

Mini CO₂ Detector

Operating manual

Attached warranty



Please read this manual carefully before use.

Please keep the receipt and instruction together after reading it.

***NOTE: Unit can ONLY be charged with the cable it comes with!
Will NOT work with other USB-C cables!**

Instructions

① How to turn on the power

Long press the power button to turn on the power.

It takes about 35 seconds for the measurement to stabilize.

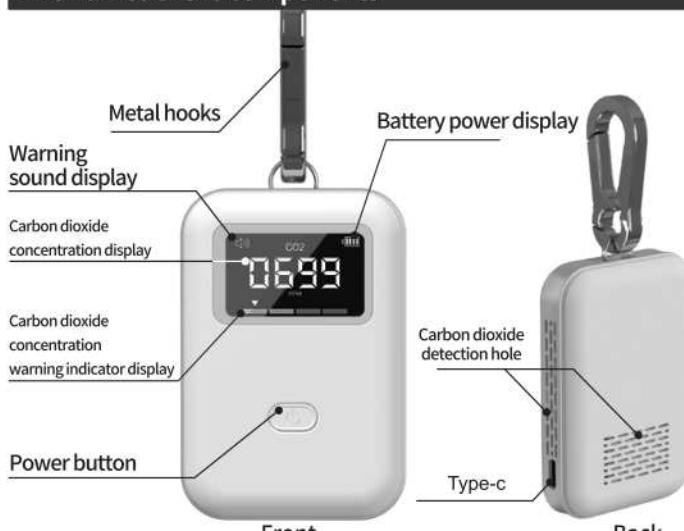
After that, it is automatically measured and the measured value is displayed on the screen.

② How to turn off the power

Press and hold the power key in the power on state until you hear the beep to turn off the power supply.

The screen will automatically turn off without any active within 5 minutes, will be standby mode. And short click to view the CO₂ concentration,The screen display lasts for one minute.

The names of the components



Model/Trade name	BCM01		
Customer information	Name		※Please attach a bill certifying the date of purchase
	Address		
	TEL		
Warranty period	Ontology	Within 1 year from the purchase date	
Date of purchase	Year	Month	Day
Sales shop	Store name	Address	
		TEL	

※ This warranty is a certificate of free warranty agreed under the specified conditions within the express period of this book. *According to this warranty, the issuer (warranty responsible person) and other operators have no restriction on the legal rights of customers.

Product guarantee conditions

● Within the product warranty period (Within 1 year from the purchase date), and the quality can only be guaranteed if it is used in a normal state. In case the product is defective or malfunctioning, we will replace it. Please contact our company. Please contact us in time.

● The warranty card will be invalid under the following situations.

① When the warranty cannot be presented.

② When the prescribed items cannot be filled in, the words and sentences are rewritten.

③ The cause of the failure is a situation caused by negligence or deliberate operation.

④ Failures and damages caused by natural disasters, man-made disasters or all other external factors.

⑤ Failure and damage caused by using outside the normal range of use

● If it is judged that it is the customer's own modification or repair, the return or replacement cannot be accepted even within the warranty period.

● This guarantee refers to a separate guarantee for the product, and all losses (business losses, various expenses, etc.) caused by product malfunctions or malfunctions are not included in the guarantee.

● This warranty does not limit the legal rights of customers

● Warranty will not be reissued, please keep it safe.

● This warranty is valid only in the country local country.

Regarding the indication of the carbon dioxide concentration warning standard

The carbon dioxide concentration ppm of the color displayed on the screen is as follows.

Carbon dioxide concentration warning display guidelines

[Green] 400 ~ 800ppm (± 50 ppm)

[Yellow] 801 ~ 1200ppm (± 50 ppm)

[Orange] 1201 ~ 1500ppm (± 50 ppm)

[Red] 1501 ~ 5000ppm (± 50 ppm)

The alarm goes off when the measured value exceeds 1000ppm,
The alarm will be 1 minute when the measured value exceeds 1500ppm.

About turning on/off the warning sound

After turning on the power, you can turn on and off the warning sound by pressing the "power button" twice in succession.

Manual calibration

■ If the measured value is wrong, follow the steps below.

Place it in a well-ventilated place and perform manual calibration manually.

- | | | |
|---|---|-----------------------|
| 1 | Long press the "power button" for 10 seconds | Screen display [8888] |
| 2 | With "8888" displayed on the screen, press the "Power button" 3 times within 3 seconds. | Screen display [1230] |
| 3 | Press the "power button" immediately | Screen display [400] |
| 4 | When the screen changes to 200, the 200-second count starts. | Screen display [200] |
| 5 | When "pass" appears on the screen, calibration is completed and the | Screen display [PASS] |

ppm, which is 0.04% when converted into a percentage, which is one of the units that express the carbon dioxide concentration.

About the standard value of carbon dioxide concentration

The standard value of carbon dioxide concentration is announced by the Ministry of Health, Labour and Welfare of Japan in 2020. In order to avoid the high risk of mass infection, the standard for good ventilation is the carbon dioxide concentration (CO₂ concentration) below 1000 ppm, which is considered to be the standard for indoor ventilation. One of the values.

Detection method of carbon dioxide concentration

The detection method of the CO₂ detector uses the principle of non-dispersive infrared absorption method (NDIR) to detect the presence of carbon dioxide in the air. This product has the characteristics of good selectivity, anaerobic dependence, and long service life.

Product specifications

product name: Mobile CO ₂ Manager	CO ₂ concentration measurement range: 400-5000ppm ±(50ppm)
Product size: about W53mm × D18mm × H80mm	Number precision: ±(50ppm + 5%)
Product weight: about 78g	Battery capacity: 900mAh lithium ion battery
Material: ABS+PC	Charging method: USB Type-C *
Display: LCD display	Input voltage: DC5V 0.5A
Preparation time: about 35 seconds	Charging time: about 2.5 hours
Refresh rate: about 2 seconds	Use time: about 7 hours
Calibration: manual calibration	

Product details: CO₂ concentration measuring instrument x 1, USB data cable x 1, instruction manual x 1

Precautions for use

Please pay attention to the following matters before using this product.

