merrytek®

SENSING MERRY LIFE

LIFEBEING® sensor

2021 A0

About Merrytek

Shenzhen Merrytek Technology Co., LTD., founded in 2011, is a high-tech enterprise specializing in the research, development, manufacturing and sales of microwave sensors. It is also the earliest enterprise in China that use unlocking microwave sensor technology for intelligent life and improvement of human living environment. With innovative product concept and excellent product quality, "Merrytek" has become a well-known brand in the field of lighting intelligent sensing.

Merrytek has more than 50 people research and development team, with more than 300 patents. Among them, the international patent of low impedance antenna solves the industry problem of poor environmental adaptability of the traditional microwave sensor and is vulnerable to interference from Wi-Fi, 5G, Bluetooth and other Wireless signals. The international patented technology of 5.8GHz microwave sensor is used for movement, minor motion, breathing signals and other living existence detection, which unlocking the application possibility of microwave sensor for smart home, smart building, smart endowment, security monitoring and other fields.

In addition to the advanced technology as the core competitiveness, we also keep up with the pace of the times, built the first domestic microwave module antenna dynamic packaging line. Improve the enterprise's industrial dynamic production and lean production capacity. It is expected to complete the leading automatic microwave antenna production line integrating sorting, welding, packaging and testing in 2021.

CONTENT

3 Core Technology

Core Technologies

1 Low Impedance Antenna Technology

Thanks to Merrytek global patent low impedance antenna technology, makes the sensor effectively filter out the interference of external radio signals. In practical application, wireless electromagnetic signals such as 2.4G Bluetooth, 5GWiFi, 5G communication and RF will not interfere with the normal operation of microwave induction. What's more, the batch complies with RED certification requirements.

5.8G Hz ™
LOW Impedance ANT

Spectrum Diagram Of Low Impedance Antenna

dbm

0   f=5.80GHZ   HZ

GNDANT

2 Lifebeing Sensor Technology

Merrytek's Lifebeing Sensor is based on 5.8Ghz microwave motion detection technology. The patented low impedance antenna and exclusive occupancy sensing algorithm are used to detect human existence by detecting the expansion of the chest and abdomen during human respiration. At the same time, the algorithm and microwave detection can effectively avoid the airflow interference from air conditioning and exhaust, which achieves accurately identify the occupancy of human being. No matter in any mode of activity, meeting, reading, writing, rest or static meditation.

Breathing detect

3 Accurate Constant Light Technology

The brightness of artificial LED lights can be adjusted naturally according to the changes of natural light through the light sensor, so that artificial light, daylight and space can be perfectly integrated to meet the needs of humanized constant illumination lighting.

Merrytek solves the problem that the illumination sensor cannot accurately detect the illumination of the desktop through the self-developed Filar optical lens and illumination detection algorithm, and meanwhile, the lens optical imaging technology can avoid the influence of the desktop color and material. It can accurately maintain the interaction effect between LED light and sunlight to achieve accurate constant light effect, with a constant light accuracy of +/-10%.

Widely used in offices, classrooms, embassies, airports, warehouses and other occasions need to adjust the brightness according to the daylight.

80% 20%
Accurate constant light

Through the perfect combination of LIFEBEING detection technology and IOT connection, To realize Smart control for home and building lighting, curtains, security, energy management, heating, anti-air conditioning, signal and monitoring systems, service interfaces and electronic devices such as remote, metering, video, audio control. The products are suitable for office, home, business, hotel, airport, hospital, automobile, pension and other intelligent applications.

Classroom

Through the recognition of space, position and movement direction, the region is segmented to realize the detection of movement trajectory and the partition control.

Core Application

Bathroom

Microwave living body induction, when people do not move, to avoid sudden lights out.

Older Care

The data of respiratory and heart rate can be detected, which can be found and rescued in the first time when abnormal conditions occur.

Meeting Room

Detection of shaking head, raising hand and other small movements, detection of breath detection signals, to achieve human existence detection.

