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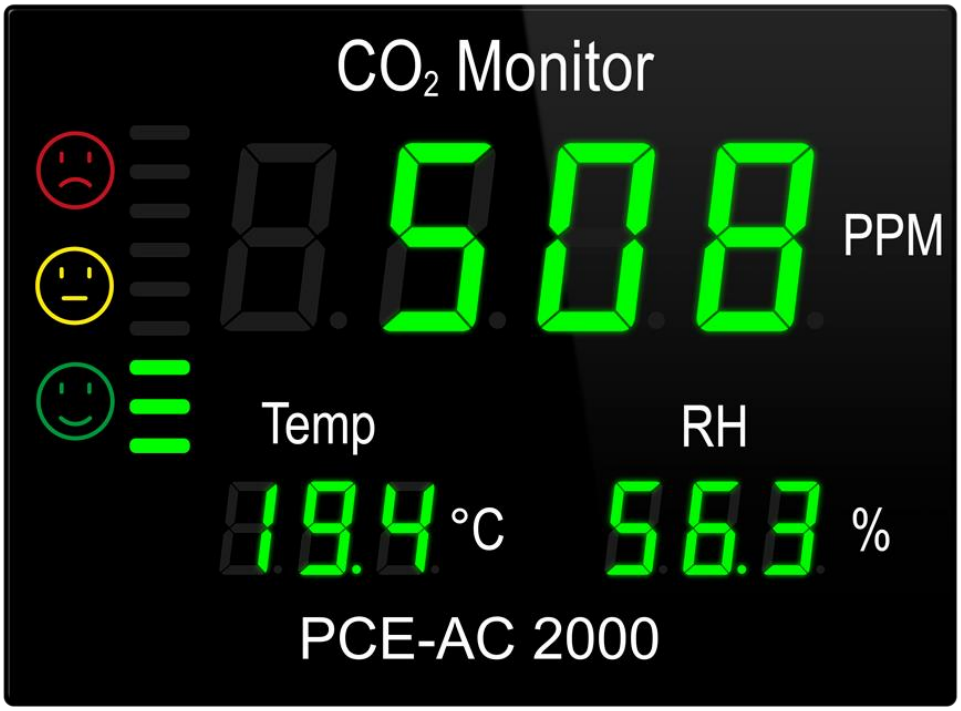
# Carbon Dioxide Meter

**User Manual**

**PCE-AC 2000**



## Content

## I. Instruction before use

Thank you very much for your purchasing of the wall-mounted multiple-function carbon dioxide, temperature and humidity detector manufactured by our company. In order that you can operate the device correctly, quickly and conveniently, you must read safety information and considerations mentioned in other clauses in this instruction book first. This will help you to use the product better.

## II. Product overview:

The product is a type of multiple-function detector used to detect concentration of carbon dioxide, temperature and humidity and is widely applied in detection of environmental quality such as Industrial production, hotels and department stores, offices and meeting rooms, libraries, warehouses, stations and airports, biological pharmacy, family living rooms, laboratories of schools, reading rooms, hospitals, agricultural production greenhouses and other sites.

## Characteristic of products:

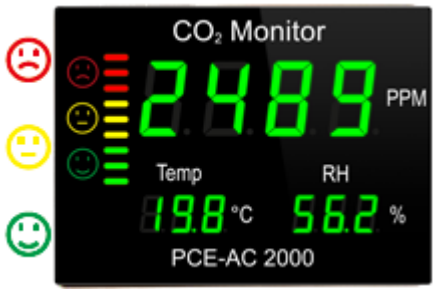
• Unique design of shell materials, as bright as new after long-term use; beautiful overall appearance, humane key design, simple operation.
• High precision, high resolution and quick response;
• Adoption of matching power adapter converting AC 220V to DC 9V to provide power enables continuous work for a long time.
• Multiple groups super large three-color LED digital tubes for display. Clear and intuitive. The air quality level is distinct.
• The alarm value for upper and lower limit of carbon dioxide concentration can be set at will. With the function of two-level sound-light alarm, the concentration for alarm may be preset. It can respond in time and give out alarm prompt.
• Original carbon dioxide sensor imported from Europe is adopted as the sensor. The sensor features linear output with quick response speed.
• The concentration of carbon dioxide, temperature and humidity can be displayed at the same time to detect air quality in time.