1. Please use the USB charger sold in the package to charge this product.
2. Do not block the ventilation holes, as this may affect the measurement accuracy.
3. For long-term use, please do not use it frequently in dusty environments and other places with poor air quality.
4. Do not use this product in a high temperature/high humidity environment or an environment near a strong magnetic field. It may cause damage to the product.
5. Hold the product vertically during measurement to ensure correct measurement.
6. This product has no waterproof function.

●Please read this "Safety Precautions" carefully before use to ensure correct use.
●The precautions given here are to ensure the safe and correct use of the product, and to prevent injury or damage to you or others.
In addition, in order to clearly indicate the severity and urgency of the hazard or damage, the precautions are divided into "warning" and "caution" that may occur due to improper handling. All of these are important safety issues, so be sure to follow them.

After reading, be sure to save it where the user can see it at any time.

Image display example	⚠ Warning	⚠ Attenions
	<p>Content that may cause death or serious injury. The symbol on the left represents the "mandatory" behavior. It is the content that must be observed.</p>	<p>Content that may cause personal injury and property damage. The symbol on the left represents "prohibited" behavior. "Prohibited" content that cannot be done.</p>

⚠ Warning

- Do not disassemble, repair or modify.
It may operate abnormally and cause fire, fire or electric shock.
- Stop using it immediately when an abnormality occurs.
●There are abnormal sounds and burnt smells
●Mobile power cord, sometimes powered on, sometimes not powered
●USB cable is abnormally hot
●Abnormal heating of the main body and operating parts
In the above cases, there is a danger of smoke, fire or electric shock.
Unplug the power cord while charging.
- Do not use or store in high temperature, long-term direct sunlight, high humidity or water.
Otherwise, it may cause liquid leakage, heat generation, explosion or fire.
- Do not soak or splash water.
Otherwise, a short circuit may cause electric shock or fire.
- Do not plug or unplug the USB plug or operate with wet hands.
Otherwise, it may cause electric shock.
- Do not drop, vibrate strongly or hit, otherwise it may cause overheating, change of test data, explosion or fire.
- Avoid short-circuiting the USB port.
Otherwise, it may cause heat generation, rupture, or fire.
- Do not throw the main body into the fire.
Otherwise, it may cause an explosion or fire.
- Do not put pins, wires, metal objects and other foreign objects in the USB ports and gaps
Contact with the inside may cause heat, electric shock, injury or burns.
- Do not let children use this machine alone, and do not use or store it where infants and young children can reach it.
- Please wipe the dust on the USB interface with a dry cloth.
Otherwise, it may cause fire and heat generation.
- Do not use damaged USB plugs.
If it is used in a damaged condition, it may cause electric shock or short circuit, which may cause a fire.
- Make sure that the USB plug is fully inserted into the base.
Incomplete insertion may cause a fire due to electric shock or heat.

⚠ Attention

! If this product is found to be damaged or abnormal, please stop using it immediately. Otherwise, it may cause electric shock or fire due to short circuit, etc.

! Do not pull the stand forcibly, swing it with the stand, apply excessive load, or operate it roughly.
Otherwise, it may cause an accident, injury or malfunction.

! We do not guarantee the measured value of this product and the research and results using the measured value.

! This product is not used for crisis management of carbon dioxide concentration, human and animal health management, life support, and other medical-related facilities.

! Be careful not to accumulate dust near the USB plug. Otherwise, it may cause a fire.

! Please make sure that there is enough space around the product.
It may not be possible to obtain correct measurements in poorly ventilated areas.

! Do not use, install or store this product in the following places.

- Places exposed to direct sunlight
- High temperature place
- Places where the temperature changes rapidly (places that are prone to freezing)
- Places where static electricity is generated
- Places near devices or objects that generate magnetism or electromagnetic waves.
- Dust place

When the displayed carbon dioxide concentration is abnormally high

In a small space, the value will rise rapidly.

In addition, the product may detect its own exhalation, causing the value to rise sharply. If the concentration of carbon dioxide is abnormally high or the high concentration value is measured for a long time, please use outside air for manual calibration.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.



