HDL®

User Manual

Multi functional Sensor

SB-CMS-12 in1

buspro

www.hdlautomation.com

Document updates:

Version	Date	Description
V1.0	2015.01.22	Finish new document

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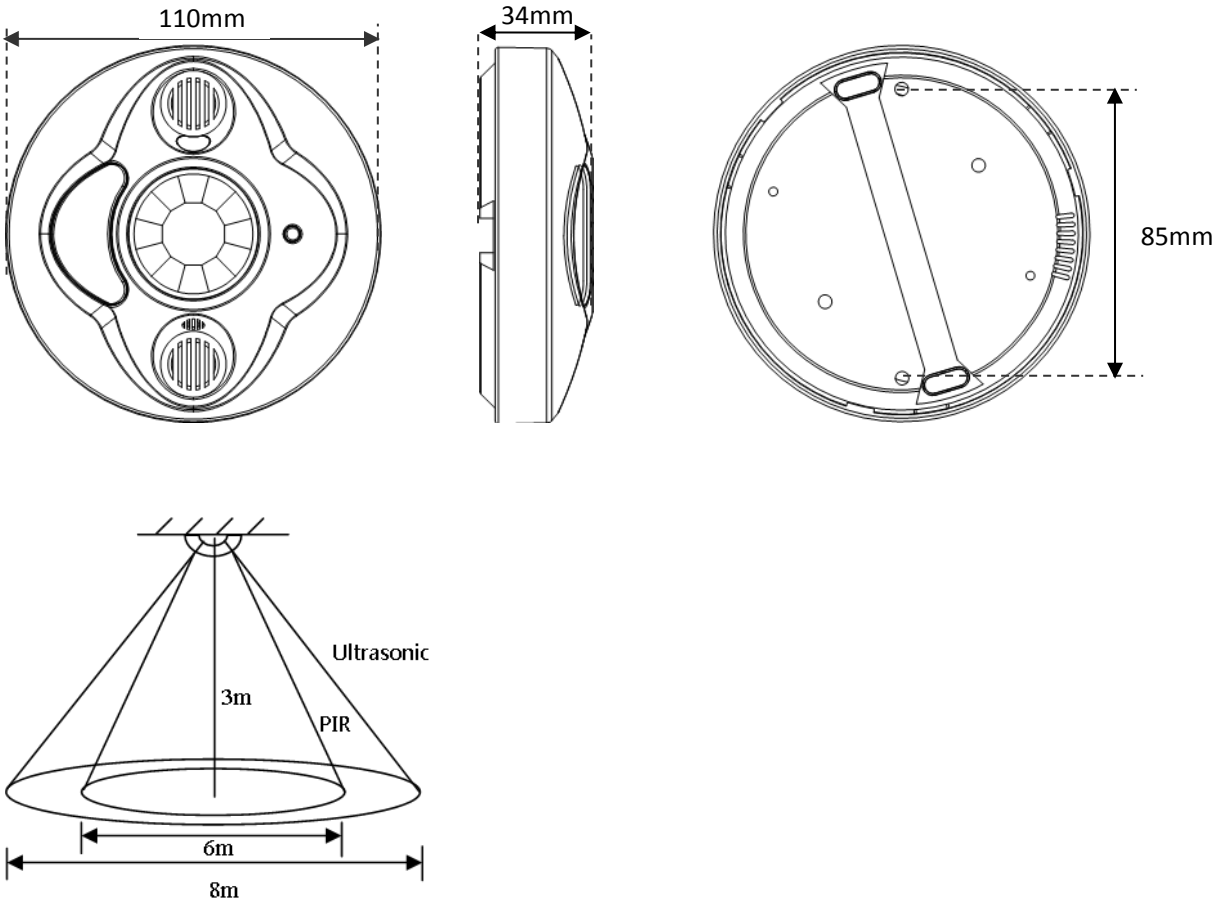
1. Overview

1.1 General Information

1.1.1 Description

The 12 in 1 sensor can detect temperature, motion, LUX, ultrasound, IR, and dry contact inputs. Using a 2CH 5A relay output and logic block, these inputs can be combined to meet the needs of different applications. The unit is also able to fully integrate with HDL security solutions and some 3rd party security systems.

1.1.2 Mounting



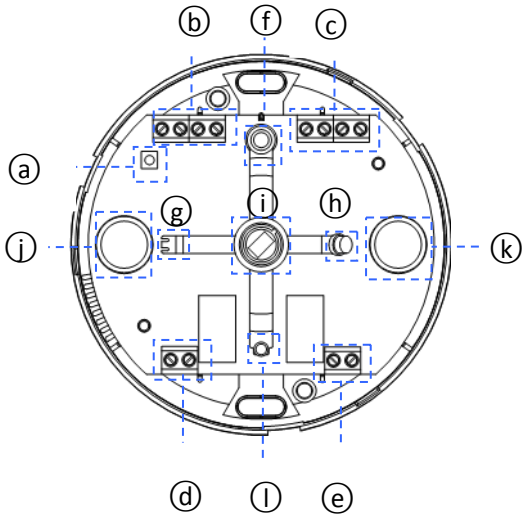
Detect range

- Celling mount Installation

1.2 Functions

- Detection of temperature, Lux, IR motion, Ultrasonic, 2 dry contact inputs, and 2 external inputs
- 2 logic relations: OR、AND
- 24 logic blocks, these have a maximum of 9 logic inputs, and up to 20 control targets in each logic block
- 2CH 5A Relay output
- Proportion Integration Differentiation (PID) algorithm to ensure constant luminosity
- Reception of 40 IR control commands
- Transmission of 240 IR control commands
- 24 programmable logic blocks
- Integration with existing security systems
- Support upgrade from the HDL BUS

1.3 Device Description



ⓐ. Programming button
ⓑ. Dry contact 1、2
ⓒ. HDL Buspro
ⓓ. Relay output
ⓔ. Relay output
ⓕ. LUX sensor
ⓖ. Temperature sensor
ⓗ. IR Emitter
ⓘ. PIR sensor
ⓙ. Ultrasonic sensor
ⓚ. Ultrasonic sensor
ⓛ. LED indicator

2. Safety Precautions

- When mounting the device the tightening torque of screws cannot exceed 0.1Nm.
- Care must be taken when connecting the devices bus interface.
- Never connect AC current to the Bus wire as this will cause irreparable damage.
- Avoid contact with liquids or corrosive gases.

