

Datasheet: K-22 OC Sensor

The K-22 OC (Open Collector) CO2 sensor module is designed to be built into stationary ventilation equipment (such as window vent or duct exhaust actuators) and to transmit CO2 levels in real-time.

This sensor provides a 100ma current sink to drive external loads such as relays or indicators. The open collector activates at 1,000 ppm and remains activated until the CO2 level declines to less than 800 ppm, making the K-22 OC the ideal component for a simple control system.

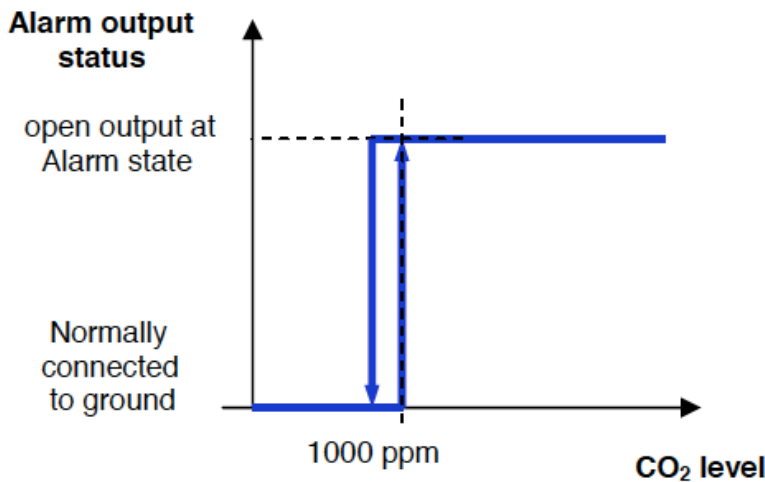
Based on reliable infrared gas sensing technology (NDIR), the K-22 is the best value sensor available for cost-sensitive products on the market today. Contact us directly for wholesale pricing on large quantities.



Functional Description

The unit is designed to run at 4.5 to 12 V stabilized supply voltages provided that load and line regulation of power supply is within +/-5%.

During normal operation, the sensor module measures ambient gas CO2 concentrations at two seconds intervals. The module outputs on Alarm Output the logic OR alarm if any of the three events CO2 High / Power Low / Fault occur. The Alarm Output is an open collector transistor switch, which sinks the Alarm Output pin to zero volt in normal mode operation. The presence of the sensor module can therefore be detected by the host system using an external pull-up resistor. In alarm conditions, as well as during start-up, the Alarm Output enters an open, non-conducting state (@ + input voltage). The Alarm Output will stay in alarm mode until the results of the next measurement cycle are analyzed and filtered. The minimum alarm time is preprogrammed to 32 seconds.



Technical Data

CO2 Measurement

Measurement Range	0 – 2,000 ppm _{vol}
Sensing Method	non-dispersive infrared (NDIR) waveguide technology with ABC automatic background calibration algorithm
Sampling Method	diffusion
Measurement Interval	2 seconds
Extended Measurement Range	2000 to 10 000 ppm _{vol} . (digital readout only – accuracy not specified)
Calibration Adjustment Switch	close @ fresh air (~400 ppm) restores calibration if S1 short cut > 2 seconds
Repeatability	± 40 ppm ± 1 % of measured value
Accuracy	± 75 ppm + 5% of measured value
Pressure Dependence.....	+ 1.6 % reading per kPa deviation from normal pressure, 100 kPa

General Performance

Operating Temperature Range	0 to 50 °C
Storage Temperature Range	-30 to +70 °C
Operating Humidity Range	0 to 95% RH (non-condensing)
Sensor Life Expectancy	> 15 years
Conformance with standards	RoHS directive 2002/95/EG
EMC Immunity	EN 61000-6-1:2001 "... for residential, commercial and light-industrial environments"
EMC Emission	EN 61000-6-3:2001 "... for residential, commercial and light-industrial environments"
EMC Tests	EN 61000-4-8 level 4, EN 61000-4-3 level 2, EN 61000-4-4 level 4, EN 61000-4-2 level 2, EN 55022 class B