Core Application

Independent Office
Wireless Communication Series
-Zigbee, WIFI, Bluetooth
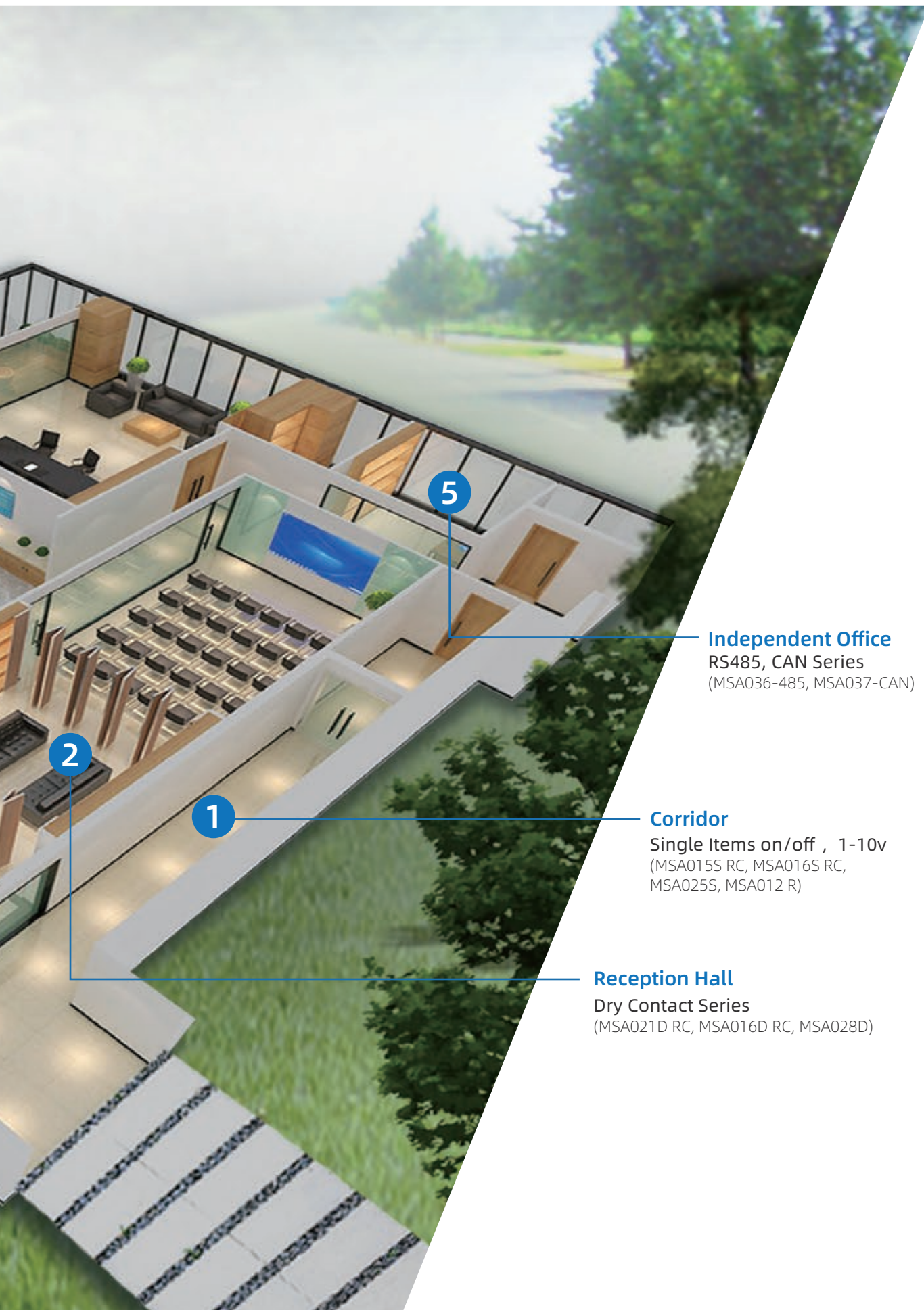(MSA035-Z1)

General Office
KNX Series
(MSA017K)

Conference Room
DALI Series
(MSA019, MSA020,
MSA029, MSA030)

5

Independent Office
RS485, CAN Series
(MSA036-485, MSA037-CAN)

1

Corridor
Single Items on/off, 1-10v
(MSA015S RC, MSA016S RC,
MSA025S, MSA012 R)

2

Reception Hall
Dry Contact Series
(MSA021D RC, MSA016D RC, MSA028D)
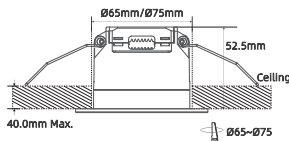
Single Items
on/off , 1-10v

LIFEBEING™

5.8Gʜᴢ ™
LOW Impedance ANT
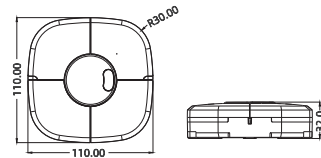
Single Items on/off, 1-10v
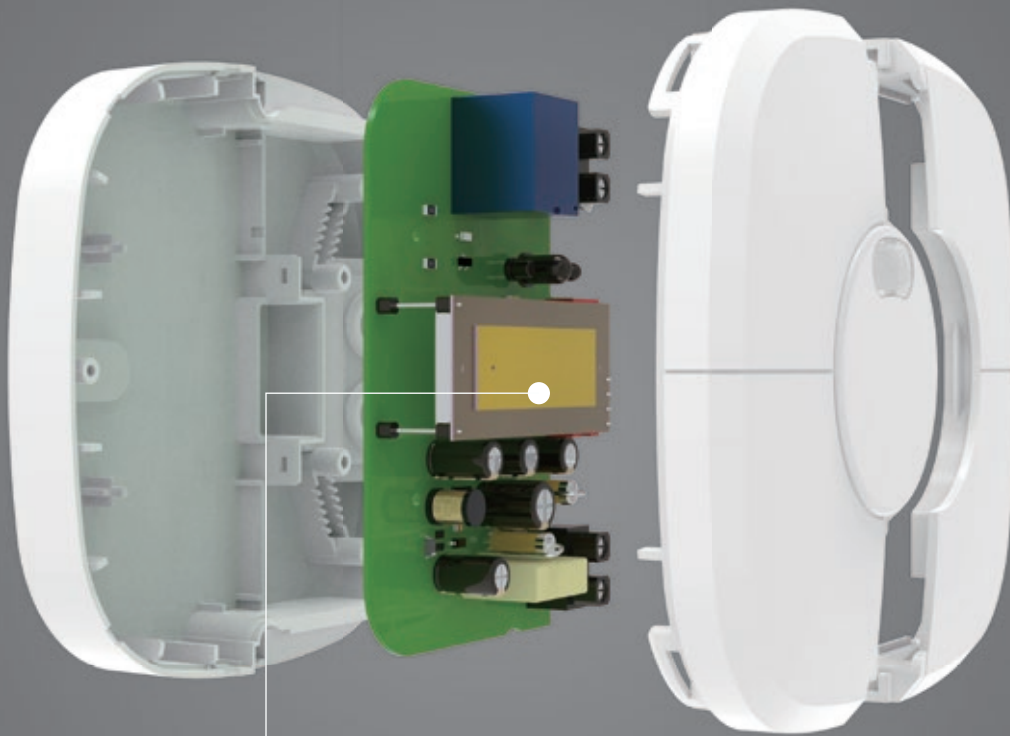
MSA015S RC

