



# LIGHTING CONTROLS

## FULL LIGHTING CONTROL'S CATALOG | 2020

MRBAS Building Lighting Control System can be connected to one network such as "Relay ON / OFF System", "DALI Dimming Control System", "Wireless Dimming Control System" to enable efficient control through interlocking control. In addition, the recently released RLCM (Room Lighting Control Management) does not require a separate computer and software, and the automatic recognition function automatically sets the basic program, so you can easily and conveniently build a lighting control system.

**MRBAS**

[www.mrbas.co.kr](http://www.mrbas.co.kr)



# mrbas

With over 30 years of experience in lighting control in Korea, MRBAS provides excellent and reliable lighting control technology solutions in the building lighting market, which has recently changed into LED lighting. We have three types of systems, Local Control (Level-1), Smart Control (Level-2), and Full Lighting Control (Level-3), providing various solutions according to the size of the building.

## LIGHTING CONTROLS

Participated in 2020 Frankfurt and USA LIGHT FAIR Exhibition

Lotte World Tower, Incheon Airport Terminal 2

Why is ELC system the perfect lighting control solution?

Utilization value of Wireless Dimming Module

Introduction of ROOM LIGHTING CONTROL MANAGEMENT

About LED Lighting System

ELC SYSTEM

DALI Dimming System

Wireless Dimming System

Room Lighting Control Management

Softwares

And MRBAS lighting control products







ON MAY 5<sup>TH</sup> ~ 7<sup>TH</sup> 2020, LAS VEGAS, USA, WE WILL EXHIBIT OUR PRODUCTS AND SYSTEM WITH OUR PARTNER COMPANY PLC MULTIPOINT AT LIGHT FAIR.



## AT LAS VEGAS, LIGHT FAIR IN 2020, WE INTRODUCES NEW TECHNOLOGIES AND PRODUCTS TO OUR GLOBAL CUSTOMERS

MRBAS & PLC Multipoint will showcase new products in addition to the existing products already applied to large Korean projects.

- ELC System is reliable Lighting Control System already applied to domestic and foreign projects.
- Dimming Controls is a variety of products such as 0-10V Dimming Control Module, DALI Dimming Module, Wireless Dimming Module, etc., which can be installed in the appropriate area for efficient control.
- RLCM (Room Lighting Control Management) has the function of Plug & Play and does not require a separate PC and Software. The switch and the control module are connected to the existing LAN cable, and when connected, each device automatically recognizes the address and the basic program is automatically set to control.
- Smart Touch Switch is a multi-function switch that smartly operates multiple Scene modes of LED Lighting to increase work efficiency.
- The IR switch & MRBAS BLE APP can control not only LED Lighting but also Heating & Cooling of Air-Conditioning by IoT Switch for convenient temperature and lighting control is possible.

## LIGHT + BUILDING IN FRANKFURT, GERMANY, IN 2020, WE WILL INTRODUCE OUR NEW PRODUCTS TO OUR GLOBAL CUSTOMERS.

- At this exhibition, 2,000 lighting control and related companies from around the world will participate and showcase cutting-edge control and lighting equipment.
- Recently, with the spread of LED lighting and the development of new products, new technologies are being developed rapidly, and we will introduce new products to visitors as new market items.
- The new RLCM (Room Lighting Control Management) is a system that automatically controls each device as soon as the switch and control module are connected to the existing LAN cable and automatically sets the basic program. And we are planning to introduce the configuration of reliable system to global customers based on the installation experience in Korea. The experience of installing Lotte World Tower will be enough to prove the reliability of our technology in any project in the world.
- The reliability and durability of our products will be introduced to global customers as a result of more than 2,000 project installation experiences in the Korean market over the past 30 years. Also we will introduce new ideas to the global market that are built on the reliability of such products.



WE WILL BE SHOWCASING NEW LIGHTING CONTROL TECHNOLOGIES AND NEW PRODUCTS AT THIS EXHIBITION, AS WELL AS THE UPGRADED CONTENT OF OUR EXISTING SYSTEMS TO OUR GLOBAL CUSTOMERS. PLEASE VISIT OUR BOOTH AND CHECK NEW TECHNOLOGIES.



IN OCT 14 ~ 16, 2014, THE 2ND LOTTE WORLD SHOPPING MALL WAS OPENED. THE LIGHTING CONTROL WAS INSTALLED SUCCESSFULLY AND OPERATED THE LIGHTING AT THE SHOPPING MALL PERFECTLY. ALSO IN 2015, WE STARTED TO INSTALL THE LIGHTING CONTROL AT LOTTE TOWER. AT DEC 20, 2016, THIS DATE IS THE COMPLETION DATE AND WE HAVE NAMED OUR COMPANY THAT INSTALLED LIGHTING CONTROL AND POWER CONTROL IN TALLEST BUILDING IN KOREA FOR HISTORY.



***The 2nd Lotte World is the project to be established as a Landmark Building in Korea. The low floors were completed and opening was last Oct 13 ~ 15, we have made every effort to check the Lighting Circuits and Lighting Fixtures for this project for Perfect Opening.***

In Oct 13, 2014, the Avenue Department was opened and in order, the other department such as Shopping and Entertainment was opened and showed its merits to the public. With the luxurious interior decorations and outlines of luxury stores are revealed to show its true value. Despite the fact that tower is still under construction, it is becoming a popular spot for many regular customers and tourists. It was obvious that many related and many partner companies made their efforts to complete the construction.

In early 2013, our Lighting Control System was selected as lowest bid in the bidding between Lotte Construction and the Lighting Control related companies. Along with the gradual construction of architecture, our system was also delivered in stages and the examples of special construction from this site was it used the LAN network for the communication line. The communication line that has been installed at each floor and each area, we have established the communication network through our SCU (System Communication Unit) that can acts converter for ELC Network. We have installed the 30 EA of SCU to utilize the existing LAN Network as the Lighting Control Communication Line and also we have managed to secure the smooth and quick communication network with the speed of 100MBPS.

Also, as another feature of Lighting Control System, there is no switch installed in the area where regular customers stay so that light is not turned OFF by people. Our ELC System is able to monitor the status of each relay on each Lighting Control Panel and it was manually operated by facility personal. If necessary, the site control is possible in the nearest electrical room.

In large store, we have installed additional software for controlling the lighting and also the

remote control is possible by monitoring the status of lighting and graphic screen of entire store itself.

From the Central Monitoring Room, Integrated Monitoring Center and Main PC, our Lighting Control System is operated as Lighting Control System capable of simultaneousness remote control and status monitoring to recognized as convenient operating system for the Lotte Facility Team.

At early 2015, we started to supply and install the Lighting Control System and at early 2017, we have completed the actual completion. The high-level area of tower also used the data communication network such as IBS (Fiber Optic Network) to establish the data communication for each floor's Lighting Control Panel.

We have installed the DALI Dimming Module & ON/OFF Control for Office area for each LED Luminaire to control the individual control for each LED.



THE INCHEON INTERNATIONAL AIRPORT 2ND TERMINAL WHICH IS EXPECTED TO BE COMPLETED AND OPENED IN THE SECOND HALF OF 2017 AND THIS IS ONLY THE THIRD PHASE CONSTRUCTION OF INCHEON INTERNATIONAL AIRPORT. LIGHTING CONTROL FOR AREA ACCORDING TO THE AIRLINE FLIGHT SCHEDULE INCLUDING THE CHECK-IN BOARDING TIME IS CHARACTERISTIC OF THE LIGHTING CONTROL SYSTEM AT INCHEON INTERNATIONAL AIRPORT, WHICH IS NOT AVAILABLE AT AIRPORTS AROUND THE WORLD.



***Incheon International Airport 2nd Terminal is in construction due to to be completed at Sep 2017. We will be supply the all systems by the end of 2016 and from the beginning of 2017, we have left for the commissioning of the system until completion.***

We have already participated in Incheon Airport for Phase 1, Phase 2 and Transportation Center. Therefore we know very well for the conditions of Incheon Airport Area. The Lighting Control in this area is the infrastructure that considers reliability the most important compared to other buildings. Therefore, the system should be Redundant and Stand-Alone Type control panel structure so that even if there is one failure, it can be replaced it. Also the lighting is needed to be provided due to environment and schedule of the airport where the landing and takeoffs are frequently happened. it is a natural condition that the system should be linked control with the air navigation server.

According to the circumstances & conditions, our Lighting Control System provides the following systems and programs with great features.

- .. First, the Central Monitoring System is configured as redundant structure so that even if one server fails, it will automatically switches to another standby server.
- .. Second, each circuit has the current sensing circuit so that each electric power by each electric circuit is provided every 15 mins to BEMS System and Monitoring System. It is used as a monitoring function of the total & individual power loads.
- .. Third, it is possible to control the schedule according to the sunset/sunrise time.

We did not have to make such an unreasonable task of setting the program for season schedule control every time.

.. Fourth, it is connected at air navigation server to interlock control with Lighting Control for each entrance & exit area.

By the various functions and control programs, the Incheon International Airport 2nd Terminal is upgraded for Lighting Control System than existing 1st & 2nd Terminal.

Our Lighting Control System is installed at Incheon International Airport 2nd Terminal with reliability. It is expected to see the effect of building value of this facility as energy saving & efficient lighting load management.



## WHY IS THE ELC SYSTEM A PERFECT LIGHTING CONTROL SOLUTION ?



*We pursue the perfection & convenience for our ELC Lighting Control System. We have created new storm in lighting control market and it surprise the world-wide market with our new Lighting Control System. Explained the most important contents for the reasons here.*



**Each Control Panels, Switches, Sensor Modules and DALI Masters are classified as Device and this device is granted with address for 001-999 to operate it.**

The groundbreaking specification of our ELC System is configured with same communication protocol for every device and it has Hardware Address too. The Relay Module, Sensor Input Module, Program Switch and DALI Master for Control are all connected by same communication protocol also it is possible to connect each module by at least 001 - 999 address to achieve reliable network. If the number of control points increase, the communication becomes heavy and the communication becomes unstable. In order not to lose such reliability, we have created the unified standard for each device for standardized result.

**Stand Alone Controller : Each Relay Module has its own independent CPU internal and it allows continuous control even the other devices & central monitoring device are disabled.**

There are several types of Relay Modules that can be operated in the ELC System. 6sRM(6 Relay Module), 4sRM(4 Relay Module), 4eRM(4 Elec.Sensing Relay Module), 6eRM(6 Elec.Sensing Relay Module).

All of these Relay Modules have the Stand Alone Controller function. Even if monitoring device, communication device and other Relay Module becomes disabled, the program stored in the Relay Module's CPU is controlled by this program unless it is deleted. The contents of the program is included with schedule control, group & pattern control, preset event control and control of corresponding relays by the sensor.

The special feature is that Global Link Control is also possible. In TLC & SLC System, the Global Interlocking Control is possible by SLINK but from ELC System, the Global Interlocking Control is possible without SCU. In other words, lets say there are 3 EA of Relay Modules that are connected by the communication line and the SCU (Communication Device) is disabled but the communication line is established. The 3 EA Relay Modules are capable of pre-programmed control and when the sensor event signal is triggered, the 3 EA of Relay Modules will operate at same time. This is the true Stand Alone function.

**The ON/OFF & Dimming System can be integrated in ELC System.**

The ON/OFF Control is controlled by 20Ampere latching relay and LED Dimming Control is controlled by DALI Dimming Module & Wireless Dimming Module and recently this configuration is the standard concept for Dimming System. The database is needed to be configured by the software program and in order to control remote control for each relay and dimming module individually and it group, communication protocol with each hardware device and interface development for each device in software should be preceded. Our Smartrol v.3.1(GS & BTL Certification)

has already enabled various programs for such devices. The ELC System is configured as convenient operating in various forms such for DB configuration, program setting, data transmission and gathering information for local site status.

Therefore, our ELC System can be operated with ON/OFF and Dimming function together and it is already been approved as Excellent System in World-Wide Market.

**It has Self-Diagnosis function for convenient maintenance.**

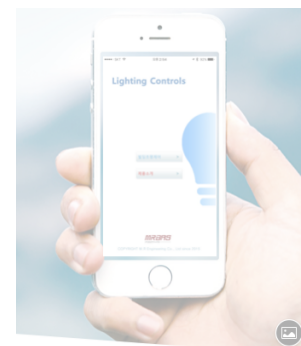
The latching relay has auxiliary contact point and its role is very important. When the relay is actually in operation, the relay status will be transferred to the monitoring software via this auxiliary contact point. If this auxiliary contact point is not in operation, the monitoring software will show the relay status as failure or disable by the self-diagnosis function. Also the DALI Dimming Module is operated as same function. Monitoring the status of different modules attached to a number of LED Luminaire is an important factor. The ability to judge the failure of each LED Luminaire from monitoring software has now become the most important point.

