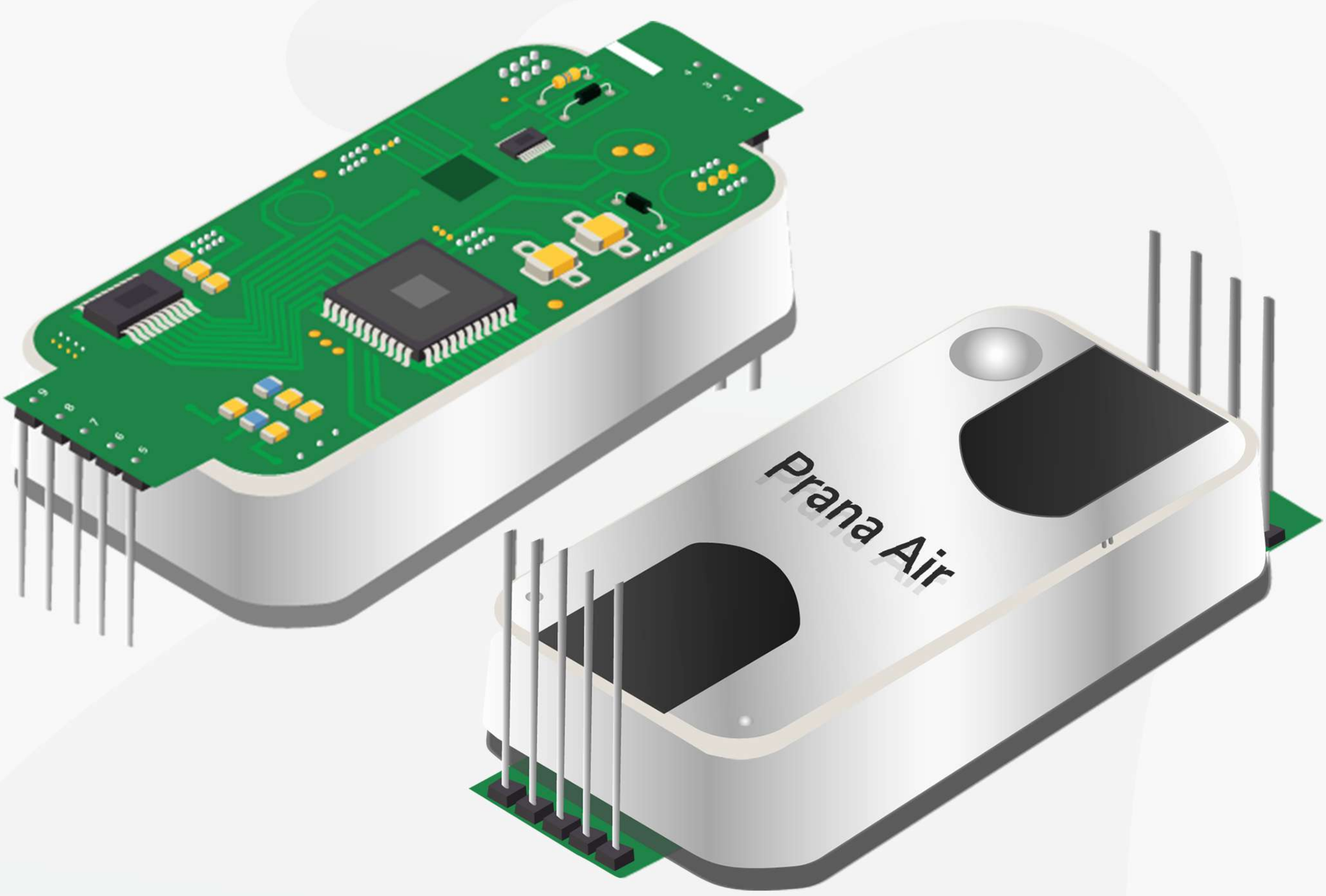
Prana Air

Carbon Dioxide Sensor

0~10,000 ppm



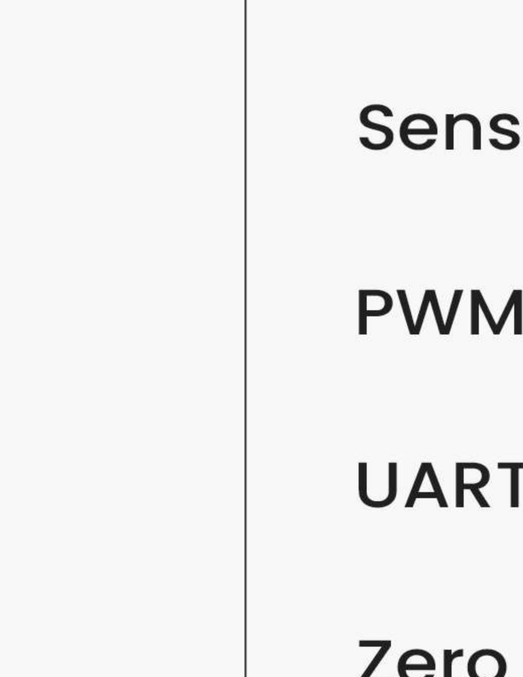
Description

PAS series is a single beam NDIR CO2 sensor, based on non-dispersive infrared (NDIR) technology, which can detect CO2 concentration of indoor air. With high accuracy, long term stability, small size, it is widely used for IAQ monitor, ventilation system, air purifier, HVAC transmitter, etc.