CE RED

MSA016S RC / MSA025S

CE RED

Specifications	MSA015S RC	MSA016S RC / MSA025S
Working Voltage	120-277VAC 50/60Hz	120-277VAC 50/60Hz
Standby Power Consumption	<0.5W	<0.5W
The Rated Load	400W (Inductive/LED) 800W (resistive)	400W (Inductive/LED) 800W (resistive)
Detection Technology	Occupancy Detecting, daylight Detecting	Occupancy Detecting, daylight Detecting
Working Mode	On/off	On/off
Working Frequency	5.8 GHz ±75 MHz, ISM band	5.8 GHz ±75 MHz, ISM band
Transmission Power	0.5mW Max.	0.5mW Max.
Hold Time	5S/30S/1Min/3Min/5Min/10Min/20Min/30Min	5S/30S/1Min/3Min/5Min/10Min/20Min/30Min
Detection Area	100%/75%/50%/25%	100%/75%/50%/25%
Daylight Sensor	5-150lux, Disable	5-150lux, Disable
Dimension (Cut Size)	φ65-φ75mm	110x110x32mm
Working Temperature	-25~50℃	-25~50℃
IP Rating	IP20	IP20

MSA016S RC with elongated induction zone

Breathing detecting   Minor motion detecting   Normal motion detecting   Anti-interference   ON/OFF function   Daylight threshold   5 Year Guarantee
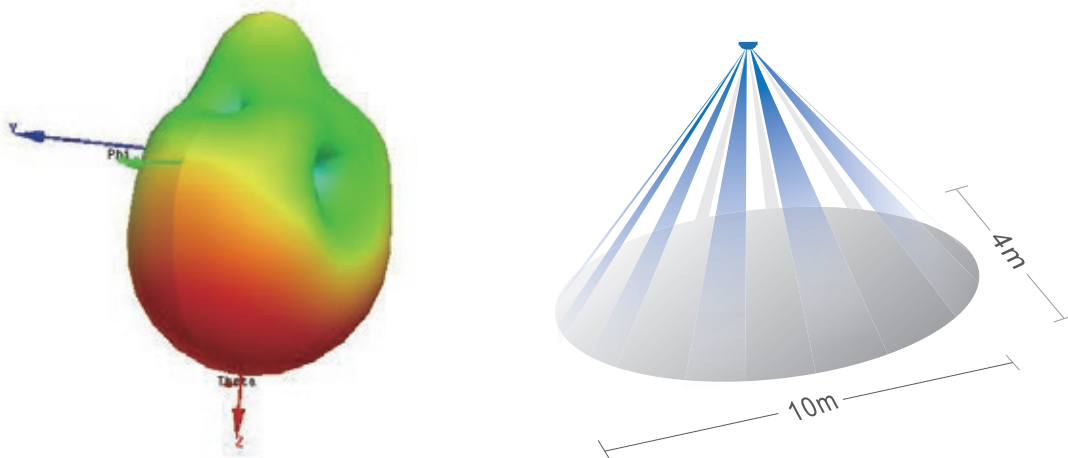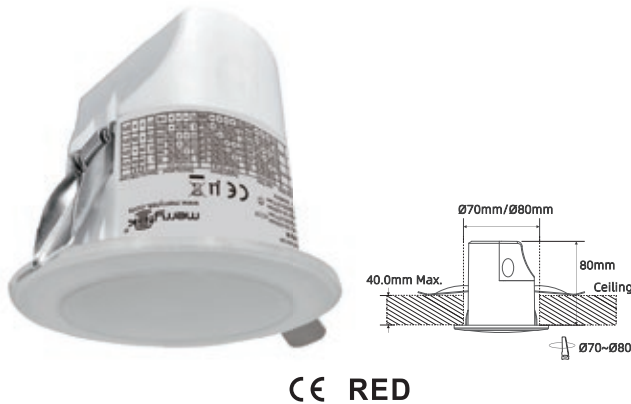
MSA016S RC

Merrytek's Patent Lifebeing Sensing for true occupancy detecting
Low impedance antenna, avoid the interference from air conditioning, exhaust fan and wireless signals
Elongated induction area, can be used for special applications, to achieve partition control.

Elongated induction area pattern

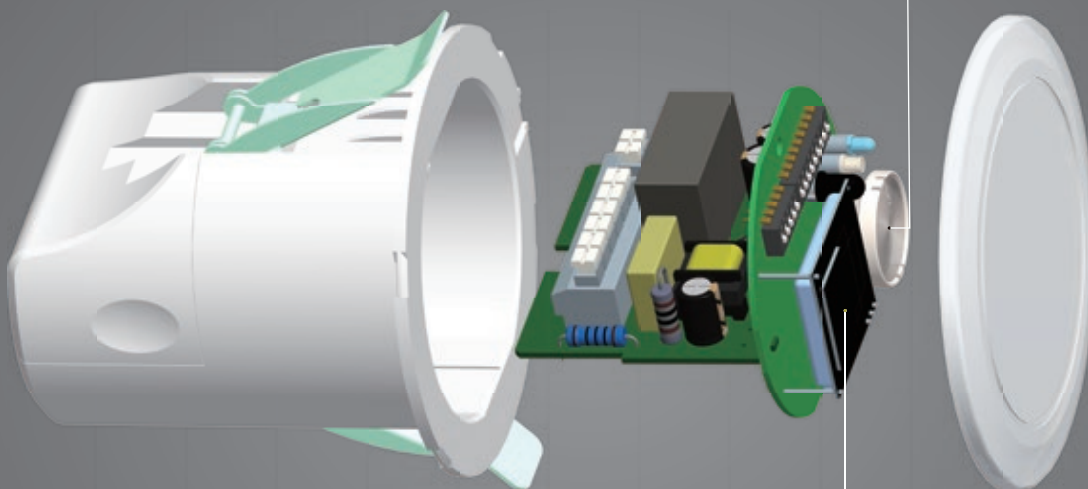4m

10m

Single Items on/off, 1-10v

MSA012R

Ø70mm/Ø80mm

80mm
Ceiling

40.0mm Max.

Ø70~Ø80

CE RED

Specifications

Working Voltage	120-277VAC 50/60Hz
Standby Power Consumption	<1.0W
The Rated Load	800w (inductive),1000w (resistive)
The Rated Load	Occupancy Detecting, Daylight Detecting
Working Mode	On-off / step dimming
Working Frequency	5.8 GHz ±75 MHz, ISM band
Transmission Power	0.5mW Max.
Hold Time	5s~30min
Stand-by Dim Level	10%/20%/30%/50%
Stand-by Period	0s~30min
Detection Area	100%/75%/50%/25%
Daylight Harvesting	0-2000lux
Cut Size	φ70-80mm
Working Temperature	-25~50℃
IP Rating	IP20

80%20%

| Breathing detecting | Minor motion detecting | Normal motion detecting | Daylight harvesting | Anti-interference | ON/OFF function | Daylight threshold | 5 Year Guarantee |

The Fresnel optical lens and illumination detection algorithm created by Merrytek can achieve accurate spatial constant light.

Combined with 5.8G Lifebeing sensor technology, Any movement, micro even respiratory signals can be collected to realize real occupancy detecting , meanwhile not interfered by air conditioning, exhaust fan and wireless signals.
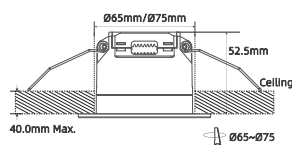
Dry Contact Series
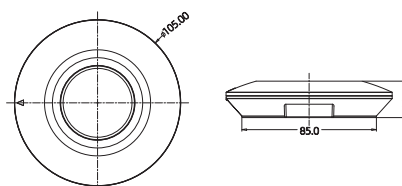
LIFEBEING® 5.8G Hz™ LOW Impedance ANT

MSA021D RC

CE RED

Ø65mm/Ø75mm
52.5mm
Ceiling
40.0mm Max.
Ø65~Ø75

MSA040D RC

CE RED

Ø105.00
23.0
85.0

Specifications

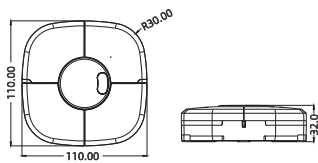|	
Working Voltage	12-24V DC operate
Working Current	45mA max@12V
The Rated Load	36V 50mA max
Detection Technology	Occupancy Detecting, Daylight Detecting
Working Mode	Dry contact (normally open)
Working Frequency	5.8 GHz ±75 MHz, ISM band
Transmission Power	0.5mW Max.
Hold Time	5S/30S/1Min/3Min/5Min/10Min/20Min/30Min
Detection Area	100%/75%/50%/25%
Daylight Sensor	5lux/25lux/50lux/Disable
Working Temperature	-25~50℃
IP Rating	IP20
Cut Size	φ65-75mm

