

CO₂ SENSORS OVERVIEW



Type:	C3 Infrared CO₂ sensor
Application:	General CO ₂ monitoring
Principle:	Double beam infrared absorption
Ranges:	Various: 0-3000ppm to 0-10% Volume
Response time:	30 sec (t90)
Signal output:	4-20 mA
Dimensions:	74 x 55 x 30 mm (L x W x H)
Part Numbers:	2112B7000 or 2112B7050



Type:	Infrared CO₂ monitor
Application:	Indoor air quality monitoring
Principle:	Double beam infrared absorption
Range:	0-3000ppm CO ₂
Response time:	30 sec (t90)
Signal output:	4-20 mA
Dimensions:	78 x 78 x 35 mm (L x W x H)
Part Number:	2112B8000



Type:	Infrared CO₂ monitor with traffic light
Application:	Indoor air quality monitoring
Principle:	Double beam infrared absorption
Range:	0-3000ppm CO ₂
Response time:	30 sec (t90)
Dimensions:	78 x 78 x 35 mm (L x W x H)
Part Numbers:	2112B8000-TLM or -TLR



Type:	Infrared CO₂ gas measuring system
Application:	CO₂ monitoring (heavy duty)
Principle:	Double beam infrared absorption
Ranges:	Various: 0-3000ppm to 0-10% Volume
Response time:	30 sec (t90)
Signal output:	4-20 mA
Dimensions:	90 x 85 x 65 mm (L x W x H)
Part Numbers:	2112B9000 or 2112B9050 or 2112B9055



INFRARED CO₂ SENSOR FOR OEM APPLICATIONS

The innovative material and construction of this double beam infrared measuring system ensures Carbon Dioxide is detected quickly and precisely. A new digital algorithm evaluates and processes the measured signals, offering long-term stability in a light-weight, compact and cost-effective package. The infrared measuring system detects the absolute Carbon Dioxide content of ambient air and monitors itself constantly, signalling if there is a malfunction of its hardware or software.



C3 standard CO₂ infrared sensor.
Part no. 2112B7000 or
2112B7050

C3 STANDARD CO₂ SENSOR – SPECIFICATION –

Principle: Double beam infrared absorption

Range: **Variant 1 – ppm ranges**

Part No: 2112B7000

standard: 0 – 3,000 ppm

optional: 0 – 4,000 ppm

optional: 0 – 5,000 ppm

optional: 0 – 10,000 ppm

optional: 0 – 20,000 ppm

optional: 0 – 30,000 ppm

Variant 2 – % volume ranges

Part No: 2112B7050

standard: 0 – 5 % volume

optional: 0 – 6 % volume

optional: 0 – 7 % volume

optional: 0 – 10 % volume

Accuracy: +/- 2% of f.s.d.

Reproducibility: +/- 1% of f.s.d.

Response time t90: approximately 30 sec

Gas entry: by diffusion

Ambient temperature: -10°C up to +50°C

Weight: 98g

Warranty period: 6 months

Resolution: dependent upon range. For example, 0-3000ppm range – 60ppm resolution

Output signal: 4 – 20 mA

Ambient pressure: 900 – 1100 hPa

Ambient humidity: 15 – 95% rel.

