

**SENSECUBE**

# CO<sub>2</sub> Sensor Module

## for OEM Applications

Our CO<sub>2</sub> gas sensors get a small deviation unlike NDIR Single type. So they keep long term stability.

**Excellent stability and accuracy**  
- through testing and calibration with sophisticated process and techniques

- Easy application to**
- Environment management system
  - Indoor ventilation system
  - Air conditioning system
  - Securing devices of combustors

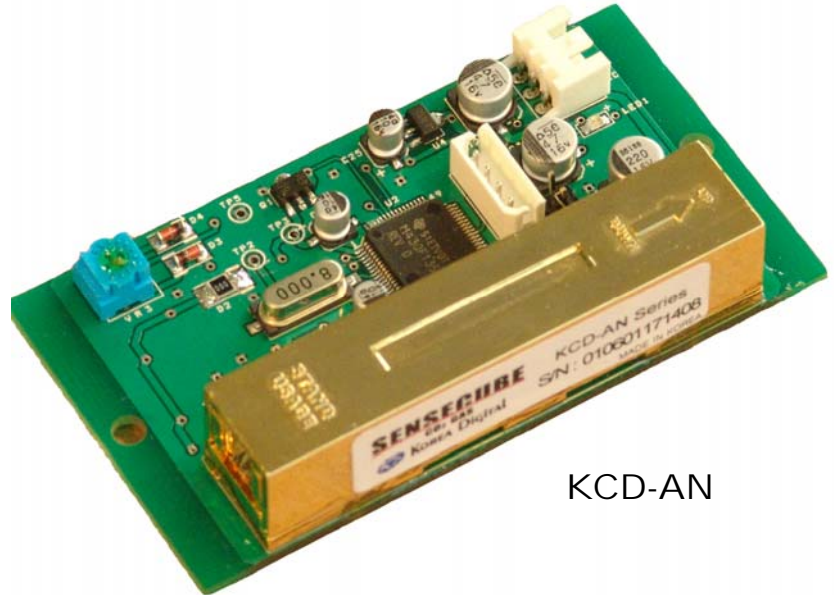
Our CO<sub>2</sub> gas sensors get a small deviation unlike NDIR Single Wavelength type. So they keep long term stability.

**Read following instruction from first line to the end for right use of sensor modules.**

→ When put power and a signal line into a connector, you should check voltage and polarity.

→ If you supply wrong power unlike said on Specifications, a controller will be repaired or replaced with charge.

→ NDIR type uses optical property to measuring CO<sub>2</sub> gas. We make up for a controller not to be affected by a shock and a wave(vibration).  
But please consult with our engineers, if you use it under harsh environments (like construction sites).



KCD-AN

### ◆ Model Numbering System

KCD-ANxG0xxx

Output

- A : PWM
- B : 0~4V
- G : 1~4V
- H : High/Low

Measuring ranges

- 1 : 0~2,000 ppm
- 2 : 0~5,000 ppm
- 3 : 0~10,000 ppm

Contact us If you want to add technical functions or change specifications as you apply our CO<sub>2</sub> sensor to your product. Our engineers will support you.

