

**SENSECUBE**

# KCD-HP

## CO<sub>2</sub> Sensor Probe (1%, 10%, 20%)

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

### Excellent stability and accuracy

- through testing and calibration with sophisticated process and techniques

### Easy application to

- Test facilities
- Cell incubators
- CO<sub>2</sub> Chambers
- Environment controlling system
- Environment monitoring system

### Read below instruction from first line to the end for right use of a sensor module

→ 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.

→ You should insulate unused output signal line of the cable. It may be damaged by short.

→ 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).

→ Contact us if you have a question about installation or connection.



[Figures]

- Top : 1% Sensor probe
- Bottom left : 10% / 20% Sensor probe
- Bottom right : Holding bracket(Optional)

### Model Numbering System

K C D - H P x xx

- Order of release
- Measuring range
  - 1 : 0 ~ 1%(10,000 ppm)
  - 2 : 0 ~ 10%
  - 3 : 0 ~ 20%
  - 4 : 0 ~ 2,000ppm
  - 5 : 0 ~ 5,000ppm
  - 6 : 0 ~ 5%

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.

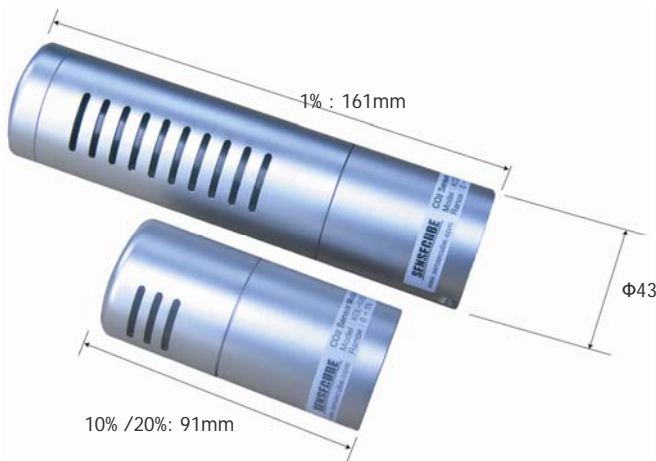
**SENSECUBE**

# KCD-HP

## CO<sub>2</sub> Sensor Probe (1%, 10%, 20%)

### Technical Data

■ <b>General</b>	Warm up time	< 2 min	
	Storage temperature	-40~70℃	
	Temperature dependence	0.2% / ℃	
■ <b>Measurement</b>	Sensing Method	Dual Wavelength NDIR	
	Measurement range	1%, 10%, 20%	
	Accuracy (@25℃)	1%	±(200ppm+3%(reading))
		10%	±(500ppm+3%(reading))
	DA output	20%	±(1,000ppm+3%(reading))
	Response time (60%)	< 65 sec	
Measurement time interval	1.5 sec		
■ <b>Operating Conditions</b>	Temperature	5 ~45℃	
	Humidity	0~99.9%RH (Non-condensing)	
	Gas flow rate	0.2~1 m/sec	
■ <b>Electrical</b>	Power supply (rectified)	24VDC ±20%	
	Power consumption	70mA average	
■ <b>Outputs</b>	Analog Outputs	0 ~10VDC or 4~20mA	
	Communication Outputs	RS485	
■ <b>Dimensions</b>	1% Probe	Φ43 x 161mm	
	10% /20% Probe	Φ43 x 91mm	
	Cable	1.5m	



× Specifications and images may change without prior notice.

**SENSECUBE**

# KCD-HP

## CO2 Sensor Probe (1%, 10%, 20%)

### ■ Connector input & output signal

Pin No.	Name	Notes	Wire color	
1	G+	24 V DC (+)	System Power	Red
2	G0	24 V DC (-)	Ground	Black
3	OUT1	Output 1 (+)	0~10V (output error: FS±2%)	Yellow
4	OUT2	Output 2 (+)	4~20mA (output error: FS±2%)	Purple or White
5	RS485A	RS485 terminal A		Green
6	RS485B	RS485 terminal B		Blue

1) You should insulate unused output signal line of the cable. It may be damaged by short.

2) Output mode can be set as RS485 communication.

When you change output way (current or voltage), you should first select 'Current' or 'Voltage' with communication. Then you can get output on corresponding Pin.