## III.Technical parameters:

| | | |
|---|---|---|
| Measurement range | $CO_2$ concentration | 0-9999PPM |
| | Temperature | -10℃～100℃ |
| | Humidity | 0-99.9 %RH |
| Measurement precision | $CO_2$ concentration | ±70 PPM ±3 % reading |
| | Temperature | ±0.6℃(MAX ±1.5 ℃) |
| | Humidity | ±3 % |
| Resolution | $CO_2$ concentration | 1PPM |
| | Temperature | 0.1 ℃ |
| | Humidity | 0. RH |
| Repeat ability | ≤±0.5 % | |
| Response time | 10 seconds | |
| Working condition | 0 ℃～50 ℃, 0 %～90 % non-condensing | |
| Storage condition: | -30 ℃～70 ℃, 0%～90 % non-condensing | |
| Work power | AC 220 V converted to DC 9 V 2 A power adapter | |
| Maximum power consumption | 9 V * 350 mA | |
| External size/weight | 388 * 288 * 43 mm | 2420 g |

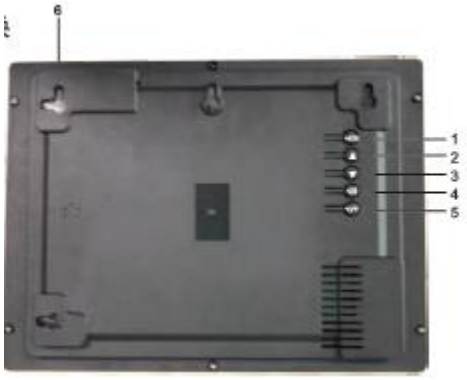
## IV. Panel and description for keys:

Poor: 1200 … 9999 PPM
Good: 600 … 1100 PPM
Excellent: 0 … 500 PPM




## Key function

1. MODE： set carbon dioxide concentration alarm value
2. ▲: Increase the alarm value
3. ▼: Decrease the alarm value
4. On or off



## Instruction for use:

Open packing case of the product to take out DC 9 V power adaptor with standard configuration. Insert DC contact to power interface of the device. After the power is connected, the device will enter detection state after countdown of 7 s.
Upper limit alarm setting:
Press “mode” key to enter the mode (the initial value at delivery is 1200 PPM). Then press “▲” and “▼” keys to adjust upper limit alarm value. After that, press “MODE” key to exit to complete the setting of upper limit alarm value.

## V. Considerations:

● The electronic sensors and microprocessors used on the product belong to precision electronic elements. The product must be kept away from water, fire, inflammable oil and gas or sites with strong electromagnetic interference to prevent influence on/damage to the device.
● At the time of installation, ensure that the air can flow naturally to prevent blocking or blowing of strong air or hot air to the vent hole used for sampling the air.
● The device should avoid strong impact and vibration.
● Strong decontaminant or other detergents should not be used for cleaning the device. It is suitable to wipe the casing with clear water and wet cloth. Avoid corrosive liquid or gas hurting the device.
● In order for normal work for a long time, the power adaptor with standard configuration of original factory must be used to ensure that fluctuation of the power supply is within the scope of technical index of the device.