PURELOGIC LABS

Prana Air

TABLE OF CONTENTS



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CO2 Monitoring

Ranges

Good

0- 600 PPM

Moderate

601 - 800 PPM

Poor

801 - 1000 PPM

Unhealthy

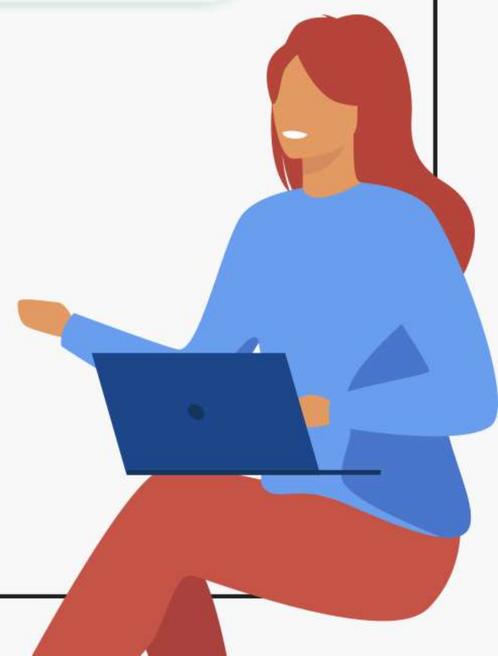
1001 - 1200 PPM

Severe

1201 - 1500 PPM

Hazardous

1500+ PPM



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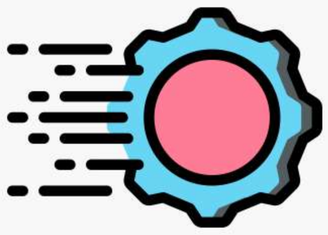
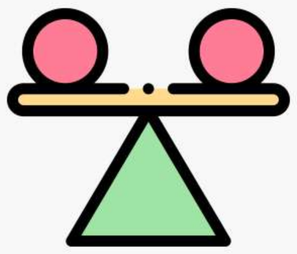
SENSOR FEATURES

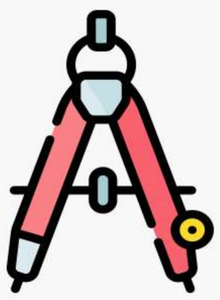


Fast response

High accuracy



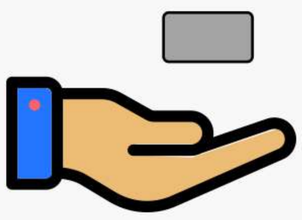
Long term stability, long lifespan



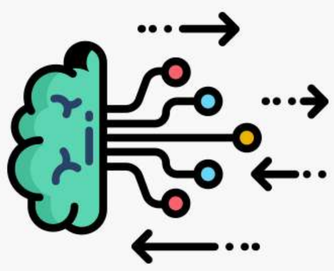
Matrix calibration within whole measurement range and temperature range

Auto-calibration mechanism with fresh air, no need of maintenance

Support customization requirements



Small size and compact structure, easy to install



Signal output PWM/UART

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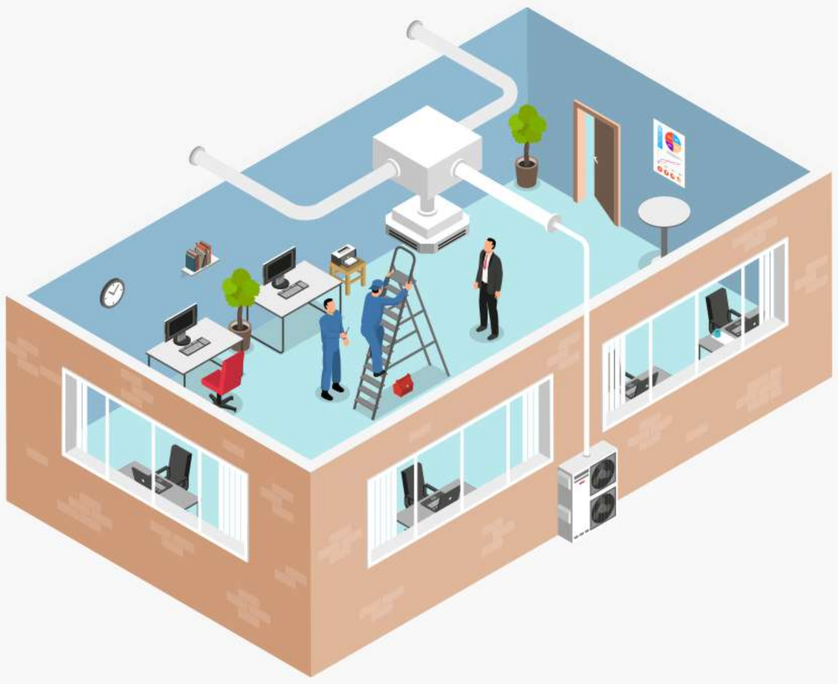
APPLICATIONS