**MODBUS SCU & Smart-Phone App Program**

The MODBUS communication device is ready and can be easily interfaced with other systems that support MODBUS. Also, the Smart-Phone App with the server and without server can be operated with low cost to configure the system without any computer & software.

**It is easy to adapt to new it technology by enabling continuous technology development.**

Our technology development ability is outstanding. Although our company is small and medium-sized company, we do have organizations and professional employees as Lighting Control specialist. Along with the newly changing technology of the IT market, our Lighting Control technology is also developing. The Wireless Dimming Module used a ZIGBEE Chip and we have developed the Smart-Phone App Program using the JAVA Language. Our ELC System is very easy to integrate with this new IT Technology. Having a source and algorithm of hardware & software, we can easily adapt to the integration of new technologies.



# UTILIZATION VALUE OF WIRELESS DIMMING MODULE

We live in the modern society and we are satisfied with the utility value under the shadow of Smart-Phone. We have naturally learning how to pursue convenience and used to Smart-Phone and it makes us happy smile. However, the Lighting Control & Smart-Phone do not match well. The reason is that to configure the Lighting Control, it is complicated job to install the control related devices at site. In order to control the lighting, need new wiring and piping also it needs to re-arrange the control lighting ZONE of existing LED Luminaire . Once more, it is necessary to re-correct the strong line of electric circuit. It is that Difficult.

**However, if uses the Wireless Dimming Module, no major work or operations is required. Simply install the Wireless Dimming Module on the required LED Luminaire to complete the Construction.**

For this Method, it is described briefly here.

## For small Office or Home, the Wireless Dimming Module can be installed simply.

It is better if the existing LED Luminaire is LED Lighting. The wiring of the existing strong line can be ignored. Remove the LED Lighting Luminaire from the ceiling for a while and install the Wireless Dimming Module on the secondary side of the LED Lighting Luminaire. Then install the Wireless Gateway in proper location and route the UTP cable to nearest PC. The wiring installed in the ceiling is connected to the PC in the most suitable position and if you install the SCU before PC, the simple hardware installation is completed. After, install the Smartrul software to PC. Finally set the control program to finish the installation of simple Wireless Lighting Control System.

As the simple schedule control is executed, the small office now has Lighting Control. If necessary, the remote control & monitoring the status can be performed by Smart-Phone App. Even if person leaves the office with turned ON lamp, it is able to control the lighting from home or at the car remotely. The convenience of Smart-Phone can be enjoyed more and more.

## The installation of Wireless Dimming Module for

## underground parking lights can maximize the effect of energy savings.

Most underground parking lights are always ON. If person intentionally does not manage the lights daily, they should always be ON. The proportion of power consumed by the LED luminaire in the parking lot is increasing. To solve this problem, it is necessary to apply the Lighting Control System but construction is not easy. It is reality that piping and wiring operation work need to be done again but it is not easy. The best way to solve this problem is to install the Wireless System.

A suitable occupancy sensor is installed in the moving line of vehicle & people. The Wireless Dimming Module is installed in each LED Lighting Luminaire. Our Wireless Dimming Module is equipped with an Occupancy Sensor so do not need to install the separate motion detector sensor. It turns ON the Lighting in advance with the moving lines of the vehicle and when the vehicle passes, set the simple delay time to turn OFF the lighting by Control Program to finish the commissioning & construction. In case of LED Luminaire, the Dimming Control is very easy to do. When turned On, the LED Luminaire goes to 100% immediately and when turned Off, it is able to set the Fade Time to gradually decrease the brightness with time difference.

Also, most existing underground parking lot Lighting luminaire are installed as

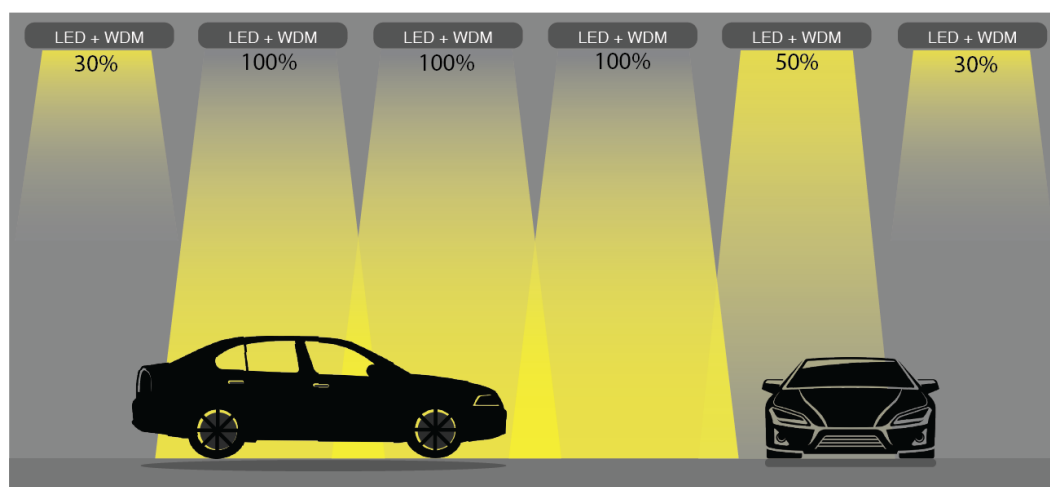
fluorescent lamps. Therefore, for building owners, it would be a way to save the energy by replacing to LED Lighting with long life and energy saving effect.

Able to monitor the lighting status of underground parking lot from central monitoring panel and if necessary, can perform the schedule control and remote control. Also it is able to control by occupancy sensor and remote manual control from monitoring room. As the result, the two-stage control method and other solutions ensure for the energy saving effect to perfect and also it ensures the return of the investment payment to owners.

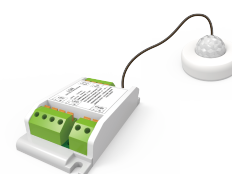
## Operation with EnOcean Switch (Wireless Switch).

This EnOcean Switch is the practical Wireless Switch that does not require the power line or the communication line. Electrical energy is generated by the operation of the switch itself, no separate power line is required.

When using this Wireless Switch & Wireless Dimming Module, it is easy and simple to install the Lighting Control Device in office or meeting room of existing building. Remove the existing fluorescent & tumbler switches and install the Wireless Switch and Wireless Dimming Module for LED Luminaire in that location without separate piping and wiring work. The ON/OFF of individual and group of LED Luminaires, Scene control and Brightness Control are possible.



EnOcean Switch(4 buttons)



Wireless Dimming Module(WDM w/BLE)



Wireless Dimming Module(WDM w/ZigBee)



The value of using the ROOM LIGHTING CONTROL MANAGEMENT starts with your bold choice.

# ROOM LIGHTING CONTROL MANAGEMENT( **RLCM** )

The basics of lighting control are convenient lighting control. In the mean time, energy saving control is to achieve the effect of energy saving. However, recently, more emphasis has been placed on the convenience of individual use of lighting rather than power saving. For example, person "A" wants for 70% dimming brightness and person "B" wants 90% of dimming brightness and they want to simply install and control their each desired dimming brightness. With the lighting circuits and LED lights in each individual room, you want to choose the control method that suits your personal preference.

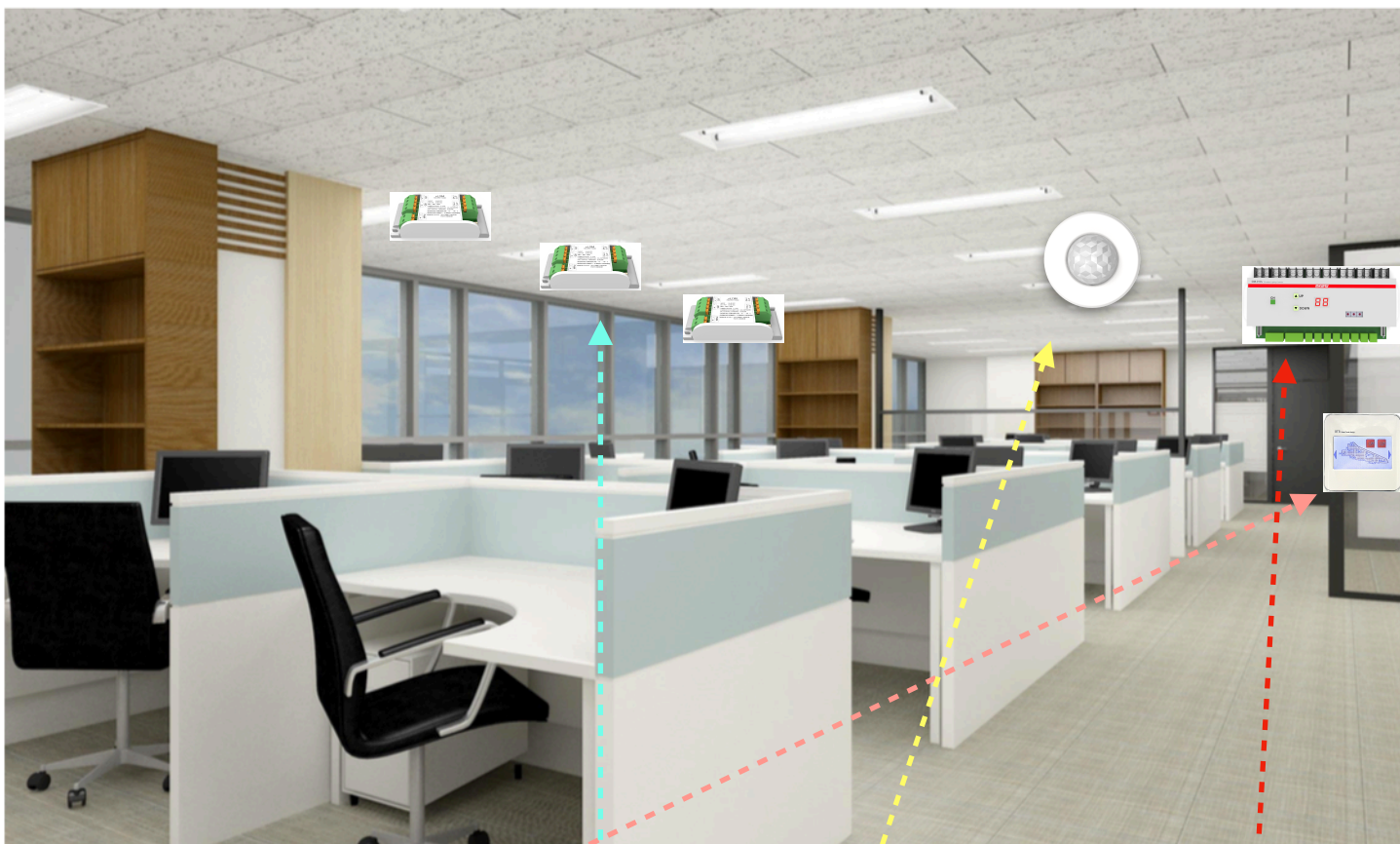
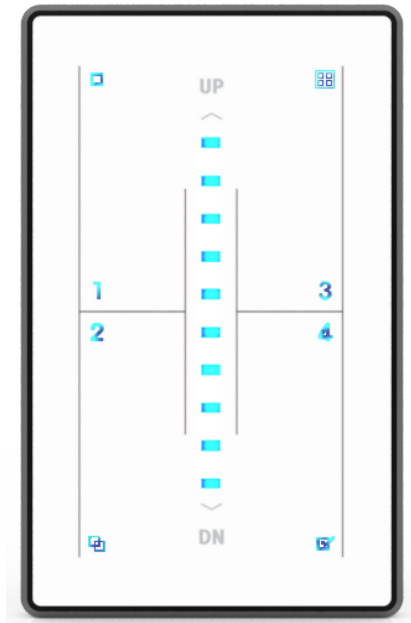
The name of this system is "**RLCM**".

The biggest feature of this system is the hardware automatic recognition setting function. After installing the lighting control products, all items are automatically addressed and the basic program is automatically set up for basic control. And if you do additional program for more detailed control, you can set additional program through smart touch switch or smartphone APP.

If a suitable lighting control system is required for small offices, conference rooms, shopping malls, restaurants, exhibition halls, lecture rooms, etc., this RLCM can be suitably applied. Install DALI Dimming Module (LDM), Wireless Dimming Module (WDM) for dimming switch, relay module, or LED lighting. When power is connected, group ON / OFF control and Scene Dimming control are switched by basic program and smartphone APP.

In addition, each switch is capable of BLE communication, and when the smartphone app is opened, the smartphone and the switch are automatically paired, and the contents of the switch are displayed on the smartphone, and the group and individual, Can be controlled by touching the Scene button.

