INSTRUCTION

Product Name: LifeBeing sensor (CAN Protocol)

Model No.: MSA037 CAN

Issue Date: 2021-02-01

Attention
1. The product shall be installed by a professional electrician. Please disconnect the power before installation, wiring or changing the setting of by DIP switch 2. Please read the relevant contents of this manual carefully before using the product. 3. This product is only suitable for indoor environment. 4. Ensure that the product is installed in a relatively dry and ventilated environment. 5. Before the product is powered on, please confirm that the input voltage range meets the requirements of the manual. 6. Keep out of reach of children.

1. Features

This is a CAN BUS protocol sensor whose installation way is independently ceiling mounting. The sensor, controlling and exchanging data through CAN BUS protocol, has movement, slight motion, breathing detecting+illumination sensing and so on. It adopts 5.8GHz, high gain, double feed current and low impedance technology and its advantage is to achieve living existence detecting and light sensing information independently accessing CAN BUS system as a unit of collecting data. The production meets CAN BUS communication standard.

1) Adopted living body detecting technology that can accurately detect movement, minor motion and breathing signal can exactly achieve human existence detecting.

2) Illumination sensing and intelligently light sensing recognizing.

3) Sensor, collecting and transmitting data through CAN BUS communication port, is suitable for building, hotel, home lighting and relevant area of intelligently controlling.

2. Parameters

Working Voltage	DC 12-24V
Working Current	≤80mA (12V DC)
Communication Method	CAN BUS protocol
Working Frequency	5.8GHz±75MHz
Transmitting Power	5mW Max.
Detecting Angle	120°
Detecting Radius	Movement detecting range: 3-4m Slight motion detecting range: 3-4m Breathing detecting range: 2-3m
Detecting Area	100% 75% 50% 25% (set by remote control or serial port)
Daylight Range	5-1200Lux (collected below the sensor, height of 3m)
Mounting Height	2.5-4.0m
Installation Way	Ceiling Mounting
Wring Way	Lifting terminal with elastic piece: 0.75mm2-1.5mm2
Working Temperature	0℃...+50℃
Long-term Storage Temperature	-25℃...+80℃

3. Function

The product, adopting fixed 30S cyclically reporting mechanism, transmits human condition information(no human-existing/human-existing: movement mode, slight motion mode, existence mode) and illumination data through CAN BUS communication protocol.

Movement signal

Slight motion& Breathing signal maintain

Movement Mode: Detecting the signals of human greatly moving(walking) in detecting area within 30S.
Slight Motion Mode: Detecting the signals of only human slightly acting in detecting area within 30S, such as: leaning forward, leaning back, body swing, shaking head, typing, using cellphone and other slighting acting.
Breathing Mode: Detecting the signals of only human breathing(the expansion of abdomen and chest) without greatly moving signal and slightly acting signal in detecting area within 30S.
Light Sensing Reporting: Reporting light sensing value when the change value of ambient light is more than set difference value.

4. Communication Parameters and Protocol（Merrytek Standard Protocol）

Serial Port Communication Baud Rate	9600
Data Bits	8
Stop Bits	1
DATA0	ID high
DATA1	ID low
DATA2	DATA length
DATA3-DATA6	Command function
END DATA	Accumulating&Verifying data (DATA0+...+DATA6)
Communication Data Type	Transmitting&Receiving in HEX format

DATA3 Command	function	Name	Date range	Writing& Reading	Default Value
0x03	Work state	Work state	1-7		
0x05	Detecting area	Detection area	0-100	w/r	100%
0x07	Block time	Block Sensor	32bit	w	
0x08	LED indicator	LED Indicator	0-1	w/r	1
0x09	Light sensor	Light sensor	5-1200Lux		
0x0A	Difference value	Difference Value	10-100Lux	w/r	10Lux
0x0D	Hold time	Hold Time	2-7200	w/r	30s
0x17	Firmware version	Firmware version	0.0.0-100.0.0	r	0.0.1
0x18	Device ID	Device ID	0x0000-0xFFFF	w/r	0xFFFF

Communication Data Requirements:
The interval time between each command should be more than 50ms. Monitor whether the returned data is the same as that sent. If not receive, send again for no more than 3 times.