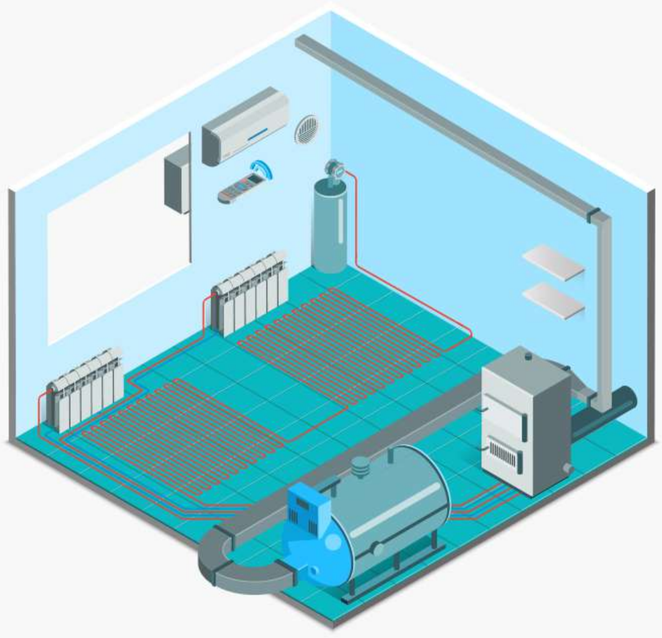


Ventilation System

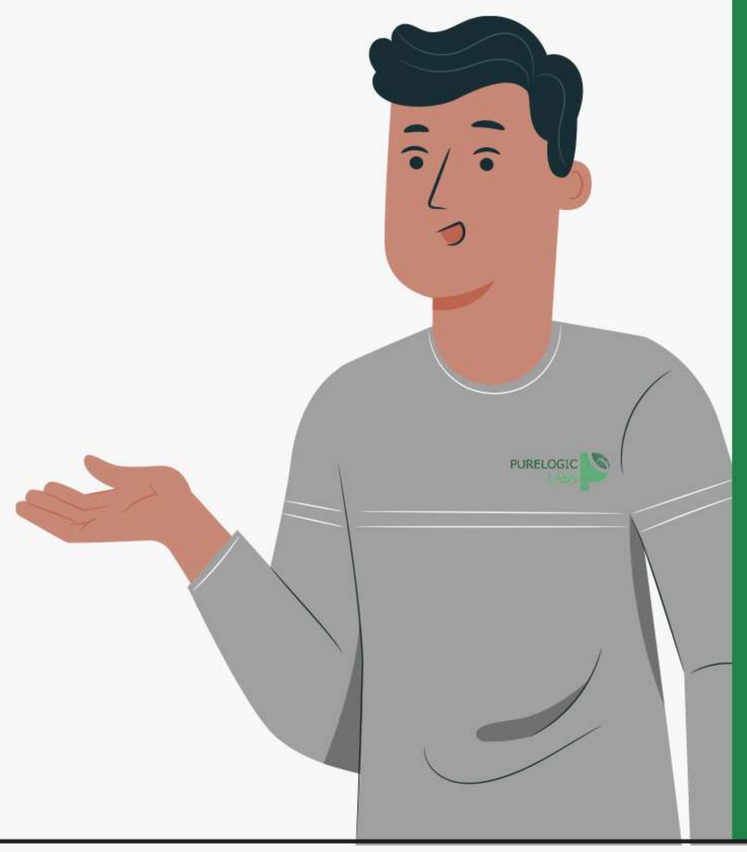
Air Purifiers

IAQ Monitors

IOT Devices



HVAC Industry



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