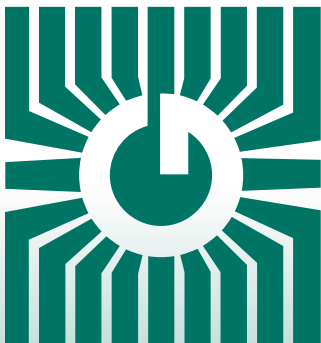


GREYSTONE ENERGY SYSTEMS INC



AIR QUALITY CONTROLLER-MONITOR AIR4 Series



Precision air quality control / sensing

FEATURES:

- True Air Quality Monitor
- Microprocessor based controller
- Linear and stepped analog output
- Optional relay output
- Optional temperature sensor
- LCD Display

*Peace of mind
through reliable
gas monitoring*

GREYSTONE HAS AN ISO 9001 REGISTERED QUALITY SYSTEM

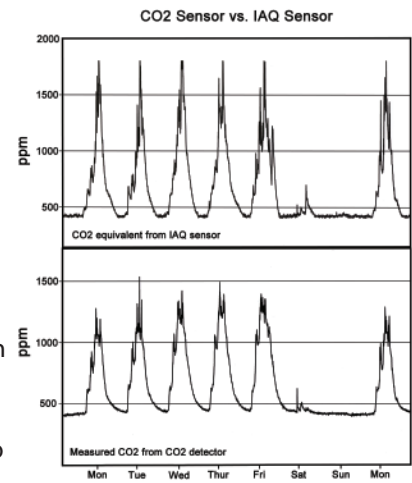
OPERATION

The AIR4, Indoor Air Quality (IAQ) Sensor uses an advanced MEMS metal oxide semiconductor sensor to detect poor air quality. The sensor reacts quickly to detect a broad range of VOCs such as smoke, cooking odors, bio-effluence, outdoor pollutants and from human activities. The sensor captures all VOC emissions that are completely invisible to CO2 sensors.

Extensive studies and research have shown that there is direct correlation between CO2 levels and VOC levels and the Air Quality Sensor has been calibrated to provide a "CO2-equivalent" ppm measurement value, thereby achieving full compatibility to existing HVAC CO2 ventilation standards. The sensor also includes control algorithms that correct sensor drift and aging and therefore provides a long-term consistent DCV solution while overcoming the deficiencies of CO2 measurement by detecting the true root-cause of ventilation demand, VOCs. The IAQ sensor emulates the human perception of air quality much more than a CO2 sensor and even detects odorless, potentially hazardous substances such as carbon monoxide.

The CO2-equivalent sensor output value was developed over a period of several years to allow the IAQ sensor to be optimized for Demand Controlled Ventilation applications.

The long-term IAQ sensor performance was monitored in various locations including offices, cafeterias, schools, production facilities, apartments and homes in direct comparison to infrared-absorption CO2 sensors. The data shows consistent results between measured CO2 values and the IAQ CO2-equivalent values and also highlight the poor air quality events detected by the IAQ sensor that the CO2 sensor misses. The above sample chart shows CO2 measurements vs. IAQ measurements.



| Typical Indoor Air VOC Contaminants | | |
|---|-----------------------------------|---|
| Contamination Source | Emission Source | VOCs |
| Human Being | Breath | Acetone, Ethanol, Isoprene |
| | Skin Respiration and Perspiration | Nonanal, Decanal, α -Pinene |
| | Flatus | Methane, Hydrogen |
| | Cosmetics | Limonene, Eucalyptol |
| | Household Supplies | Alcohols, Esters, Limonene |
| Office Equipment Building Material Furniture Consumer Products | Combustion | Unburnt Hydrocarbons |
| | Printers, Copiers, Computers | Benzene, Styrene, Phenole |
| | Paint, Adhesive, Solvent, Carpet | Formaldehyde, Alkanes, Aldehydes, Ketones |
| | PVC (Poly Vinyl Chloride) | Toluene, Xylene, Decane |