Command Implement Instruction:

Merrytek microwave sensor standard communication command function corresponding table. Command Implement Instruction:

Read Function data					
	ID (DATA0-DATA1)	**LEN (DATA2)**	**Function (DATA3)**	**Value (DATA4)**	**CRC (DATA5)**
Query detecting area	0x0000	0x05	0x00	0x05	data0+...+data4
Query LED condition	0x0000	0x05	0x00	0x08	data0+...+data4
Query difference value	0x0000	0x05	0x00	0x0A	data0+...+data4
Query hold time	0x0000	0x05	0x00	0x0D	data0+...+data4
Query firmware version	0x0000	0x05	0x00	0x17	data0+...+data4
Query device ID	0x0000	0x05	0x00	0x18	data0+...+data4

Work state					
	ID (DATA0-DATA1)	**LEN (DATA2)**	**Function (DATA3)**	**Value (DATA4)**	**CRC (DATA5)**
No human-existing	0x0000	0x05	0x03	0x01	data0+...+data4
Movement	0x0000	0x05	0x03	0x02	data0+...+data4
Slight motion	0x0000	0x05	0x03	0x03	data0+...+data4
Breathing	0x0000	0x05	0x03	0x04	data0+...+data4
Abnormality	0x0000	0x05	0x03	0x05	data0+...+data4
Initializing	0x0000	0x05	0x03	0x06	data0+...+data4
Initialization completed	0x0000	0x05	0x03	0x07	data0+...+data4

Condition Report Instruction:

1. Report immediately when no human-existing turns into human-existing(movement, slight motion, breathing).
2. Report once time at 30S intervals when change occurs among movement, slight motion, breathing and no human-existing.

1. **Detecting Area**					
	ID (DATA0-DATA1)	**LEN (DATA2)**	**Function (DATA3)**	**Value (DATA4)**	**CRC (DATA5)**
25%	0x0000	0x05	0x05	0x19	data0+...+data4
50%	0x0000	0x05	0x05	0x32	data0+...+data4
75%	0x0000	0x05	0x05	0x4B	data0+...+data4
100%	0x0000	0x05	0x05	0x64	data0+...+data4

2. **Time of Blocking Sensor**					
	ID (DATA0-DATA1)	**LEN (DATA2)**	**Function (DATA3)**	**Value (DATA4-DATA6)**	**CRC (DATA7)**
100ms	0x0000	0x07	0x07	0x000064	data0+...+data6
10s	0x0000	0x07	0x07	0x002710	data0+...+data6
10min	0x0000	0x07	0x07	0x0927C0	data0+...+data6

3. **LED Indicator**					
	ID (DATA0-DATA1)	**LEN (DATA2)**	**Function (DATA3)**	**Value (DATA4)**	**CRC (DATA7)**
Disable	0x0000	0x05	0x08	0x00	data0+...+data4
Enable	0x0000	0x05	0x08	0x01	data0+...+data4

4. **Light Sensor**					
	ID (DATA0-DATA1)	**LEN (DATA2)**	**Function (DATA3)**	**Value (DATA4-DATA5)**	**CRC (DATA7)**
Min: 5Lux	0x0000	0x06	0x09	0x0005	data0+...+data5
Max: 1200Lux	0x0000	0x06	0x09	0x04B0	data0+...+data5

5. **Difference Value**					
	ID (DATA0-DATA1)	**LEN (DATA2)**	**Function (DATA3)**	**Value (DATA4)**	**CRC (DATA7)**
Min: 10Lux	0x0000	0x05	0x0A	0x0A	data0+...+data4
Max: 100Lux	0x0000	0x05	0x0A	0x64	data0+...+data4

6. **Firmware version**					
	ID (DATA0-DATA1)	**LEN (DATA2)**	**Function (DATA3)**	**Value (DATA4-DATA5)**	**CRC (DATA5)**
Min: v0.0.0	0x0000	0x06	0x17	0x0000	data0+...+data5
Max: v100.0.0	0x0000	0x06	0x17	0x2710	data0+...+data5