**Mini
CO2 Detector**



Air Quality Monitor

CO2 Detector



Smart alarm



CO2 detection



Refresh in 3 seconds



Automatic calibration



Long battery life



Security Intelligence



Mini CO₂ Detecor



Product name
Mini CO₂

Scope of test
400-5000ppm

Working humidity
0~95%RH

Operating temperature
-10-50°C

Warm up
35s

Refresh rate
2s

Voltage
3.7V

Charging method
USB

CO₂ DETECTOR REAL-TIME MONITORING

Non-dispersive infrared (NDIR) principle to detect CO₂ in the air



0 ≤ CO₂ < 700 PPM

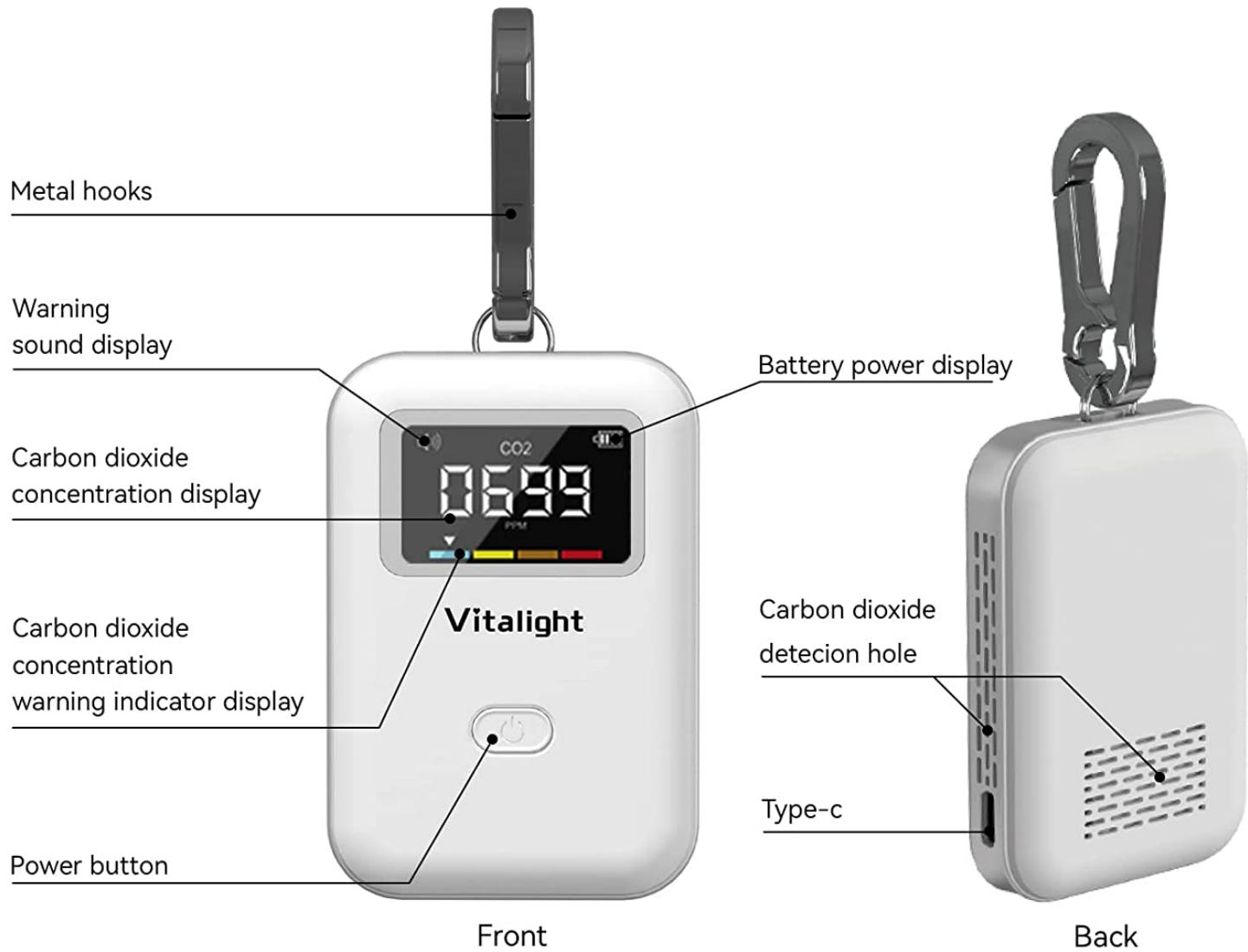


700 ≤ CO₂ < 1500 PPM



CO₂ > 1500 PPM

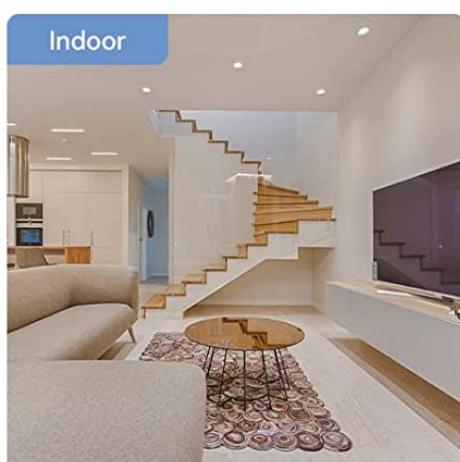
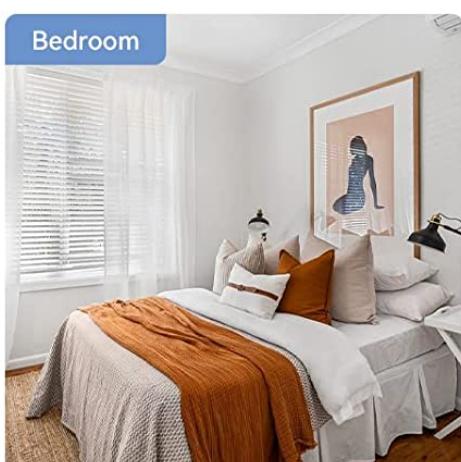
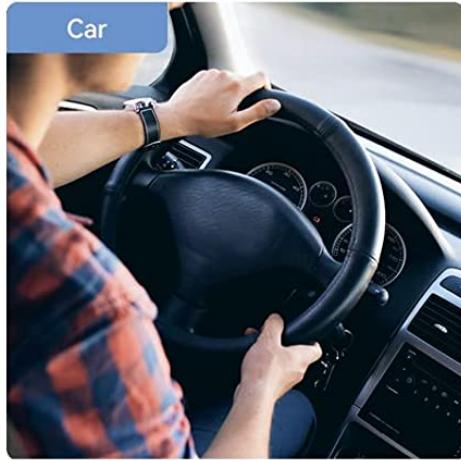
THE NAMES OF THE COMPONENTS





Vitalight Air Quality Monitor CO2 Detector

Protect the Health of You and Your Family



- Mini Air Quality Monitor: It is small and easy to carry, can be carried around as a decoration, you can check air quality anywhere anytime.
- CO2 Detector: Built-in high-performance CO2 sensor, using more professional infrared optical principles to accurately and quickly detect carbon dioxide. If the carbon dioxide concentration exceeds 1000ppm, an alarm will be issued immediately.
- Real-time Monitoring of CO2 Concentration: The screen will automatically turn off without any active within 5 minutes, will be standby mode. And short click to view the CO2 concentration, the screen display lasts for 1 minute.
- USB Rechargeable Battery: Built-in 900mAh large capacity USB rechargeable battery, Charging takes only 2.5 hours, 8h long working time.
- Application Areas: Home, office, agricultural planting, greenhouse vegetables, production warehouse, raw material processing, home interior, etc. If you have any questions, please contact us and provide you with the best service at any time.

