

# 二氧化碳溫溼度傳感器 使用手冊

## 注意事項

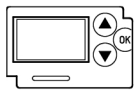
- 使用傳感器時，不可觸摸，擦拭或敲擊感測元件，不適合的行為會造成量測值的偏移。
- 安裝電路時請勿將 110V 或 220V 接到裝置的電源端或是輸出端。
- 請勿超出使用電源的範圍，以免裝置的損壞。

## 輸出

- DELP-1x/3x/4x 系列僅提供二氧化碳輸出。
- DELP-2x 系列提供二氧化碳及溫溼度輸出。
- 類比輸出提供 1 個 4...20mA 或 0...10V 輸出通道，透過指撥開關選擇，僅提供二氧化碳輸出。
- RS485 輸出，出廠設定值為 ID1, 9600, N81。

## LCD 顯示器和觸控按鍵

- 同時按住▲、▼和 OK 鍵 3 秒鐘，進入設置畫面。
- RS485 輸出可設置站號、傳輸速度、資料格式。
- 可設定警報輸出。
- 可設定 offset 修正值。
- 可設定 ABC 自動校正開啟或關閉。



註：若是 LCD 顯示模組的安裝是在電源開啟之後，此時顯示器若是沒有任何畫面，請同時按住▲、▼和 OK 鍵 3 秒鐘，如此 LCD 將會開啟並進入設置畫面。

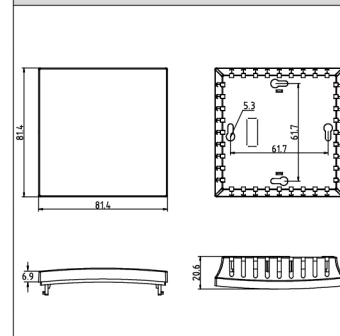
## ABC 自動校正

- 本二氧化碳傳感器提供自動校正功能，依據大氣二氧化碳背景濃度參考，自動適當地調整校正到正確的量測值。自動校正的週期一般為 7 天。
- 一般場所包含辦公室、醫院、診所、工廠、電影院、百貨公司、大賣場...等，建議開啟自動校正功能，可以經常保持良好的量測精準度。
- 特殊場所包含植物培養室、溫室、家禽家畜養殖場、24 小時輪班的營業場所或工廠...等，因為長時間處於高濃度狀態，很少有機會能達到大氣二氧化碳背景濃度，建議關閉自動校正功能。
- 關閉自動校正功能後，建議每年將本傳感器移到通風良好的場所，並打開自動校正功能，放置約一到二個週期的時間，使其可依據大氣二氧化碳背景濃度參考，自動適當地調整校正到正確的量測值。
- 產品安裝時若因為碰撞或擠壓而導致二氧化碳量測偏移，在程度不嚴重的狀況下，經過三個週期的自動校正修正後，可恢復到正確的量測值。

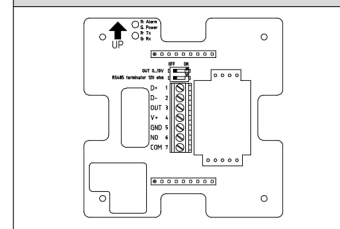
## 工程注意

- 4 ... 20mA 輸出的機種具有高功率損耗，可影響溫度測量。影響程度取決於工作電壓。超過 DC24V 的工作電壓可能會發生過載或欠補償。
- 此外，測量精度受以下因素的影響：現場的空氣流動、牆面紋理（木材、石膏、混凝土、磚）。
- 由安裝應用所造成的不準確度，在 1 個小時之後會固定下來，之後可以使用規劃器或是 LCD 進行調整。
- 流動空氣的變化會短暫的造成一些偏移，一段時間後會恢復正常。

## 安裝尺寸 (mm)



## PCB 電路板



## 技術數據

### 二氧化碳

|       |                       |
|-------|-----------------------|
| 量測範圍1 | 標準範圍 400 ... 2000 ppm |
| 精度1   | ±40ppm ±3% 讀值         |
| 量測範圍2 | 延伸範圍 0 ... 10000 ppm  |
| 精度2   | 大於±40ppm ±3% 讀值       |
| 工作原理  | 非色散紅外線 NDIR           |

### 相對濕度

|      |                            |
|------|----------------------------|
| 量測範圍 | 0 ... 100 %RH              |
| 精度   | ±5% RH@25°C (20 ... 80%RH) |

### 溫度

|      |             |
|------|-------------|
| 量測範圍 | 0 ... 50 °C |
| 精度   | ±0.7°C      |

## RS485 Modbus RTU 輸出

|      |                               |
|------|-------------------------------|
| 站號   | 1...247                       |
| 傳輸速度 | 9600/19200/38400/57600/115200 |
| 資料格式 | N81/N82/E81/E82/O81/O82       |