SPECIFICATION:

| | |
|------------------------------|---|
| Sensing Technology | MEMS metal oxide semiconductor VOC sensor |
| Measurement Range | 450-2000 ppm CO2 equivalent or 0-100% (menu selectable) |
| Drift Compensation | Automatic baseline correction |
| Power Supply | 20-28 Vac/dc (non-isolated half-wave rectified) |
| Consumption | 35 mA max @ 24 Vdc |
| Input Voltage Effect | Negligible over specified operating range |
| Protection Circuitry | Reverse voltage protected, over voltage protected |
| Operating Conditions | 0-50 °C (32-122 °F), 5-95 %RH non-condensing |
| Linear Output Signal | 0-5 / 0-10 Vdc (menu selectable) = 0-2000 ppm CO2 equivalent |
| Analog Stepped Output Signal | Three steps representing Good, Fair and Poor air quality (each step is independently adjustable from 0-10 Vdc) |
| Output Drive Capability | 10 K Ω minimum |
| Programming and Selection | Via internal push-buttons and LCD menu |
| Warm-up Time | 5 minutes |
| LCD Resolution | 1 ppm / 1 % |
| LCD Size | 1.4" w x 0.6" h (35 x 15 mm) alpha-numeric 2 line x 8 characters |
| LCD Backlight | Enable or disable via menu |
| LED Display (Room Only) | Tri-color (Good = Green, Fair = Blue, Poor = Red), enable or disable via menu |
| Wiring Connections | Screw terminal blocks (14 to 22 AWG) |
| Enclosure | Room: White ABS, IP30 (NEMA 1) |
| | Duct: Grey ABS, UL94-5VB, IP65 (NEMA 4X) |
| | Duct Probe: 177 long x 25.4 Diameter mm (7"l x 1" d) |
| Dimensions | Room: 84 w x 119 h x 29 d mm (3.3" w x 4.7" h x 1.15" d) Duct: 145 w x 100 h x 63 d mm (5.7" w x 3.95" h x 2.5" d) Duct Probe: 177 long x 25.4 Diameter mm (7"l x 1" d) |
| Weight | Room: 122 gm (4.3 oz) Duct: 290 gm (10.2 oz) |
| Override Switch (Room only) | Front panel switch with FET output, 30 Vdc @ 50 mA max |
| Relay Output | Optional on Room, Standard on Duct Form A contact (N.O. or N.C.) 2 Amps @ 140 Vac, 2 Amps @ 30 Vdc (Relay action, trip point and hysteresis set via menu) |
| Optional Temperature Sensor | Various thermistors and RTDs, 2-wire resistive output |

FEATURES:

- Measures total VOCs
- Direct correlation to CO₂ levels
- High sensitivity and fast response
- 0 to 2000 ppm CO₂ output signal
- Room or Duct models
- LCD to display air quality information
- Internal menu for easy setup
- Selectable 0-5 or 0-10 Vdc signal
- Analog stepped output for damper control
- Linear output for logging and control

Room Features and Options

- Tri-color LED to indicate IAQ level
- Optional relay output with adj. setpoint
- Optional override switch output
- Optional resistive temperature sensors

PRODUCT ORDERING INFORMATION (ROOM)