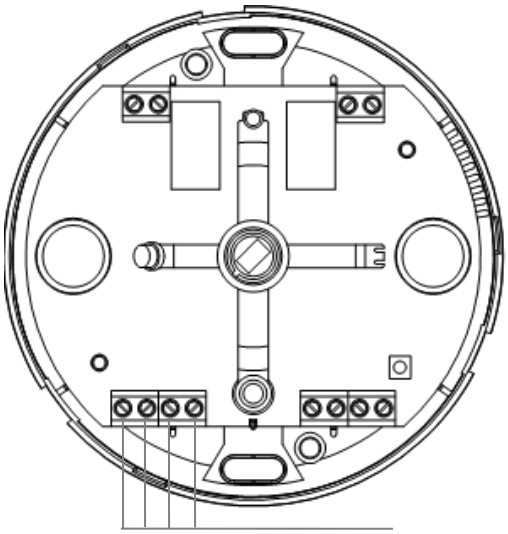
3. Technical Data

Electric Parameters:	
BUS power supply	DC12-30V
Static power consumption	40mA/DC24V
Dynamic power consumption	90mA/DC24V
Range of temperature sensor	-20℃to 60℃
IR transmission frequency	38KHz
IR transmission distance	4m
Illumination detection range	0-5000Lux
PIR sensing range in diameter	6m (install height-3m)
Ultrasonic sensor in diameter	8m
Environmental Conditions:	
Working temperature	0℃~45℃
Working relative humidity	Up to 90%
Storage temperature	-20℃ to +60℃
Storage relative humidity	Up to 93%
Approved	
CE	
RoHS	
Production information：	

Dimensions	110(Diameter)×33(mm)
Weight	206.7(g)
Housing material	Lens, ABS
Installation	Ceiling mount
Protection degree	IP20

4. Installation

4.1 Wiring



HDL Buspro

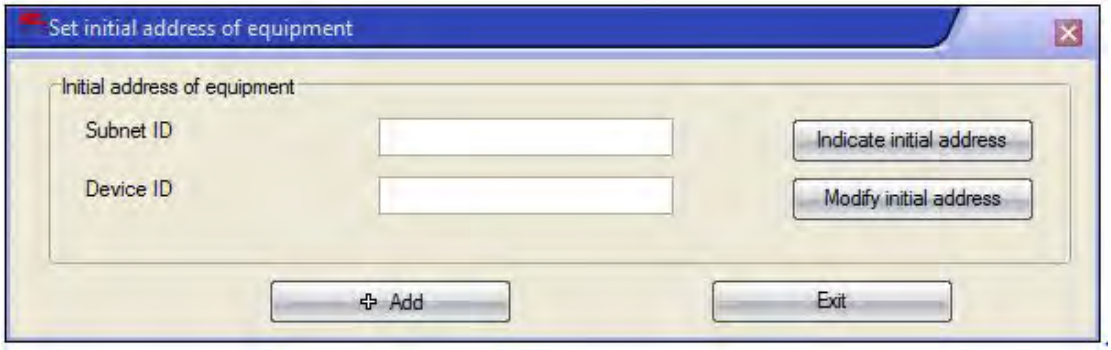
4.2 Commissioning

Method One:

a) Open the HDL-BUS Pro Setup tool.

b) Press and hold the programming button located on the underneath of the device until it turns red.

c) Using the software, click on ‘Address management’, and select the ‘Modify address’, the window below will then be displayed.



d) Click the “Indicate initial address”, the device ID of the 12in1 sensor will then be shown. If you wish to modify the address, fill in the new address, and click the “Modify initial address”. Click the “+Add” button, and the module will be included in the “ON-line devices” list.

Method Two:

a) Open the HDL-BUS Pro Setup tool.

b) Click the search button and a new window will then appear, click the fast search button to search for online devices. Then click the “Add all” button, the devices which are found will then be added to the “ON-line device” list.

5. Software Configuration

5.1 Basic settings

5.1.1 Changing the device ID

Every HDL Buspro device has one Subnet ID, and one Device ID. The Device ID should be unique in its subnet, and the Subnet ID should be kept consistent with the Gateway (typically the SB-DN-1IP or HDL-MBUS01IP.431).

5.1.2 Setting The LED Indication

Enable or disable the PIR/Ultrasonic LED indicator.

If enabled the LED indicator will turn red when the PIR detects movement, the same indicator will turn green when the ultrasonic sensor detects movement.