NO COMPUTER  
NO SOFTWARE  
AUTO SETTING  
AUTO PAIRING



Smart Phone  
w/BLE App.



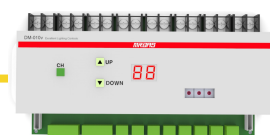
Smart Touch  
Switch



LED Dimming  
Module



Occupancy  
Sensor



0-10 Dimming  
Module(8CH)

## ABOUT LED LIGHTING SYSTEM ...

*In recent years, light fixtures have been installed with almost all the light source elements being changed by LED light, whether indoor or outdoor lighting. One of the reasons are that light sources such as conventional fluorescent lamps, incandescent lamps, halogen, and mercury lamps are less efficient than the LED light source in efficiency and power saving effect. With this trend, the global lighting market is now turning into LED lighting. Some global companies have given up their lighting business due to the loss of competitiveness.*

As you go through the recent lighting exhibit, all the light sources in the luminaire are LED, and the world is coming up with a technological leap forward. The proportion of LED lighting in the 4th industrial revolution will be quite large. Also, it is necessary to newly rearrange the direction of the technology development while the LED lighting and the lighting control of MRBAS are combined in technical matters.

**Currently, the technology that MRBAS implements as "LED lighting system" is as follows.**

.. Developed systems and products capable of controlling individual dimming of LED lighting fixtures and have already installed experience in large-scale domestic projects.

.. Integrated control of all lighting control was made possible by extending DALI and Wireless communication systems to existing lighting control system networks.

.. There are various types of LED lighting fixtures such as constant current and current voltage. Our control module is also compatible with various types of LED lighting because our lighting control system has the ability to adjust the PWM frequency value according to the luminaire type. If this does not work, Flicker and Glare phenomenon occur severely in the lighting fixture.

.. Communication should be good to control more than a thousand lighting fixtures. MRBAS system has a suitable solution to prevent communication Traffic problems.

.. LED lights are now controlled and managed to suit individual tastes. For example, the lamp on the desk can be controlled by the user's PC or smartphone, and the dimming control should be automatically performed when the user is absent. For this function, each lighting is equipped with a sensor, and individual dimming modules are connected in a DALI or wireless communication method to allow step-by-step dimming control.

.. It has a control module for emotional intelligent lighting function. The color temperature control and the dimming control can be performed according to the season or the atmosphere of each space. This capability will require prior collaboration with LED lighting companies.

.. Each sensors can be connected in various ways to enable interlocking control. Using sensor module in DALI Communication Line or data line to connect each sensor and use it. In the conventional method, the sensor can not be connected to the DALI line. There was an inconvenience that a separate communication

line had to be drawn, and the sensor for DALI protocol was developed and solved.

### **Why need a DALI Dimming System?**

Recently, DALI system is one of the most representative used system of LED dimming control. The reasons for using this system are summarized as follows.

1. When control method is adopted for each luminaire, it is possible to individually control LDM (LED DALI Dimming Module) by simply installing on the secondary side of LED power source. Unlike communication, the use of cables such as power lines does not cause communication problems due to induction phenomena. It is judged that this DALI communication method is suitable for use in combination with electric lamp lines.

2. When a frequent office partition changes, and when the control zone is modified. It is possible to configure the control zone simply by modifying the program without needing to modify the pipeline wiring.

3. By creating individual office space, we provide creative office environment. Waste electrical energy can be saved by automatic absence and dimming (eg, 70% dimming at 30 min. detection, 30% dimming at 60 min. detection, and completely dark after 2 hours).

4. As a system that can reduce electric energy in detail compared to the ON/OFF control method for each working time by existing circuit. The LED dimming module of DALI communication type is an essential option as the top item of recent LED lighting installation building.

5. Depending on the installation location, two sensor functions mixes and apply... The window zones are controlled by photo sensor and the office area, the control function is applied by mixing the two functions of the dimming compensation control occupancy sensor and photo sensor. If the dimming compensation control adjust the need for the office and if the illuminance level maintains the light brightness that can maximize the efficiency of illumination is 80~90%. It controls the brightness of the surroundings while controlling the self-illumination appropriately and maintains the illumination of about 85% continuously.

### **Things to consider when applying DALI Dimming System**

#### **1. Is there a way to solve communication Traffic problem? Review Request**

..When more than 1,000 DALI Dimming Modules are installed, communication traffic is in a **Busy** state and communications are expected to malfunction.

.. The solution is :

1) Each DALI Master (or DALI Controller) can connect up to 64 DALI Dimming Modules per one, but it is recommended to install up to 50 for smooth communication.

2) It is possible to install as many as the main communication device of the lighting control system. It is advisable to connect and operate with one communication device for about 1,000 DALI Dimming Modules.

3) The DALI Dimming Module has a function to adjust the communication interval of STATUS (illuminance condition, occupancy detection status, dimming current status) held in the software program to solve communication speed traffic.

#### **2. Is there way to solve the problem when applied as an integrated stabilizer? What is the alternative?**

1) There is a capacitor in the LED lighting fixture (SMPS), and the LED lighting is controlled by this capacitor. The capacitor life of the domestic high quality stabilizer is about 5 years, so after 5 years, the stabilizer should be replaces. Otherwise, there is a problem that the dimming program needs to be reset again when the dimming module and the ballast are integrates, so needs to be replaced every five years.

2) An alternative to this problem is to separate the ballast and dimming modules. In Korea, Sejong City Government Office, KEPCO Naju Building, and Lotte 2nd World are also equipped with separate ballast and DALI dimming module.

#### **3. Is there a way to solve the problem of applying DALI dimming module to LED lamp? Review Request**

1) LED SMPS (power supply) type CCCV (Constant Current Constant Voltage) method enables good dimming control when connected with DALI Dimming Module : No Glare and Flickering phenomenon. Due to the price problem, LED lighting companies in Korea are applying the ballast as a constant current (CC) method. In this constant current method, there is a problem in the quality dimming control.

2) When a Flickering or Glare phenomenon occurs in the software program, the frequency is adjusted and downloaded to each DALI dimming module to enable proper PWM frequency generation.





# OVERVIEW OF ELC SYSTEM

ELC System is a complete excellent lighting control system. It is a system with more than 50 years of know-how, reflecting all the experiences and customer requirements of ten thousands of projects, from field control devices to control panels to communication devices and software.

The source of this system is based on the solution of the US GE TLC System. The most basic aspect of the TLC System is that the lighting control panel is a stand-alone function. If the central monitoring system is disabled, the site lighting system continues to perform the control according to the set program. Also, if the control module of the field control panel fails, the relay and the relays are controlled individually and in groups by Soft Wiring. There is LED for monitoring the status of relay, so the operation status can be checked in the filed. The independent stand alone function of each of these field lighting control panels allows the panels to be linked to enable global interlock control. It is possible to control a group of relays in a panel by grouping them with one sensor or switch.

Self-diagnostics, sunset sunrise time schedule control, and various functions for each circuit based on the Stand Alone function of the basic lighting control panel have been developed based on decades of customer demands.

The most important feature of the ELC system is the integration of several control modules into one ELC network. In other words, On / Off Relay Control Module, 0-10V Dimming Module, DALI Master (Controller), Wireless System, etc. are connected to ELC Network and used simultaneously. A system that can freely select and apply these various control modules in one system is a rare solution in worldwide.

The scalability of the ELC system is also excellent. Each device (control module and switches) can be connected to SCU (System Communication Unit), which is a communication device, and each control module can be connected up to 999 (001-999 Address). For example, there are three types of relay modules : 6sRM (6 relays of 20 Ampere) up to 999, 4sRM (4 relays of 20 Ampere) up to 999, and 4eRM (4 relays of 16 Ampere) up to 999 can be used by connecting to the SCU. This SCU can be used by connecting up to 500 units. Up to 999 DALI Masters can be connected, up to 999 0-10V Dimming Modules (8 Channels) can be connected, and up to 255 Wireless Gateways.

In addition, various switches are connected to the ELC System. Smart Touch Switch (16 buttons), DSW-4,8, TS-4,8, nTS-4,8 and d&s TS-4,8.

There are three software programs that can be configured, monitored and remotely operated. Window version of Smartrol. Web version of WeBAS. Smartphone app version of MR Lighting Control APP.

This ELC System has a complete self-diagnosis function, so it is excellent in maintenance, as it can be found centrally to the relay of the field control panel.

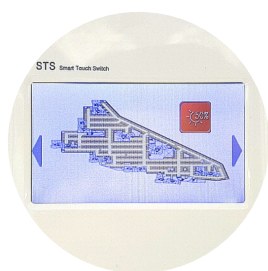
In the age of LED smart lighting, on-site lighting control is being used effectively and efficiently. Individual dimming control of each light, circuit dimming or On / Off control, and the ability to monitor various switches and switches programmed in the smartphone app are available. Our ELC System is equipped with a variety of hardware and software to satisfy every customer.



01

## RELAY CONTROL MODULE

4sRM, 6sRM.  
4eRM, 6eCSM



02

## SMART TOUCH SWITCHES

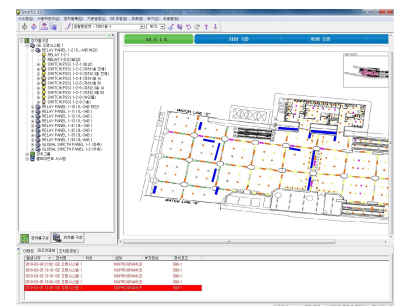
STS, SWS.  
DSW-4,-8.  
TS-4,-8.  
nTS-4, -8.  
d&s TS-4,-8  
GDS, LDS.



03

## DALI & WIRELESS DIMMING MODULES

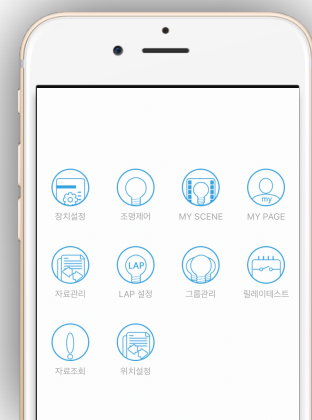
LDM, WDM.  
0-10V DM  
I



04

## SOFTWARES

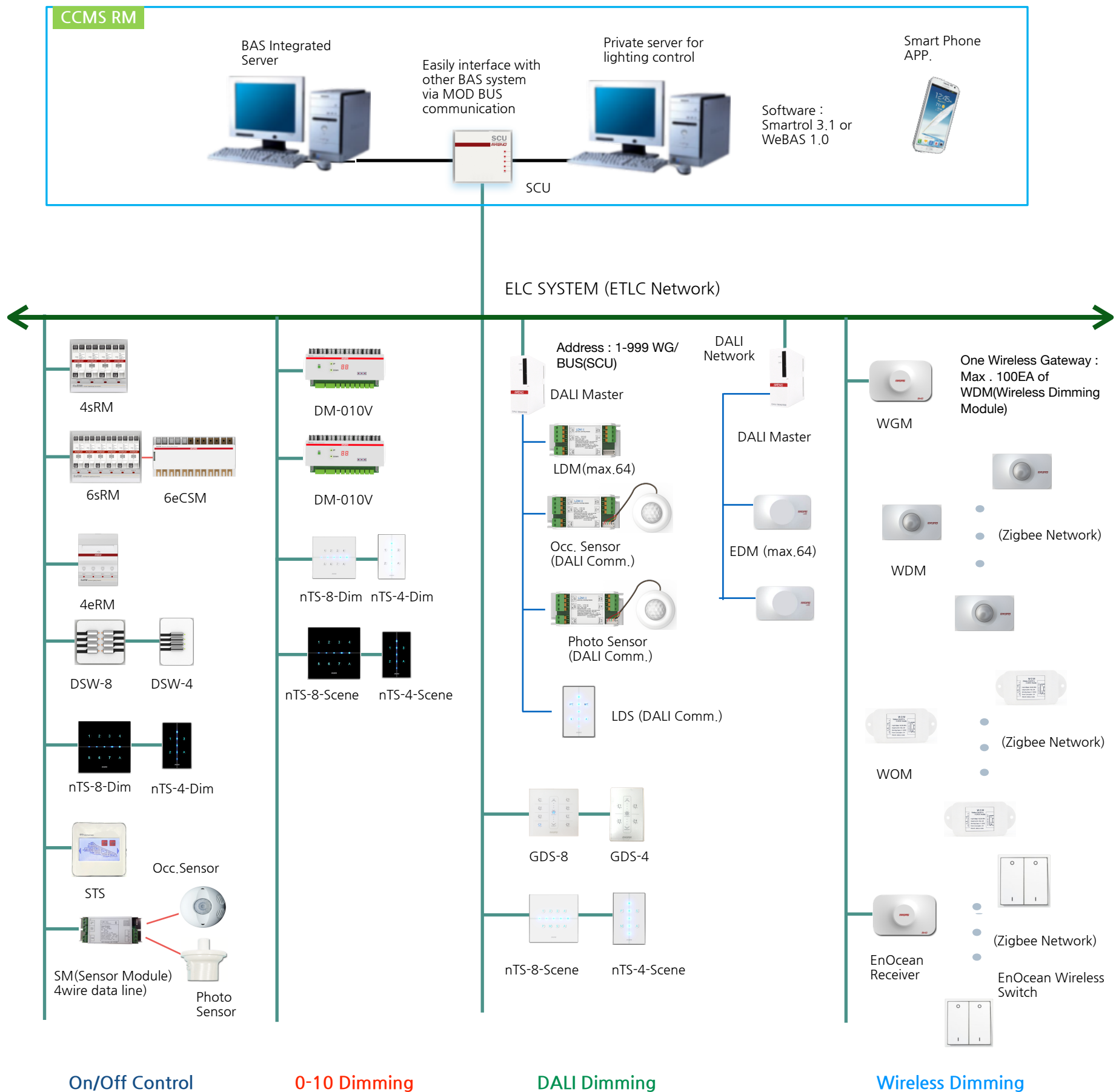
Smartrol v.3.1  
WeBAS v.1.0  
MR Lighting Control APP.