Refer to 'Setting communication'

(0x0000 : current output    0x0100 : voltage output)

### ■ RS485 Communication protocol

#### 1. Communication Connector

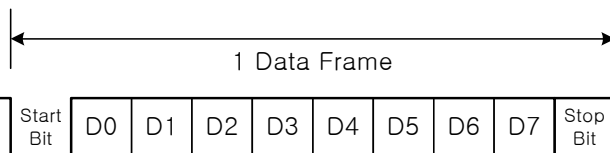
Pin No.	Name	Notes
5	RS485 A	RS-485 connection terminal A
6	RS485 B	RS-485 connection terminal B

(2) WAFER : No.5, 6

#### 2. Communication Mode

ASYNCR (UART : Universal Asynchronous Receiver Transmitter)

#### 3. Communication data type



BAUD RATE        9,600bps,  
 Data Bits        8 bit  
 Parity Bit        no  
 Stop Bit         1 bit

#### 4. Communication protocol

1) Commands for requesting product information and setting status from MASTER to SLAVE

Command	Description
10(0x0A)	Transfer measured CO2 value
58(0x3A)	Change CO2 module ID (default: 31)
59(0x3B)	Change signal output mode of CO2 module(default :current)
60(0x3C)	Change communication Baud Rate of CO2 module (default 9,600bps)

## 2) Commands for data transfer status from MASTER to SLAVE

No	Data	Types	Bytes	Ranges	Notes
1	STX	byte	1	0x03	Block start byte
2	Slave ID	byte	1	1~31	System ID
3	Data block length	byte	1	6	Block total length
4	COMMAND	char	1	0x0A : data transfer command	
5	CheckSum	byte	1	0 ~ 255	Sum no.1 to no.4
6	ETX	byte	1	0x04	Block stop byte

## 3) Commands for setting or changing ID status from MASTER to SLAVE

No	Data	Types	Bytes	Ranges	Notes
1	STX	byte	1	0x03	Block start byte
2	Slave ID	byte	1	1~31	system ID
3	Data block length	byte	1	8	Block total length
4	COMMAND	char	1	0x3A : system setting changing command	
5*	Data	byte	2	0x0001 : setting ID to 'no.1'	Range : 1~31
6	CheckSum	byte	1	0 ~ 255	Sum no.1 to no.5
7	ETX	byte	1	0x04	Block stop byte

\* Communication data are composed in low byte(0x01)-&gt;high byte(0x00) order. (Little-endian)

## 4) Commands for output type setting changing output status from MASTER to SLAVE

No	Data	Types	Bytes	Ranges	Notes
1	STX	byte	1	0x03	Block start byte
2	Slave ID	byte	1	1~31	system ID
3	Data block length	byte	1	8	Block total length
4	COMMAND	char	1	0x3B : output type change command	
5*	Data	byte	2	0x0001 : setting to current output	0: 0~10V 1: 4~20mA
6	CheckSum	byte	1	0 ~ 255	Sum no.1 to no.5
7	ETX	byte	1	0x04	Block stop byte

\* Communication data are composed in low byte(0x01)-&gt;high byte(0x00) order. (Little-endian)

## 5) Commands for setting or changing transmission speed from MASTER to SLAVE

No	Data	Types	Bytes	Ranges	Notes
1	STX	byte	1	0x03	Block start byte
2	Slave ID	byte	1	1~31	system ID
3	Data block length	byte	1	8	Block total length
4	COMMAND	char	1	0x3C : command for changing transmission speed	
5*	Data	byte	2	0x2580 : set as 9,600bps	
6	CheckSum	byte	1	0 ~ 255	Sum no.1~no.5
7	ETX	byte	1	0x04	Block stop byte

\* Communication data are composed in low byte(0x01)-&gt;high byte(0x00) order. (Little-endian)

**SENSECUBE**

# KCD-HP

## CO<sub>2</sub> Sensor Probe (1%, 10%, 20%)

### 6) Commands for data transfer from SLAVE to MASTER

No	Data	Types	Bytes	Ranges	Notes
1	STX	byte	1	0x03	Block start byte
2	Slave ID	byte	1	1~31	system ID
3	Data block length	byte	1	26	Block total length
4	COMMAND	char	1	System command	Master transfer command
5	System class code	byte	1		
6	System proper code	string	10	System product name	
7*	CO <sub>2</sub>	integer	2	0	Transfer as '0', if it is not used or changes system setting value
8*	Measured Temperature value	integer	2	0	
9*	Measured Humidity value	integer	2	0	
10*	Measured VOC value	integer	2	0	
11	Firmware version	byte	1	100	Ver. 1.00
12	Checksum	byte	1	0 ~ 255	Sum no.1 to no.11
13	ETX	byte	1	0x04	Block stop byte

\* Communication data are composed in low byte(0x01)-&gt;high byte(0x00) order. (Little-endian)

## Warranty and Instructions

### ■ Warranty

This product passes our strict quality control and Korea Digital will repair or replace without charge this item within 1 year after sale except for damage or break by customer's mistake.

### ■ Instructions

- Caution: shock and moisture
  - The characters of NDIR optical system may be changed by impacts.  
Never drop this sensor module and give it heavy impacts.
  - Don't use it where water drops and condensation can occur, too
- Keep operating conditions written above. If you do not, it may break down or have large errors.
- Don't use a sensor without a case to block dust and other pollutants in case of using for a long time.
- You should insulate unused output signal line of the cable. It may be damaged by short.
- If output terminal is damaged by short, repair isn't free of charge whether within one-year warranty period.