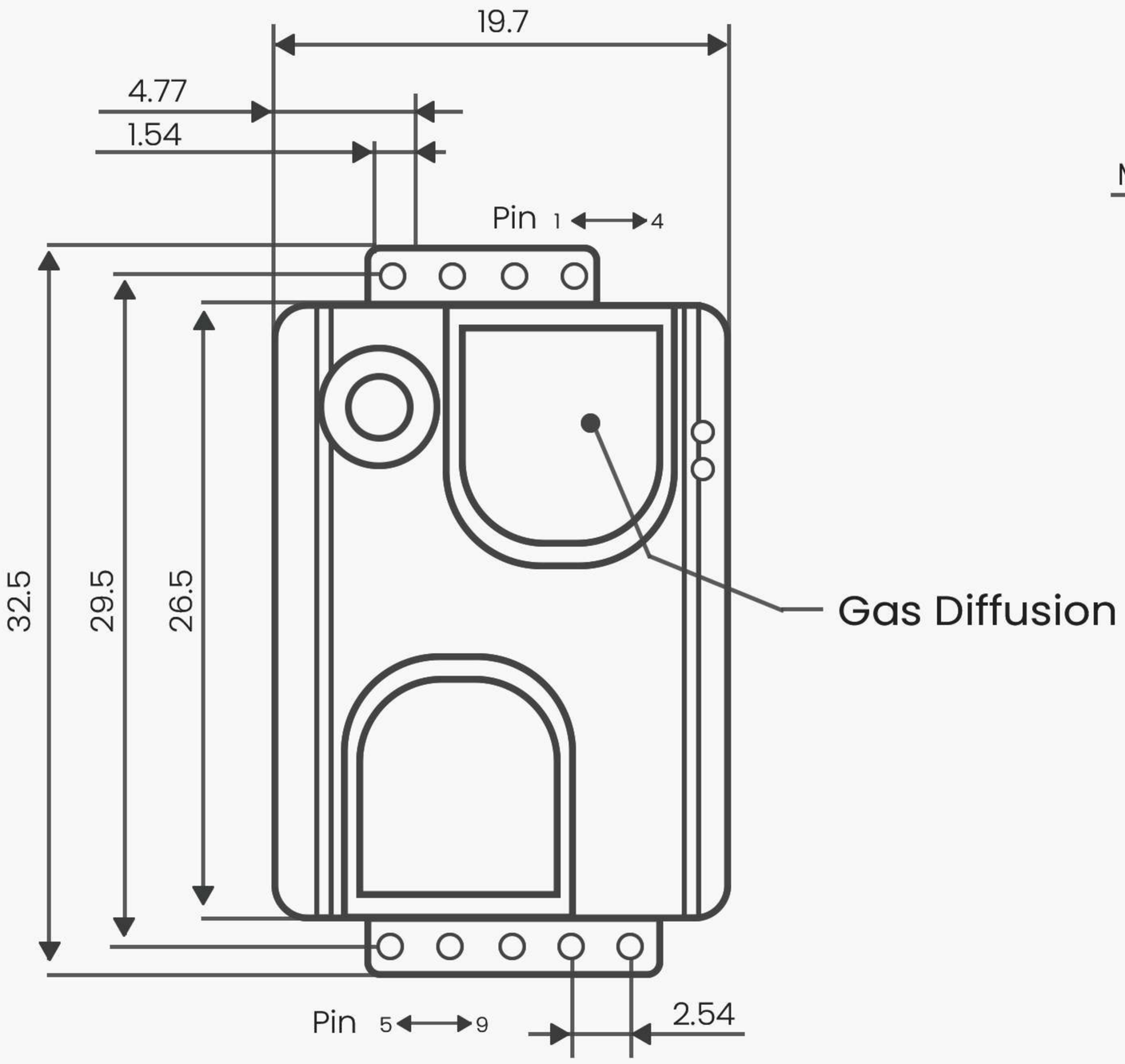
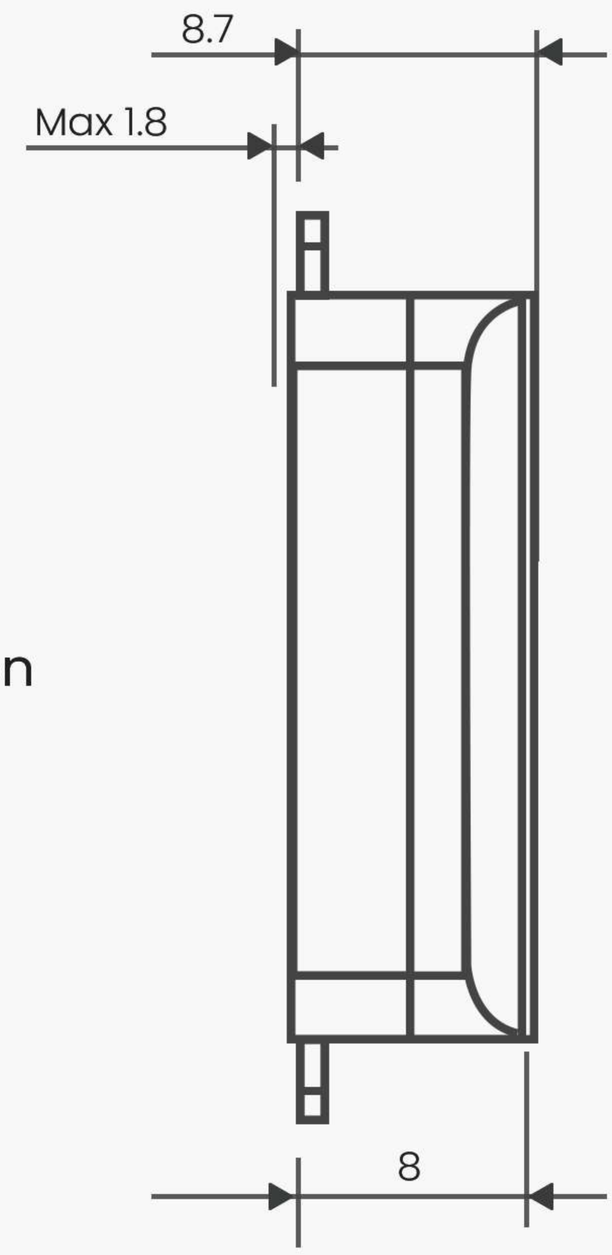
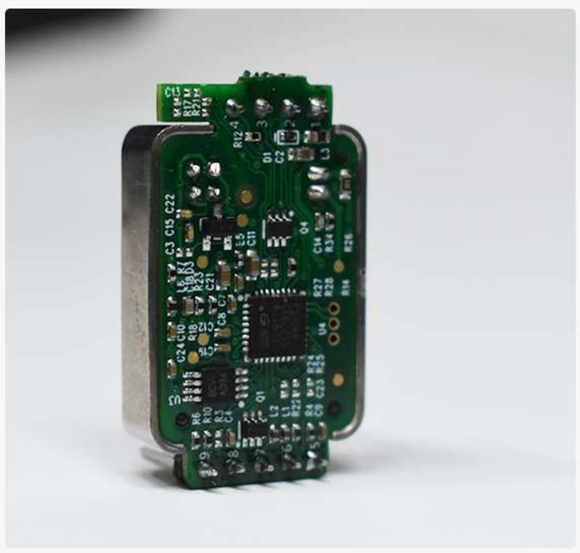
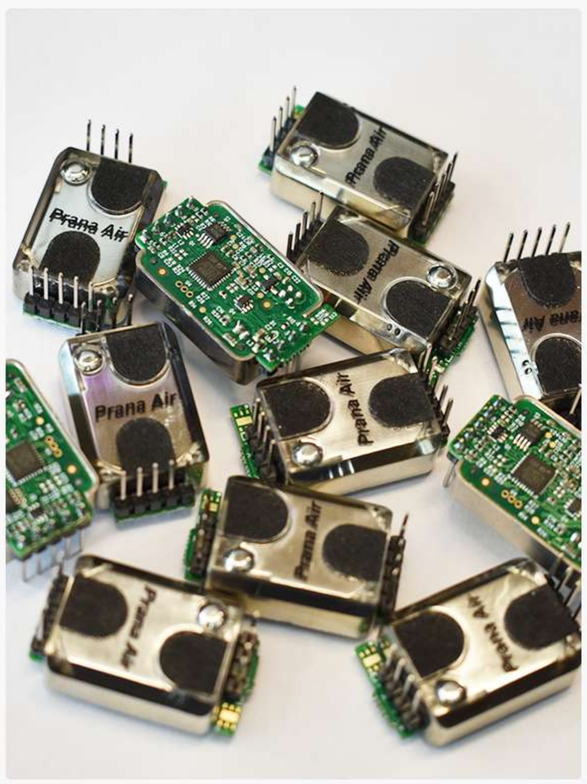
DIMENSIONS





