

# 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

→ 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 400x**

- Left : KCD-AN400 module
- Right : Mounting cover



### ◆ Technical Data

■ <b>Measurement</b>	Sensing Method		Dual Wavelength NDIR
	Measuring range options		0~ 2000ppm, ~ 5000ppm, ~ 10000ppm
	Accuracy*		±(4%FS+3%Reading)
	Response time (τ <sub>63</sub> )		<40 sec
	Measurement time interval		6.0 sec
■ <b>General</b>	Warm up time		< 2 min
	Storage temperature		-40~70 °C
	Temperature dependence		0.2% FS / °C
	Weight		< 30g
■ <b>Operating Conditions</b>	Temperature		0~50 °C
	Humidity		0~95%RH (Non-condensing)
■ <b>Electrical</b>	Power supply (rectified)		8 ~14VDC
	Power consumption		50mA average
■ <b>Signal Logic</b>	PWM	Low	0~0.3V
		High	4.75~5.25V
		Period	1004ms
■ <b>Dimensions</b>	Length × Width × Height		93mm × 53mm × 28 mm (W/CASE)
	Hole Pitch		84mm±0.2mm (Φ3.5mm)
■ <b>Communications (UART)</b>	BAUD RATE		38,400 bps
	Low		0~0.3V
	High		2.7~5V

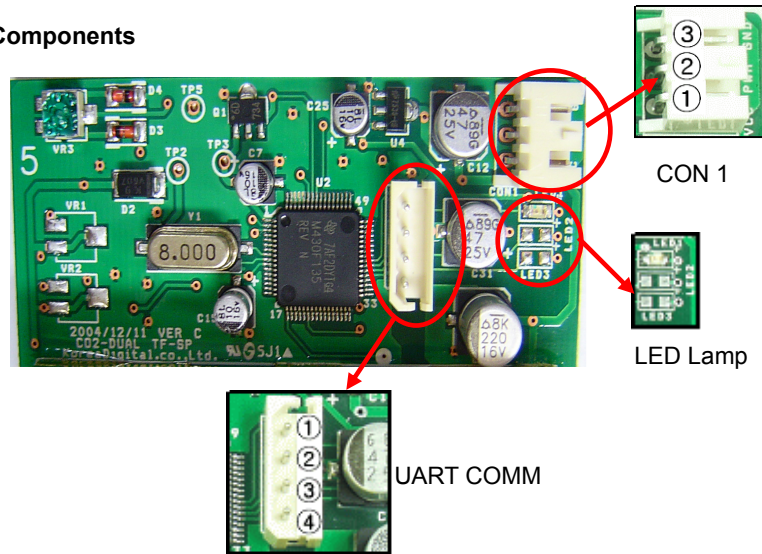
Contact us If you want to add technical functions or change specifications as you apply our CO<sub>2</sub> sensor to your product. Our engineers will support you.

\* Under conditions of calibration facilities of production factory, @25 °C , intermediate value of detected ranges.  
※ Specifications and images may change without prior notice.

# CO2 Sensor Module for OEM Applications

## ◆ Connectors

### 1. Components



### 2. Specifications

#### 1) CON1

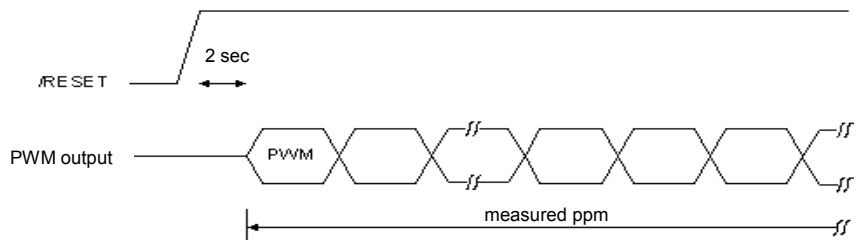
No.	Name	Descriptions
1	V <sub>DD</sub>	Power input, +8V ~ +14VDC
2	V <sub>OUT</sub>	Signal output (PWM)
3	GND	GND

\* WAFER : Yeonho Elec. SMAW250-03G

#### 2) 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.

#### 3) PWM Output



#### 4) Data update period

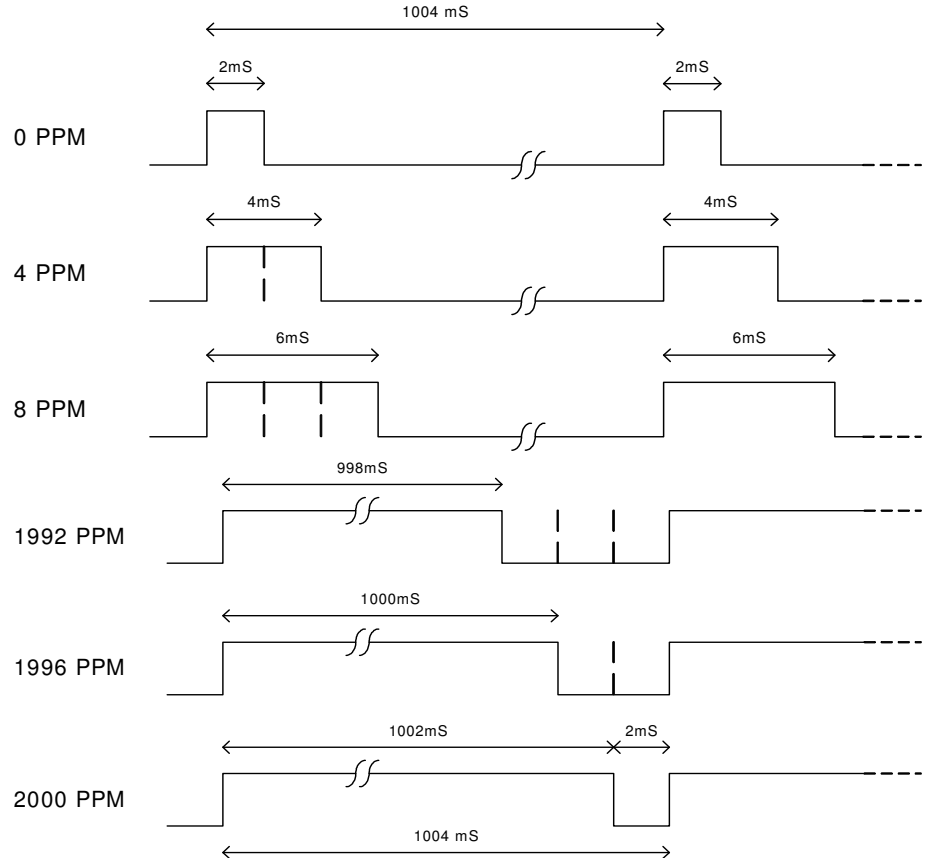
New data update every 1.5 sec - Infrared source lamp blinking interval

# CO2 Sensor Module for OEM Applications

### 5) 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

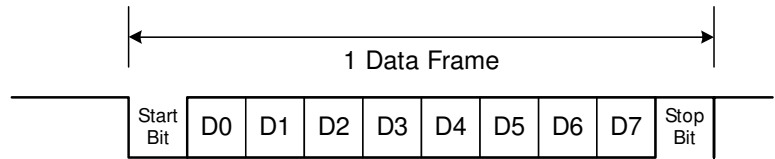
\* WAFER : Yeonho Elec. YMW025-04R or Molex 5267-03

#### 2) Communication Mode : ASYNC

(UART : Universal Asynchronous Receiver Transmitter)

# CO2 Sensor Module for OEM Applications

### 3) Communication data type



- 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

### ❖ 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

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

## ◆ 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.

20110601