# SYSTEM CONFIGURATION OF ELC SYSTEM

Smart Stand Alone Relay On/Off modules, DALI Dimming modules, and Wireless Dimming modules. It is connected to one network and it controls various interlocking control to create effective lighting control and energy saving.





**SCU****System Communication Unit**

SCU is the device that communicates the data between PC and Lighting Control Panel. Set the DATA-BASE of each lighting control panel, switch, sensor and DALI Master. Also process the transmitting data operation through this SCU by creating each program. The low-level of Lighting Control communication is configured with ELC Bus and the high-level of PC communication is configured with Ethernet TCP/IP. The LED that indicates the status of Power and Data Communication is located at front side to understand the Real-Time status for Data Communication Lighting Control Panel.

**4sRM****4 Stand Alone Relay Module**

4sRM is the RELAY ON/OFF Control module and it performs the function for Relay's ON/OFF control & display the operation status. It connects through ETLC Communication with SCU and through the ETLC protocol, it performs the schedule, ON/OFF operation, ON/OFF status display, Relay Group Control and Sunset/Sunrise Control. It stores the Operation Log of the Relay & Data for Run-Time.

**6sRM****6 Stand Alone Relay Module**

6sRM is the RELAY ON/OFF Control Module. It performs the function for Relay's ON/OFF Control & display the operation status. It connects through ETLC Communication with SCU and through the ETLC Protocol, it performs the schedule, ON/OFF operation, ON/OFF status display, Relay Group Control and Sunset/Sunrise Control. It stores the Operation Log of the Relay & Data for RUN-TIME.

**6eCSM****6 Electric Current Sensing Module**

6eCSM is a module capable of 6 current sensing.

This module has a built-in CT and a current sensing module to measure the current usage of each relay. The current sensing module of 6eCSM and 6sRM are connected in a serial manner. The connection of the 6nRM line of the relay of each relay of 6sRM and the strong line of 6eCSM is directly connected to the relay terminal. The current sensing method of this module is the sensing method using CT, and the current sensing accuracy is 1% and the accurate current measurement is possible.

**4eRM****4 Stand Alone Relay Module w/R**

4eRM is the RELAY ON/OFF Control Module and it performs the function for Relay's ON/OFF control & display the operation status. It connects through ETLC Communication with SCU and through the ETLC protocol, it performs the schedule, ON/OFF operation, ON/OFF status display, Relay Group Control and Sunset/Sunrise Control. It stores the Operation Log of the Relay & data for Run-Time. Especially, this 4eRM is internal with 4 Latching Relay inside of Relay Module. It is adopted the current sensing IC for each Relay's ON/OFF feedback.

**REPEATER****Data Line Amplifier**

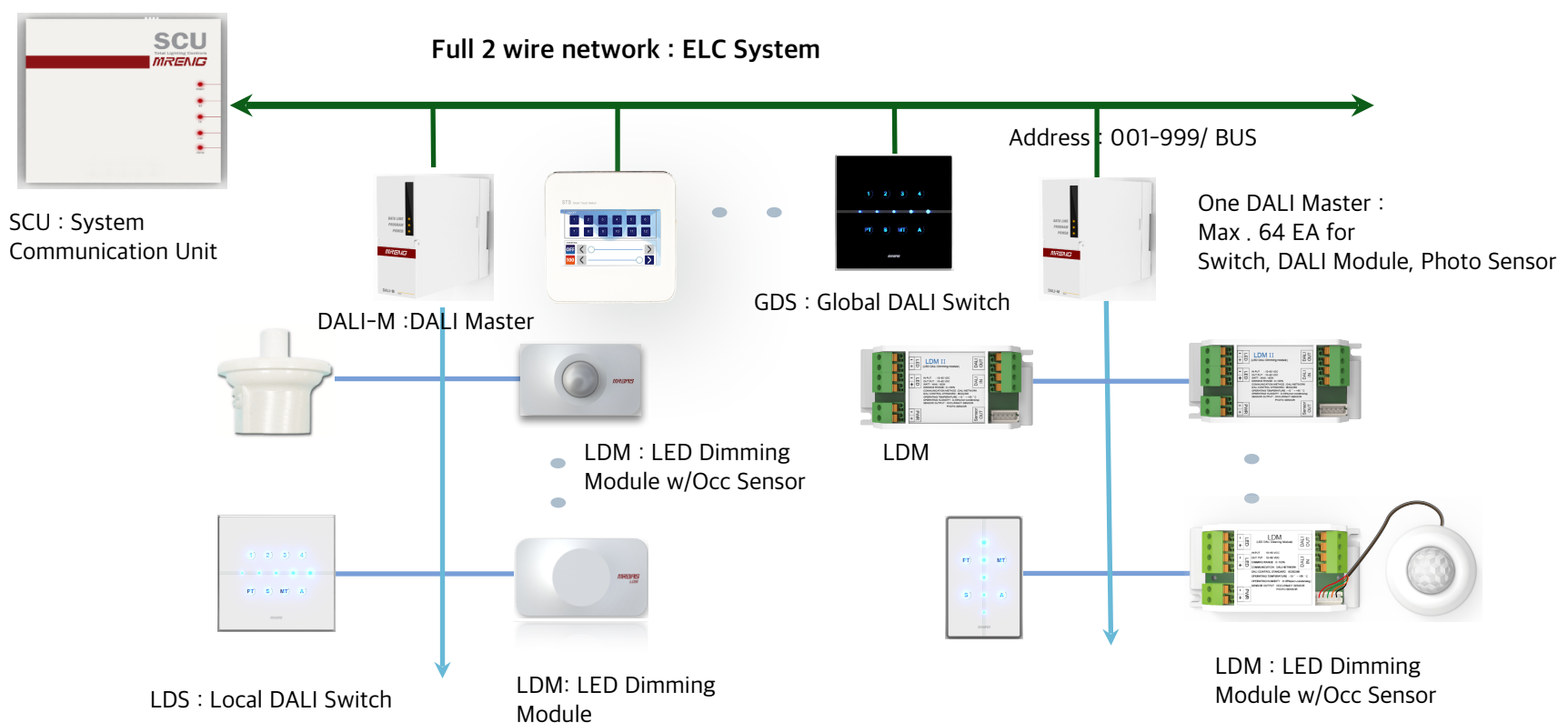
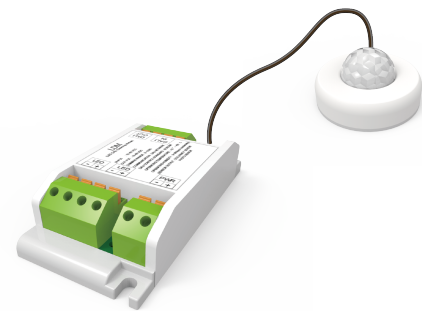
REPEATER is the communication device that amplify & recycle the data communication between SRLINK and Lighting Control Panel. The Lighting Control Panel's Low-Level network is TLC BUS which is the digital signal. Furthermore from certain distance, the output signal is decreasing. To solve this problem for longer distance data output, it may need to reset or device that amplify the output. Therefore, the REPEATER is the device that amplifies the transmission signal. It can expand the number of system by installing at the middle of SRLINK & Lighting Control Panel.



# DALI DIMMING SYSTEM

- ELC / DALI Protocol Converting.
- DALI Master can connect up to Max of 64 EA of DALI Dimming Modules.
- Install up to 999 DALI Master on ELC Network ... A total of more than 60,000 DALI Dimming Modules operate as one system.
- Each DALI Dimming Module : 0 ~ 254 steps of dimming
- 16 Scene setting
- Install photo & occupancy sensor on DALI communication line
- GDS Switch: Ability to control DALI modules in 64 other 64 groups
- LDS Switch : able to control 64 ea of DALI modules

## DALI System Configuration





**DALI-M****DALI Master**

The DALI Master is performing the role of converter that interface with the product (DALI Module) for using the DALI Protocol that is connected to ETLC Communication network.

From this single DALI Master, connect the DALI Sensor or 64EA of DALI Module, to control the Dimming and several Scene, Pattern, Schedule and ON/OFF by LED Lighting.

**LDM-L3-n****LED DALI Dimming Module w/ Output Circuit**

- LED 180W Type
- Operation Environment : -10°C ~ 60°C, 0~95% RH
- Input Power : DC 12~ 60V
- Consume Power : 12- 180W
- Communication Method : DALI
- Maximum Communication Distance : 300M
- Output Power(POut) : Max. 180W
- Output Voltage(VOut) : 12 - 60 VDC

- Output Power(POut) : Max. 180W
- Output Voltage(VOut) : 12 - 60VDC
- Outout Current(IOut) : Max.3A
- Dimming Range : 1 - 100%
- OverLoad Protection : Yes
- Short Circuit Protection : Yes

**LDM-L3-pwm****LED DALI Dimming Module w/ PWM signal**

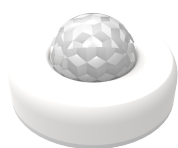
- LED 180W Type
- Operation Environment : -10°C ~ 60°C, 0~95% RH
- Input Power : DC 12~ 60V
- Consume Power : 12- 180W
- Communication Method : DALI
- Maximum Communication Distance : 300M
- Output Signal : PWM

- Dimming Range : 1 - 100%
- OverLoad Protection : Yes
- Short Circuit Protection : Yes

**LDM-L3-010****LED DALI Dimming Module w/ 0-10v signal**

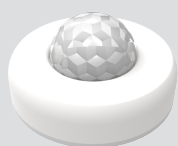
- LED 180W Type
- Operation Environment : -10°C ~ 60°C, 0~95% RH
- Input Power : DC 12~ 60V
- Consume Power : 12- 180W
- Communication Method : DALI
- Maximum Communication Distance : 300M
- Output Signal : DC 0- 10V

- Dimming Range : 1 - 100%
- OverLoad Protection : Yes
- Short Circuit Protection : Yes

**OCC - L3****Occupancy Sensor for Level-3(DALI Module)**

This is a Occupancy sensor for LDM

The sensing distance of the sensor is within 5m radius and is directly connected to LDM, allowing individual control of LDM and up to 64 LDM linked to one DALI Master. The Enable / Disable selection function and operation delay time of this sensor are set by downloading after setting in the upper software program.

**Ph - L3****Photo Sensor for Level-3(DALI Module)**

This is Photo sensor for LDM.

The detection range of this sensor is within 0-753LUX (0-70FC), and is directly connected to LDM, allowing up to 64 individual LDM control and LDM connected to one DALI Master. Controllable. The enable / disable selection function of this sensor is set to downloading after setting in the upper software program.