K
P1 P
Dry-contact | Breathing detecting | Minor motion detecting | Normal motion detecting | Anti-interference | Daylight threshold | 5 Year Guarantee

Dry Contact Series

MSA016D RC / MSA028D

CE RED

Specifications — MSA016D RC with elongated induction zone
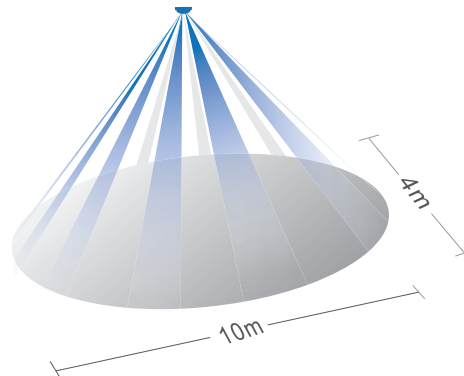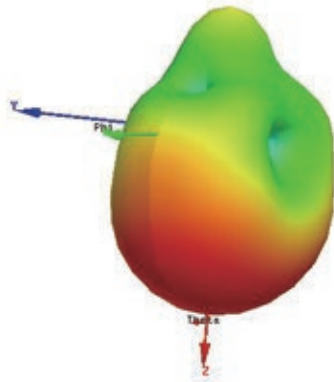
Working Voltage	12-24v dc
Working Current	45mA max@12V
The Rated Load	400W (Inductive) 800W (resistive)
Detection Technology	Occupancy Detecting, Daylight Detecting
Working Mode	Dry node (normally open/normally closed)
Working Frequency	5.8 GHz ±75 MHz, ISM band
Transmission Power	0.5mW Max.
Hold Time	5S/30S/1Min/3Min/5Min/10Min/20Min/30Min
Detection Area	100%/75%/50%/25%
Daylight Sensor	5-150lux/Disable
Working Temperature	-25~50℃
IP Rating	IP20
Dimension	110x110x32mm

Dry-contact | Breathing detecting | Minor motion detecting | Normal motion detecting | Anti-interference | Daylight threshold | 5 Year Guarantee

MSA016D RC

1) Conform to RED certification requirements

2) Can detect any signals of movement, slight motion or breathing

3) Parameter can be adjusted by DIP switch or Remote control

4) Support ceiling mounting

5) Elongated induction area, can be used for special applications, to achieve partition control

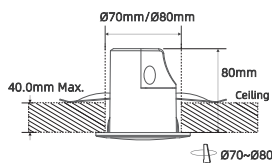**Elongated induction area pattern**

4m

10m

DALI Series

LIFEBEING™ 5.8G Hz™
LOW Impedance ANT

MSA019

CE RED

Ø70mm/Ø80mm
40.0mm Max.
80mm
Ceiling
Ø70~Ø80

Specifications

Working Voltage	120-277VAC 50/60Hz
Load Capacity	64pcs DALI drive
Detection Technology	Occupancy Detecting, Daylight Detecting
Working Mode	On-off, DALI dimming/constant light
Working Frequency	5.8 GHz ±75 MHz, ISM band
Transmission Power	0.5mW Max.
Hold Time	5s~30min
Stand-by Dim Level	10%/20%/30%/50%
Stand-by Period	0s~30min
Detection Area	100%/75%/50%/25%
Daylight Harvesting	0-2000lux
Cut Size	φ70-80mm
Working Temperature	-25~50 ℃
IP Rating	IP20

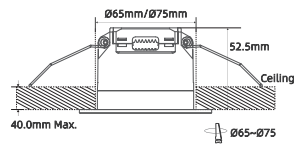DALI | Breathing detecting | Minor motion detecting | Normal motion detecting | Anti-interference | ON/OFF function | Daylight threshold | 5 Year Guarantee

DALI Series

MSA020

CE RED

Ø65mm/Ø75mm
52.5mm
Ceiling
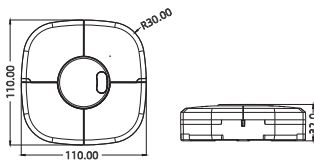40.0mm Max.
Ø65~Ø75

Specifications

Power Supply Source	DALI bus power supply (9.5-24V DC)
Load Capacity	Maximum load 64pcs DALI drive
Detection Technology	Occupancy Detecting, Daylight Detecting
Working Mode	On-off
Working Frequency	5.8 GHz ±75 MHz, ISM band
Transmission Power	0.5mW Max.
Communication Method	Standard DALI protocol signal
Cut Size	φ65-75mm
Working Temperature	-25~50℃
IP Rating	IP20

DALI | Breathing detecting | Minor motion detecting | Normal motion detecting | Anti-interference | ON/OFF function | Daylight threshold | 5 Year Guarantee

MSA029 / MSA030

CE RED

R30.00
110.00
110.00
32.0

Specifications

Working Voltage	MSA029 (120-277V AC)
	MSA030 (DALI bus power supply), 9.5-24V DC
Detection Technology	Occupancy Detecting, Daylight Detecting
Communication Method	Standard DALI protocol signal
Working Mode	DALI dimming
Working Frequency	5.8 GHz ±75 MHz, ISM band
Transmission Power	0.5mW Max.
Hold Time	5S/30S/1Min/3Min/5Min/10Min/20Min/30Min
Detection Area	100%/75%/50%/25%
Daylight Sensor	5-150lux/Disable
Working Temperature	-25~50℃
IP Rating	IP20
Dimension	110x110x32mm