Air pollution is a major threat to human health. Knowing the quality of the surrounding air is important to you, not only for yourself, but also for the people you care about. This carbon dioxide meter will accurately read the carbon dioxide levels anywhere and also help assess the amount of ventilation in any indoor space such as a restaurant or gym. Help ensure that indoor ventilation levels are at an adequate level to ensure the safety of everyone inside. For the health of you and your family, you should have it.

Features

- ✓ Color screen display: LED display is simple and intuitive;
- ✓ Quick response: fast data reading and stable performance;
- ✓ Real-time detection: automatically log the data and detect the CO2;
- ✓ Compact and convenient: small footprint, portable, and easy to operate;
- ✓ Battery life: 900mAh battery has a large capacity and can be used for 6 consecutive hours, USB fast charging, easy to use.

Product Standard

CO2 concentration measurement range: 400-5000ppm

Material: ABS+PC

Display: LCD display

Battery capacity: 900mAh lithium ion battery

Charging method: USB Type-C

Package Contents

MINI CO2 concentration detector X1

USB cable X1

Specification X1

Mini CO2 detector



A variety of functions

- Smart alarm
- CO2 detection
- Refresh in 3 seconds
- Automatic calibration
- Long battery life
- Security Intelligence

Is your home really safe?

The harm caused by high carbon dioxide concentration



CO2 detector real-time monitoring

Use the principle of infrared (NDIR) to detect CO2 in the air



Refresh in 2 seconds High accuracy

High-precision sensor, 32-bit processor, faster and more accurate

convenient light weight

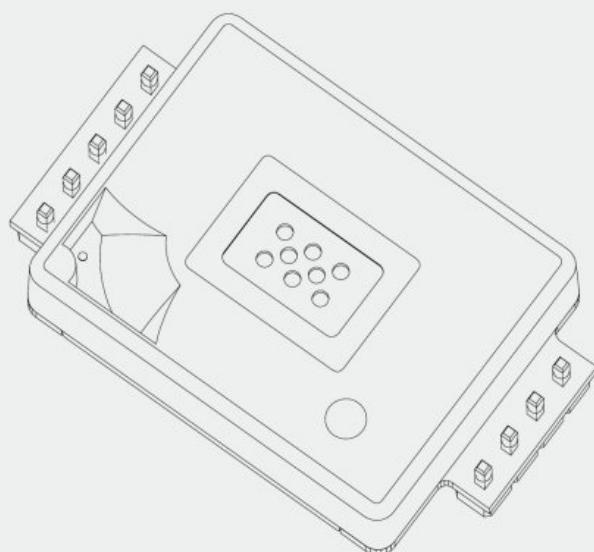
Weights only 78g
About the weight of an egg

78g

78g | 3.7V | 53*18*80
Weight | Power | size



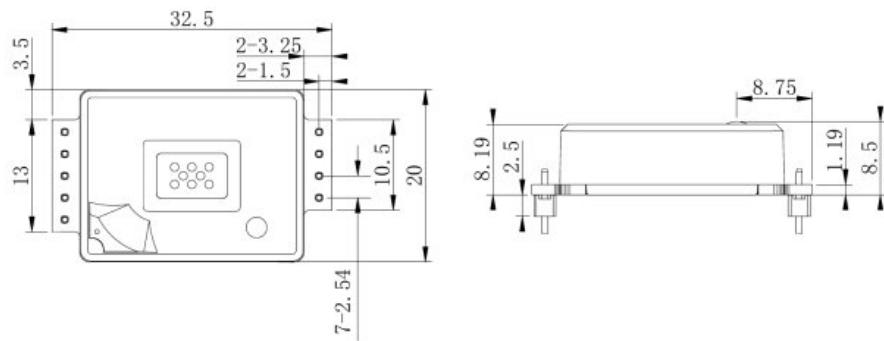
MEMSF MTP40-F



SPECIFICATION
Shenzhen Memsf Frontier Electronics Co., Ltd.

MTP40-F NDIR CO₂ Sensor Module

◆ Appearances and Dimensions



◆ Specifications

MEMSF MTP40-F-5K CO ₂ Module	
Target Gas	CO ₂
Operating Principle	NDIR
Measurement Range	400ppm---5000ppm
Measurement Interval	2s
Accuracy	±(50ppm+ 5% of reading)
Response Time	T90 time is 90s
Operating Temperature	0-50°C
Operating Humidity	0-90% RH non condensed
Storage Temperature	-20°C---60°C
Dimensions	32.5×20×8.5mm(max dimensions)
Power Supply	4.2V---5.5V
Power Consumption	300mA peak, 4mA normal, 13mA average
Life Expectancy	10 years+
Serial Communication	Uart /IIC
PWM Output	Period: 1004ms, Pulse: 2ms-1002ms(0---5000ppm)
Alarm Output	>1000ppm output to 1, <800ppm output to 0, open-drain output with pull-up resistor, the pin cannot sink any current
Self Calibration Cycle	Initial time is 24 hours, later is 7 days

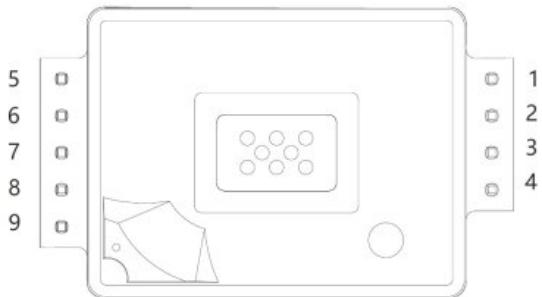
Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Ambient Storage Temperature	-40	85	°C
Maximum Voltage Range	-0. 3	5. 5	V
Maximum Output Current from Active Output Pin	-25	+25	mA
Maximum Current on Input	-5	+5	uA
Maximum Load Voltage on UART Pin	-0. 3	3. 5	V