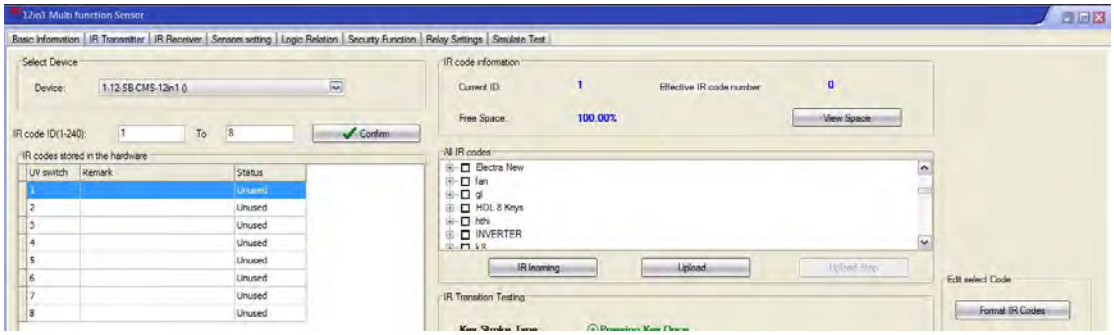
5.2 IR Transmitter

The 12 in 1 has an IR (infrared) Transmitter, which can be used to control a TV, DVD, AC, or any common IR controlled appliance.

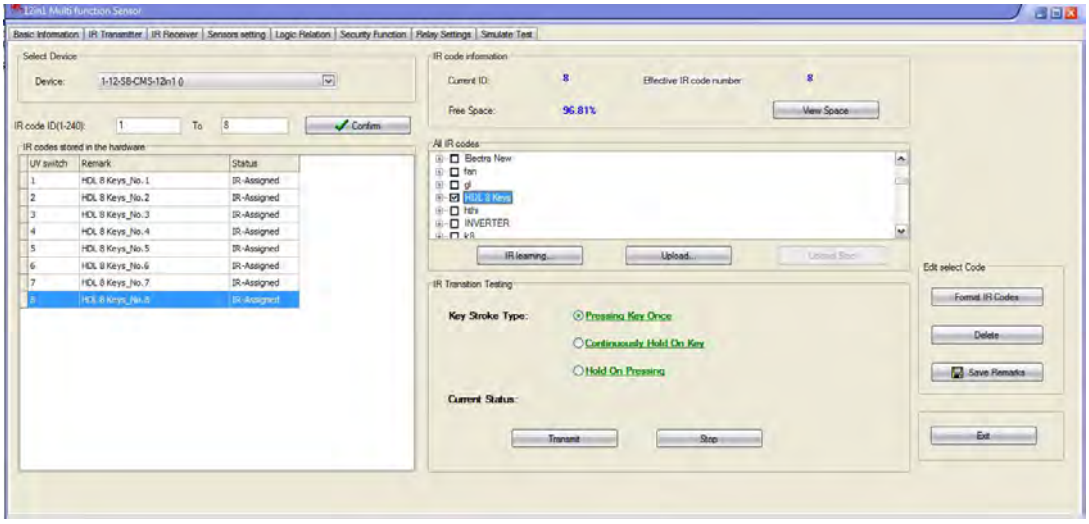
To enable the 12 in 1 to control the IR appliances it may be necessary to upload the IR codes to the device directly. This can be done via the HDL-BUS Pro Setup tool, the setup tool may already have the needed codes under the 'All IR Codes' window. If the codes are not present, you need to use IR Learner to learn codes first.

Below is an example to upload the panel codes to 12in1:

a) Input a range for the IR code ID, here the range is 1 to 8, click 'Confirm'



b) Select 'HDL8 Keys' in the 'All IR Codes' window, and click 'Upload', these codes will be shown in 'IR codes stored in the hardware' list. The key status will then change to 'IR-Assigned'.



Tips:

when use buttons to control 12in1 to send out codes,set the button ‘key type’ as the universal switch, and then set parameter1 (Switch no.) to correspond with the UV switch number in the 12in1, the parameter2 (Switch Status) is ON.

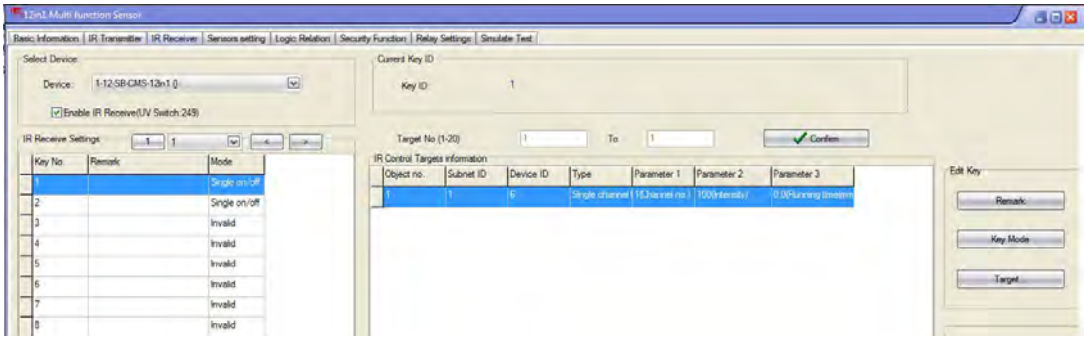
Format IR Codes: All the IR codes in the 12in1 will be deleted.

Delete: Delete the IR code that is selected.