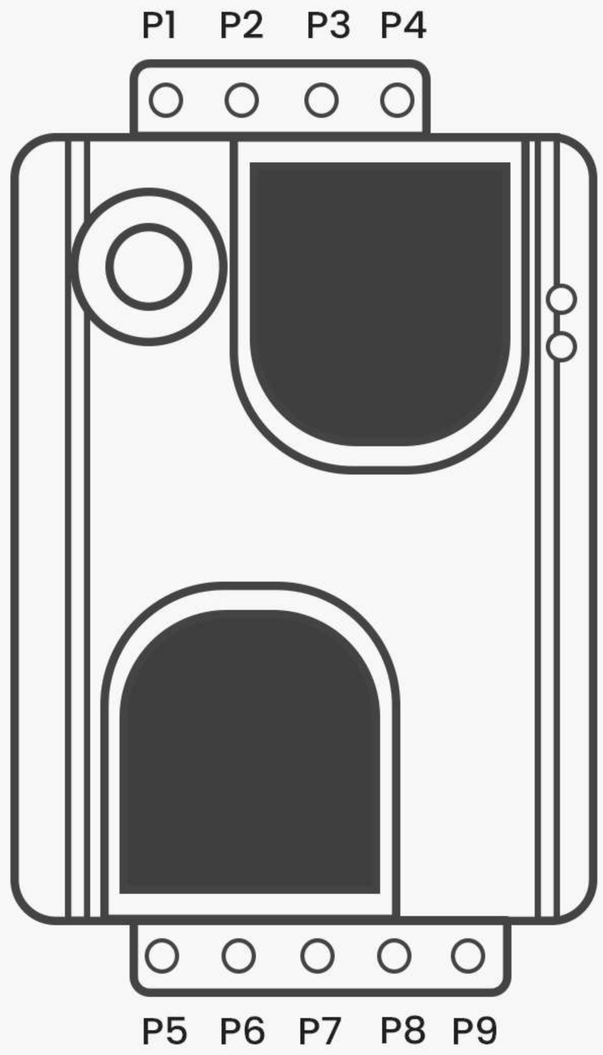
Images Gallery >>

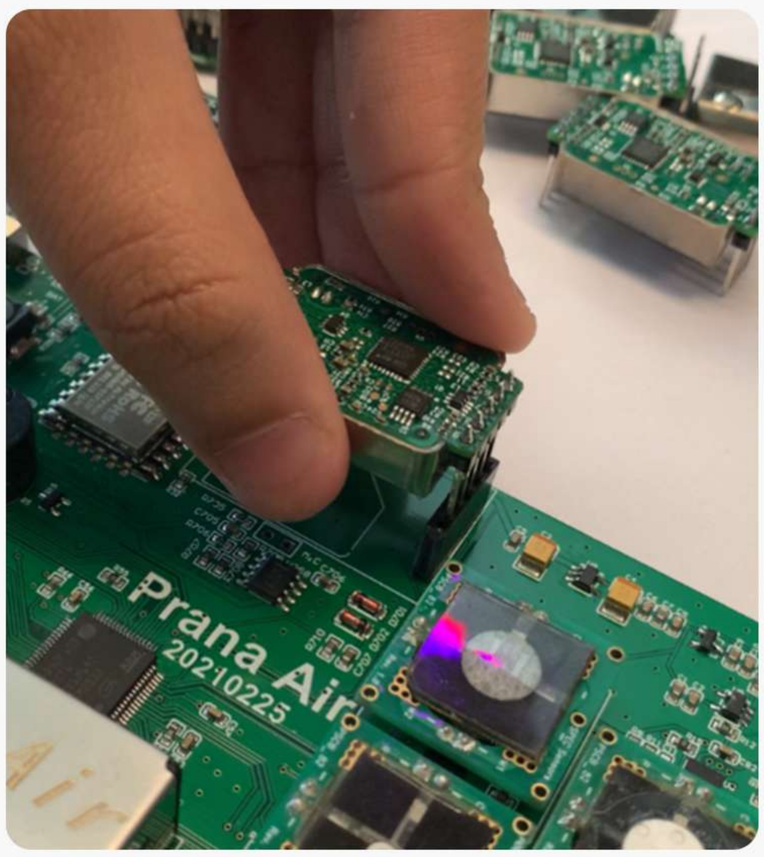


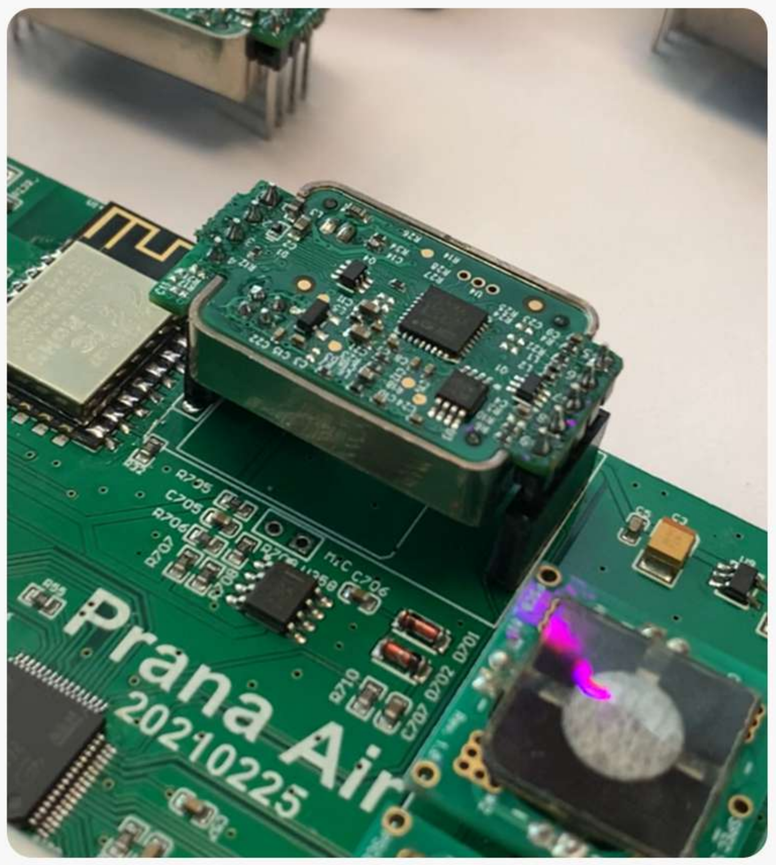


Prana Air

Pin	Definition	Description
P1	VCC	Positive pole of power
P2	GND	Negative pole of power
P3	Alarm	Reserved
P4	PWM	PWM Output
P5	VA	Reserved
P6	RXD	UART_TTL level data input
P7	TXD	UART_TTL level data output
P8	NC	Reserved
P9	Zero	Zero point calibration, low level lasting for over 7 seconds is effective