Mechanical Performance

Dimensions	6.5 x 6.0 x 3.5 cm (Length x Width x Height)
Conformance with standards	Mechanical shock test IEC 60068-2-27 Test Ea Random vibration test IEC 60068-2-64 Test Fh
Vibration immunity Test severity	IEC TR 60721-4-5 table 5: IEC 60721-3-5, Class 5M3 (3.6 gRMS) "Mechanical conditions in road vehicles in areas without well-developed road systems, light-weighted vehicles, tracked vehicles and self propelled machines, including installations in places which may be directly hit by flying stones"
Random vibration Test severity	IEC TR 60721-4-2 table 7: IEC 60721-3-2, Class 2M3 (3.2 gRMS) "Transportation in lorries, trailers and all other kinds of transportation in areas without well-developed road systems, by trains with shock reducing buffers and by ships", IEC 60721-3-2, Class A (1.0 gRMS) "Instrumentation and automation equipment on ships"

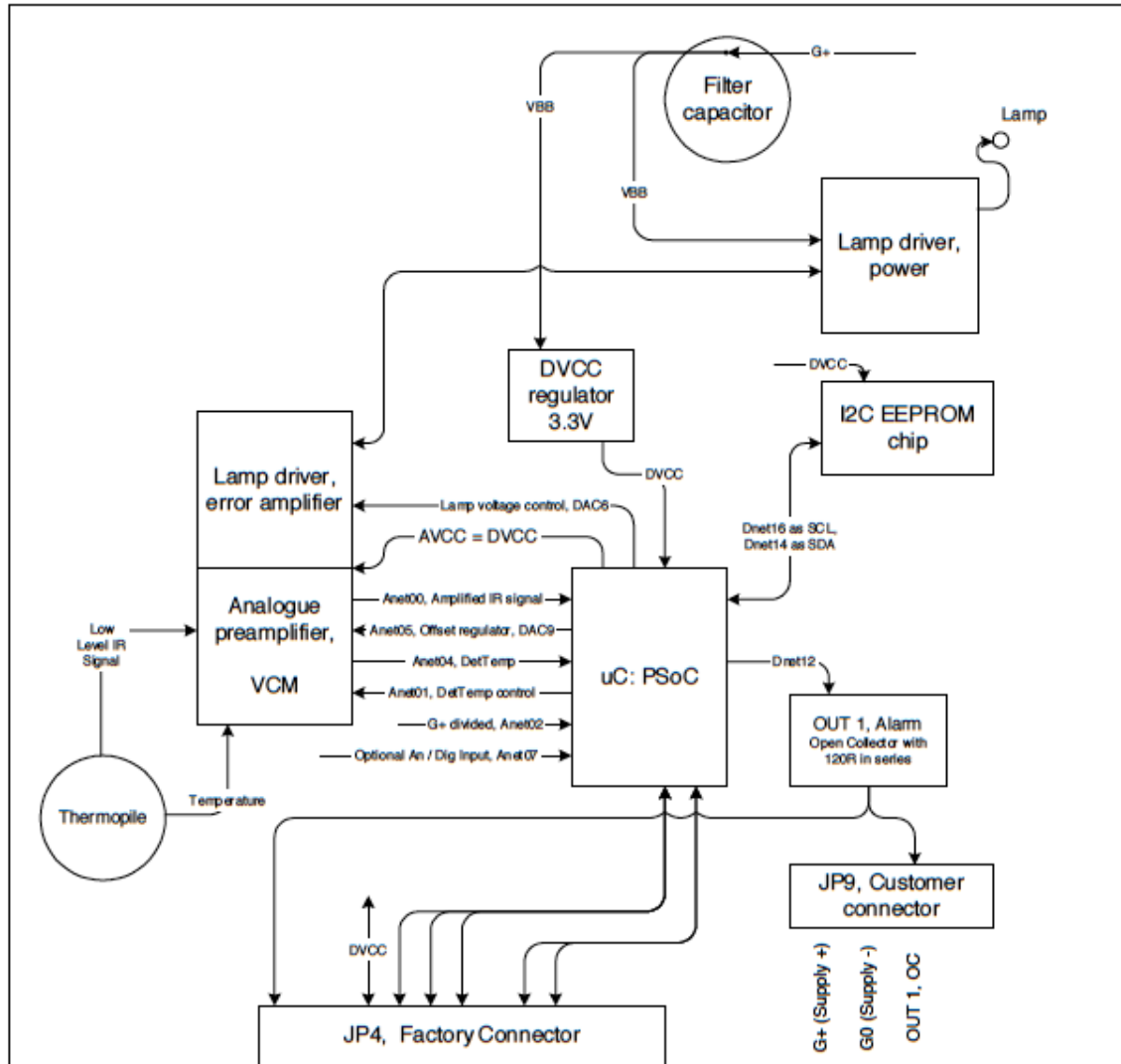
Electrical Data

Power Input	4.5 to 12.0 VDC maximum rating (without reverse polarity protection) stabilized to +5% over load and line changes. Ripple voltage less than 50mV.
Current Consumption	40 mA average, < 300 mA peak current (~55 ms)
Electrical Connections	Power (+), Ground (G0), PWM Output; 3-pin 2,5mm pitch JST connector B3B-EH-A
Serial Data Communication	I2C bus; 2.5mm pitch footprint holes and Factory edge connector
Warm Up time to spec precision.....	30 sec

Alarm Output

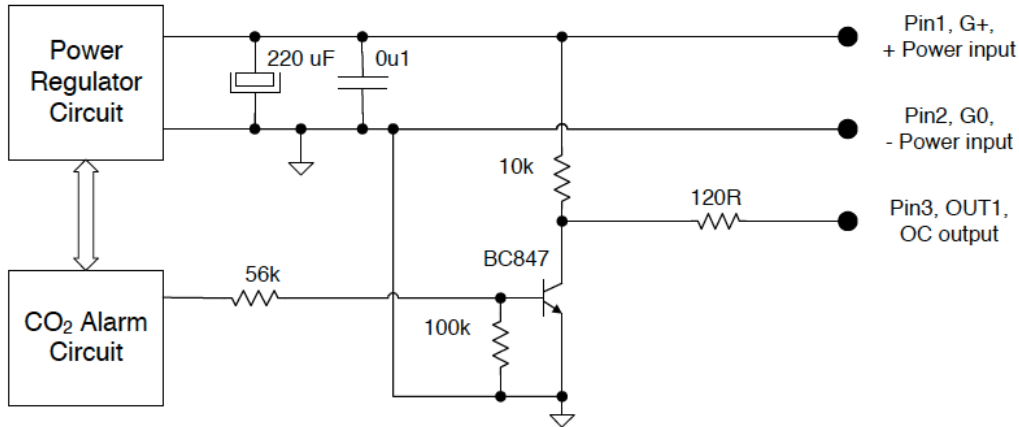
Electrical Characteristics	Open collector with series 120R resistor, normally closed (conducting), 10kΩ pull-up resistor to power +
Function	Transistor open at CO2 High OR Power Low OR at Sensor Failure
Response Time	~ 32 seconds
CO2 High Alarm Level	1000 ppm
CO2 Alarm Reset Level	800 ppm
Power Low Alarm Level	~4 V @ load