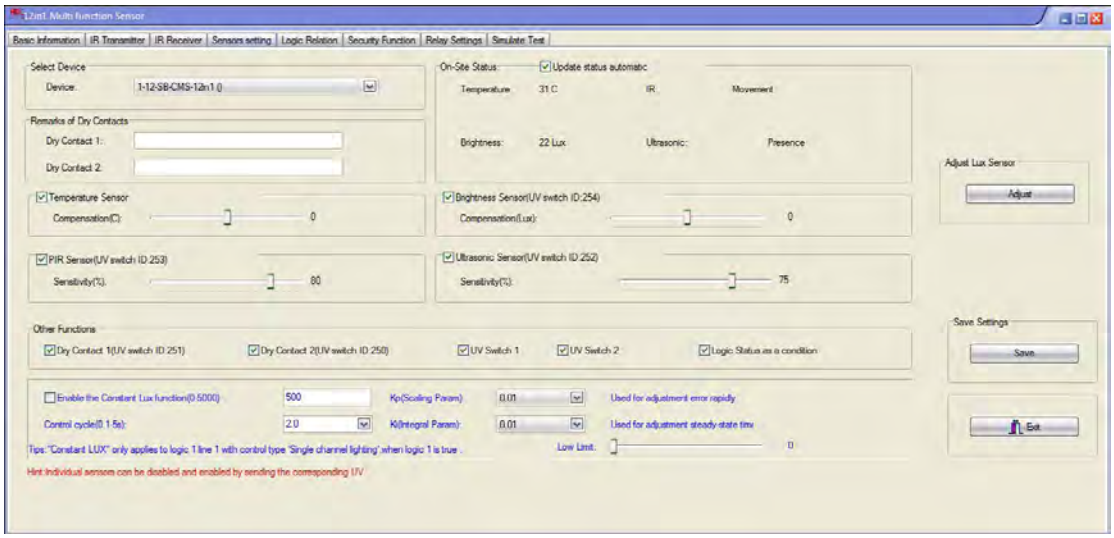
5.3 IR Receiver

It is possible to send the UV switch 249 ‘ON’ command to enable or disable the IR Receiver. Generally it works with HDL IR/RF Remote Controller (HDL-MTIRW), which has built-in HDL self-defined IR codes, can control HDL panels/sensors directly. The 12in1 can support up to 5 pages, and a total of 40 keys.

The below example shows when the first button being pressed in panel page 1 of HDL-MTIRW, this will trigger the dimmer/relay (1-6) to turn channel 1 on or off.



5.4 Sensor settings



5.4.1 Basic Info

- Remarks

It is recommended that you name the dry contact in order to differentiate it from other similar devices.

- On-Site Status

You can check the real-time values of sensors by enabling the ‘Update status automatic’ tab.

- Compensation

You can adjust the temp/lux sensors by giving them compensation values, according to the environment of your installation place.

- Sensitivity

The PIR and Ultrasonic sensors have an adjustable sensitivity; this decreases the possibility of the module being falsely triggered.

- Other Functions

Additional features and functions are located in the ‘other functions’ tab. The functions included under this tab are dry contact1/2, UV switch1/2, and logic status as a condition.

- UV Switch ID

Both the sensors and the dry contacts have a different universal switch ID. This universal switch ID can be enabled or disabled from the panel or other devices.

5.4.2 Constant Lux function

The constant Lux function enables the illumination level of a room to remain unchanged regardless of external conditions. If for instance the sun is suddenly covered by cloud, the illumination level of the lighting will increase.

- Enable LUX(0-5000lux)

Enable the constant lux function, set a certain brightness value by user.

- Control Cycle(0.1-5s)

Set the time for the sensor to detect the surrounding brightness then control the lights to keep the constant lux in the room.

-Kp (Scaling Parameter)

It's the speed parameter to adjust the lux, the larger the Kp is, the more sensitive it is.

- Ki (Integral Parameter)

It's the steady parameter to adjust the lux, the smaller the Ki is, the more accurate final output it can provide.

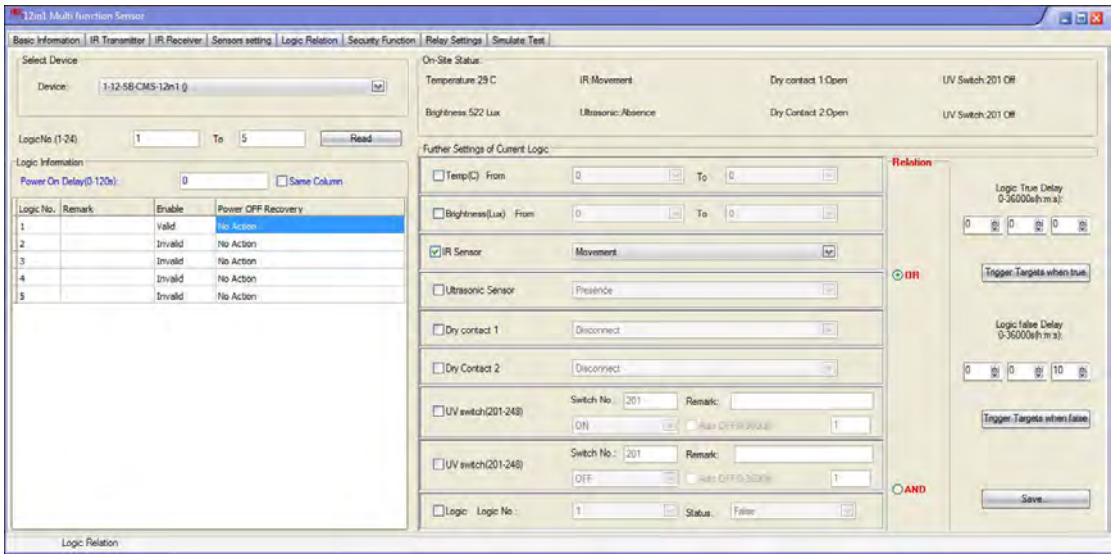
Note: the constant lux function only can work in logic 1 when true, and the output is single lighting control type.