MTP40-F NDIR CO₂ Sensor Module

◆ PIN Assignment



NO.	Name
1	Vin: 4.2V-5.5V
2	GND
3	Alarm
4	PWM/IIC-Detect
5	VCC-Out:3.3V
6	Host-TX/IIC-SDA
7	Host-RX/IIC-SCL
8	R/T
9	bCAL-in

◆ Terminals Description

Pin Function	Pin Description	Electrical Specification
Power Pins		
GND(Pin 2)	Power Supply Minus Terminal	
VIN(Pin1)	Supply Plus Terminal	Unprotected against reverse connection, input voltage range: 4.2V---5.5V
VCC-Out(Pin5)	The internal LDO output of the sensor is usually 3.3V+/-2%. Generally used for serial communication level conversion.	Output voltage: 3.3V+/-2% No overcurrent protection Maximum output current: 6mA
Communication Pins		
Host-TX(Pin6) /IIC-SDA	The TX pin of the UART of the host system is usually the TX of the customer's MCU, or the SDA of the IIC function.	Usually the communication level is 3.3V, and there is a 1K series current limiting resistor inside.In IIC mode, the pins have weak pull-ups resistor(Around 50KΩ)
Host-RX(Pin7) /IIC-SCL	The RX pin of the UART of the host system is usually the RX of the customer's MCU or the SCL of the IIC function.	Usually the communication level is 3.3V, and there is a 1K series current limiting resistor inside.In IIC mode, the pins have weak pull-up resistor(Around 50KΩ)
Input / Output		
PWM(Pin4)	PWM function,the pins have weak pull-up resistor(Around 50KΩ),the load cannot be driven directly.	The pin is an open-drain with pull-up structure, the load cannot be driven directly.
Alarm-OC(Pin3)	Alarm function: the pin is open-drain with pull-up resistorweak pull-ups (The pull-up resistor is around 50KΩ). When the measured concentration exceeds 1000ppm, the output of this pin is high, when the concentration is lower than 800ppm, the output of this pin is low.	The pin is open-drain with a pull-up resistor and cannot directly drive the load.
R/T(Pin8)	This pin has two functions: 1. As an RS485 direction control pin. This pin is directly connected to the direction enable pin of the RS485 chip. Do not connect a pull-up or pull-down resistor. At this time, the modules Pin6 and Pin7 are UART functions. 2. UART/IIC function selection pin. This pin is grounded before power-on (grounding	When the pin is powered on, the input has a pull-up resistor, which can be left floating or grounded.

	after power-on is invalid). Pin6 and Pin7 are functions of IIC.	
bCAL-in(Pin9)	Manual calibration to control pin.	When the pin is powered on, the input has a pull-up resistor.



MTP40-F

NDIR CO₂ Sensor Module

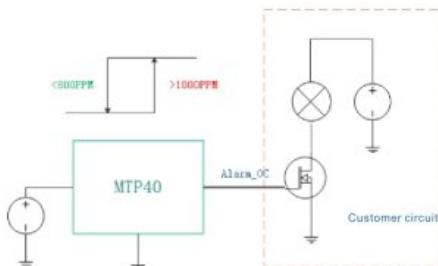
◆ Calibration Function

The module supports two calibration functions:

- 1.The MTP40 module is a precision optical module. Due to various reasons such as transportation, installation, welding, etc., the measurement of the module will cause a certain drift, making influence to the accuracy. The module has a built-in self-calibration algorithm, which can automatically correct the measurement error periodically, so that the module always maintains a relatively good measurement accuracy. The module self-calibration cycle defaults to 7 days (168 hours), which can be adjusted by instructions (24 hours to 720 hours).In order to make the module adjust the accuracy faster, the module will complete a self-calibration within 24 hours after power-on, and then perform periodic self-calibration according to the set cycle. In order to ensure the measurement accuracy of the sensor after calibration, please make sure that the CO₂ concentration in the working environment of the sensor can be close to the outdoor atmospheric level for at least a few hours within 24 hours of power-on and 7 days of continuous operation.
- 2.In addition to the self-calibration function, the sensor can also be manually calibrated to quickly restore accuracy. Pin9 (bCAL-in) of the sensor is the control pin for manual calibration. Pull this pin down for more than 2 seconds, and the sensor can complete the calibration. The reference concentration of this calibration function is the CO₂ concentration in the outdoor atmosphere, generally around 400PPM. To use this function, please place the sensor in an environment close to the outdoor atmospheric with CO₂ concentration, such as a relatively ventilated place. After power on, let it stay for at least 20 minutes. Then pull down Pin9 (bCAL-in) for more than 2 seconds to complete the calibration. Besides, the sensor also supports software instructions to calibrate. For details, please check the chapter of communication protocol instructions.

◆ Alarm Function

The MTP40 module supports the alarm function, which is output through the Alarm-OC pin. When the measured CO₂ concentration value>1000PPM, the Alarm-OC pin outputs a high level. When the measured CO₂ concentration value is less than 800PPM, the Alarm-OC pin outputs a low level. Note that the Alarm-OC pin is configured as an open drain with a pull-up resistor, so it has only a weak drive capability and cannot sink current. If an error occurs in the module, the Alarm-OC pin will always remain high level. Refer to the usage method as shown on the right.



◆ Communication Protocol

Serial Communication

Baud rate of Serial communication is 9600 bps.
The definition of serial communication packet:

1. Protocol Format:

Frame format description:

Numeric Field	Length	Description
Frame Header	2	Fixed to 0X42,0X4D
Instruction byte	1	Instruction definition or sensor type definition
Command byte	2	Specific command word
Data length	2	Big endian
Data	n	Big endian
Checksum	2	The cumulative sum of all bytes from the frame head to the last byte of data

The following protocol is applied in the product series of gas sensors, Instruction byte is 0xA0.