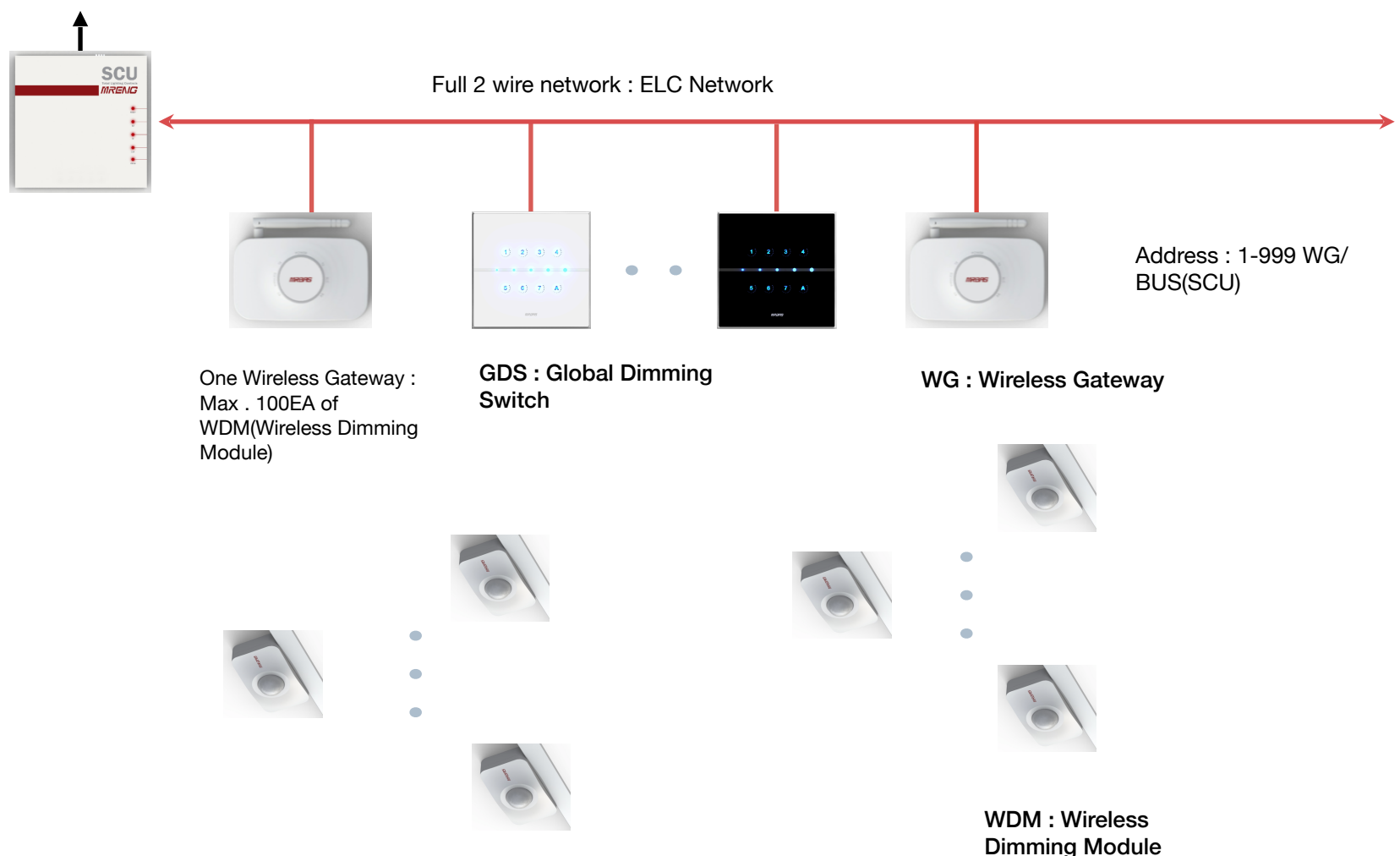


# WIRELESS DIMMING SYSTEM

- ELC/ZIGBEE(IEEE802.15.4) Protocol Converting.
- Up to 127 access groups (AGs) in one WG (wireless gateway) : Actual AG within 10 .
- Up to 64 wireless modules in one AG.
- Install WG (Wireless Gateway) Max of 256 to ELC Network ...  $256 \times 10 \times 64 =$  A total of 163,840 wireless modules operate as one system. Up to 256 GATEWAYS.
- Each Wireless Module : 1 ~ 254 Step Dimming.
- 16 Scene setting.
- Each Wireless Module includes Occupancy and Photo Sensor.
- LED Flash On / Off function for luminaries line check and warning.
- Self-diagnosis function : Communication error & dimming output error.
- Provides own information status : Fade Rate, Fade Time, Max Value, Min Value, Group info, Scene info, Sensor Enable).

## Wireless System Configuration

ELC SYSTEM ( Smartrol or WEBAS)





WG-CEILING

Wireless Gateway for Ceiling

- Performs the broadcasting role between the ELC Network & Wireless Communication.
- Wired and Wireless Communication Integrated Gateway
- Performs the communication between SCU & Smartrol and it is configured for 0 - 255 NODE and the maximum 254 EA of Gateway is configured.
- Remote Control for Individual / Group LED Lighting and Time Schedule Control.
- IEEE 802.15.4 ZIGBEE TO ETHERNET Protocol Conversion
- Operation Power : 12 - 24VDC, 250mA
- Communication : IEEE 802.15.4 ZIGBEE
- Operation Environment : 0 - 40°C, 0 -90% RH



WDM

Wireless Dimming Module

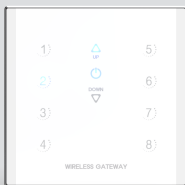
Wireless Dimming Module is configured as International Standard Protocol IEEE802.15.4 ZIGBEE Communication that included with Occupancy Detection and Photo Detecting Sensor function. As Wireless Dimming Module of LED Lamp, the Maximum Control Output is 180W.



E-RECEIVER

EnOcean Receiver for ELC

This Receiver is connected at ELC System for SWS(Smart Wireless Switch) to operate the DALI Dimming Module, Wireless Dimming Module and Each of Relay by SWS(Wireless Switch). The capacity of this Receiver is similar to the Wireless Gateway. Therefore, one Receiver is connected at 24EA of SWS to control the Relays & Dimming Modules.



WG-WALL

Wireless Gateway for Wall

This Wireless Gateway is wall mount type product. The one Gateway is able to configure unto maximum of 127 EA of AG (Access Group) but actually, the AG is configured for 5 EA to operate the Wireless Module.



WOM

Wireless ON/OFF & 0-10VDC Module

The Wireless ON/OFF Module includes the 1EA of 10Ampere Latching Relay and it is consist of International Standard IEEE802.15.4 ZIGBEE communication. Several LED fixtures can be grouped together to turn On/Off wirelessly at once and if necessary, send out the 0-10VDC signal to control the Dimming of LED Fixture.



SWS- 4CH

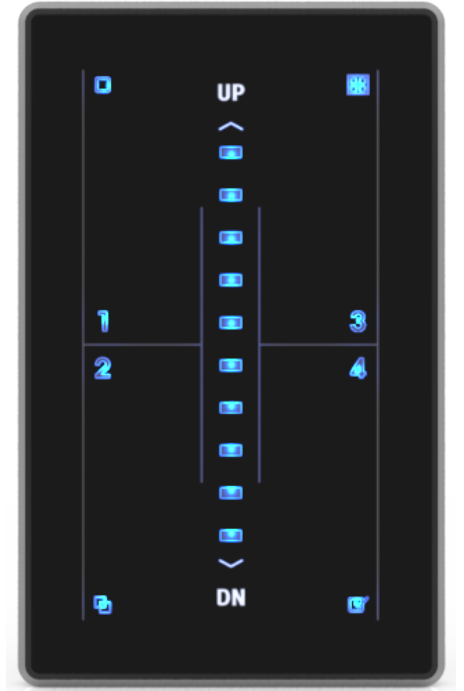
Smart Wireless Switch

This Wireless Switch (SWS-4CH) has its own Power Generator so that it does not require the separate Power Lines. In addition, it is selected with ZIGBEE CHIP for communication. It can be directly connected to each Relay Module & Dimming Module through reliable communication for Lighting Control.

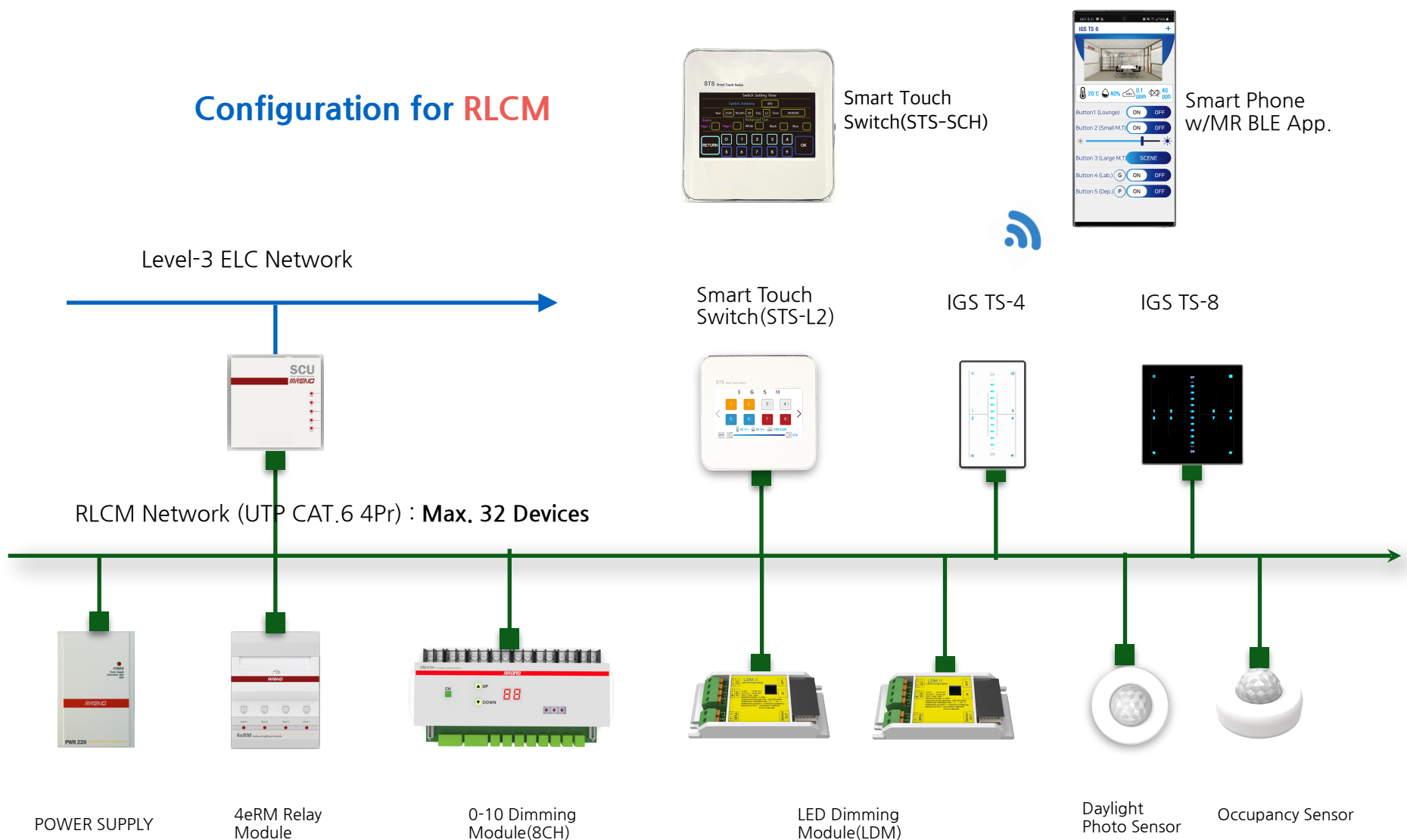


# ROOM LIGHTING CONTROL MANAGEMENT( **RLCM** )

- A RLCM(Room Lighting Control Management) is a lighting control system that does not require a separate software and computer.
- After connecting to each switch and control module of RLCM to LAN cable. The program for Individual, GROUP, and SCENE can be set by simple address and switch setting.
- Up to 32 switches and control modules can be connected to one RLCM Network.
- The switch has separate buttons for setting Individual, GROUP, and SCENE. (Individual relay setting, GROUP setting, SCENE setting)
- There are two types of switches : IGS TS-4,8 and STS (Smart Touch Switch).
- There are four types of control modules are available : 4eRM-L2 (4 of 16Ampere Relay Module), 2chRM (2 of 16Ampere Relay Module with Junction Box's Connector), 0-10DM-L2 (8Channel 0-10V Dimming Control Module, LDM II-L2 (Led Dimming Module for LED 10-180W).
- There are two types of sensors : OCC-L2(Occupancy Sensor), PH-L2(Photo Sensor)
- The smartphone app that is automatically paired with the switch is equipped with MR BLE APP, so you can set and operate programs instead of the switch.
- Schedule program is applied by downloading through RLCM network after program setting in STS-SCH (Smart Touch Switch for Schedule) and MR BLE APP.