| MODEL | Description |
|--------------|---|
| AIR41 | Room Air Quality Monitor, 0-2000 ppm CO ₂ Equivalent |
| CODE | LCD Display |
| 0 | Concealed |
| 1 | Viewable |
| CODE | LED Indicator, Tri-color |
| 0 | Concealed |
| 1 | Viewable |
| CODE | Temperature Sensor (Leave blank if not required) |
| T2 | 100 Ω Platinum RTD, IEC 751, 385 Alpha, thin film |
| T5 | 1801 Ω, NTC Thermistor, ±0.2 C |
| T6 | 3000 Ω, NTC Thermistor, ±0.2 C |
| T7 | 10,000 Ω, type 3, NTC Thermistor, ±0.2 C |
| T8 | 2.252K Ω, NTC Thermistor, ±0.2 C |
| T12 | 1000 Ω Platinum RTD, IEC 751, 385 Alpha, thin film |
| T13 | 1000 Ω Nickel RTD, Class B, DIN 43760 |
| T14 | 10,000 Ω, type 3, NTC Thermistor, ±0.2 C c/w 11K shunt resistor |
| T20 | 20,000 Ω, NTC Thermistor, ±0.2 C |
| T24 | 10,000 Ω, type 2, NTC Thermistor, ±0.2 C |
| CODE | Momentary Override |
| - | No Override |
| S | Front panel push button momentary switch (NO) |
| CODE | Relay Output |
| - | No Relay |
| R | Relay |
| AIR41 | 0 1 T7 S R |

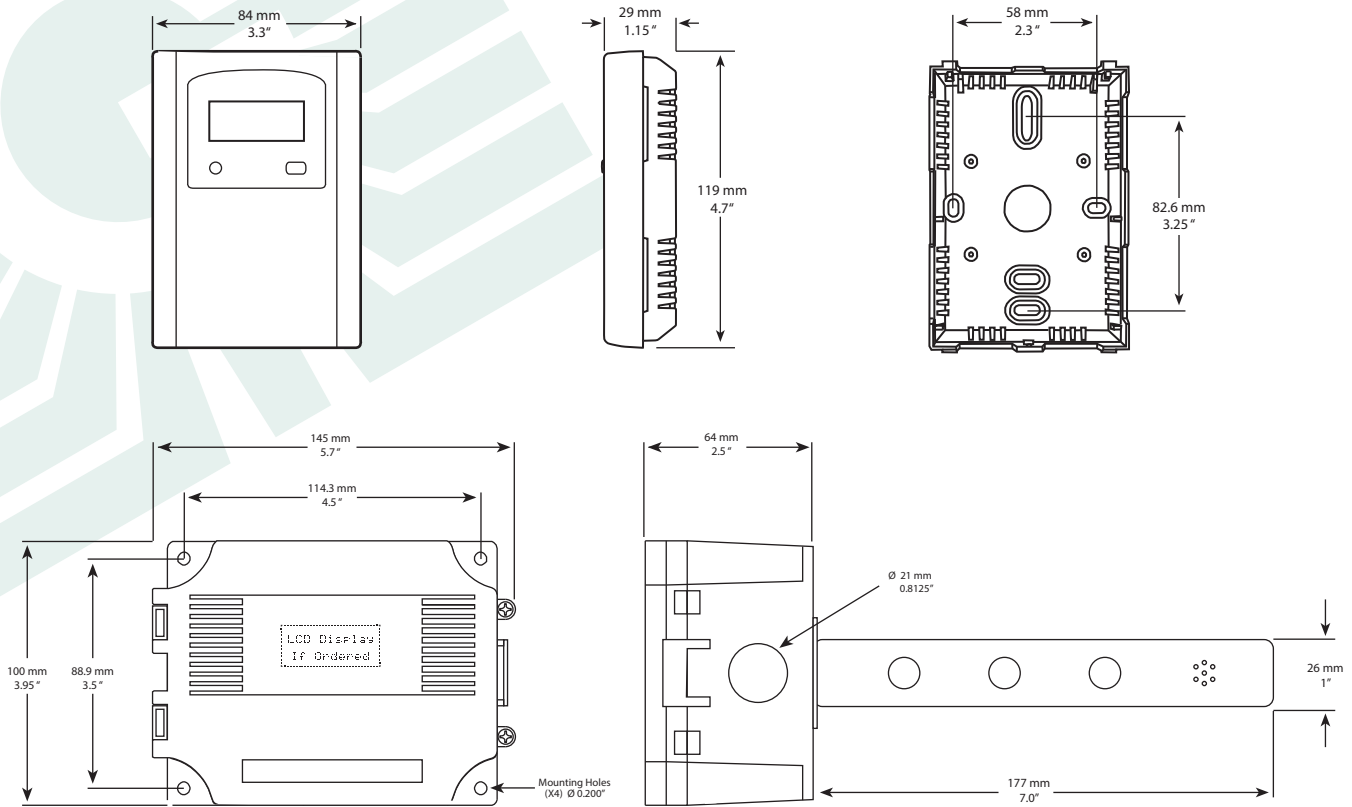
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PRODUCT ORDERING INFORMATION (DUCT)