Operating voltage: 24 V d.c. +/- 5%

Monitoring coverage: 80 – 200m²

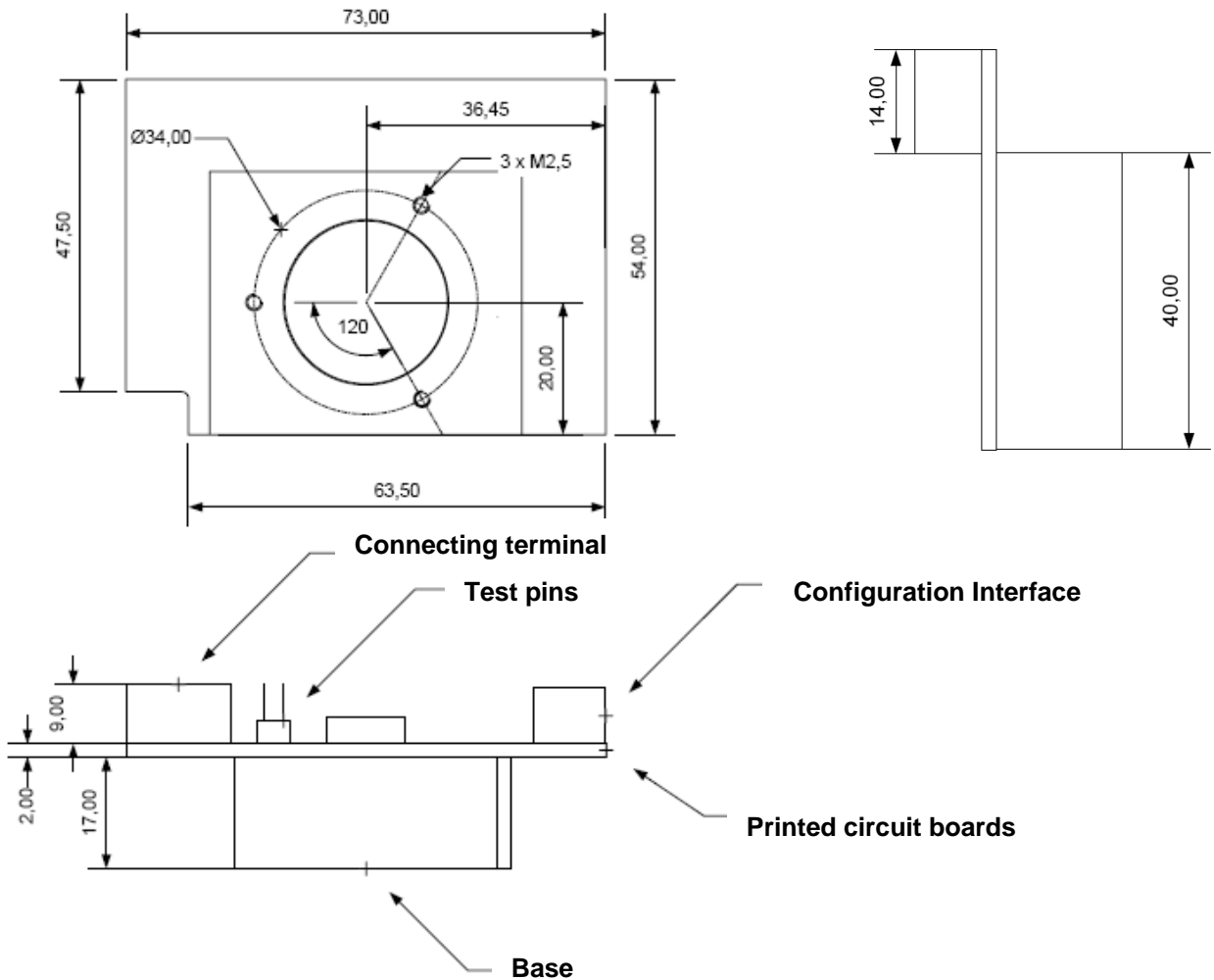
Min-max. operating voltage: 21,6 – 26,4V

Dimensions: 74 x 55 x 30 mm (L x W x H)



INFRARED CO₂ SENSOR FOR OEM APPLICATIONS

C3 STANDARD CO₂ SENSOR – DIMENSIONS



C3 standard CO₂ infrared sensor. Part no. 2112B7000 or 2112B7050

Please note: The components on the front and back printed circuit boards, including the configuration interface and connecting terminal, require a distance of at least 10mm from housing or other devices.



INFRARED CO₂ MONITOR FOR INDOOR AIR QUALITY MONITORING



CO₂ indoor air quality monitor
Part no. 2112B8000

CO₂ INDOOR AIR QUALITY MONITOR - SPECIFICATION -

Principle:	Two beam infrared
Range:	0 – 3000 ppm CO ₂
Accuracy:	+/- 2% fsd
Reproducibility:	+/- 1% fsd
Response time:	appr. 30 sec
Gas entry:	by diffusion
Operating voltage:	24 V d.c. +/- 5%
Output signal:	4 – 20 mA
Operating temperature:	-10°C up to +50°C
Operating pressure:	900 – 1100 hPa
Operating humidity:	15 – 95% rel.
Dimensions:	78 x 78 x 35 mm (L x W x H)
Part No:	2112B8000



INFRARED CO₂ MONITOR FOR INDOOR AIR QUALITY TRAFFIC LIGHT OPTION - MOBILE

The infrared measuring system determines the absolute CO₂ content of the surrounding air and monitors itself continuously, signalling any malfunction of hardware or software with a flashing yellow LED. The measuring range is linear.

There is no need for installation by an expert. In normal applications, calibration is unnecessary. However, if required, calibration can be carried out by a specialist.