5.4.3 Adjusting the Lux Sensor

Adjusting the Lux sensor is not recommended, a user can do so however using the password: 85521566.

5.5 Logic Relation

There are 24 logics present in each logic block, in each of these blocks, 9 inputs/conditions can be set. The 9 inputs/conditions enable 20 targets to be triggered when the logic is true, and 20 targets to be triggered when the logic is false.



5.5.1 Logic Information

- Power On Delay (0-120s)

The power on delay is specifically designed for ‘Power Off Recovery’ (if you select ‘true’ in the ‘Power OFF Recovery’, you may get jam on the bus when initializing. you can set ‘Power On Delay’ to avoid this.)

-Same Column

If the ‘same column’ feature is enabled, the properties of all logics can be changed simultaneously.

-Logic No.

There are up to 24 logics available; it is recommended that a remark is made concerning the function of the logic to aid installation and trouble shooting.

-Enable

Using the ‘Enable’ tab a logic can be enabled or disabled.

-Power OFF Recovery

There are four ways to set the status for power off recovery function, they are as follows:

- No Action：No action when power on
- Power-off status：Return to the status before power off
- True：Set the logic as True when power on;
- False：Set the logic as False when power on;

- On-Site Status

This enables the values detected by the sensors to be displayed.

5.5.2 Further logic settings

There are 9 logic conditions available, this allows a user to select the logic that best meets their requirements. The logic conditions are as follows.

- Temperature（°C）

The temperature logic condition is met when the temperature is within the range set by the user. (The temperature range is between - 20°C~60°C)

- Brightness (Lux)

The brightness logic condition is met when the illumination level is within the range set by the user. (The brightness range is from 0~5000)

- IR sensor

The IR logic condition can be set as either ‘movement’ or ‘no movement’.

- Ultrasonic sensor

The ultrasonic logic condition as be set as either ‘present’ or ‘absence’.

- Dry Contact 1

The first dry contact condition can be set as either ‘disconnect’ or ‘connect’. In ‘disconnect’ an open circuit meets the logic condition, whereas the ‘connect’ logic condition is met by a short circuit.

- Dry Contact 2

This allows the second dry contact to be used as a logic condition.

- UV switch (201 - 248)

The UV switch can also be used as a logic condition, its range is from 201-248, and the status can either be set as on or off.

The auto off feature has a variable delay from 0-3600 seconds, if the auto off function is selected the status of the UV switch will go off automatically at the time set by the user.

- Logic

The logic status can either be true or false, a secondary logic can then use the status of the first logic as a condition.

5.5.3 Relation

If more than one logic condition is selected, the condition of both logics can either be 'AND' or 'OR'.

- AND

When all the logic conditions are met, the logic is 'true'.

- OR

When one logic condition is met, the logic is 'true'.

5.5.4 Triggering targets

Regardless of if the logic is true or false, a target can still be triggered.

- Logic true delay

When the logic is true, a time delay can be selected. This enables a delay before the target is triggered.

- Trigger targets when true

When the logic status is true up to 20 targets can be triggered.

- Logic false delay

When the logic status is false, a delay time can be selected. This enables a delay before the target is triggered.

- Trigger targets when false

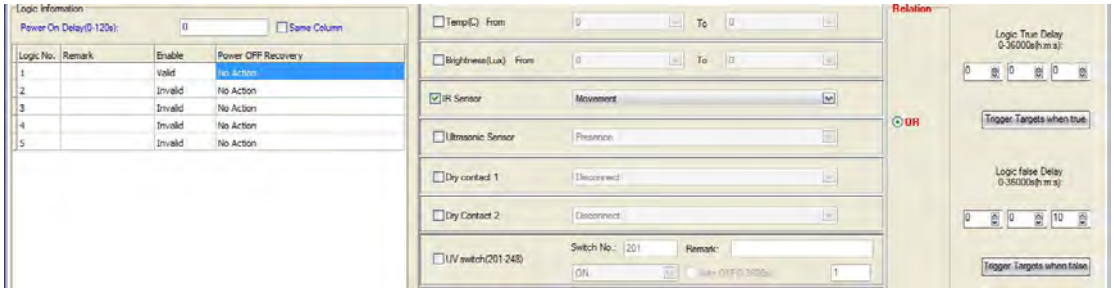
When the logic status is false up to 20 targets can be triggered.

5.5.5 Application

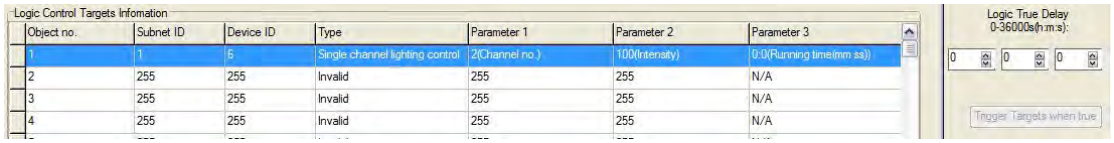
- Application1

As a hypothetical scenario a user wishes to turn on a light when movement is detected, then turn off the light when no movement is detected for 10 seconds. To enable this scenario a user should follow the below steps:

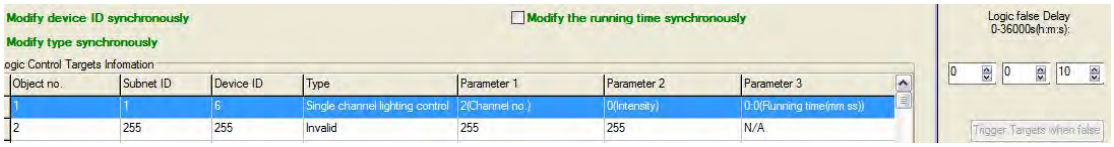
a) Enable logic No.1, Set IR Sensor - Movement as the condition



b) Logic true delay is 0s, in the ‘trigger target when true’ window, input dimmer/relay ID, here is 1-6, parameter 1 is channel 2, parameter 2 is 100.



c) Logic false delay is 10s, in ‘trigger targets when false’ window, turn off corresponding device channel 2.