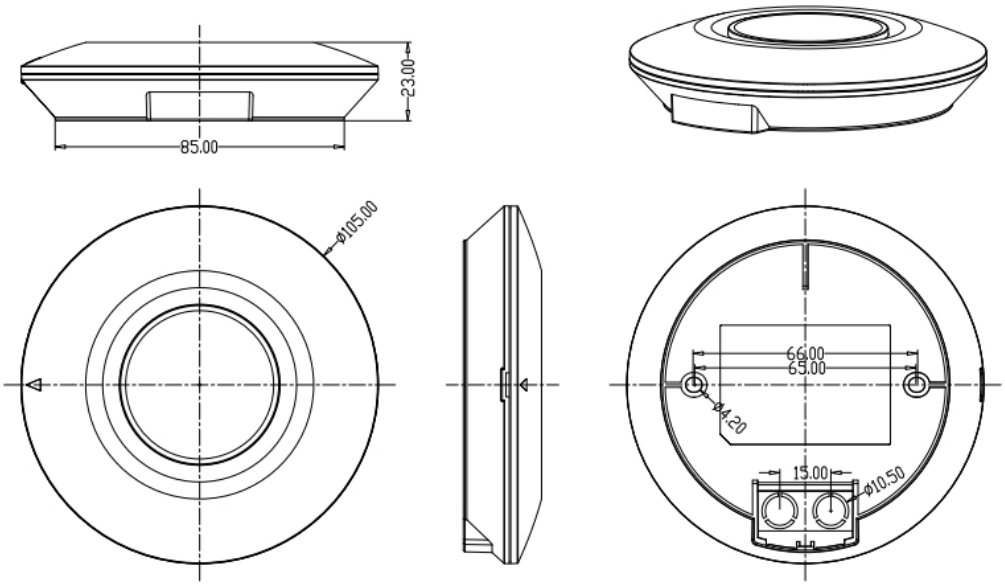
7. **Device ID**					
	ID (DATA0-DATA1)	**LEN (DATA2)**	**Function (DATA3)**	**Value (DATA4-DATA5)**	**CRC (DATA5)**
Min: 0x0000	0x0000	0x06	0x18	0x0000	data0+...+data5
Max: 0xFFFF	0x0000	0x06	0x18	0xFFFF	data0+...+data5

Note: the default device ID is 0xFFFF

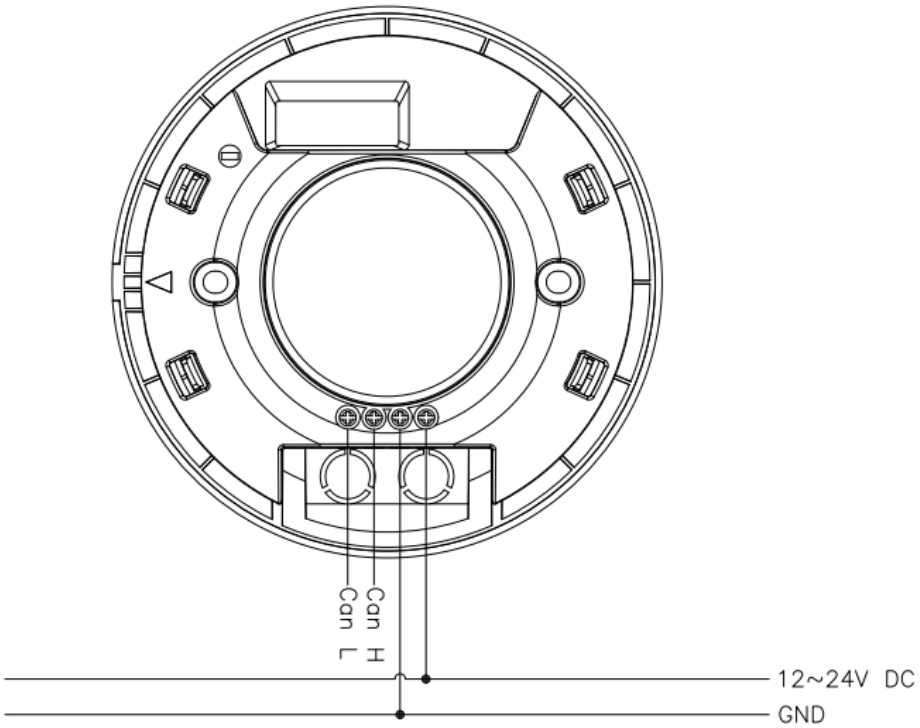
8. **Hold time**					
	ID (DATA0-DATA1)	**LEN (DATA2)**	**Function (DATA3)**	**Value (DATA4-DATA6)**	**CRC (DATA7)**
Min: 2S	0x0000	0x06	0x0D	0x0002	data0+...+data5
Max: 7200S	0x0000	0x06	0x0D	0x1C20	data0+...+data5
Disable	0x0000	0x06	0x0D	0xFFFF	data0+...+data5

Note: Return to 000005FF01XX, If there is no above features or command is issued incorrectly.
Return to 000005FF02XX, If setting data range is incorrect.