## 類比輸出

|         |                                                   |
|---------|---------------------------------------------------|
| 電流/電壓輸出 | 三線式 4 ... 20 mA/0 ... 10 V                        |
| 輸出負載    | 電流輸出 RL < 400 ohm<br>電壓輸出 0 ... 10 V RL > 10K ohm |

## CO2 警報輸出 (選配)

|        |                     |
|--------|---------------------|
| 警報種類   | CO2                 |
| 警報開關   | MOS-RELAY Form-A x1 |
| 警報開關容量 | 0.9A 60V AC&DC      |

| 輸出                    | 指撥開關                             | 電路連接 |
|-----------------------|----------------------------------|------|
| 4...20mA<br>(只提供 CO2) | <br>OUT 0...10V<br>OFF: 4...20mA |      |
| 0...10V<br>(只提供 CO2)  | <br>OUT 0...10V<br>ON: 0...10V   |      |
| RS485                 | <br>Terminal 120 ohm             |      |

## 顯示器 (選配)

|                   |                   |
|-------------------|-------------------|
| ABC               | 開啟/關閉             |
| CO2 offset 修正值範圍  | -1000 ... +1000   |
| 相對濕度 offset 修正值範圍 | -100.0 ... +100.0 |
| 溫度 offset 修正值範圍   | -100.0 ... +100.0 |

## 電源供應

|     |            |
|-----|------------|
| VDC | 15 ... 24V |
| VAC | 24V ±10%   |

## 電流消耗 (25 °C, 24 VDC)

|         |                 |
|---------|-----------------|
| RS485輸出 | 最大310mA，平均 20mA |
| 類比輸出    | 最大320mA，平均 30mA |

## 機構

|      |                       |
|------|-----------------------|
| 外殼材質 | ABS                   |
| 外殼尺寸 | 81.4 x 81.4 x 27.5 mm |
| 保護等級 | IP20                  |

## 環境

|                |                   |
|----------------|-------------------|
| 工作溫度           | 0 ... 50 °C       |
| 工作濕度           | 0 ... 85%RH (無結露) |
| 儲存溫度           | -20 ... 60°C      |
| 電氣防護           |                   |
| 過壓保護，逆向保護，短路保護 |                   |

## 電磁干擾防護

|                                     |  |
|-------------------------------------|--|
| EN 61326-1:2013                     |  |
| CISPR11:2009+A1:2010 Group1 Class B |  |

# Indoor CO2 Transmitter User's Manual

## Warning

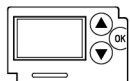
- Do not touch or wipe the sensing element.
- Do not connect 110V or 220V to the sensor.
- Do excess the power supply voltage, this may permanently harm the sensor.

## Output

- DELP-1x only provide CO2 output.
- DELP-2x provide CO2, humidity and temperature output.
- One analog channel of 4...20mA or 0...10V by dip switch selecting, this only for CO2 output.
- RS485 output · default setting - ID1, 9600, N81 ·

## LCD display and touch buttons

- Press ▲, ▼ and OK simultaneously for 3 seconds into setting page.
- RS485 setting: Slave ID, Baud rate, Data format
- Offset setting: CO2 ±1000 ppm, Humidity ±10.0%RH, Temperature ±3.0°
- CO2 setting: ABC on/off
- Alarm output setting: High point or Low point En/Dis, Set-point, Hysteresis, Delay, Latch.



Note: If the LCD display module is installed after the power is turned on, the monitor will not have any picture at the moment. Press ▲, ▼ and OK simultaneously for 3 seconds, so the LCD will turn on and enter the setting page

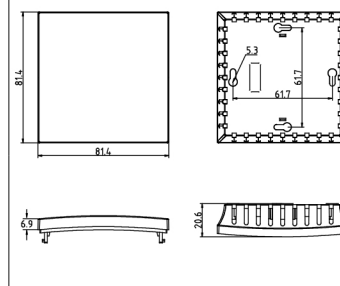
## ABC algorithm

- This CO2 sensor provides an ABC algorithm, which automatically adjusts and corrects the value according to the reference of the atmospheric CO2 background concentration. The period of ABC is generally 7 days.
- In ordinary places include offices, hospitals, clinics, factories, movie theaters, department stores, supermarkets, etc. It is recommended to turn on the ABC to maintain good measurement accuracy.
- In other places include plant cultivation rooms, greenhouses, poultry and livestock farms, 24-hour operation places or factories... etc. Because they are in a high concentration state for a long time, there is no chance of reaching the atmospheric CO2 background concentration. It is recommended to turn off the automatic correction function.
- If the ABC is turn off, it is recommended to move the sensor to a well-ventilated place every year, and then turn on the ABC, leave it for about one to two cycles, so that it can automatically adjust and calibrate appropriately based on the reference of atmospheric CO2 background concentration.
- If the CO2 measurement is offset due to collision or extrusion during product installation, it can be restored to the correct measurement value after three cycles of automatic calibration and correction in a less serious condition.