## VI. Description of appendix information

1. Physical and chemical property of $CO_2$: Carbon dioxide: molecular formula $CO_2$, molecular weight 44.01, condensation point -56.6 ℃, boiling point -78.5 ℃, sublimation temperature -78.48 ℃, specific gravity 1.527 g/cm$^3$. It is colorless, odorless and gas with slight sour at standard conditions.
2. Source of $CO_2$: carbon dioxide is one of the main pollutants in indoor air. The source of indoor carbon dioxide includes indoor and outdoor sources. Outdoor sources include combustion of coal and timber, etc. Indoor sources mainly include two aspects. One aspect is the gas from exhalation of mankind. Another aspect is from combustion of fuels (indoor heating coal stove and gas stove, etc).
3. The relation between $CO_2$ and human body: $CO_2$ is the changeable component in air. The concentration of $CO_2$ in normal air is about 300 … 500 ppm. $CO_2$ is needed for normal physiology of human body and belongs to stimulant of respiratory center. The concentration of $CO_2$ in human exhalation is about 4000 ppm. Therefore, it is not poisonous substance generally. In places with crowded people, fuel combustion and indoor locations with poor ventilation, $CO_2$ concentration is usually higher than that of outdoor places. It will not produce toxic action for human body unless the

concentration exceeds certain scope.

Table 1: Toxicity of $CO_2$

| $CO_2$ concentration | | | | Poisoning condition |
|---|---|---|---|---|
| mg/m³ | | ppm | | |
| 10000 | | 5550 | | No poisoning symptom after 6 hours. |
| 20000 | 30000 | 11000 | 16700 | May be living within several hours |
| 60000 | 80000 | 35500 | 44500 | Still living within 0.5-1 hour |
| 90000 | 120000 | 50000 | 67000 | Die within 0.5-1 hour or acute death |

Latest carbon dioxide concentration and human physiological reaction
350～450 ppm: the same as common outdoor environment
350～1200 ppm: fresh air, smooth breadth
1200—2500 ppm: feel that the air is turbid and begin to feel sleepy.
2500～5000 ppm: feel headache, drowsiness, sluggishness, aprosexia, tachycardia and mild nausea
Larger than 5000 ppm: may result in serious anoxia, cause permanent cerebral injury, coma or even death.

Table 2: existing domestic $CO_2$ indoor air quality standard

| Issuing department: | Name of standard | Standard code | Standard value (ppm) |
|---|---|---|---|
| | Hygienic Standard for Carbon Dioxide of Indoor Air | GB/T170941997 | ≤1000 |
| | Hygienic Standard for Hotels | GB 9663-1996 | 700<br>1000<br>1000 |
| | Hygienic Standard for Public Place of Entertainment | GB 9664-1996 | ≤1500 |
| | Hygienic Standard for Public Bathrooms | GB 9665-1996 | Changing room≤1500<br>Bathroom≤1000 |
| | Hygienic Standard for Barber Shop and Beauty Shop | GB 9666-1996 | ≤1000 |
| | Hygienic Standard for Swimming Place | GB 9667-1996 | ≤1500 |
| | Hygienic Standard for Gymnasium | GB 9668-1996 | ≤1500 |
| | Library, museum and Gallery | GB 9669-1996 | Library/museum /Gallery≤1000 |
| | Hygienic Standard for Exhibition Hall | | Exhibition Hall≤1500 |
| | Hygienic Standard for Shopping Centre and Book Store | BG 9670-1996 | ≤1500 |
| | Hygienic Standard for Hospital Waiting Room | GB 9671-1996 | ≤1000 |
| | Hygienic Standard for Waiting Room of Public Transit Means | GB 9672-1996 | ≤1500 |
| | Hygienic Standard for Public Means of Transportation | GB 9673-1996 | ≤1500 |
| | Hygienic Standard for Restaurant (dining room) | GB 16153-1996 | ≤1500 |

4. The relation between $CO_2$ and plants: $CO_2$ is raw material for photosynthesis of plants and photosynthesis affects growth speed of plants directly. From the aspect of professional research, $CO_2$ also affects respiratory rate of plants and utilization efficiency of water at the same time and changes metabolism of plants to further affect nutrition of plants. In short, proper $CO_2$ concentration can improve quantity and quality of plants to a great extent.

## Onsite photographing of the scene as shown in figure: