

Our CO₂ 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

- Test facilities
- Cell incubators
- CO₂ Chambers
- Environment controlling system
- Environment monitoring system

NDIR type uses optical property to measuring CO₂ 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).

Ordering Codes

- KCD-HP 100x (1% probe)
- 1 1000ppm
 - 2 2000ppm
 - ...
 - A 1%

- KCD-HP 200x (10% probe)
- 2 2%
 - 5 5%
 - 7 7%
 - A 10%

- KCD-HP 300x (20% probe)
- 2 12%
 - 5 15%
 - A 20%



[Figures]

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

■ Measurement	Sensing Method	Dual Wavelength NDIR
	Measurement range options	1%, 10%, 20%
	Accuracy*	±(3%F.S+2%Reading)
	Response time (τ63)	< 65sec
	Measurement time interval	1.5sec
■ General	Warm up time	< 2min
	Storage temperature	-40~70 °C
	Temperature dependence	0.2% FS / °C
■ Operating Conditions	Temperature	5 ~45 °C
	Humidity	0~99.9%RH (Non-condensing)
	Gas flow rate	0.2~1 m/sec
■ Electrical	Power supply (rectified)	12~24VDC
	Power consumption	70mA average
■ Outputs	Analog Outputs	0~5VDC, 0 ~10VDC, 4~20mA
	Communication Output	RS485
■ Dimensions	1% Probe	Φ43 x 161 mm
	10% /20% Probe	Φ43x 91mm
	Cable	1.5m

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

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%)	Violet or Orange 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

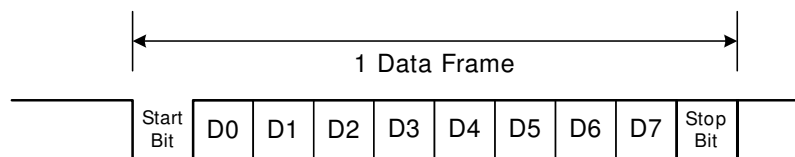
Pin No.	Name	Notes
5	RS485 A	RS-485 connection terminal A
6	RS485 B	RS-485 connection terminal B

(2) WAFER : No.5, 6

2. Communication Mode

ASYNC (UART : Universal Asynchronous Receiver Transmitter)

3. Communication data type



BAUD RATE 38,400bps

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 CO ₂ value
58(0x3A)	Change CO ₂ module ID (default: 31)
59(0x3B)	Change signal output mode of CO ₂ module(default :current)
60(0x3C)	Change communication Baud Rate of CO ₂ module (default 38,400bps)

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CO₂ Sensor Probe (1%, 10%, 20%)

2) Commands for data transfer 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)->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)->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)->high byte(0x00) order.
(Little-endian)

KCD-HP

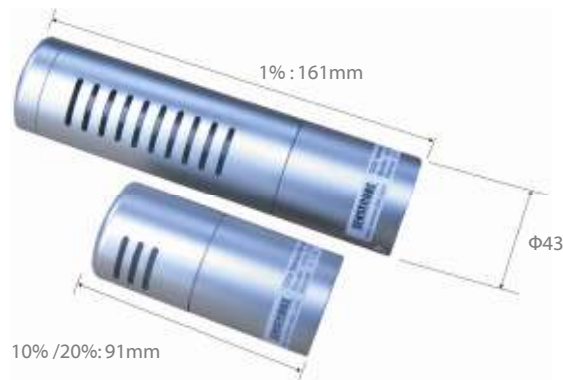
CO₂ Sensor Probe (1%, 10%, 20%)

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 ₂	Unsigned integer	2	0	Not using this data, it transfer '0x0000' When return value is 0xD5 0x02 , the formula is (0x02*0x100)+0xD5 =0x02D5 ₍₁₆₎ =725 ₍₁₀₎ Ex) 1%module→725ppm 10%module→7,250ppm(0.725%) 20%module→72,500ppm (7.25%)
8*	Measured Temperature value		2	0	
9*	Measured Humidity value		2	0	
10*	Measured VOC value		2	0	
11	Firmware version	byte	1	100	Ver. 1.00
12	Checksum	byte	1	0 ~ 255	Sum no.1 to no.11 Ex) Sum value : 0x01FF → 0xFF 0xFFFF → 0xFF
13	ETX	byte	1	0x04	Block stop byte

* Communication data are composed in low byte(0x01)->high byte(0x00) order. (Little-endian)

■ Dimensions



KCD-HP

CO₂ Sensor Probe (1%, 10%, 20%)

Warranty and Instructions

■ Warranty

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

■ Instructions

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