## Configuration for **RLCM**





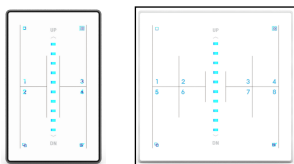
STS-L2  
Smart Touch Switch

Smart Touch Switch (STS) in RLCM is used as switch and program setting equipment. Set Address SW of this STS-L2 to No. 1, 4eRM relay module is No. 1 address, 0-10V Dimming Module is No. 2 address, when setting relay module of No. 1 address, power supply of dimming module of No. 2 address To OFF, and set module 2 to OFF. STS has a setting screen, so you can set relay module and dimming module by individual, group and dimming scene in setting screen.



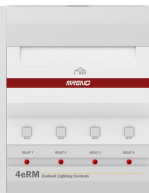
STS-SCH  
Smart Touch Switch

IGS TS (IGS Touch Switch) in RLCM is used as switch and program setting equipment. Set Address SW of this IGS TS to No. 1, 0-10V Dimming Module to No. 1, and set switch to individual, group, dimming scene for each channel you want. When setting the second relay module, set the relay for each switch while the power of dimming module of address 1 is turned off.



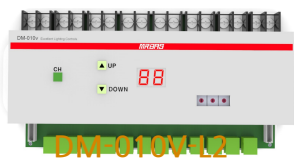
IGS TS-4, -8  
IGS Touch Switch

4eRM in RLCM is a relay control module with 4 16Ampere Latching Relays installed and up to 32 can be operated. Each relay module has an address switch, and the relay program is set to match the address of the switch.



4eRM-L2  
4 Relay Control Module

The DM010V (0-10V Dimming Control Module) in RLCM has eight channels, enabling dimming control of eight 16 Ampere circuits. The dimming module has an address switch, and when it is set to the same address as the switch, it is automatically connected to the switch (8 buttons) in one-to-one operation. For group and scene setting, use the setting screen of switch and STS.



DM-010V-L2  
0-10V Dimming Control Module

Up to 32 LDM (LED Dimming Module) in RLCM is connected in each LED lighting and dimming and On / Off control of LED lighting. The program is set at the IGS TS switch and STS.



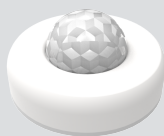
LDM-L2  
LED Dimming Module

This Occupancy Sensor is connected to LDM II-L2 and interlocks with other control modules as well as LDM. Sensor detection range is within 5M radius. The delay time of the sensor and the selection of Enable and Disable are set in STS.



OCC-L2  
Occupancy Sensor

The Photo Sensor is connected to the LDM II-L2, which controls not only the LDM but also other control modules. Sensor detection range is 0-753LUX (0-70FC). The selection of Enable and Disable of the sensor is set in STS, the setting device.



PH-L2  
Photo Sensor



# SOFTWARE FOR ELC SYSTEM

## Smartrol v.3.1 Software for ELC, DALI & Wireless System

### Background of Development

Our Software has been developed with evolution of advanced IT technology. By the release of Window OS from the DOS version in early MS, our software is also been developed at Window OS to control the Lighting Control Program conveniently at early of 2000 year. Therefore, after 14 years, our Software has been Upgrade to many steps.

At early, the Lighting Control System is applied at only for ON/OFF control and the Software that meets the eye was SmartTLC. We have been exported this S/W in the name of Light-X to GE America.

Smartrol v.1.0 is applied and developed for our iLC System SLC System and Dimming Control System. Recently, The Smartrol v.3.1 is the software that is developed and applied for ELC System and DALI System since 2013. This software is certified with BTL Listing at 2013. This Software is the Lighting Control only with power USER INTERFACE function and much better graphic function than other Software.



### Overview

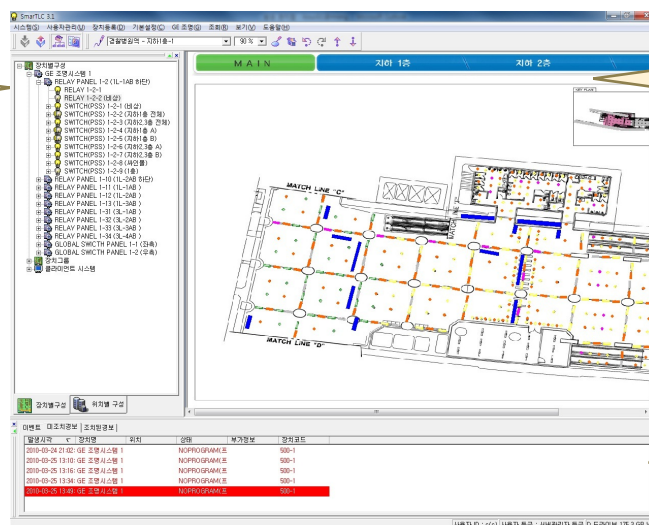
The Smartrol v.3.1 is developed to control and manage the power of building, facility, lighting and integrated system software efficiently. Therefore the Smartrol v.3.1 is managed as individual system and if necessary, it is managed integrally with power and facility auto control to perform the interlocking control. The Smartrol v.3.1 is installed at server and client to perform the BACK UP function for each other and it can monitor the modified program from server and also monitoring the contents of DB from client.

### Application

It can be applied at various places like small and medium sized buildings and large buildings. It can be applied at shopping mall, office only building, airport, convention center, gym, gymnasium, APT and public area where the Lighting Control is needed. It is configured with Lighting Control Only Program. Also the schedule, sunset/sunrise, occupancy, group, pattern, DALI Dimming and Photo control is available.

Graphic edit, On Line monitor, Diagnostic Pop up

Real time programming and monitoring.



Schedule, Pattern and Group Down Loading

Ethernet, Mod bus, BACNet interface

# SOFTWARE FOR ELC SYSTEM

## WeBAS v.1.0 Web Based Software for ELC, DALI, & Wireless System

### Background of Development

The Software of MRBAS has been developed together with the development of IT technology. With the launch of Window OS in the initial MS version of DOS, Software of MRBAS was also developed as a lighting control program in early 2000 and has been continuously upgraded for 20 years and fully developed. Initially, the lighting control system is applied On/Off-oriented control method, and the suitable software is SmartTLC. This software is exported to USA GE under the name of Light-X. Smartrolv.1.0 is developed and applied to ILC system, SLC system and dimming control system. Smartrolv.3.1 is the software that has been applied since 2013, recently developed for ELC system and DALI system. The software is BTL certified and GS certified in 2013. It is dedicated software for lighting control which is more convenient and powerful USER INTERFACE function than other software because it is an excellent function of graphic. Based on this accumulated technology of Client Server based solution, WEBAS based WEB which can be used anytime and anywhere is launched in 2017 and it has also been certified by BTL.

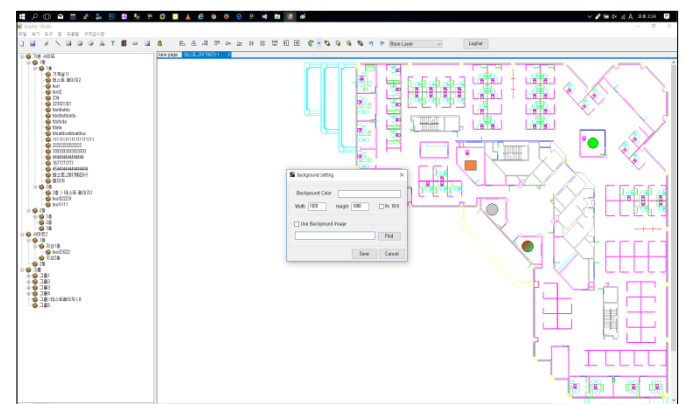


### Overview

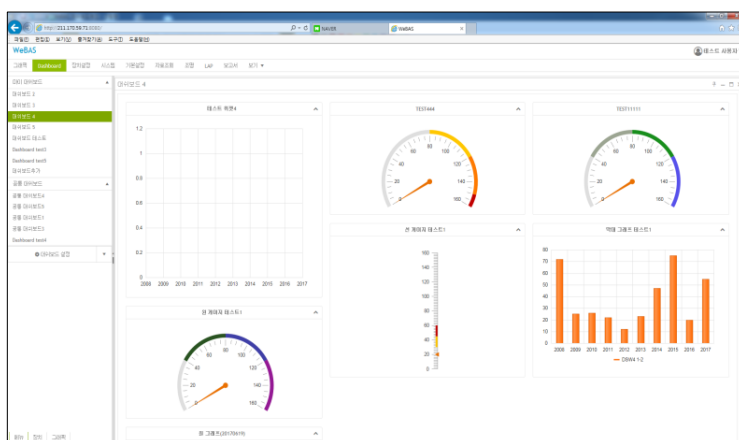
WeBAS software was developed as a software that controls and monitors integrated management such as Lighting control and Electric power control in a building in a WEB environment. If necessary, it can be operated by other HVAC control and integration. It is possible to monitor various functions such as graphic monitoring, Dashboard monitoring, widget setting and chart, and it is an excellent WEB-based MMI program using the cloud service.

### Main Feature

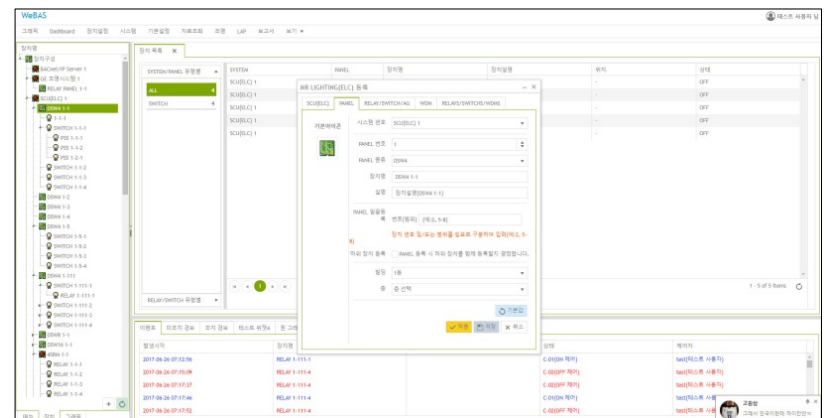
- Monitoring control and setting function using WEB browser
- Dashboard Builder and Surveillance
- Split screen and full mode, slide monitoring
- Easy Drag-Drop Graphic Point Setting Widget creation function using TREND DATA
- Watched, manipulated, and exported data to PDF files
- CAD vector file background (no cracking on enlargement)
- Monitoring and setting on smartphone
- CLOUD service for device information and DB backup management
- Ability to see sub-device list
- Convenient trend with daily import function
- Control various user rights settings



CAD Vector File Import



Various chart setting and send file



Device Configuration Status Inquiry & Device Search



# SOFTWARE FOR ELC SYSTEM

m.r.Lighting Control.S  
m.r.Lighting Control

App. for Building Lighting Control

## Background of Development

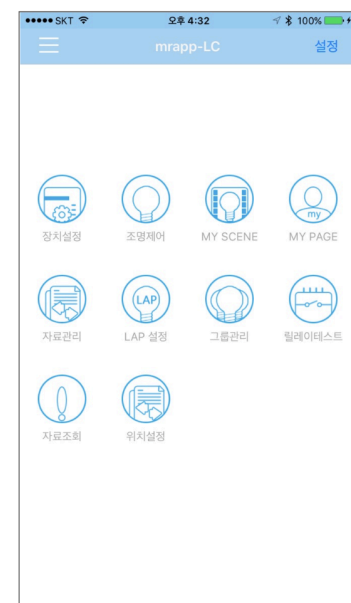
In a recent days, people are using smartphones everywhere, so building tenants want to control lighting for their area by a smartphone instead of a switch. With this background, we have developed the MR-App program to interlock with our ELC System. It was developed as an APP program that can be run on Google's Android and Apple's IOS and if you register only the IP address of the system on the Internet website, you can use this program easily. The ON/OFF Control is possible and also ON/OFF & Dimming Control for DALI Module is also possible from the smartphone-app program. The scheduling program for each region was also made possible on the smartphone. In addition, MY PAGE and MY SCENE functions are provided for tenants to make it easy for residents to operate the lighting for their area.

## Overview

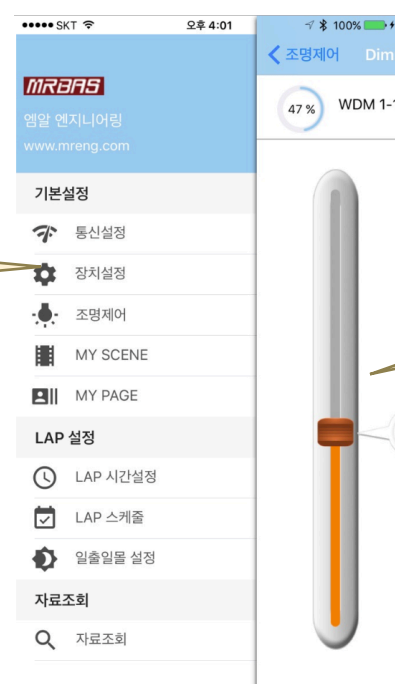
The MR-App program is based on our Smartrol v.3.1. We have extracted only the key point from the program for lighting control and created a smartphone-app program. The ELC system was set up as a smartphone-app program and covered all the essential elements that could be used. Especially, it can be used as a function to replace the MMI software with the schedule program, MY PAGE and MY SCENE setting, and programmed contents downloading function.