DALI | Breathing detecting | Minor motion detecting | Normal motion detecting | Anti-interference | ON/OFF function | Daylight threshold | 5 Year Guarantee
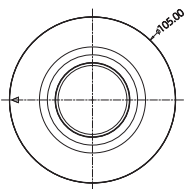
14

KNX Series | LIFEBEING™ | 5.8G Hz™ LOW Impedance ANT | KNX®

MSA017K

CE RED

Ø55mm/Ø65mm

20.0mm Max.

Ø55~Ø65

Specifications

Working Voltage	24-30v dc (KNX bus power supply)
Working Current	15mA max (@30V DC)
Detection Technology	Occupancy Detecting, Daylight Detecting
Communication Method	KNX standard communication protocol
Working Frequency	5.8 GHz ±75 MHz, ISM band
Transmission Power	0.5mW Max.
Working Temperature	-25~50℃
IP Rating	IP20
Cut Size	φ55-65mm
Installation Mode	Flush mounting

| Breathing detecting | Minor motion detecting | Normal motion detecting | Anti-interference | ON/OFF function | Daylight threshold | 5 Year Guarantee |

RS485, CAN Series

LIFEBEING™

5.8G Hz™
LOW Impedance ANT

MSA036-485 / MSA037-CAN

CE RED

⌀105.00
85.0
23.0

Specifications

	MSA036-485	MSA037-CAN
Working Voltage	12-24v dc	12-24v dc
Working Current	45mA max (@20V DC)	45mA max (@20V DC)
Detection Technology	Occupancy Detecting, Daylight Detecting	Occupancy Detecting, Daylight Detecting
Communication Method	RS485, standard Modbus communication protocol	Standard CANBUS communication protocol
Baud Rate	9600	9600
Working Frequency	5.8 GHz ±75 MHz, ISM band	5.8 GHz ±75 MHz, ISM band
Transmission Power	0.5mW Max.	0.5mW Max.
Working Temperature	-25~50℃	-25~50℃
IP Rating	IP20	IP20
Dimension	φ105x23mm	φ105x23mm
Installation Mode	Ceiling mounting	Ceiling mounting

Breathing detecting | Minor motion detecting | Normal motion detecting | Anti-interference | ON/OFF function | Daylight threshold | 5 Year Guarantee

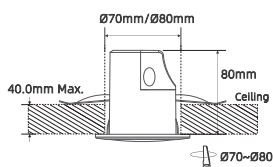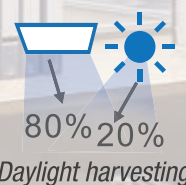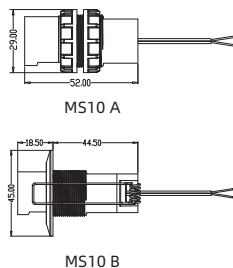# Wireless Communication Series
-Zigbee, WiFi, Bluetooth

LIFEBEING® 5.8GHz™ LOW Impedance ANT

ZigBee® Wi Fi Bluetooth

MSA035-Z1

CE RED

Ø70mm/Ø80mm
40.0mm Max.
80mm
Ceiling
Ø70~Ø80

Specifications

Working Voltage	120-277v AC 50/60Hz
Detection Technology	Occupancy detecting, daylight detecting
Communication Method	Zigbee wireless communication
Working Frequency	5.8 GHz ±75 MHz, ISM band
Transmission Power	0.5mW Max.
Working Temperature	-25~50 ℃
IP Rating	IP20
Cut Size	φ70-80mm
Installation Mode	Flush mounting

Breathing detecting | Minor motion detecting | Normal motion detecting | Anti-interference | ON/OFF function | Daylight threshold | Wireless communication | 5 Year Guarantee

Daylight Series

80% 20%
Daylight harvesting

MS10

MS10 A   MS10 B

MS10 A

MS10 B

Specifications

Working Voltage	1-10V dc
Color Coding Of Cable	Red+, Black-
Cable Length	80cm
Max. Current Sink	50mA Max.(1-10v port current)
Working Mode	1-10v dimming
Working Temperature	-25℃…+50℃
IP Rating	IP20

MS13

Specifications

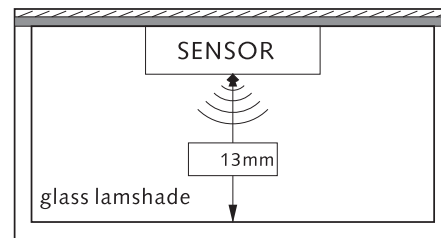|	
Power Supply Mode	DALI bus power supply（9.5-24V DC）
Detection Technology	Light induction (constant light)
Communication Method	Standard DALI signal
Working Mode	Switch/Dimming Instruction
Working Temperature	-25℃…+50℃
Installation Mode	Ceiling mounting
IP Rating	IP20
Dimension	φ105x23mm

General Notes about 5.8G Microwave Motion Sensor

Microwave motion sensors are mainly based on the principle of the Doppler effect,and the wavelength of microwave radiation changes due to the relative motion of the wave source and the detected. The faster the motion,the greater the frequency.The frequency difference between the transmitting and receiving which caused by the Doppler effect is called the Doppler Shifts.The microwave motion sensors control the lamp ON-OFF or dimming by judging the Doppler Shifts.