- Application2

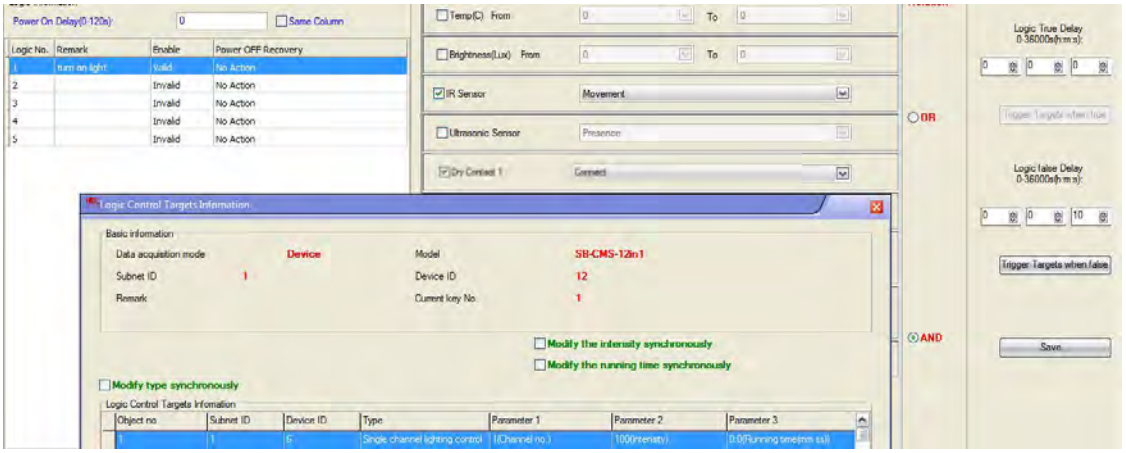
As a hypothetical scenario a user wishes to turn on the lights and air conditioner automatically when people enter a meeting room. And turn off them after leaving. To enable this scenario, a user should follow the steps listed below:

a) Enable logic No.1, Set IR Sensor - ‘Movement’ as one condition

b) Set dry contact 1 - ‘Connect’ as the condition(Suppose dry contact 1 has been

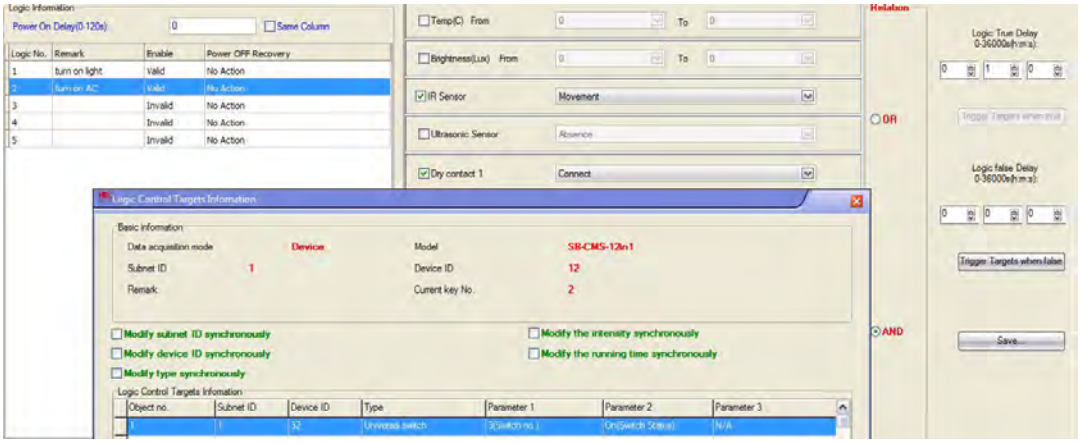
connected with a magnetic contact and used to detect the door status)

c) Set the relation for the logic is ‘AND’, turn on dimmer(1-6) channel1 when true.

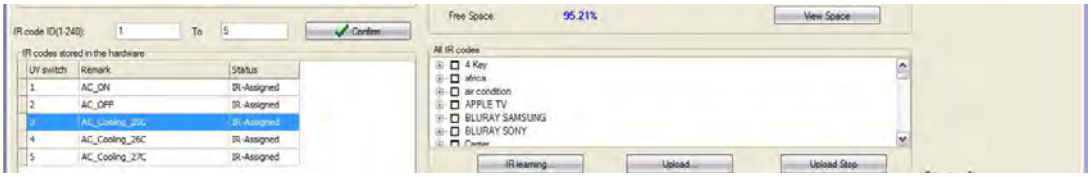


d) After 1 minute turn on the AC and set the temperature at 25℃:

Set the IR Sensor to ‘Movement’ and then set dry contact 1 to ‘Connect’ as an input condition, and the relation for the logic is ‘AND’, which after a delay time of 1 min will turn on the AC when true.