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### ◆ Technical Data

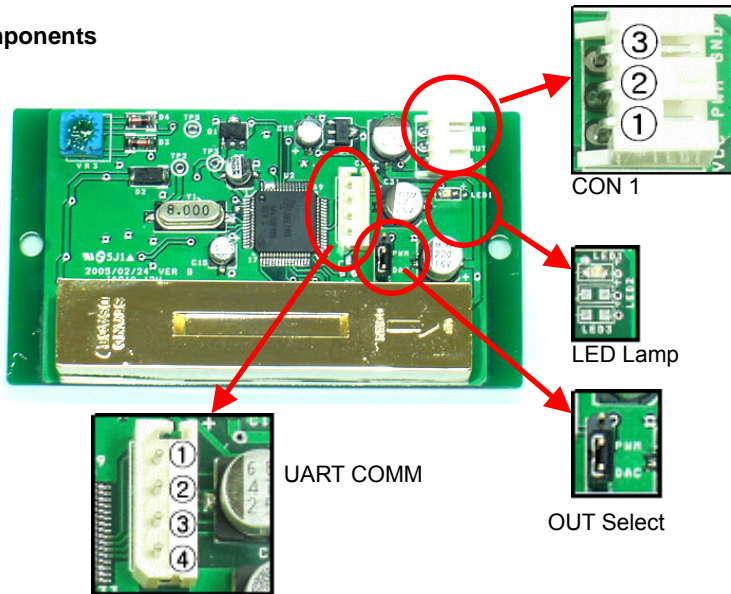
■ <b>Measurement</b>	Sensing Method		Dual Wavelength NDIR	
	Measuring range options		0~2,000ppm, 0~5,000ppm, 0~10,000ppm	
	Accuracy (@25℃)	2,000ppm	±(50ppm+3%(Reading))	
		5,000ppm	±(100ppm+3%(Reading))	
		10,000ppm	±(200ppm+3%(Reading))	
Response time (60%)		< 40 sec		
Measurement time interval		1.5 sec		
■ <b>General</b>	Warm up time		< 2 min	
	Storage temperature		-40~70℃	
	Temperature dependence		0.2% / ℃	
	Weight		< 30g	
■ <b>Operating Conditions</b>	Temperature		0~50℃	
	Humidity		0~95%RH (Non-condensing)	
	Gas flow rate		0.2~1 m/sec	
■ <b>Electrical</b>	Power supply (rectified)		8 ~14VDC	
	Power consumption		70mA average	
■ <b>Outputs</b>	Resolution	@ ~2000ppm , PWM	2ppm	
		@ UART communication	1ppm	
	Analog Outputs		0(1) ~4 VDC , PWM	
■ <b>Dimensions</b>	Length × Width × Height		82mm × 44.5mm × 18 mm	
	Holes	Diameter	Φ3.5mm	
		Pitch	72mm±0.2mm	
■ <b>Communications (UART)</b>	BAUD RATE		38,400 bps	
	Low		0~0.3V	
	High		2.7~5V	

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◆ **Connectors**

**1. Components**



**2. Specifications**

1) CON1

No.	Name	Descriptions
1	V <sub>DD</sub>	Power input, +8V ~ +14VDC
2	V <sub>OUT</sub>	Signal output, (PWM or DC voltage)
3	GND	GND

\* WAFER : Yeonho Elec. SMAW250-03G

2) OUT Select

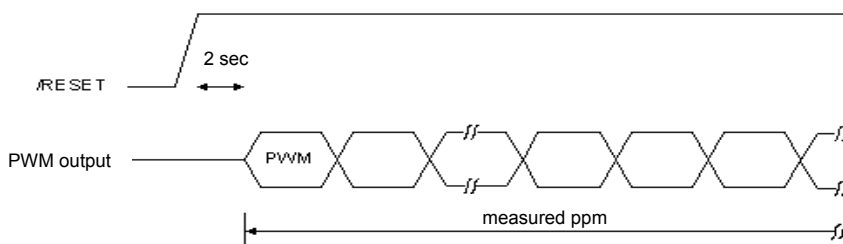
Jumper	Way	Descriptions
UP	PWM	Digital PWM signal output (Optional)
DOWN	DAC	Analog voltage output

- \* @ PWM(Digital) : 47KΩ full up resistance is connected inside.
- \* @ DAC(Analog) : it outputs 0 ~ 4V (voltage output)

3) Warm up

It takes about 30 seconds to output detect signal after initial power supply(8~14V).  
But output signal during stability (first 2~3 minutes) may show incorrect values.