CO₂ indoor air quality monitor
traffic light option – mobile unit
Part no. 2112B8000-TLM

CO₂ INDOOR AIR QUALITY MONITOR TRAFFIC LIGHT OPTION – MOBILE UNIT SPECIFICATION

Principle:	Two-beam infrared
Range:	0 - 3000ppm
Accuracy:	+/- 2% fsd
Reproducibility:	+/- 1% fsd
Warm up time:	5 minutes
Response time:	approx. 30 seconds
Gas entry:	by diffusion
Operating voltage:	24V d.c. +/- 5%
Power supply:	via mains adaptor a.c./d.c.
Operating temperature:	-10°C up to +50°C
Operating pressure:	900 – 1100 hPa
Operating humidity:	15 – 95% rel.
Dimensions:	78 x 78 x 35 mm (L x W x H)
Weight of housing:	approx. 150g
Housing protection rating:	IP 30 (white plastic)
Part No:	2112B8000-TLM



INFRARED CO₂ MONITOR FOR INDOOR AIR QUALITY TRAFFIC LIGHT OPTION - MOBILE

This monitor has been designed for air quality in interior rooms. The monitor is mobile, compact, light-weight and in normal applications, maintenance free, offering long-term stability.

The device can be plugged into a normal socket outlet through a power supply unit and can be mounted to a wall or placed on a shelf.

The gas measuring system is fast and precisely determines the concentration of Carbon Dioxide in the air at an ambient temperature of -10°C up to +50°C. It contains a novel infrared measuring system, which principally functions like a common two-beam photometer.

Measuring signals are evaluated and processed according to a new digital algorithm.

A traffic light on the housing displays the Carbon Dioxide content of the air as below:



**CO₂ indoor air quality monitor
traffic light option – mobile unit
Part no. 2112B8000-TLM**

CO ₂ Concentration in ppm	Optical Signal (LED)	Audible Signal (beep tone)	Air Quality
0 – 1500ppm	Green	No signal	OK
1500 – 2500ppm	Yellow	Once	Medium, ventilation recommended
2500 – 3000ppm	Red	Twice	Poor, ventilation necessary
Above 3000ppm	Red, flashing	Five times	Very poor, ventilation essential
Malfunction	Yellow, flashing	-	Hardware/ software malfunction



INFRARED CO₂ MONITOR FOR INDOOR AIR QUALITY TRAFFIC LIGHT OPTION - RELAY

This monitor has been designed for indoor air quality. With the aid of two independent relay contacts, it can control automatic window openers, air conditioning and fans.

The monitor is compact, light-weight and in normal applications, maintenance free, offering long-term stability. The plastic housing can be mounted on a wall or onto a flush-mounted box.

The gas measuring system is fast and precisely determines the concentration of Carbon Dioxide in the air at an ambient temperature of -10°C up to +50°C.

It contains a novel infrared measuring system, which principally functions like a common two-beam photometer. Measuring signals are evaluated and processed according to a new digital algorithm.

A traffic light on the housing displays the Carbon Dioxide content of the air as below:



**CO₂ indoor air quality monitor
traffic light option – relay unit
Part no. 2112B8000-TLR**

CO ₂ Concentration in ppm	Optical Signal (LED)	Air Quality
0 – 1500ppm	Green	OK
1500 – 2500ppm	Yellow	Medium, ventilation recommended
2500 – 3000ppm	Red	Poor, ventilation necessary
Above 3000ppm	Red, flashing	Very poor, ventilation essential
Malfunction	Yellow, flashing	Hardware/software malfunction



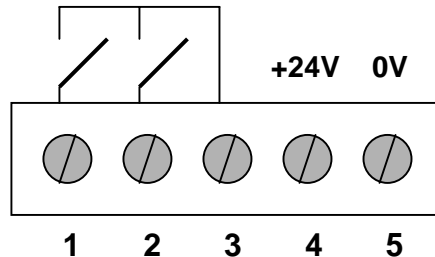
INFRARED CO2 MONITOR FOR INDOOR AIR QUALITY TRAFFIC LIGHT OPTION - RELAY

The infrared measuring system determines the absolute CO₂ content of the surrounding air and monitors itself continuously, signalling any malfunction of hardware or software with a flashing yellow LED. The measuring range is linear.

Processing and output of the measurement signals (two independent relay contacts) are integral functions. Relay contact 2 sends a short pulse when the CO₂ concentration exceeds 1,500ppm and relay contact 1 sends a short pulse when the CO₂ content falls below 1,400ppm. The measured values are evaluated and further processed in a downstream device specified by the user (eg. Ventilation system, PLC, window opener).

In normal applications, calibration is unnecessary. However, if required, calibration can be carried out by a specialist.