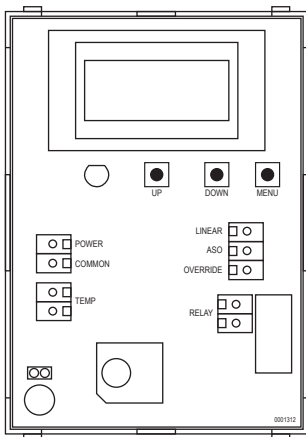
| MODEL | Description |
|----------------|---|
| AIR4200 | Duct Air Quality Monitor, 0-2000 ppm CO ₂ Equivalent |
| CODE | Temperature Sensor (Leave blank if not required) |
| T2 | 100 Ω Platinum RTD, IEC 751, 385 Alpha, thin film |
| T5 | 1801 Ω, NTC Thermistor, ±0.2 C |
| T6 | 3000 Ω, NTC Thermistor, ±0.2 C |
| T7 | 10,000 Ω, type 3, NTC Thermistor, ±0.2 C |
| T8 | 2.252K Ω, NTC Thermistor, ±0.2 C |
| T12 | 1000 Ω Platinum RTD, IEC 751, 385 Alpha, thin film |
| T13 | 1000 Ω Nickel RTD, Class B, DIN 43760 |
| T14 | 10,000 Ω, type 3, NTC Thermistor, ±0.2 C c/w 11K shunt resistor |
| T20 | 20,000 Ω, NTC Thermistor, ±0.2 C |
| T24 | 10,000 Ω, type 2, NTC Thermistor, ±0.2 C |
| AIR4200 | T7 |

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DIMENSIONS:

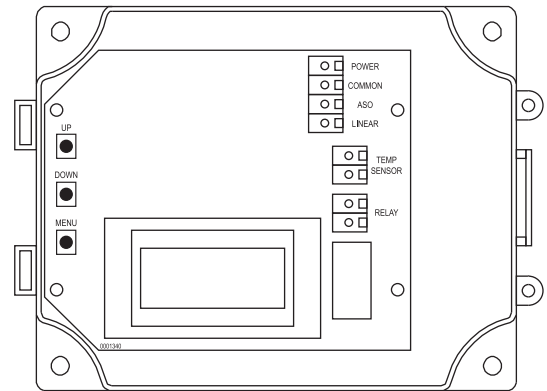


PCB/WIRING INFORMATION



| Terminal | Function |
|----------|--------------------------------|
| POWER | Power input |
| COMMON | Power & Signal Common |
| LINEAR | Analog Output 0-5 or 0-10 Vdc |
| ASO | Analog Stepped Output 0-10 Vdc |
| VERRIDE | Digital Output (Room Only) |
| *TEMP | Resistive Temperature Sensor |
| *TEMP | Resistive Temperature Sensor |
| *RELAY | Relay Output |
| *RELAY | Relay Output |

* Terminals only present if option ordered



Greystone Energy Systems Inc. is one of North America's largest ISO registered manufacturers of HVAC/R sensors and transmitters for Building Automation Management Systems.

We have conscientiously established a worldwide reputation as an industry leader by maintaining leading-edge design technology, prompt technical support, and a commitment to on-time deliveries. We take pride in our Quality Management System which is ISO 9001 certified, assuring our customers of consistent product reliability.

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