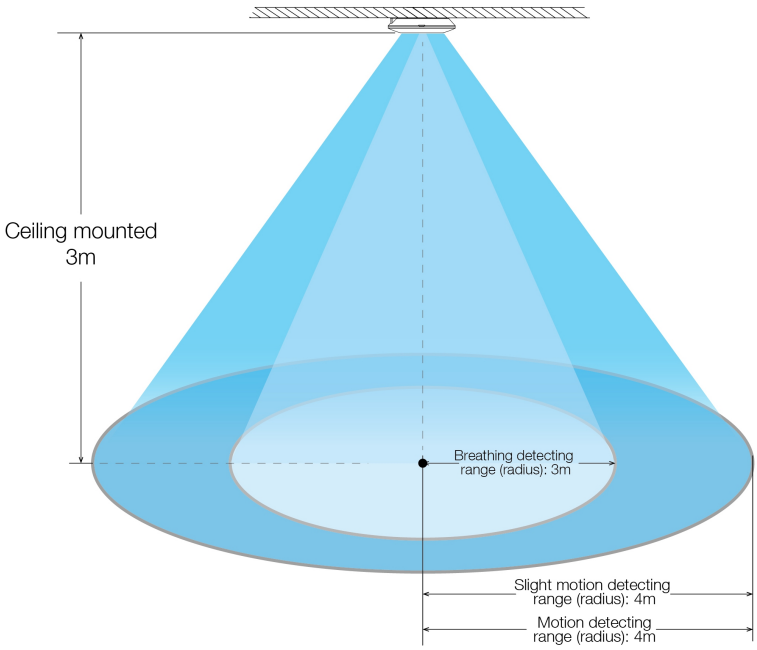
5. Dimension (unit : mm)



6. Wiring

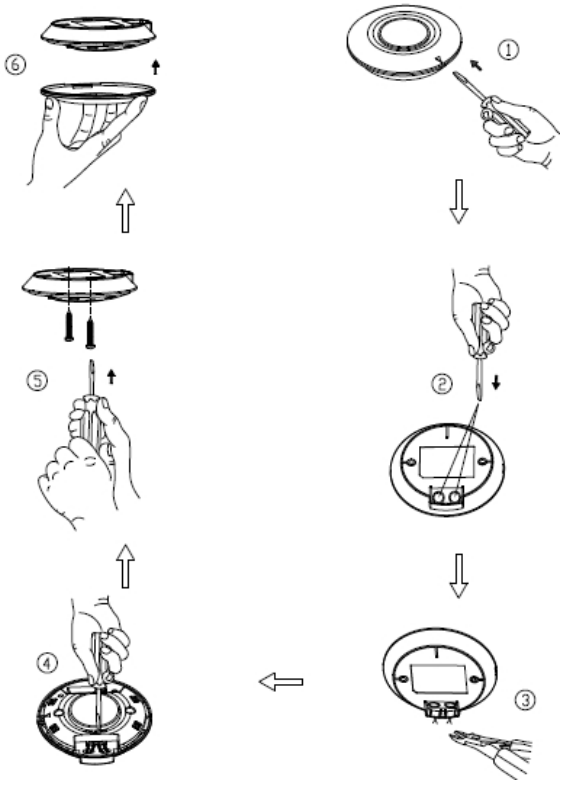


7. Detecting Area



Movement: Detecting the signals of human greatly moving(walking) in detecting area.
Slight motion: Detecting the signals of leaning forward, leaning back, body swing, shaking head, typing, using cellphone and other slightly acting.
Breathing: Detecting the signals of only human breathing(the expansion of abdomen and chest
Note:
1. Considered the features of electromagnetic wave transmitting, the effective range of radar will vary to some extent as the radar is related to size of transmitter and material and thickness of the target cover.
2. Electromagnetic waves in centimeter wave frequency band can penetrate non-metallic materials, such as glass, wooden board, screen and thin wall and can detect the moving objects behind cover but can not penetrate thick wall, metal door and so on.