4) PWM Output



# CO<sub>2</sub> Sensor Module for OEM Applications

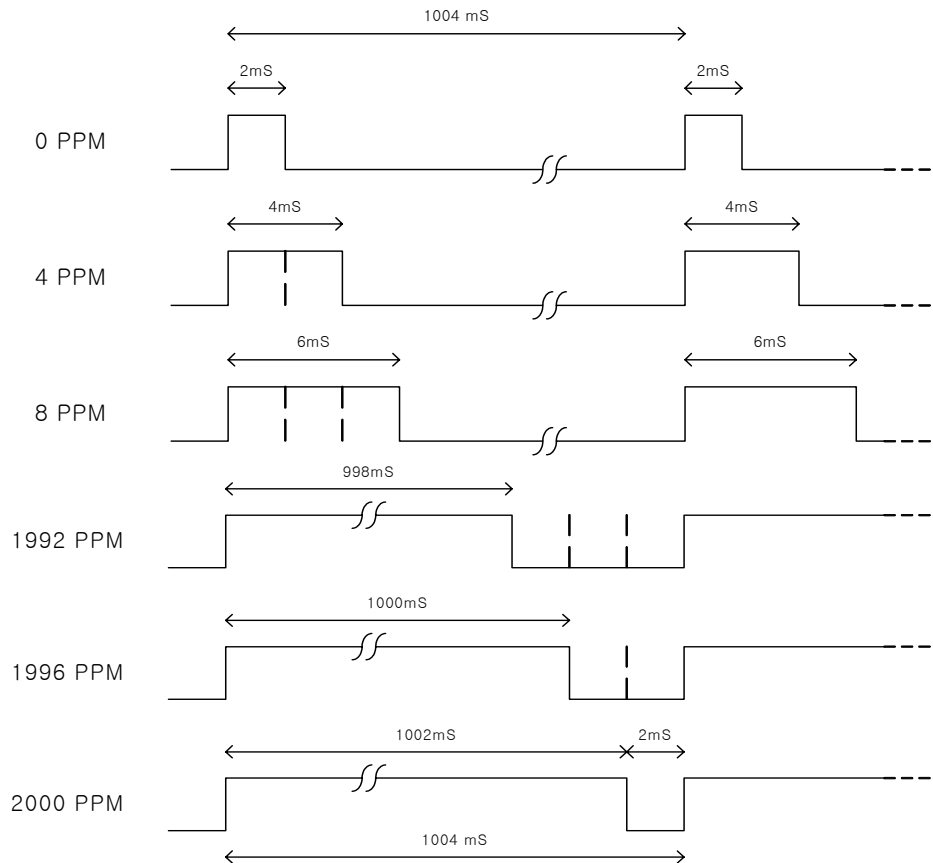
5) Data update period

New data update every 1.5 sec - Infrared source lamp blinking interval

6) Digital Output (@ PWM)

- PWM interval: 1004 mS
- Positive duty: (PPM / 2) + 2mS

Ex) Output signals when measuring range is set 2,000ppm



### 3. LED lamp signal

Lamp	Indicator	Function
LED 1	Operating	Infrared lamp ON for collecting sensor's signal
LED 2	-	Not used
LED 3	-	Not used

### 4. UART Series Communication

1) Communication connectors

PIN No.	Name	Descriptions
1	DTR	FACTORY RESERVED
2	RST	FACTORY RESERVED
3	TXD	TRANSMIT DATA
4	RXD	RECEIVE DATA

\* WAFER : Yeonho Elec. YMW025-04R or Molex 5267-03

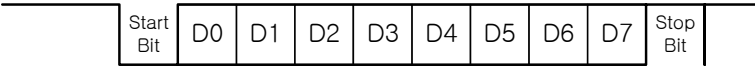
2) Communication Mode : ASYNC (UART : Universal Asynchronous Receiver Transmitter)

3) Communication data type

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- BAUD RATE 38,400bps,
- Data Bits 8 bit
- Parity Bit no
- Stop Bit 1 bit

#### 4) Communication Protocol

COMMAND	1 byte	2byte	3byte	4byte
ASCII	#	H-DATA	L-DATA	CR
HEX	0x23	0x??	0x??	0x0D

- STX : shows the start of '#' protocol
- EOT : shows the end of CR protocol

- ❖ Command transmission from a Computer to a CO<sub>2</sub> Module  
[Command]  
00~ 09 : Product information  
10~19 : Read a Module's status  
20~29 : Setting commands for factory calibration  
30~39 : Setting commands for factory inspection  
40~99 : Reserve

- ❖ Read MODULE's information  
PC->MODULE : Do command reading the module's information  
MODULE->PC : Transmit product's information of a stored module

Ex) When read a CO<sub>2</sub> Module's information... (KD-IAQ10 Ver1.xx)

COMMAND	1 byte	2byte	3byte	4byte
ASCII	#	0	0	CR
HEX	0x23	0x30	0x30	0x0D

RETURN	1 byte	2byte	-	n-1 byte	n bytes
ASCII	#	Data 0	-	Data n	CR
HEX	0x23	0x??	-	0x??	0x0D

- ❖ Read the current CO<sub>2</sub> ppm  
PC->MODULE : Do command reading level of CO<sub>2</sub>  
MODULE->PC : Transmit the current level  
This module can measure CO<sub>2</sub> concentration up to 9,999ppm.