*Representative image to depict the placement of sensor on the PCB Board

CONNECTOR

Prana Air

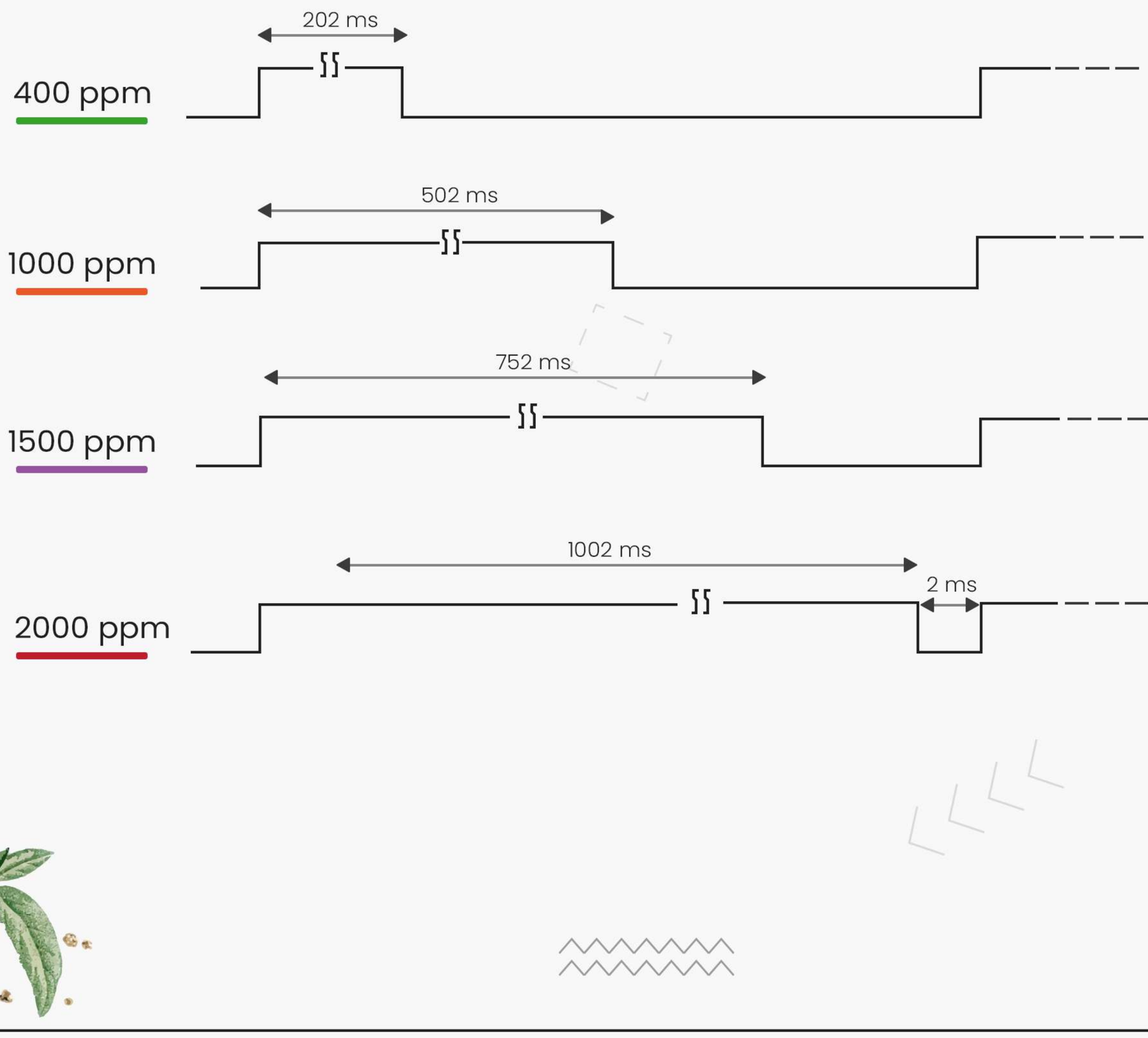
PWM Output

Take 0~2000ppm for example

PWM cycle : 1004ms±5%
Cycle start high level output : 2ms
The middle cycle : 1000ms±5%
Cycle end low level output : 2ms
CO2 output range : 0~2000ppm
CO2 concentration : Cppm=2000x(TH-2ms)/(TH+TL-4ms)

Cppm: CO2 concentration
TH: Highlevel output time during cycle TL: Low level output time during cycle

PWM Output Schema



UART Output

General Settings

Connect module's Vin-GND-RXD-TXD to user's 5V-GND-TXD-RXD
(User must use TTL level. If RS232 level, it have to be converted.)
Baud rate:9600, Data Bits:8, Stop Bits:1, Parity:No, Flow control:No.

Commands	
0x86	Read CO2 concentration
0x87	Calibrate zero point (ZERO)

0x86 Read CO2 concentration								
Sending Command								
Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Start Byte	Reserved	Command	-	-	-	-	-	Checksum
0xFF	0x01	0x86	0x00	0x00	0x00	0x00	0x00	0x79
Return Value								
Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Start Byte	Command	Concentration (High 8 Bits)	Concentration (Low 8 Bits)	-	-	-	-	Checksum
0xFF	0x86	HIGH	LOW	0x00	0x00	0x00	0x00	0x79

CO2 Concentration = HIGH*256+LOW

For example: Send command FF 01 86 00 00 00 00 00 79, return value FF 86 01 F4 00 00 00 00 85

*The concentration is 0x01 * 256 + 0xF4 = 500ppm*

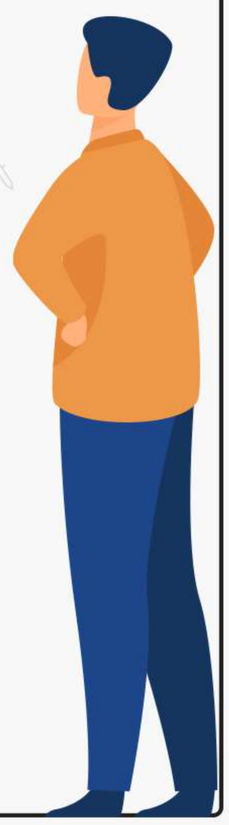
Checksum Calculation								
