

Product Specification

K85

Carbon dioxide sensor



General

K85 measures CO₂ concentration in ambient air, with additional options for measuring temperature and allows flexible connectivity. K85 measures the carbon dioxide concentration in the ambient air, using non-dispersive infrared technology, up to 2000ppm, and transforms the data into an analogue output.

K85 reuses the core sensor optics from the S8 module, but comes pre-assembled on a robust PCB-board with industrial standard analogue outputs, e.g. 0 – 10V and 4 – 20mA and wide input voltage tolerance with reverse-polarity protection.

Pin layout for additional connectors and terminals allow for further options; e.g. thermistor for temperature and potentiometer for temperature offsets. The product is prepared to be mounted in an suitable enclosure as a wall-mounted or duct-mounted transmitter.

Item	K85 general specification
Target gas	Carbon dioxide (CO ₂)
Operating principle	Non-dispersive infrared (NDIR)
Measurement range	0 – 2000ppm _{v_ol}
Accuracy	±40ppm ±3% of reading ¹
Response time (T _{1/e})	≤2minutes, diffusion
Rate of measurement	0.5Hz
Operating environment	In normal IAQ applications, SO ₂ .enriched and corrosive environments are excluded ²
Operating temperature	0 – 50°C
Operating humidity	0 – 95%RH non condensing
Storage temperature	-20 – 70°C
Dimensions	88 x 50 x 14mm (max. dimension)
Power supply	24VAC/VDC
Warm Up time	1min (@ full specs <15min)
Life expectancy	15 years ³
OUT 1	Linear Conversion Range: 0 – 5V/10V for 0 – 2000ppm Electrical Characteristics: R _{OUT} <100Ω R _{LOAD} >5kΩ D/A conversion accuracy: ≤±(20mV + 2% of output) D/A Resolution: 10mV
OUT 2	Linear Conversion Range: 4 – 20mA for 0 – 2000ppm Electrical Characteristics: R _{LOAD} <500R D/A conversion accuracy: ≤±(0.3mA + 2% of output) D/A Resolution: 0.02mA
Thermistor	Prepared for thermistor for passive measurement of temperature
Maintenance	Maintenance-free if using Senseair® ABC logic Self calibration using for normal indoor applications ^{3,4}

Table 1: Key technical specification for the K85

Note 1: Accuracy is defined after zero calibration or after minimum three (3) ABC periods of continuous operation

Note 2: All corrosive environments are excluded

Note 3: In normal Indoor Air Quality (IAQ) applications @ NTP (25°C, 101.3kPa)

Note 4: Requires fresh air (400ppm) at least once every week

Terminal descriptions

The table below specifies what terminals and I/O options are available in the general *K85 sensor platform*. Please note, that in the K85 default configuration, only G+, G0, OUT1 and OUT2 have any pre-programmed functions.

Functional group	Descriptions and ratings
Power supply	
G+	Power supply voltage may be AC or DC. Positive pole of DC power supply shall be connected to G+. Sensor performs half wave rectification of supplied AC voltage. Power supply lines are protected by varistor from voltage spikes and over voltage, overcurrent protection by resettable PTC. Nominal specification: 24VAC \pm 20% 12 – 24VDC \pm 20%
G0	Connected to sensor's ground. Negative pole connection for DC power supply
Outputs	
OUT1	Buffered linear output 0 – 5V or 0 – 10V, selectable by dip-switch No. 1 (see figure 1) Default: 0 – 10V, polarity protection. Resolution 10mV
OUT2	Buffered linear output 4 – 20mA. Resolution 0.02mA

Table 2: Terminal descriptions for K85

Calibration

The default K85 is maintenance free in normal environments thanks to the built-in self-correcting ABC algorithm (*Automatic Baseline Correction*), manually selectable by dip switch (see figure 1). This algorithm constantly keeps track of the sensor's lowest reading over a 7.5 days interval and slowly corrects for any long-term drift detected as compared to the expected fresh air value of 400ppm CO₂.

Background- (bCAL) / Zero (zCAL) calibration procedure

Rough handling and transportation might result in a reduction of sensor reading accuracy. With time, the ABC function will tune the readings back to the correct numbers. The default "tuning speed" is limited to about 30 ppm/week. For post calibration convenience, in the event that one cannot wait for the ABC algorithm to cure any calibration offset, bCAL or zCAL can be executed.