## Feature

- Applicable to all smartphones for Android and iPhone.
- Powered by two apps, one with a server and one without a server.
- Communication setting: Communication connection with SCU of ELC System.
- Device setting: various relay module, dimming module, wireless dimming module, various switch, group switch and etc.
- Lighting control settings: Set specific control programs for each device created in the device settings.
- Schedule control and data transmission.
- Data View : LOG & Run Time.



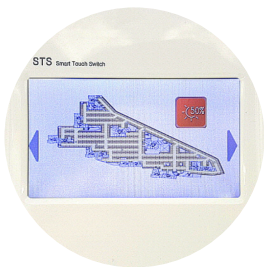
The Main menu for MR-App follows..  
Communication settings.  
Device Settings  
Lighting control  
MY SCENE  
MY PAGE  
Schedule setting  
Data Management  
LAP settings  
Group Management  
Relay test  
Search  
Positioning.



Program setting,  
Configure, On / Off,  
Dimming Control, Actual  
Action.

# LIGHTING CONTROLS of MRBAS

The main lighting control items are listed. You can order by model number and product name of the list.

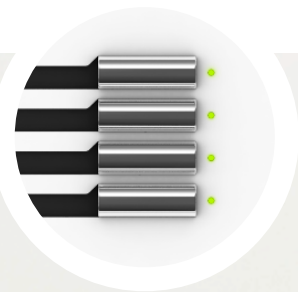
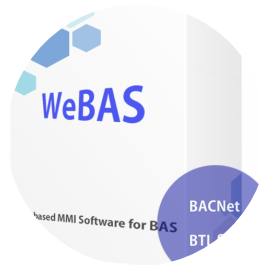


MODEL	SYSTEM
	<b>ELC SYSTEM</b>
SCU	System Communication Unit
mini SCU	Mini System Communication Unit
6sRM	6 Stand Alone Relay Module
4sRM	4 Stand Alone Relay Module
4eRM	4 economic Relay Control Module
6eCSM	6 electric Current Sensing Module
DM-010V	0 -10V Dimming Control Module 8CH
EPWR	Power Supply Unit
REPEATER	Data Line Amplifier
SU	2 Wire Switch Converter Unit
SM	Data Line Sensor Module
	<b>DALI SYSTEM</b>
DALI-M	DALI Master
LDM-2	LED DALI Dimming Module - 2
LDM1CH(50W)	LED DALI Module
LDM1CH(180W)	LED DALI Module
EDM(50W)	LED Emotinal Dimming Module
LDMw/OCC	LED DALI Module with Occupancy
DALI-PH	DALI Photo Sensor
DALI-OCC	DALI Occupancy Sensor
LDS-4,-8	Local DALI Switch
GDS-4,-8	Gobal DALI Switch
	<b>WIRELESS SYSTEM</b>
WG-CEILING	Wireless Gateway for Ceiling
WG-WALL	Wireless Gateway for Wall
WDM	Wireless Dimming Module
WOM	Wireless ON/OFF & 0-10VDC Module
	<b>ENERGY HARVESTING WIRELESS TECH.</b>
E-RECEIVER	EnOcean Receiver for ELC
SWS-4CH	Smart Wireless Switch - 4 Channel
WBP	Wireless Basic Program
	<b>TLC Remodeling</b>
	<b>SLC SYSTEM</b>
SCU-s	System Communication Unit for SLC
SLC LCP	Stand Alone LCP
SRCC48	Stand Alone Controller
SRDC12	12 Relay Driver
SPWR	Power Supply Unit
SU-s	2 Wire Switch Converter Unit
SRBRIDGE	REPEATER AND ISOLATION UNIT
	<b>RELAYS</b>
LR9P	20 Ampere Latching Relay
RR-7	20 Ampere Latching Relay w/o Feedback
RR-9P	20 Ampere Latching Relay w/Feedback
LR25	20 Ampere Latching Relay for Panasonic



# LIGHTING CONTROLS of MRBAS

The main lighting control items are listed. You can order by model number and product name of the list.

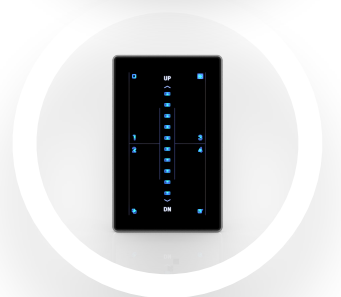
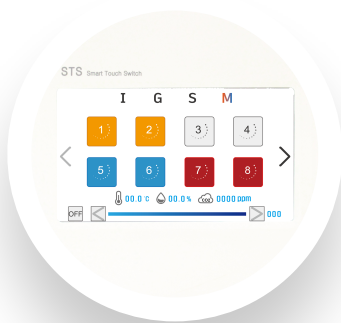


MODEL	SYSTEM
	SOFTWARE
SmarTLC Smartrol v.3.1	Software for ILC,SLC & ON/OFF Control Software for ELC & DALI System
Smartrol OPC	Software for OPC Interface
WeBAS v.1.0	Web Based Software for ELC, DALI & Wireless System
	Smart Phone App.
m.r.Lightnng Contro.S m.r.Lighting Control	App. for Building Lighting Control
	Switches
DSW-4	1-4 ON/OFF Data Line Switch
DSW-8	5-8 ON/OFF Data Line Switch
TS-4	1-4 ON/OFF Data Line Touch Switch
TS-8	5-8 ON/OFF Data Line Touch Switch
nTS-4-Scene	1-4 new Touch Switch with Scene & Led
nTS-8-Scene	5-8 new Touch Switch with Scene & Led
nTS-4-Dim	1-4 new Touch Switch with Dimming Slide & Led
nTS-8-Dim	5-8 new Touch Switch with Dimming Slide & Led
TS-12	9-12 ON/OFF Data Line Touch Switch
NDFS Series	New Data Line Feedback Switch
STS	Smart Touch Switch
	Sensors
RESNOR-1	Single Direction Ultrasonic Sensor
RESNOR-2	Dual Direction Ultrasonic Sensor
OSC04-PIW	Passive Infrared Sensor
OSC05-RMW	Multi-Tech. PIR/Ultrasonic Sensor
OSC10-RMW	Multi-Tech. PIR/Ultrasonic Sensor
RPSEN	Photo Sensor

## LED Dimming Controls

# LIGHTING CONTROLS of MRBAS

NO COMPUTER, NO SOFTWARE,  
RLCM is a system that can be  
easily installed and conveniently  
operated in your living space.



MODEL	SYSTEM
	Room Lighting Control Management(Wired System)
STS-L2	Smart Touch Switch w/Setting of I.G.S.
STS-SCH	Smart Touch Switch w/Setting of I.G.S. & Schedule
IGS TS-4	IGS Touch Switch for 4 Button & Setting
IGS TS-8	IGS Touch Switch for 8 Button & Setting
RPWR	Power Supply for RLCM
4eRM-L2	4 Relay Control Module - L2
DM010V-L2	0-10V Dimming Control Module - L2
LDM2-L2	LED Dimming Module - L2
OCC-L2	Occupancy Sensor -L2
PH-L2	Photo Sensor - L2
RPWR	Power Supply Unit for RLCM
MR BLE APP	App. Program for setting and control of RLCM



## Room Lighting Control Management





## Overview

SCU is the device that communicates the data between PC and Lighting Control Panel. Set the DATA-BASE of each lighting control panel, switch, sensor and DALI Master. Also process the transmitting data operation through this SCU by creating each program. The low-level of Lighting Control communication is configured with ELC Bus and the high-level of PC communication is configured with Ethernet TCP/IP. The LED that indicates the status of Power and Data Communication is located at front side to understand the Real-Time status for Data Communication Lighting Control Panel.

## Main Feature

- LED Status Indicators that display the status of System.
- The Powerful Data Communication which is the DATA-LINE that connects at Full 2-Wire Bus : It maintains the reliability of data communication even the communication environment has ungrounded system & induced power.
- When downloading the program & editing the data-base, the control is operating continuously.
- The interlocking program of each control panel is operating continuously cause of Global Stand Alone function even when the central monitoring panel is not working.
- Access up to Max. 5 Computer.
- MOD Bus connection
- Connection with GE TLC.

## Operation

The single SCU is able to communicate up to 999EA of lighting control module and 999EA of data-line switch. The SCU is located at central monitoring panel and it execute the controlling and monitoring for communication and each of local control panel that connected at PC.



- The installation of SCU is wall mounted type and on the desk type.
- It is configured with high-level network to interlock with other system for interface. Ethernet TCP/IP, MOD Bus are possible.

## Networking

SCU is connecting the low-level and high-level communication. The low-level communication is configured with Full 2-Wire Bus. It operates by connecting the lighting control panel and data-line switch up to 999EA for each. The high-level operates by connecting the Ethernet TCP/IP communication basically. If necessary, MOD Bus, BACnet communication is possible and it can be interfaced with BAS and other product.

Connected Operating Products :

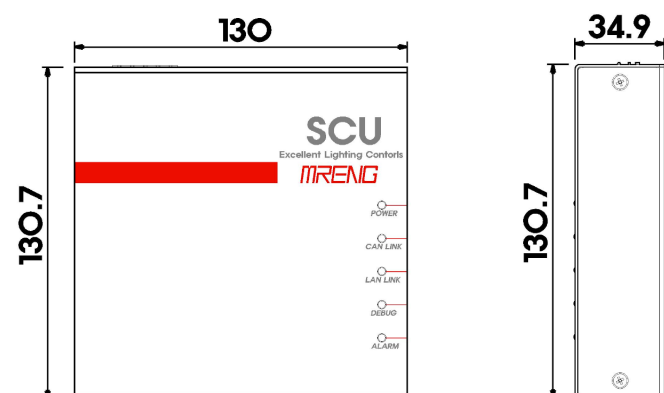
- Relay Control Module : 4sRM, 6sRM, 4eRM, 6eRM
- DM(Dali Master), LDM(LED Dali Dimming Module)
- WG(Wireless Gateway), WDM(Wireless Dimming Module), WOM(Wireless On/Off Module)
- Receiver for EnOcean Switches
- Switches : STS, DSW, TS, nTS

## Specification

- LED Status Indicators : Power, ETLK Link, Data Status, On Line, Alarm
- Connection for PC : Ethernet TCP/IP, MOD Bus
- Power : AC220/110V, 50/60 Hz.
- Size : 160(W) 60(H) 137(D)
- Weight : 980g