Here following suggests about installation:

1.Microwave antennas can not be placed at the center of arc-lampshade.

SENSOR

center of the arc-lampshade ✖
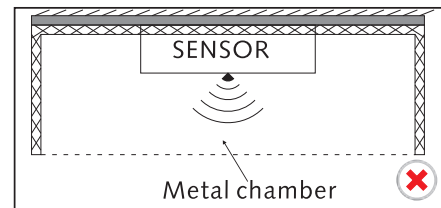
2.The distance between the antenna and the glass (Dielectric Material)should be no less than 13mm when the sensor is built in the glass lampshade.Otherwise, the microwave motion sensor will not penetrate the glass easily.
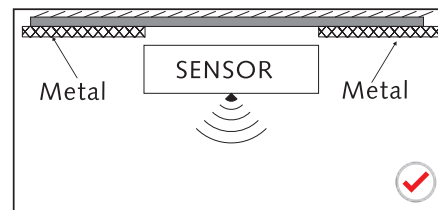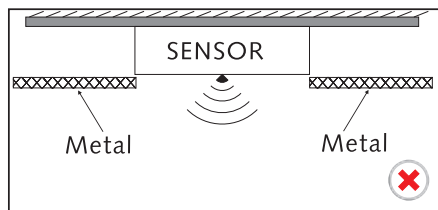
SENSOR

13mm

glass lamshade

3.To avoid blocking the microwave emission,the microwave sensor can not be covered with metal materials,be sprayed coating of metal components , or be attached metal material and stickers etc.
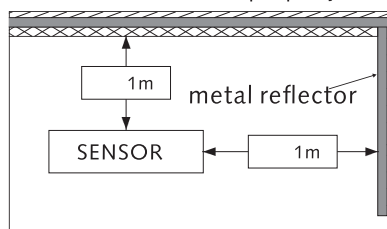
SENSOR

Metal ✖

4.Avoid placing the sensor inside the metal chamber , otherwise may cause the mistrigger.
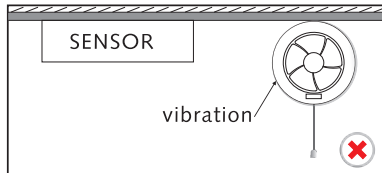
SENSOR

Metal chamber ✖

5.To avoid affecting the microwave signal transmission, the microwave antenna should be higher than the surrounding metal surface,

SENSOR

Metal   Metal

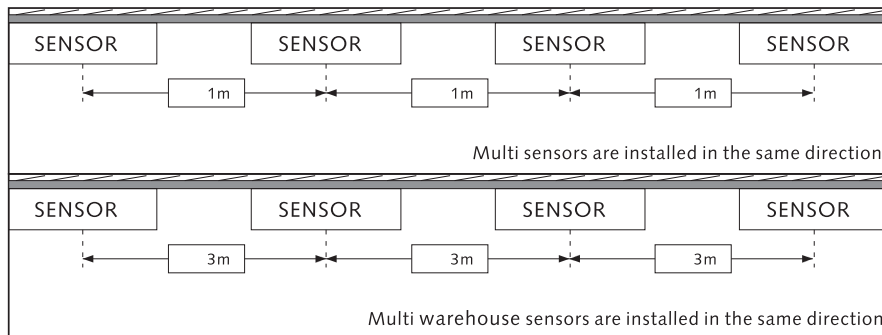Metal   Metal ✖

SENSOR

Metal   Metal ✔

6.The sensor should not be placed in a small confined space .To avoid increasing the sensor detection range or abnormal operation , the sensor should keep away from large areas of metal and glass reflectors(separation distance at least 1m).Pls reduce the detection area setting to use or contact Merrytek to confirm the situation, once the sensor works improperly.
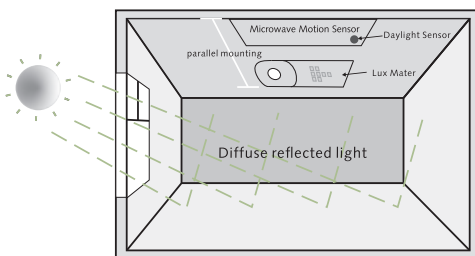
1m

metal reflector

SENSOR   1m

7.The sensor can not be installed in the room of long-time vibration,because the vibration signal will be regarded as the moving signal to trigger sensor.

8.When multiple sensors are installed side-by-side in the same direction,the distance between each other should be kept at least 1m(the warehouse sensors at least 3m) to avoid mutual interference.