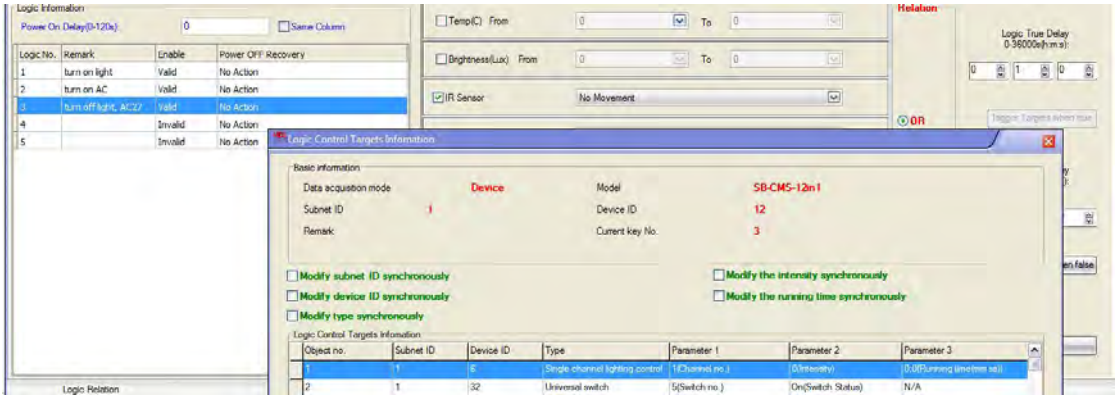


The UV switch number can be checked via the IR emitter, in the screenshot the 3rd UV switch is 25℃.



e) 1 minute after people leave the room the lights are turned off, and the temperature is set at 27℃: Then set the IR Sensor to ‘No Movement’, and the delay time to 1 min. Turn

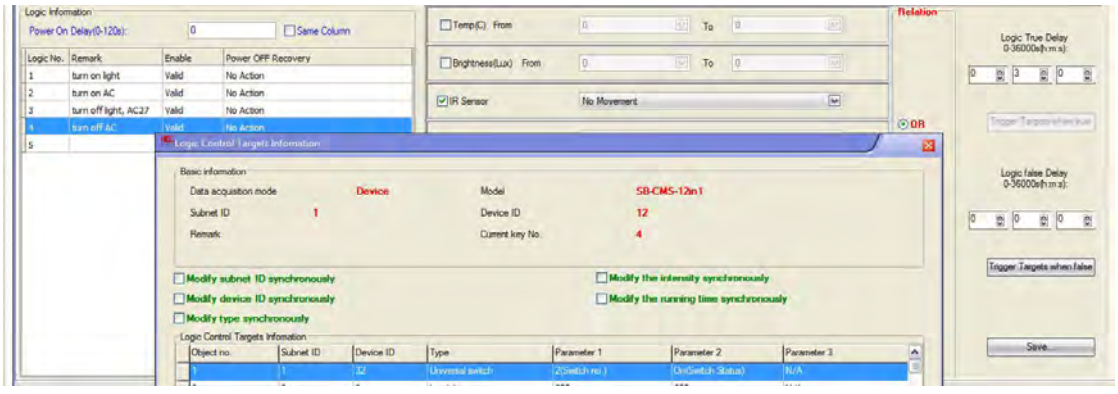
off light(1-6) channel1 and AC go to 27℃ when true.



The UV switch number can be checked from the IR emitter. In the below example the 5th UV switch is 27℃

f) After the room has been vacant for 3 minutes, the AC is then turned off automatically.

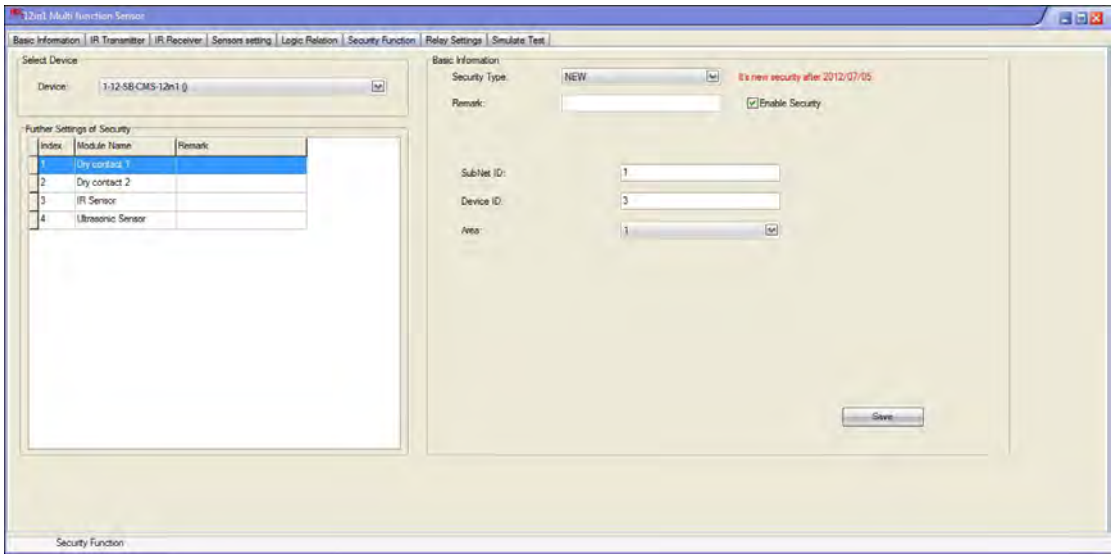
Set IR sensor to ‘No Movement’, with a delay time of 3 min,and then turn off AC when the status is true.



The UV switch can be checked via the IR emitter, in the screen shot the 2nd UV switch is ‘OFF”.

5.6 Security function

Both the connected and disconnected states, with the movement or no movement states of the IR sensor can be set as security module triggers. The presence or absence states of the ultrasonic sensor can also be set as security module triggers.