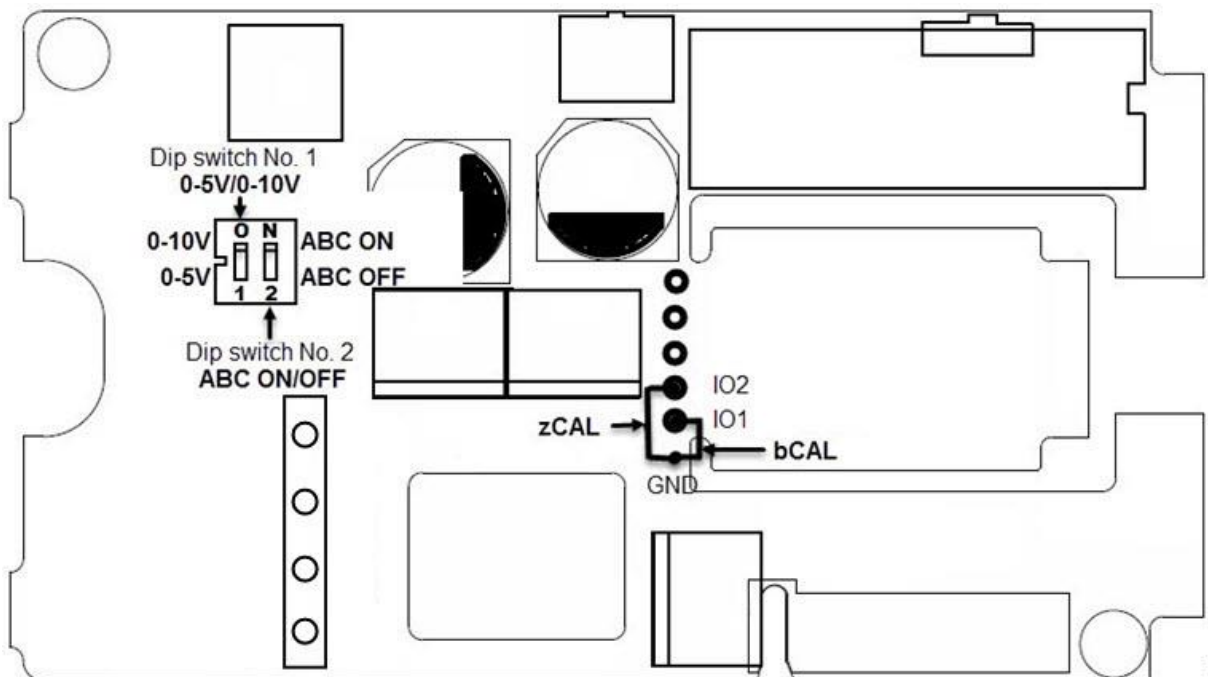


Figure 1: Calibration functions

1. Let gas mixture flow into the sensor
 - **bCal:** 400ppm CO₂ **zCal:** 0ppm, e.g. Nitrogen
 - Flow time: ≥3 minutes
 - Flow range: 0.3–1.0 litre/minute
2. Short circuit IO1 (bCal)/IO2 (zCal)
 - Shortcut Time: ≥20 seconds
3. Calibration executed?

<p><u>Yes</u> Sensor shows 400ppm (bCal)/0ppm (zCal) CO₂</p>	<p><u>No</u> sensor detected unstable gas concentration</p> <ol style="list-style-type: none"> 1. Remove shortcut 2. Wait 20 seconds 3. Repeat step 2 to 3
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4. Remove shortcut

Maintenance

The K85 is basically maintenance free in normal environments thanks to the built-in self-correcting ABC algorithm. Default: ABC ON (valuable by dip switch No. 2, see figure 1). Discuss your application with Senseair in order to get advice for a proper calibration strategy.

When checking the sensor accuracy, **NOTE** that the sensor accuracy is defined at continuous operation (at least three (3) ABC periods after installation)! ABC period: 7.5 days.

Installation

The modules are factory calibrated and ready for use directly after power up. There are several alternative ways to connect the K85™ to a host system.

Do not use edge connector for connection to the host system without discussion with Senseair!

Main terminal: available signals are power supply (G+ and G0) and the buffered analogue outputs (OUT1, OUT2) (see figure 2).

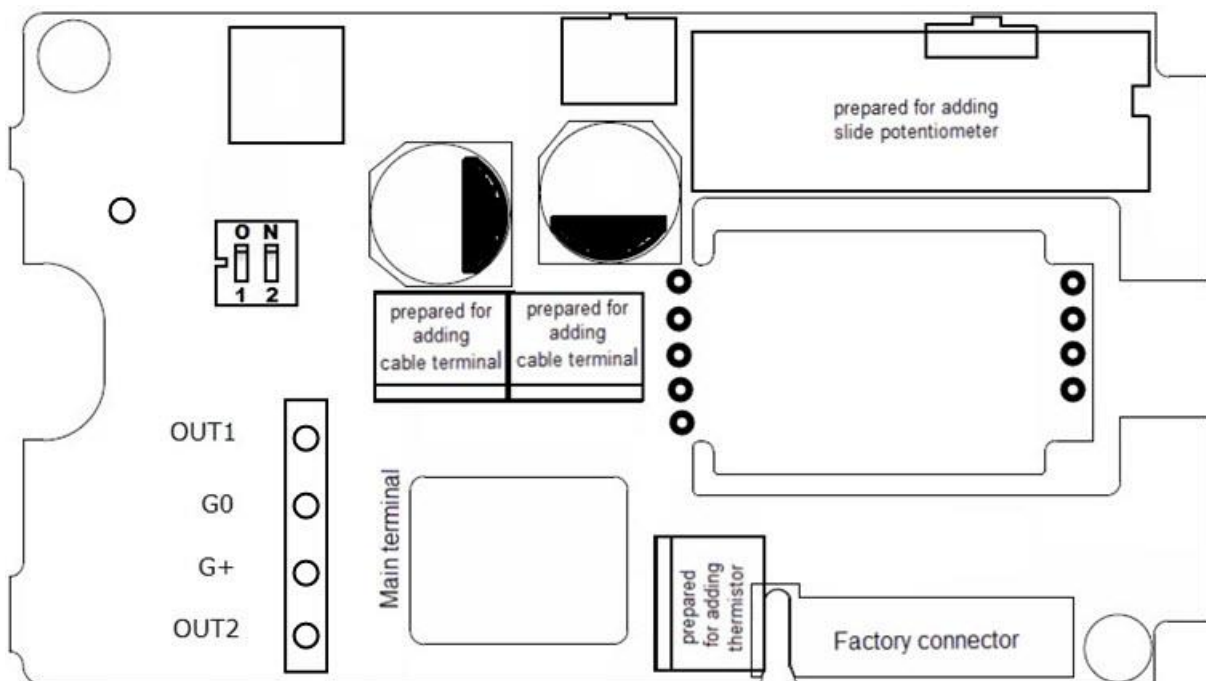


Figure 2: Terminals

Prepared for adding:
cable terminals, temperature slide potentiometer and/or thermistor (see figure 2)

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