GREYSTONE
ENERGY SYSTEMS INC

AIR QUALITY CONTROLLER-MONITOR
AIR4 Series

Precision air quality control / sensing

FEATURES:

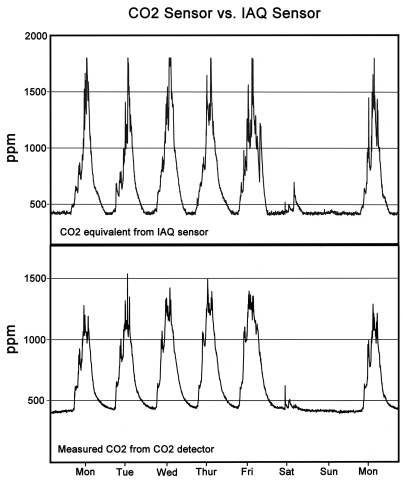
- True Air Quality Monitor
- Microprocessor based controller
- Linear and stepped analog output
- Optional relay output
- Optional temperature sensor
- LCD Display

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
	SkinRespiration and Perspiration	Nonanal, Decanal, α-Pinene
	Flatus	Methane, Hydrogen
	Cosmetics	Limonene, Eucalyptol
	Household Supplies	Alcohols, Esters, Limonene
	Combustion	Unburnt Hydrocarbons
Office Equipment Building Material Furniture Consumer Products	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 KΩ 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)
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

Greystone Energy Systems Inc. reserves the right to make design modifications without prior notice.

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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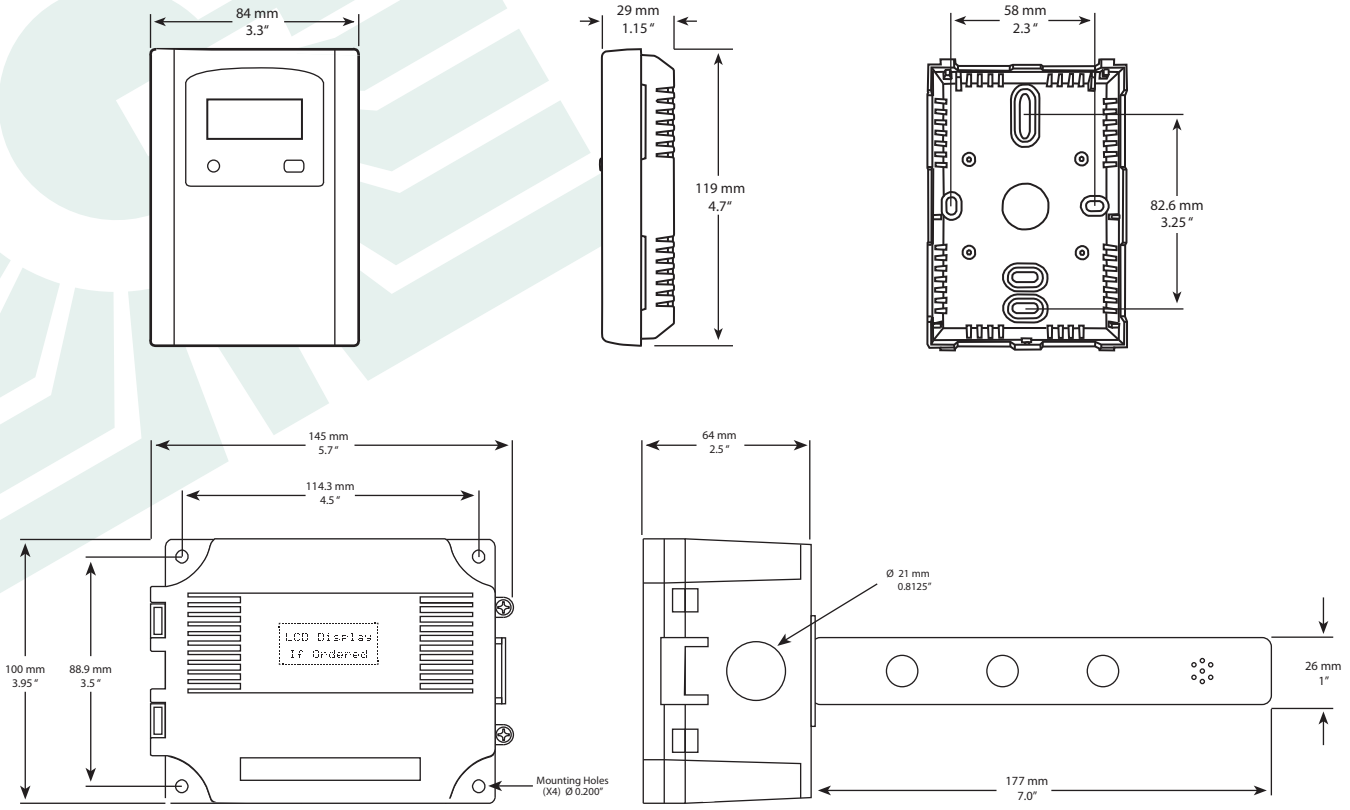
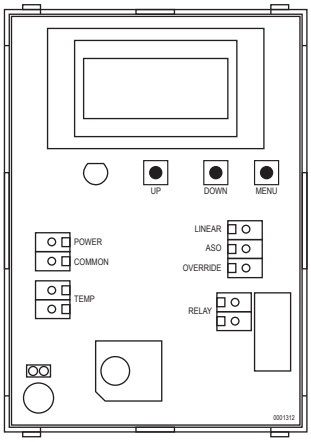
DIMENSIONS:

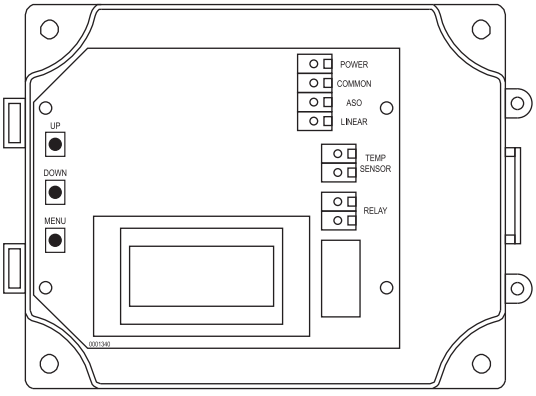


PCB/WIRING INFORMATION



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
OVERRIDE	Digital Output (Room Only)
*TEMP	Resistive Temperature Sensor
*TEMP	Resistive Temperature Sensor
*RELAY	Relay Output
*RELAY	Relay Output

* Terminals only present if option ordered



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RoHS COMPLIANT

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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07/15
PB-AIR4-01-01
PRINTED IN CANADA