Description of Command byte:

Command Byte	Description
0x0001	Set air pressure parameters (It is defaulted to 1013.0hPa)
0x0002	Read the currently set air pressure value
0x0003	Read gas concentration value
0x0004	Single point correction function(With Reference concentration)
0x0005	Single point correction read status
0x0006	Disable or enable self-calibration



MTP40-F NDIR CO₂ Sensor Module

0x0007	Read self-calibration status				
0x0008	Read the self-calibration period(hours)				
0x0009	Set the self-calibration period(hours)				

2. Basic Control Protocol

Function Name	Frame Header	Instruction Byte	Command Byte	Data Length	Data	Checksum
Set air pressure parameters	Send by MCU	0x42 0x4d	0xA0	0x0001	0x00 0x02	The range of atmospheric pressure is 700-1100 (16bit integers).
	Return by Module	0x42 0x4d	0xA0	0x0001	0x00 0x00	
Read the current pressure value	Send by MCU	0x42 0x4d	0xA0	0x0002	0x00 0x00	
	Return by Module	0x42 0x4d	0xA0	0x0002	0x00 0x02	The atmospheric pressure (16bit integers)
Read gas concentration value	Send by MCU	0x42 0x4d	0xA0	0x0003	0x00 0x00	
	Return by Module	0x42 0x4d	0xA0	0x0003	0x00 0x05	Gas concentration value(32bit integers) and Data valid flag (8bit) 0x00: Valid; 0xFF: the data is unavailable
Single point correction function (with reference concentration)	Send by MCU	0x42 0x4d	0xA0	0x0004	0x00 0x04	Reference concentration range: 400x5000(32 bit integers)
	Return by Module	0x42 0x4d	0xA0	0x0004	0x00 0x01	0x01: Calibration starts 0xff: Calibration is wrong
Read single point correction status	Send by MCU	0x42 0x4d	0xA0	0x0005	0x00 0x00	
	Return by Module	0x42 0x4d	0xA0	0x0005	0x00 0x01	0x00: Calibration is complete 0x01: Calibration is continuing
Enable or disable self-calibration	Send by MCU	0x42 0x4d	0xA0	0x0006	0x00 0x01	0x00: Enable self-calibration 0xff: Disable self-calibration
	Return by Module	0x42 0x4d	0xA0	0x0006	0x00 0x00	
Read self-calibration status	Send by MCU	0x42 0x4d	0xA0	0x0007	0x00 0x00	
	Return by Module	0x42 0x4d	0xA0	0x0007	0x00 0x01	0x00: Enable self-calibration 0xff: Disable self-calibration
Read the self-calibration period	Send by MCU	0x42 0x4d	0xA0	0x0008	0x00 0x00	
	Return by Module	0x42 0x4d	0xA0	0x0008	0x00 0x02	the self-calibration period range: 24-720h
Set the	Send by MCU	0x42 0x4d	0xA0	0x0009	0x00 0x02	the self-calibration period range: 24-720h

self-calibration period	Return by Module	0x42 0x4d	0xA0	0x0009	0x00 0x01	00: Correct operation; 01: It is not acceptable if value is less than 24h; 02: It is not acceptable if the value is more than 720h	Checksum
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MTP40-F NDIR CO₂ Sensor Module

3. Quick Guide:

① Set air pressure parameters

Send: 0x42 0x4D 0xA0 0x00 0x01 0x00 0x02 0x03 0xF5 0x02 0x2A

Device	Phase	Data	Description	Cmd.Phase.Ofs(rep)
43	OUT	42 4d a0 00 01 00 02 03 f5 02 2a	BM.....*	1.1.0
43	IN	42 4d a0 00 01 00 00 01 30	BM.....0	2.1.0

0x03F5 is Hexadecimal of 1013

② Read the current pressure value

Send: 0x42 0x4D 0xA0 0x00 0x02 0x00 0x00 0x01 0x31

Device	Phase	Data	Description	Cmd.Phase.Ofs(rep)
43	OUT	42 4d a0 00 02 00 00 01 31	BM.....1	1.1.0
43	IN	42 4d a0 00 02 00 02 03 f5 02 2b	BM.....+	2.1.0

③ Read gas concentration value

Send: 0x42 0x4D 0xA0 0x00 0x03 0x00 0x00 0x01 0x32

Data valid bit is 0xFF, the data is unavailable:

Device	Phase	Data	Description	Cmd.Phase.Ofs(rep)
43	OUT	42 4d a0 00 03 00 00 01 32	BM.....2	1.1.0
43	IN	42 4d a0 00 03 00 05 00 00 00 00 ff 02 36	BM.....6	2.1.0

◆ IIC Instruction Descriptions

The module operates in IIC slave mode and can be connected to an external MCU with a pull-up resistor inside the module.

The slave address is: 0x32 (7-bit address)

The write operation address is: 0x64

The read operation address is: 0x65

Host sending timing:

1. Send a start signal;
2. Send an address to write(slave address + R/W=0x64) and check responses;
3. Send a read command (0x03) and check the responses;
4. Send a stop signal;
5. Send a start signal;
6. Send an address to read (slave address + R/W(1)=0x65) and check responses;
7. Read 3 bytes from the module and send responses;
8. Send a stop signal.

The 3-byte data received is described as follows:

CO ₂ Concentration		Data Valid Byte
High Concentration Byte	Low Concentration Byte	0x00/0xFF

Attention:

CO₂ concentration = high byte of CO₂ concentration*256 + low concentration byte

Data valid byte, 0x00 means data is valid, 0xFF means data is invalid.