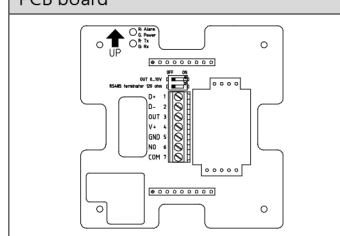
## Engineering notes

- The measuring accuracy is impacted by the following factors: Prevailing air flow, Wall texture (wood, plaster, concrete, and brick).
- For an installed sensor, the application-specific error will be constant after 1 hour, and it can be adjusted as needed in a configure adapter or on the local LCD.

## Dimensions (mm)



## PCB board



## Technical Data

### CO2

|                     |                                |
|---------------------|--------------------------------|
| Measuring range 1   | standard 400 ... 2000 ppm      |
| Accuracy 1          | ±40ppm ±3% of reading          |
| Measuring range 2   | extend 0 ... 10000 ppm         |
| Accuracy 2          | > ±40ppm ±3% of reading        |
| Operating Principle | Non-dispersive infrared (NDIR) |

### Relative Humidity

|                 |                           |
|-----------------|---------------------------|
| Measuring range | 0 ... 100 %RH             |
| Accuracy        | ±5%RH@25°C (20 ... 80%RH) |

### Temperature

|                 |            |
|-----------------|------------|
| Measuring range | 0 ... 50°C |
| Accuracy        | ±0.7°C     |

### RS485 Modbus RTU output

|             |                               |
|-------------|-------------------------------|
| ID          | 1...247                       |
| Baud rate   | 9600/19200/38400/57600/115200 |
| Data format | N81/N82/E81/E82/O81/O82       |

### Analog output (one channel)

|                |                                                                    |
|----------------|--------------------------------------------------------------------|
| Type           | 3-wire, 4 ... 20 mA / 0 ... 10 V                                   |
| External loads | current output RL < 400 ohm<br>voltage output outputs RL > 10k ohm |

### CO2 alarm output (Option)

|          |                     |
|----------|---------------------|
| Type     | MOS-RELAY Form-A x1 |
| Capacity | 0.9A 60V AC&DC      |

| Output                     | Dip switch              | Connection Diagram |
|----------------------------|-------------------------|--------------------|
| 4...20mA<br>(only for CO2) | <p>OFF: 4...20mA</p>    |                    |
| 0...10V<br>(only for CO2)  | <p>ON: 0...10V</p>      |                    |
| RS485                      | <p>Terminal 120 ohm</p> |                    |

### Display with touch button (Option)

|         |                                                         |
|---------|---------------------------------------------------------|
| LCD     | 128x64 dots without backlight                           |
| Buttons | capacitive x3                                           |
| Offset  | CO2 ±1000 ppm<br>Humidity ±10.0%RH<br>Temperature ±3.0° |

### Power supply

|     |            |
|-----|------------|
| VDC | 15 ... 24V |
| VAC | 24V±10%    |

### Power consume (25 °C, 24 VDC)

|               |                       |
|---------------|-----------------------|
| RS485 output  | max. 310mA, typ. 20mA |
| Analog output | max. 330mA, typ. 30mA |

### Mechanics

|                        |                       |
|------------------------|-----------------------|
| Housing material       | ABS                   |
| Dimension              | 81.4 x 81.4 x 27.5 mm |
| Housing classification | IP20                  |

### Environment

|                       |                           |
|-----------------------|---------------------------|
| Operating temperature | 0 ... 50°C                |
| Operating humidity    | 0 ... 85%RH non condensed |
| Storage temperature   | -20 ... 60°C              |

### Electromagnetic compatibility

|                                     |  |
|-------------------------------------|--|
| EN 61326-1:2013                     |  |
| CISPR11:2009+A1:2010 Group1 Class B |  |

## Modbus Register

Present values (IEEE 754 Floating Pt)

| No. | Register Address | Starting Address | Content           | R/W | Register | Data Type    | Unit   |
|-----|------------------|------------------|-------------------|-----|----------|--------------|--------|
| 1   | 41025            | 0x400            | Temperature       | R   | 2        | Floating Pt. | °C, °F |
| 2   | 41027            | 0x402            | Relative Humidity | R   | 2        | Floating Pt. | %RH    |
| 3   | 41043            | 0x412            | CO2               | R   | 2        | Floating Pt. | ppm    |

Present values (32-bit integer)

| No. | Register Address | Starting Address | Content           | R/W | Register | Signed unsigned  | Scaling | Unit   |
|-----|------------------|------------------|-------------------|-----|----------|------------------|---------|--------|
| 1   | 41089            | 0x440            | Temperature       | R   | 2        | signed integer   | 1:100   | °C, °F |
| 2   | 41091            | 0x442            | Relative Humidity | R   | 2        | signed integer   | 1:100   | %RH    |
| 3   | 41107            | 0x452            | CO2               | R   | 2        | unsigned integer | 1:100   | ppm    |