Circuit functional diagram

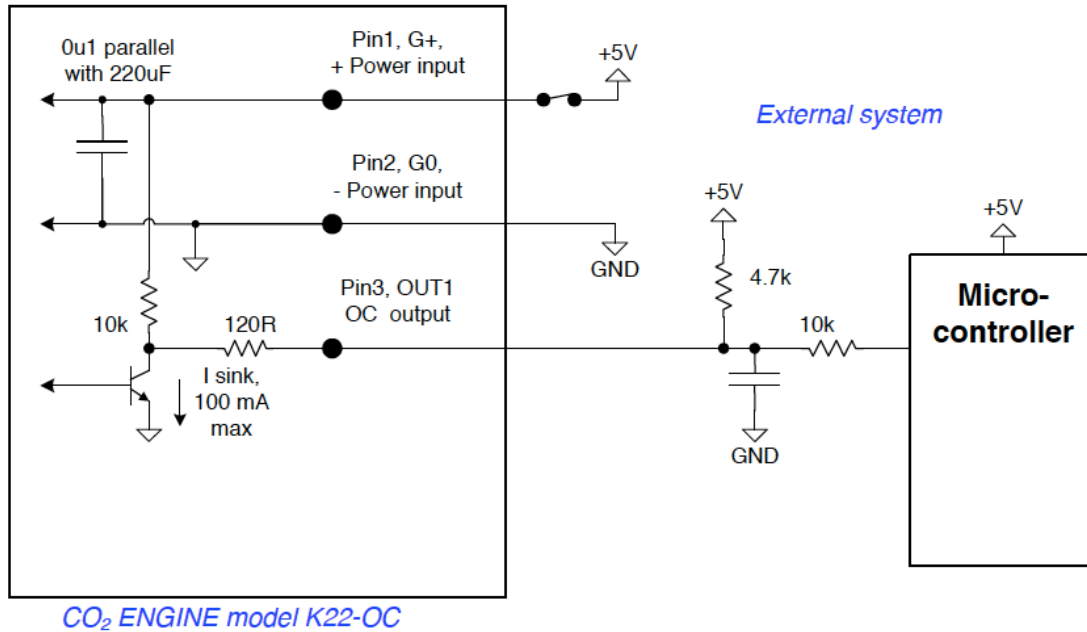


- | | | |
|---|-----------------|---------------|
| OUT 1, OC | DVCC | G+ (Supply +) |
| PWM Output, proportional to CO2 concentration | XRES | G0 (Supply -) |
| Processor programming interface. It is used for test of DVCC and meter hardware restart | con-XTALin/SCL | |
| | con-XTALout/SDA | |
| | con-I2C_SDA | |
| Test and calibration communication with processor | con-I2C_SCL | |
| Power supply lines. Supplied by 5V in test board for PO model. | | |