8. Installation Instruction



1. Use a slotted screwdriver in the preset position of housing to pry the cover.

2. Use a tool to pry the sheet of threading hole.

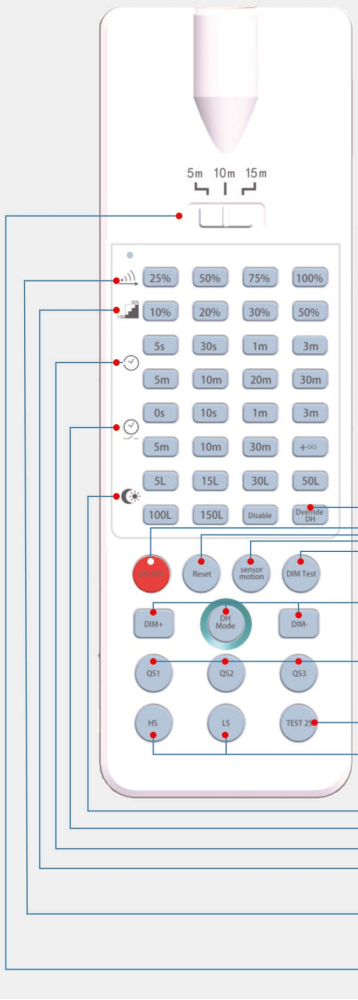
3. The thin piece on the side of housing should be cut off to make it a wire groove when exposed installing.

4. Connect wire on the terminal and set the relevant parameters.

5. Fix product on the required mounting face using matched screwdriver.

6. Make sure to fasten cover after installing(prompted with an arrow).

9. Remote Control

Panel settings	Button	Function Description
	ON/OFF	Pressing the “ON-OFF” button, sensor is disabled. There is no power off memory function. Power on again, automatically starting sensing mode.
	Reset	Pressing the “Reset” button, all parameters are changed to factory settings.(Detecting area: 100%, Hold time: 30s, Indicator light: on).
	Sensor motion	Pressing “Sensor motion” button, sensor starts to work.
	DIM Test	N/A
	Override DH	N/A
	DIM+ DIM- DH Mode	N/A
	QS1 QS2 QS3	N/A
	TEST 2S	N/A
	HS LS	HS: Turn ON indicator light LS : Turn OFF indicator light
		N/A
		N/A
		Hold time Setting：5s/30s/1min/3min/5min/10min/20min/30min
	50% 10%	N/A
		Detection area Setting：25%/50%/75%/100%
	5m 10m 15m	Remote Distance Toggling the button can set the distance of remote control controlling sensor

10. Initialization

After first power on, the indicator light will be off after flashing for 20 seconds. During the initialization, sensor is not able to detect moving object signal. Turning on or off indicator and setting the detecting area through serial protocol.

Note: Unable to set relevant parameters when product is initializing.

11. Application Notice

1) The sensor should be installed by a professional electrician. Please disconnect the power before installing, wiring or changing the setting of the dial switch.

2) Put the sensor as far as possible from large areas of metal plate, glass and other materials with high medium density to avoid triggering by mistake.

3) Put the sensor as far as possible from large areas of metal plate, glass and other materials with high medium density to avoid triggering by mistake.

4) Avoid the detection window of the daylight sensor of the detector irradiated by an invalid light source, which will interfere with the measurement of ambient light.

5) The product should not be too close to the wireless router at least more than 2m apart, when it is installed and used.

6) Setting detecting area and indicator on-off by MH10.(Pressing HS in MH10 makes indicator on and pressing LS in MH10 makes indicator off.)

7) Sensor's microwave can penetrate wall of building. It may cause misreport when microwave, penetrates wall, detects the moving objects outside fortified area. To avoid triggering by mistake, choose suitable place when installing, keep away from glass, plasterboard, wooden wall and other things that microwave can easily penetrate and choose appropriate sensing parameters according to space, for examples:

A. When product is used in the room whose length and width is about 2m or less, detecting area should be set to 25%(application scenario: washroom, sitting room)

B. When product is used in the room whose length and width is about 3m, detecting area should be set to 50%(application scenario: washroom, hallway, sitting room)

C. When product is used in the room whose length and width is about 4m, detecting area should be set to 75%(application scenario: small office, meeting room, library)

D. When product is used in the room whose length and width is about 5m or more, detecting area should be set to 100%(application scenario: large office, meeting room, library)

Note: The setting detecting area depends on the actual environment(detecting area parameters above application scenario are for reference only).

8) Product is best to be installed in the central of detecting environment and distance from door should be more than 2m.