Checksum = (-(Byte1+Byte2+Byte3+Byte4+Byte5+Byte6+Byte7))+1								
Example:								
Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Start Byte	Reserved	Command	-	-	-	-	-	Checksum
0xFF	0x01	0x86	0x00	0x00	0x00	0x00	0x00	Checksum
Calculating Checksum: 1, Add Byte1 to Byte7: 0x01+0x86+0x00+0x00+0x00+0x00+0x00 = 0x87 2, Negative: 0xFF – 0x87 = 0x78 3, 0x78+1 = 0x79								

Zero Point Callibration

Self Callbration

Rough installing, incorrect soldering and transportation might result in a reducing of sensor reading accuracy and zero drift, sensor will correct the drift by the built-in self-calibration logic. After sensor working for some time, it can judge the zero point intelligently and do the zero calibration automatically. The calibration cycle is every 4 days (96 hours) since the module is powered on. The zero point is 400ppm.

In order to ensure the reading accuracy after self-calibration, please make sure the working environment of sensor can reach the outdoor fresh air level, that is to say, the CO2 concentration of sensor can reduce to the outdoor air level (400ppm) during the 3 days.



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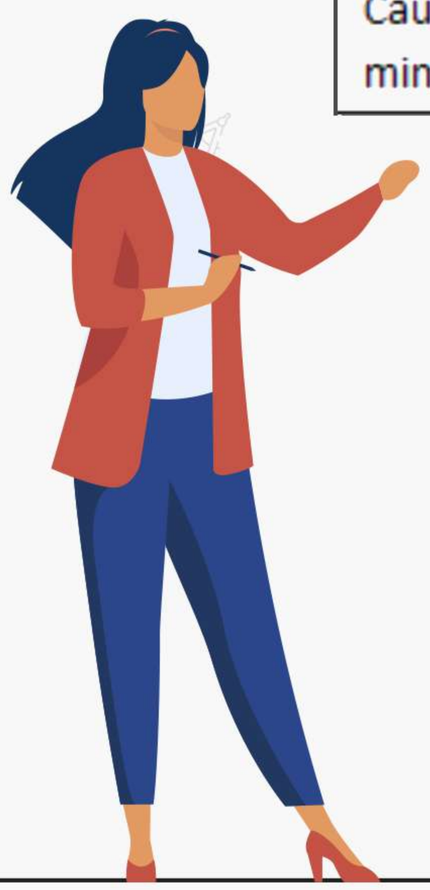
Zero Point Callibration

Manual Callbration

- ***Hand operated method:***
  Connect sensor's Zero pin to low level(0V), lasting for 7 second at least. Before calibrating the zero point, please make sure the sensor is stable for more than 20 minutes at 400ppm ambient environment.