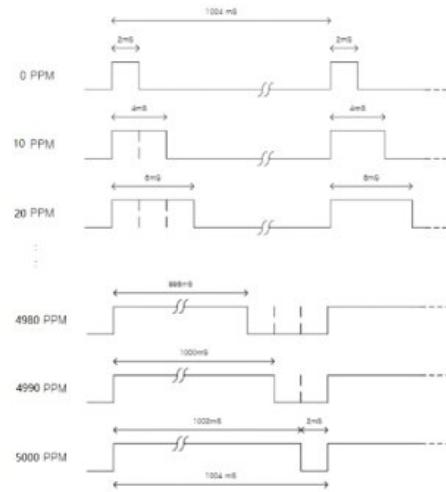


MTP40-F NDIR CO₂ Sensor Module

◆ PWM Function Descriptions

The cycle of the PWM is 1004ms;
 High level output 2ms in the initial stage;
 The central cycle is 1000ms;
 Low level output 2ms at the end stage.
 Calculation formula for obtaining the current CO₂

Concentration value through PWM:
 $C_{ppm} = 5000 * (TH - 2ms) / (TH + TL - 4ms)$;
 Cppm is the calculated CO₂ concentration value, the unit is ppm;
 TH is the time when the output is high in an output cycle;
 TL is the time when the output is low in one output cycle.



◆ Version

Date	Version	Changes
Jun.2, 2020	1.00	Initial
Aug.30, 2020	1.10	The alarm values were edited.

Guangming Dist., Shenzhen, Guangdong, 518107, China.
Tel: +86-755-21386871
Email: sales@memsf.com
www.memsf.com





中国认可
检验
INSPECTION
CNAS IB0078

锂电池
符合相关包装说明 第II部分

航空运输条件鉴别报告书

Identification and Classification Report for Air Transport of Goods

有效
2月31日

此报告本年度有效
有效期至2022年12月31日

报告编号:
PEKGZ202203082700LW660001

Issued No.:

生效日期:
2022.03.08

Effective Date:

委托单位:
广东不二医疗科技有限公司

Applicant:
Guangdong Bioall Medical Technology Co., Ltd.

物品名称:
迷你二氧化碳检测仪 BCM01 (内置聚合物锂离子电池YZ 803040 3.7V 900mAh 3.33Wh)

Name of Goods:
Mini CO2 Detector BCM01 (Containing Polymer Li-ion Battery YZ 803040 3.7V 900mAh 3.33Wh)

北京迪捷姆空运技术开发有限公司

Beijing DGM Air Transport Technology Development Co.,Ltd.



此复印件与原件一致,
如有不符愿负法律责任!



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1. 本公司依据本年度国际航协《危险品规则》以及委托人（托运人或其代理人）提供的物品及其运输信息，确定货物的航空运输条件并出具此报告书。

The report is issued by DGM China according to IATA *Dangerous Goods Regulations* published in the current year and the information of the goods and the information of its shipping provided by the applicant (shipper or his agent).

2. 依据鉴别的需要，本公司要求委托人提供真实、完整的货物样品及资料。

According to the demand of identification and classification, DGM China requires the applicant to provide true and exact sample and data of the cargo.

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The applicant guarantees that the declared goods and/or the sample who provides should be identical with the contents of cargo that is to be transported.

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地址：北京首都国际机场货运北路天竺综合保税区BGS货运楼249室 邮编：101300

电话：010-69479673 传真：010-69479621

网址：www.dgmchina.com.cn E-mail：test@dgmchina.com.cn



项目编号 Item No.	PEKGZ202203082700	签发日期 Issued Date	2022.03.08
鉴别目的 Identification Purpose	是否属于航空运输危险物品 Dangerous Goods or not restricted	鉴别日期 Identification Date	2022.03.08
鉴别依据 Identification Criteria	IATA DGR 63rd, 2022		
物品名称 Name of Goods	中文 Chinese	迷你二氧化碳检测仪 BCM01 (内置聚合物锂离子电池YZ 803040 3.7V 900mAh 3.33Wh)	
	英文 English	Mini CO2 Detector BCM01 (Containing Polymer Li-ion Battery YZ 803040 3.7V 900mAh 3.33Wh)	
生产厂家 Manufacturer	深圳市誉展电子有限公司 Shenzhen Yuzhan Electronics Co., Ltd		
件数 Pieces		注: 本栏内容为托运人或其代理人在使用本报告书时候填写的运输信息, 不属于鉴定内容。运输信息与报告书的关联性以及实际运输货物与报告书的一致性由托运人或其代理人保证, 如发生任何不一致由托运人或其代理人承担全部责任。 (请认真填写本栏内容, 并盖章) 负责人: 联系方式:	
运单号 Air waybill No.			
目的港 Destination			
物品信息 Nature of the goods	<p>该样品为银色近长方体电池。 型号: YZ 803040 尺寸: (40.5*29.6*8.0) mm 每包装件中电池/电芯数量: 50 每包装件中电池/电芯净重: 0.95kg 该电池属于单芯锂电池。 该锂电池不属于召回电池, 不属于废弃和回收电池, 并按照DGR3.9.2.6(e)规定的质量体系进行制造 (注: 该电池已经做好防短路措施并已采取防止意外启动措施。单块电池的重量约为19.0g。设备: 迷你二氧化碳检测仪; 型号: BCM01。每台设备内置1块电池, 每包装件内含50台设备。) This sample is silver almost cuboid battery. Model: YZ 803040 Size: (40.5*29.6*8.0) mm Number of batteries / cells per package: 50 Net quantity of batteries/cells per package: 0.95kg The batteries belong to single cell lithium batteries. The lithium batteries don't belong to batteries returned to the manufacturer for safety reasons, are not waste lithium batteries and not lithium batteries being shipped for recycling or disposal, are manufactured under a quality management program as described in 3.9.2.6(e).</p>		