Multi sensors are installed in the same direction

Multi warehouse sensors are installed in the same direction

9. Blowing and raining may trigger the sensor which without weatherproof design.

10.The detection area is related to the moving speed and volume etc..The faster the object moving ,or the smaller the volume , the smaller the detection area.The detection area in Merrytek's specifications or user manuals were tested by a 165cm height person with 0.5m/s moving speed.

11.Normally,the photocell in the microwave motion sensors are fuzzy controller,Merrytek just shows the typical lux values,which are tested under the conditions of the ceiling mounting,natural light diffuse environment in the sunny day and without lampshade.Therefore,the test data of lux values will be affected by different light transmittance of lampshade,natural light diffuse condition and the installation way .

12. The natural illumination in the application environment should not be less than 100lux (please confirmed the specific data with Merrytek's engineers) when using the sensor with the Light-night function).

⚠ **NOTE**

1) Please cut off power before installation,wiring,setting or any other operation.

2) The data on detection pattern is typical value tested without any lighting fixture in Merrytek factory, the detection range could be affected by moving speed, installation height, motion object and different environment.
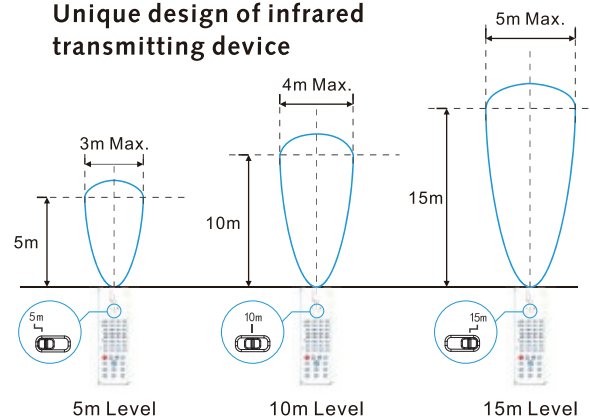
MH10 Remote Control

Remote Control Setting	Button	Remarks
	ON/OFF	Press the "ON/OFF" button, the light goes to constant on/off mode, sensor is disabled. Press any button to quit from this mode and the sensor starts to work.
	Reset	Press "Reset" button, all parameters are same as setting of DIP switch or factory settings.
	Sensor motion	Press "Sensor motion" button, the light quits from the constant on/ off mode,and the sensor starts to work (The latest setting stays in validity)
	DIM Test	Press"DIM Test" button,the 1-10 V dimming works to test whether the 1-10Vdc dimming ports are connected properly.After 2s, it returns to the latest setting automatically.
	DIM + DIM -	Short press"DIM+/DIM-" button to transmit dimming signal. The brightness of the lamp adjusts at 5% per unit. (only apply for sensor with daylight harvesting function)
	DH Mode	Long press>3s,sensor will take current light level as target lux level, to dim up/down load automatically according to the change of ambient light level. (only apply for sensor with daylight harvesting function)
	Q1 Q2 Q3	Note: Detection area / Hold time /Stand-by period /Stand-by dim level / Daylight sensor can be adjusted by pressing the corresponding button.The latest setting will stay valid.
	TEST 2S	Press the "TEST 2S" bottom can enter the test mode anytime.At the mode, the sensor parameters as below:Detection Area is 100%, Hold Time is 2s, Stand-by Dim Level is 10%, Stand-by Period is 0s, daylight sensor disable. This function only for testing. Quit the mode by pressing "RESET" or any other function buttons.
	HS LS	Press"HS"button to set the detection area to be high sensitive. Press"LS" button to set the detection area to be low sensitive. The adjustment bases on the "Detection Area"parameter you set.
	☾☀	Daylight Sensor Set up daylight threshold: 5Lux/15Lux/30Lux/50Lux/100Lux/150Lux/ Disable
	⏱	Stand-by period Set up stand-by time: 0S/10S/1min/3min/5min/10min/30min/+∞
	⏱	Hold time Set up hold time: 5S/30S/1min/3min/5min/10min/20min/30min
	50% 10%	Stand-by dim level Set up stand-by dim level: 10%/20%/30%/50%
	.)))	Detection Area Set up detection area: 25%/50%/75%/100%
	5m 10m 15m	Remote Distance Toggle bottom can set the remote distance of remote control and sensor.

Table inside Q1/Q2/Q3 remarks:

Scene Options	Detection Area	Hold Time	Stand-by period	Stand-by dim level	Daylight Sensor	Induction model
QS1	100%	5min	10min	10%	30Lux	Hs
QS2	100%	10min	30min	10%	Disable	Hs
QS3	100%	20min	30min	10%	Disable	Hs

Remote control and code setting conversion

1.DIP switch setting convert to remote control Press any bottom except "RESET" on the remote control, and the sensor settings convert to the function currently selected by the remote control.
(No function button settings invalid)

2 remote control convert to DIP switch setting
 a. Press the "RESET" button on the remote control, and all settings return to the DIP switch settings of the sensor.
 b. Turn off the power, toggle any DIP switch,connect to the power, and all settings return to the DIP switch settings when supply power again.

Unique design of infrared transmitting device

3m Max.

4m Max.

5m Max.

5m

10m

15m

5m Level   10m Level   15m Level