Connection layout for relay monitor



The gas measuring system is connected to the downstream device by means of a five-core, shielded cable. The measuring system is connected to the electric circuit via terminal 4 and 5 and the measured data is read via terminals 1 and 2.



INFRARED CO₂ MONITOR FOR INDOOR AIR QUALITY TRAFFIC LIGHT OPTION - RELAY

CO₂ INDOOR AIR QUALITY MONITOR TRAFFIC LIGHT OPTION – RELAY UNIT SPECIFICATION

Principle:	Two-beam infrared
Range:	0 - 3000ppm
Accuracy:	+/- 2% fsd
Reproducibility:	+/- 1% fsd
Warm up time:	5 minutes
Response time:	approximately 30 seconds
Gas entry:	by diffusion
Power supply:	screw terminals, current: approx. 100mA
Connections:	Terminal 1: relay contact, typical pulse 3.5 s Terminal 2: relay contact, typical pulse 3.5 s Terminal 3: common branch Terminal 4: 24V d.c. +/- 5% Terminal 5: 0 V
Outputs:	Terminal 1, relay contact: pulse f. [CO ₂] < 1,400ppm Terminal 2, relay contact: pulse f. [CO ₂] < 1,500ppm
Connecting cable:	5 x 0.25 ² Cu, shielded cable
Operating temperature:	-10°C up to +50°C
Operating pressure:	900 – 1100 hPa
Operating humidity:	15 – 95% rel.
Housing protection rating:	IP 30 (white plastic)
Weight of housing:	approx. 150g
Dimensions:	78 x 78 x 35 mm (L x W x H)
Part No:	2112B8000-TLR



INFRARED CO₂ SENSOR FOR HEAVY DUTY AND INDUSTRIAL APPLICATIONS



Infrared CO₂ gas measuring system

Part Numbers:
2112B9000 or 2112B9050
or 2112B9055

CO₂ GAS MEASURING SYSTEM – SPECIFICATION –

Principle: Two beam infrared

Range: **Variant 1 – ppm ranges**

Part No: 2112B9000

standard: 0 – 3,000 ppm

optional: 0 – 4,000 ppm

optional: 0 – 5,000 ppm

optional: 0 – 10,000 ppm

optional: 0 – 20,000 ppm

optional: 0 – 30,000 ppm

Variant 2 – volume ranges

Part No: 2112B9050

standard: 0 – 5 % volume

optional: 0 – 6 % volume

optional: 0 – 7 % volume

optional: 0 – 10 % volume

Variant 3 – certified for Zone 2 hazardous areas

Part No: 2112B9055

standard: 0 – 5,000 ppm

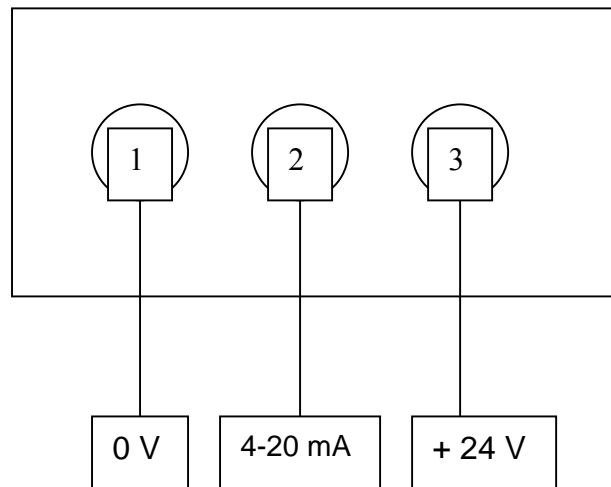
optional: 0 – 1 % volume

optional: 0 – 5 % volume

Accuracy: +/- 2% f.s.d.
Reproducibility: +/- 1% f.s.d.
Response time: approximately 30 sec
Gas entry: by diffusion
Operating voltage: 24 V d.c. +/- 5%
Output signal: 4-20 mA
Operating temperature: -10°C up to +50°C
Operating pressure: 900 - 1100 hPa
Operating humidity: 15 – 95% rel.
Housing material: Aluminium housing, suitable for wall mounting
Dimensions: 90 x 85 x 65 mm (L x W x H)
Weight: 560g
IP rating of housing: IP60; IP40 at drilling points



Terminal diagram OEM Infrared CO₂ Sensors



For the connection between the infrared sensor and Controller, a four wire screened cable with a total loop resistance of max. 100 Ω should be used. Terminal 1 and 3 is used for power supply 24 V d.c. The measuring signal 4-20 mA is available at terminal 2.

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