项目编号 Item No.		PEKGZ202203082700				
物品名称 Name of Goods	中文 Chinese	迷你二氧化碳检测仪 BCM01 (内置聚合物锂离子电池YZ 803040 3.7V 900mAh 3.33Wh)				
	英文 English	Mini CO2 Detector BCM01 (Containing Polymer Li-ion Battery YZ 803040 3.7V 900mAh 3.33Wh)				
鉴别结论 Conclusions	<p>该货物为锂离子/聚合物电池，安装在设备上。额定瓦特小时为3.33Wh。已通过 UN38.3 测试，每个包装件上均有锂电池标记。</p> <p>根据IATA DGR，锂离子电池符合包装说明967第II部分。 This goods is lithium ion/polymer battery, contained in equipment. Watt-hour rating is 3.33Wh. Each battery is of a type proved to meet the Requirements of each test in the UN MANUAL OF TESTS AND CRITERIA, Part III, sub-section 38.3. Each package is marked with lithium battery mark. According to IATA DGR, lithium ion batteries in compliance with Section II of PI 967.</p>					
建议运输条件 Suggestion for Transport Condition	UN/ID 编号 UN/ID No.	运输专用名称 Proper Shipping Name			类或项 Class or Div. (次要危险性) (Subsidiary Risk)	包装等级 Packing Group
	/	/			/	/
	包装说明 Packing Inst.	客货机 Passenger and Cargo Aircraft	/			/
		仅限货机 Cargo Aircraft only	/			/
注意事项 Remarks	电池或电芯必须加以保护，防止短路。设备必须采取措施防止意外启动。 Batteries or cells must be protected so as to prevent short circuits, and the equipment must be equipped with an effective means of preventing accidental activation.					
主检员 Prepared by:			审核人 Checked by:			批准人 Approved by:
						 报告单位(盖章) Stamp

制单: 毕丽雯



北京迪捷姆空运技术开发有限公司

项目编号：PEKGZ202203082700

物品名称：迷你二氧化碳检测仪 BCM01 (内置聚合物锂离子电池 YZ 803040 3.7V 900mAh 3.33Wh)

电池/电芯 Battery / Cell:

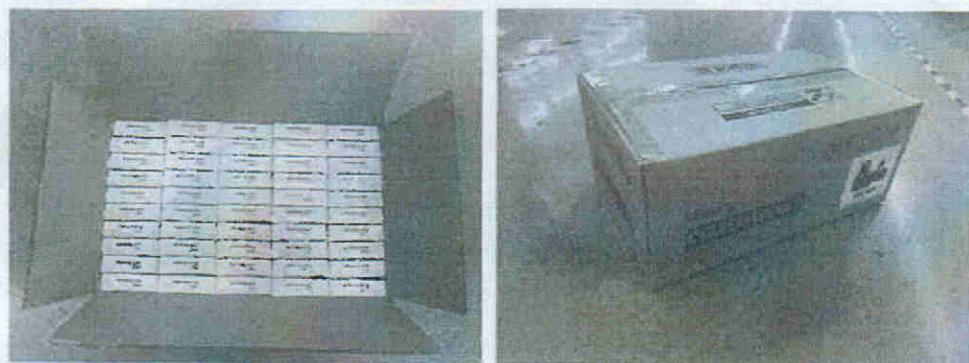


此报告

设备 Equipment 有效期



包装件 Package:



锂电池 UN38.3 试验概要 Lithium Battery Test Summary

项目编号: PEKGZ202203082700

单位信息 Company Information				
委托单位 Consignor	广东不二医疗科技有限公司 广东省东莞市凤岗镇碧湖路 28 号 2 栋 301 室 电话/Tel: +86-769-82078305 邮箱/Mail: 625425490@qq.com 网址/Website: /			
生产单位 Manufacturer	深圳市誉展电子有限公司 深圳市宝安区沙井街道后庭新宝益工贸大厦 8 楼 B1 电话/Tel: +86-18676342928 邮箱/Mail: 841692416@qq.com 网址/Website: /			
测试单位 Test Lab	深圳诺测检测技术有限公司 广东省深圳市宝安区西乡街道固戍航城大道绵商青年创业园 B 栋第 1 层、C 栋 2 层 2A 电话/Tel: +86-755-27790922 邮箱/Mail: sales@nct-testing.com 网址/Website: http://www.ncttesting.com			
电池信息 Battery Information				
名称 Name	聚合物锂离子电池 Polymer Li-ion Battery		电池/电芯类别 Battery/Cell Classification	单电芯锂离子电池 Single Cell Li-ion Battery
型号 Type	YZ 803040		商标 Trademark	--
额定电压(V) Normal Voltage(V)	3.7V		额定容量(mAh) Rated Capacity(mAh)	900mAh
额定能量(Wh) Watt-hour rating (Wh)	3.33Wh		外观/Appearance	银色近长方体 Approximate Silver Cuboid
质量(g)/Mass(g)	19.0g		锂含量(g)/Li Content(g)	不适用 N/A
测试信息 Test Information				
测试报告编号 Test Report Number	NCT22009018XB1-1		测试报告签发日期 Date of Test Report	2022.03.05
测试标准 Edition of UN Manual of Tests and Criteria Used	联合国《试验和标准手册》(第 7 版) 38.3 节 UN "Manual of Tests and Criteria" ST/SG/AC.10/11/Rev.7/Subsection 38.3			
T.1: 高度模拟 Altitude Simulation	通过 Pass	T.2: 温度试验 Thermal Test	通过 Pass	T.3: 振动 Vibration
T.4: 冲击 Shock	通过 Pass	T.5: 外部短路 External Short Circuit	通过 Pass	T.6: 撞击/挤压 Impact/Crush
T.7: 过度充电 Overcharge	通过 Pass	T.8: 强制放电 Forced Discharge	通过 Pass	
UN38.3.3(f)	不适用 N/A		UN38.3.3(g)	
签名 Signatory			签发日期 Issued Date	不适用 N/A
职务 Title	检验员		2022.03.08 NO.07 NCT-TESTING TECHNOLOGY CO., LTD. HONGBU GM-CHINA	