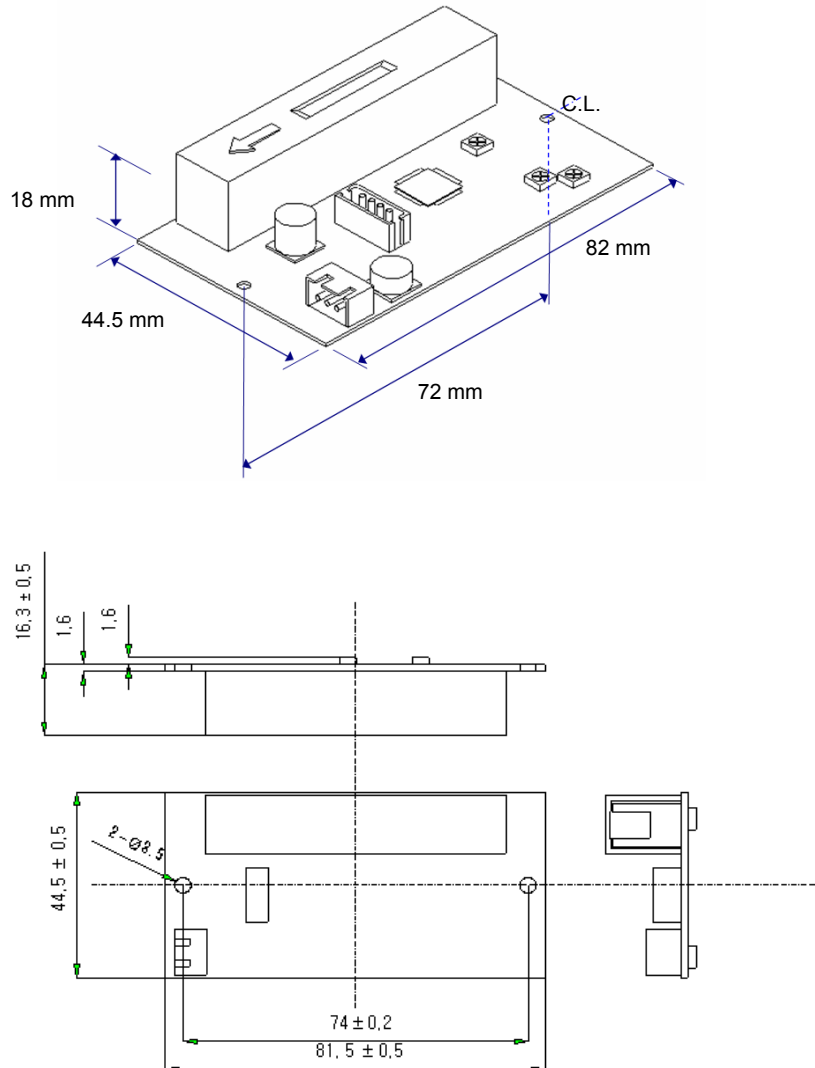
Ex) @980 ppm

COMMAND	1 byte	2byte	3byte	4byte
ASCII	#	1	0	CR
HEX	0x23	0x31	0x30	0x0D

RETURN	1 byte	2byte	3byte	4byte	5 byte	6 byte
ASCII	#	0	9	8	0	CR
HEX	0x23	0x30	0x39	0x38	0x30	0x0D

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## ◆ Dimensions



## ◆ Warranty and Instructions

### 1. Warranty

This item passed our strict quality control.

Korea Digital Co., Ltd guarantees that we repair or replace without charge this item within 1 year after sale except for damage or break by customer's mistakes.

### 2. Instructions

- 1) **No impact** : The characters of NDIR optical system may be changed by impacts. Never drop this sensor module and give it heavy impacts.
- 2) Don't use it where water drops and condensation can occur, too  
Consult with us about technical details in advance.
- 3) Keep operating and storing conditions written above. If you do not, it may break down or have large errors.
- 4) Don't use it without a case to block dust and other pollutants in case of using for a long time.
- 5) It is ideal to install the wave guide in right vertically from the directly in front of the sensor.

※ Specifications and images may change without prior notice.

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