other [specify 24 VAC/VDC control signal source]
      5) BACnet binary input
5. Performance
   a. The airflow measurement probe shall have an airflow accuracy of ±4% of reading maximum (3% of reading, typical) over an operating range of 0 to 3,000 FPM and equivalent volumetric airflow (CFM) for the unit size provided.
      1) Accuracy shall include the combined uncertainty of the sensor nodes and transmitter/controller.
         (i) Devices whose overall accuracy are based on individual accuracy specifications of sensor probes and transducer/transmitters shall demonstrate compliance with this requirement over the entire operating range.
   b. The controller shall maintain the measured airflow rate within ±3% of setpoint.

## PART 3 EXECUTION

### 3.01 SECTION INCLUDES
A. Installation
B. Adjusting

### 3.02 INSTALLATION
A. Install in accordance with manufacturer’s instructions.

### 3.03 ADJUSTING
A. The transmitter/controller airflow measurement shall not be adjusted to match field measurements without approval from the consulting mechanical engineer when installations meet or exceed manufacturer’s suggested placement guidelines. Field adjustment, when required shall be accomplished using transmitter/controller firmware that calculates adjustment gain and offset coefficients based on one or two reference measurements.