Sensor power and output schematics

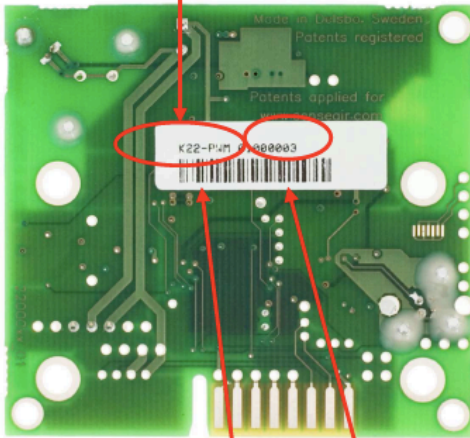


Wiring Interface with OC (Open Collector) Output to external microcontroller



Outward appearance of sensor

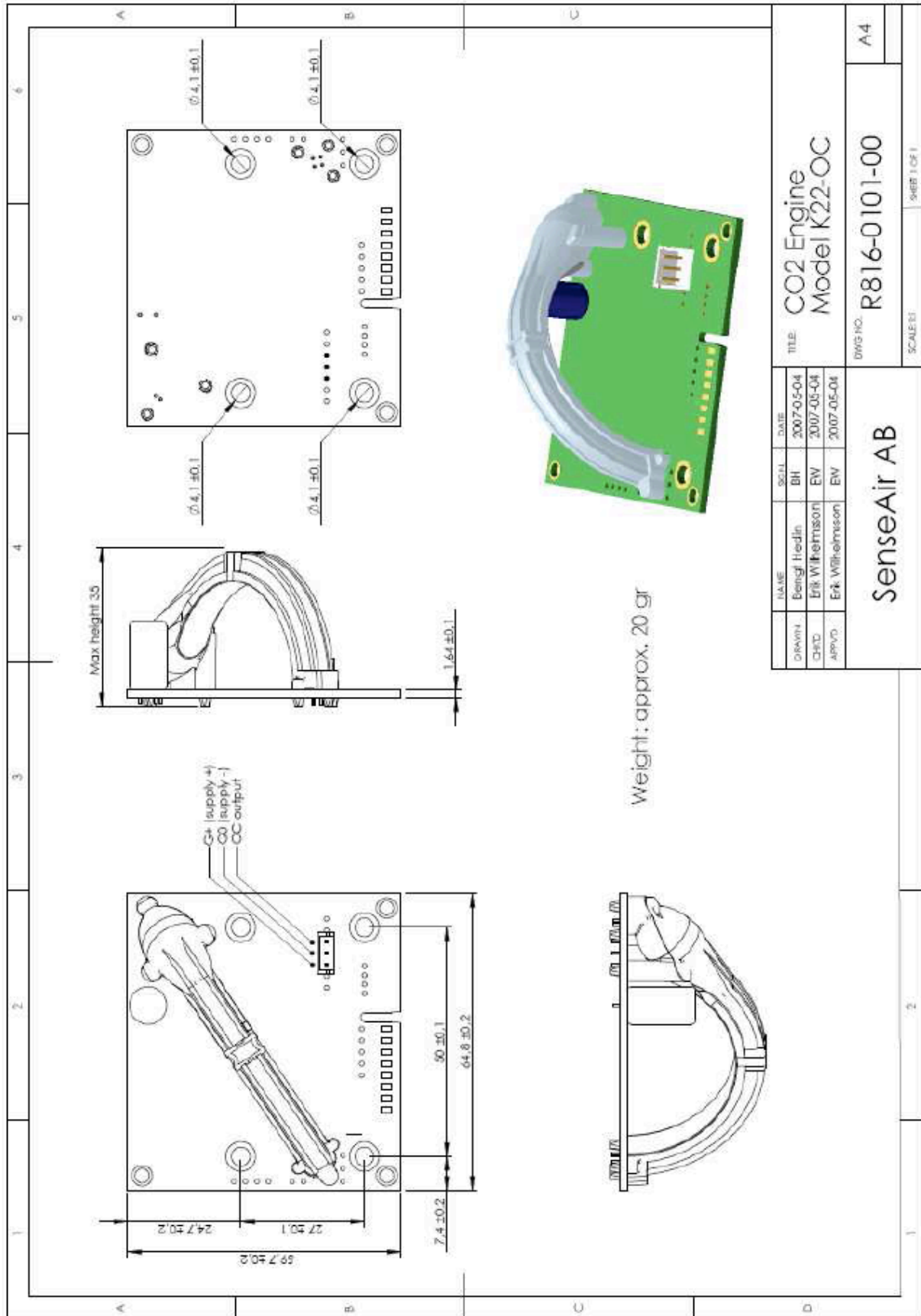
Product model name



Calibration restore
switch S1

Individual serial number label, the key for full components and process traceability, also available in sensor EEPROM.

Barcode translation of the full label print



DRAWN		DATE	TITLE	
NAME	SCALE	REV	DWG NO.	
Bengt Hedlin	BH	2007-05-04	CO2 Engine Model K22-OC	
Erik Wilhelmsson	EV	2007-05-04	R816-0101-00	
Erik Wilhelmsson	EV	2007-05-04	SCALE: 1:1	
SenseAir AB			SHEET 1 OF 1	
			A4	