- ***To send command method:***
  Zero point calibration can be achieved by sending a calibration command to the sensor via the UART, Zero point calibration commands are as follows:

0x87 Calibrate zero point								
Send command								
Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Start Byte	Reserved	Command	-	-	-	-	-	Checksum
0xFF	0x01	0x87	0x00	0x00	0x00	0x00	0x00	Checksum
No returned value Caution: Zero-point means 400ppm, please make sure the sensor is working at 400ppm stably for minutes at least before sending this command.								

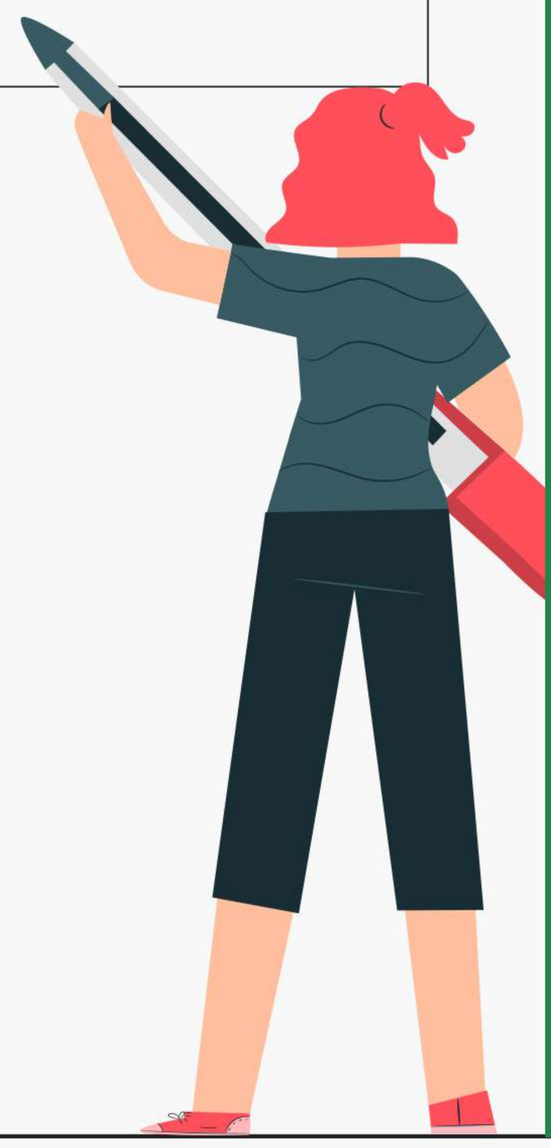


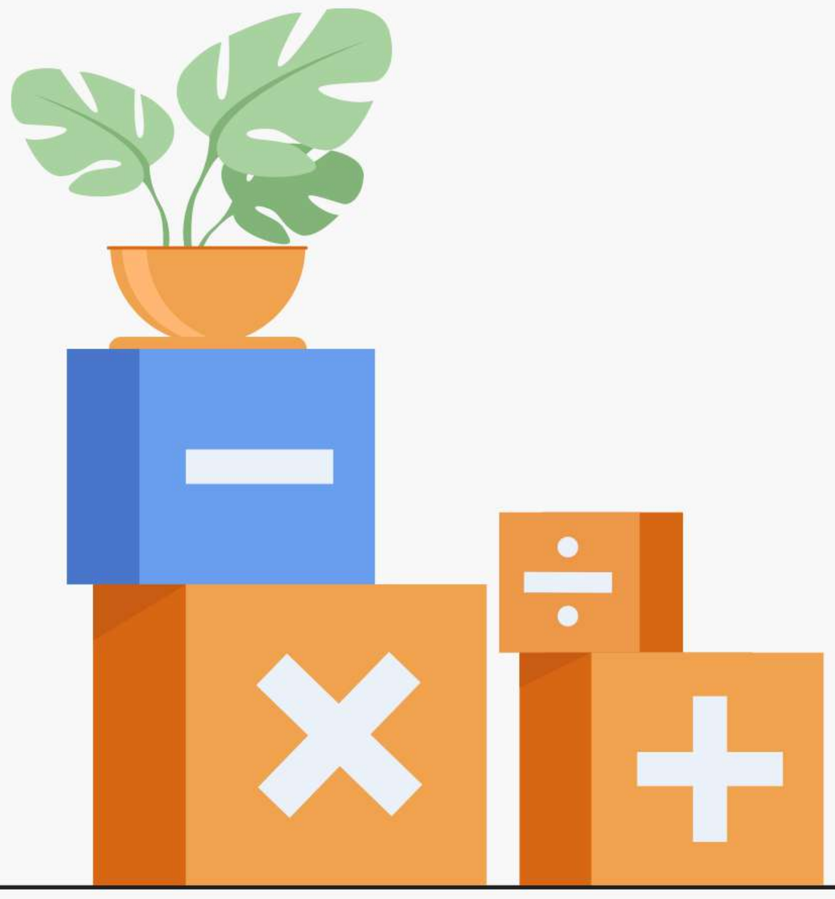
Prana Air

SPECIFICATIONS

Specifications

Measurement range	0~10000ppm
Response Time	15s (90%)
Accuracy	±(50ppm+5% of reading)
Working Temperature	0°C~50°C
Working Humidity	0~95%RH(Non-Condensing)
Storage Temperature	40°C~70°C
Storage Humidity	0~95%RH(Non-Condensing)
Power Supply	DC 5.0V+5%; ripple wave<50mV
Working Current Average	Average ≤ 20mA@1s
Signal Output	UART_TTL, PWM





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