If the dry contact sensor is used to detect the door state for security purposes, the steps below should be followed:

a) Select ‘dry contact 1’, the background of the selected contact will turn blue.

b) Select ‘NEW’ if the security module firmware version is 2012/07/05 or after, select ‘OLD’ if the security module firmware version is before 2012/07/05.

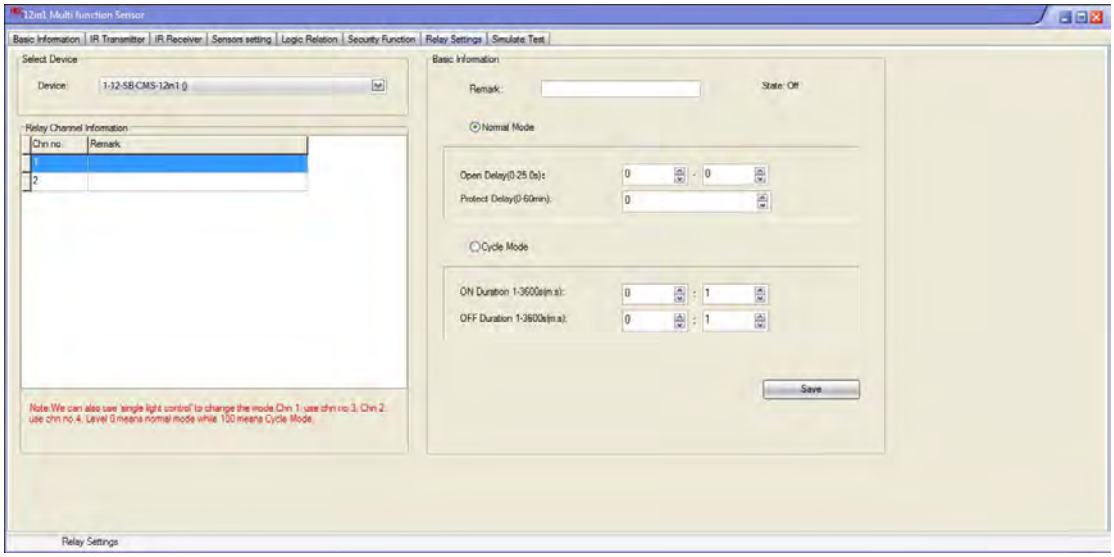
c) Enable security function

d) Input the security module’s Subnet/Device ID, totally 8 areas can be selected, here is area 1.

For further configuration, please refer to the security module’s user manual.

5.7 Relay Settings

There are 2 relay channels used by the 12in1 sensor, and each channel has 2 modes, normal mode and cycle mode.



5.7.1 Normal Mode

- Open Delay

The open delay has an ON delay range of 0-25 seconds.

- Protection Delay

A protection delay can be set, if for an example a user sets a 1 minute delay:

Now the relay channel is on, you turn it off. If a user waits 25 seconds, and then tries to turn on the module, it will not activate for a further 35 seconds. This is useful for some loads that do not allow to be turned on/off frequently.

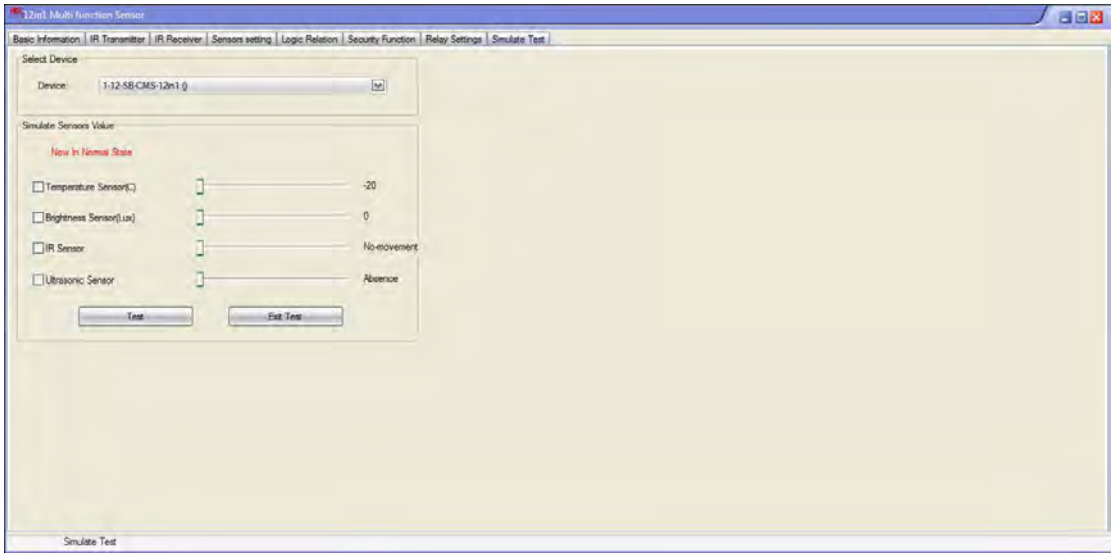
5.7.2 Cycle Mode

If you enable the cycle mode, it will automatically give an “on-off-on-off” operation; the on/off duration time’s setting range is 1-3600 seconds.

5.7.3 Change Modes

Channel 3 and channel 4 are virtual channels, they are used to set the normal mode and cycle modes for channel 1 and channel 2 respectively:

5.8 Simulated testing



To simulate the logic conditions a user has set, they may give the sensors values or statuses. (When the software is running the simulation, the real-time values will be bypassed, and replaced by the values given by the user.)

6. Note