## Dimension of Layout



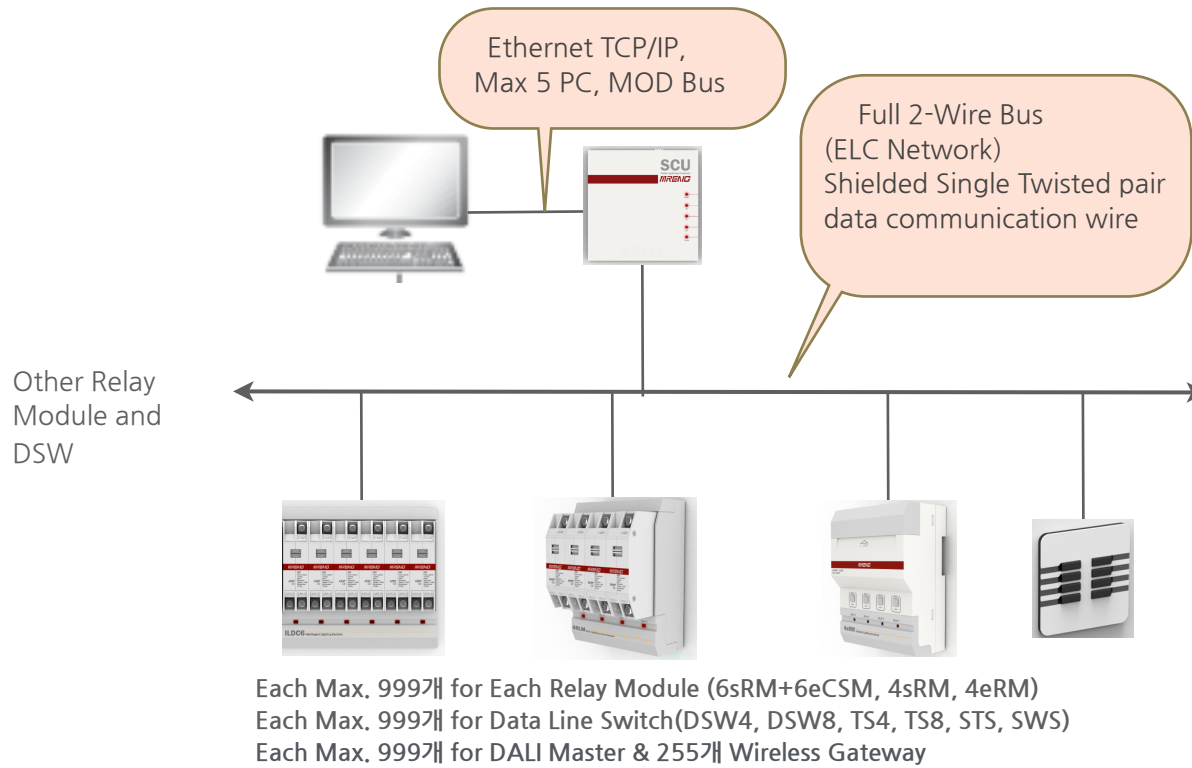


# LIGHTING CONTROLS

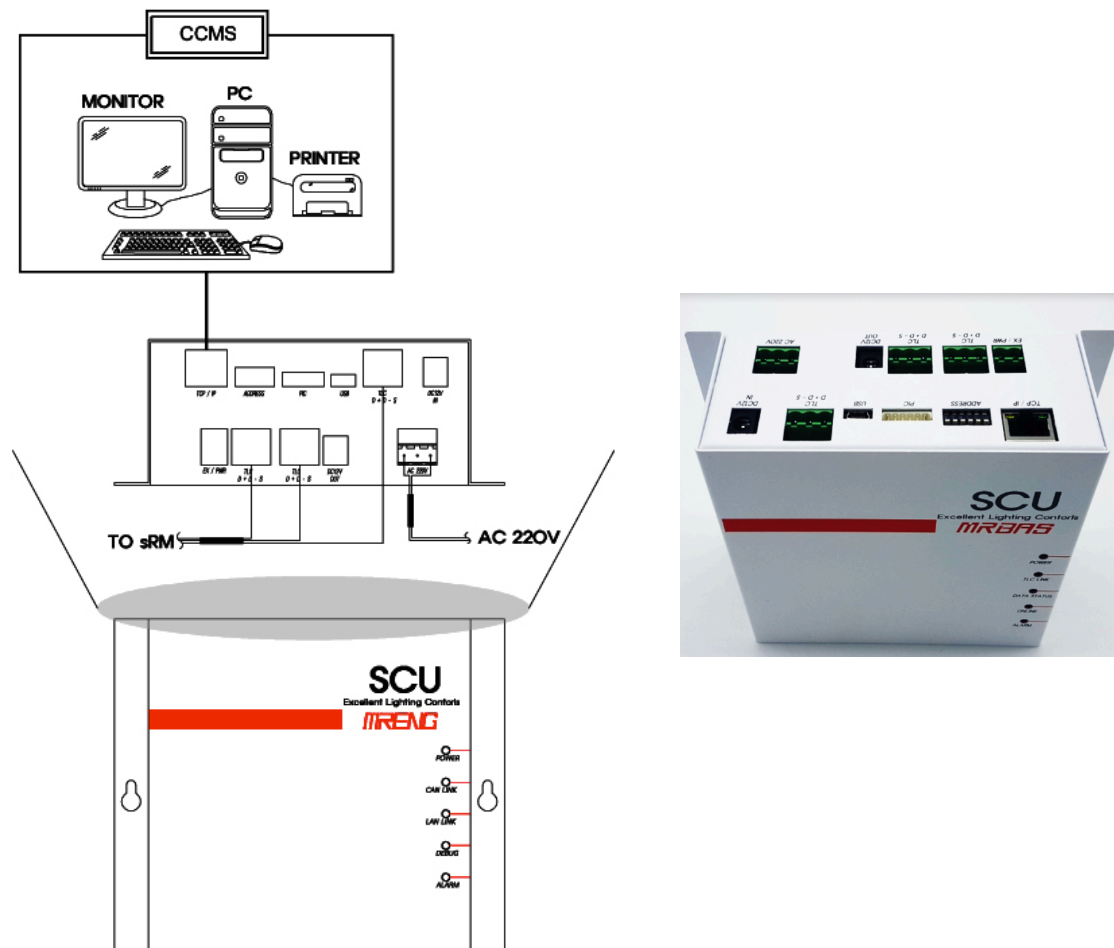
SCU System Communication Unit

ELC SYSTEM

## System Diagram



## Connection Diagram







## Overview

The Mini SCU is a device designed to input and download the programs directly from the local site. Connect this Mini SCU to the data-line of the local site switch and once again, connect the communication line to Notebook (PC) using the RS232 Port. The entire Lighting Control Panels will be connected for the communication.

First, set the DATA-BASE for each of Lighting Control Panel, Switch, Sensor, DALI Master and etc. The operation will be executed through this SCU for transmitting and create each program to execute the operation through this Mini SCU.



## Main Features

- The Powerful Data-Line that can be connected with Full 2-Wire Bus type.
- Communication : Maintains the reliability of the data communication even in poor communication environment such as induction & non-grounding.
- The control is continuously executed even when downloading such as Database & Program Modification.
- The Interlocking programs between each control panel are continuously executed even when the central monitoring device is disabled due to the Global Stand Alone Function.
- To connect with PC, connect by RS232 Port.

## Operation

The single SCU is able to communicate up to 999 EA of Data-Line Program Switches and 999 EA of Lighting Control Modules.

This Mini SCU is connected at local site switch to perform the real-time monitoring and control the communication for each of lighting control panel.

## Networking

SCU is connecting the low-level and high-level communication. The low-level communication is configured with Full 2-Wire Bus. It operates by connecting the lighting control panel and data-line switch up to 999EA for each. The high-level operates by connecting the RS-232 communication basically.

Connected Operating Products :

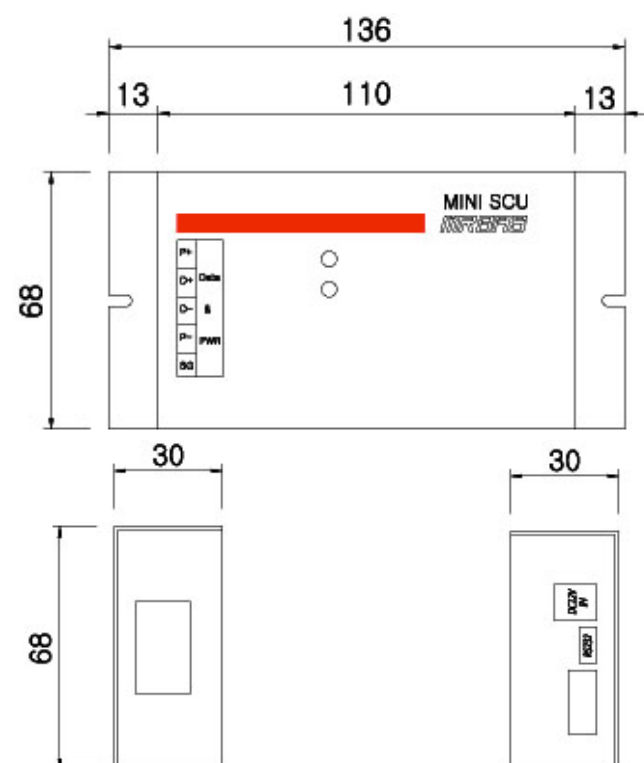
- Relay Control Module : 4sRM, 6sRM, 4eRM, 6eRM
- DM(Dali Master), LDM(LED Dali Dimming Module)
- WG(Wireless Gateway), WDM(Wireless Dimming Module), WOM(Wireless On/Off Module)
- Receiver for EnOcean Switches
- Switches : STS, DSW, TS, nTS

## Specification

- LED Status Indicators : Power, Data Status
- Connection for PC : RS-232
- Power : USB 5V or ETLC DC24V
- Size : 136\*68\*30
- Weight : 500g



## Dimension of Layout





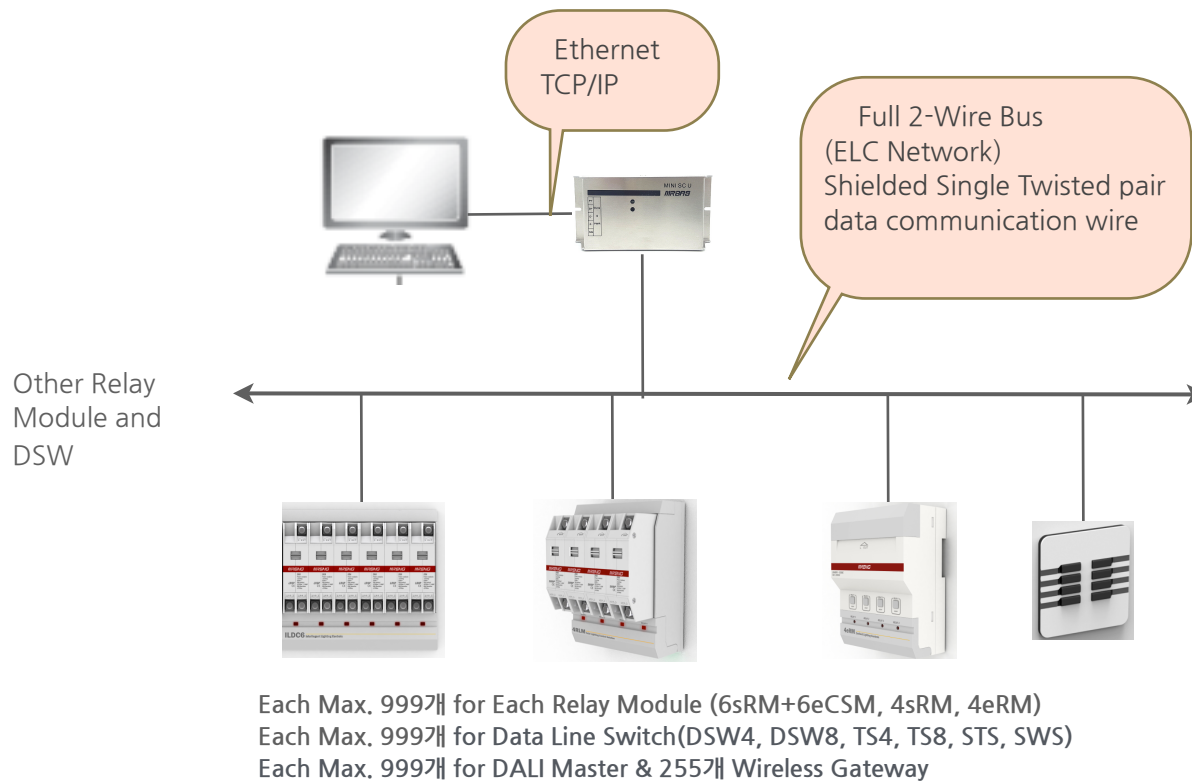
# LIGHTING CONTROLS

mini SCU

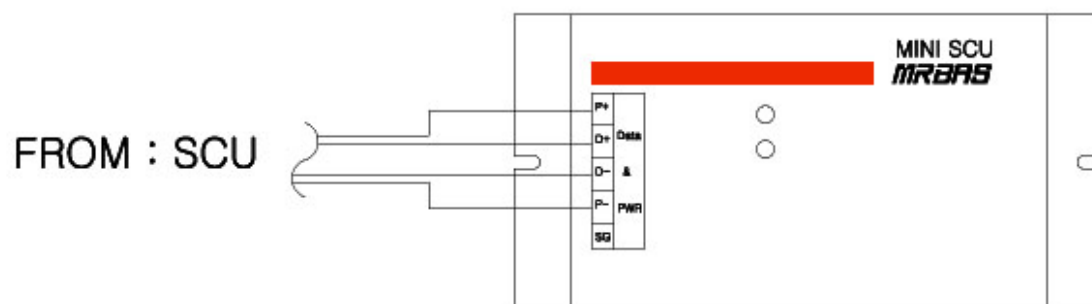
System Communication Unit

ELC SYSTEM

## System Diagram



## Connection Diagram







## Overview

6sRM is the RELAY ON/OFF Control Module. It performs the function for Relay's ON/OFF Control & display the operation status. It connects through ETLC Communication with SCU and through the ETLC Protocol, it performs the schedule, ON/OFF operation, ON/OFF status display, Relay Group Control and Sunset/Sunrise Control. It stores the Operation Log of the Relay & Data for RUN-TIME.

## Main Feature

- The LED Status Indicator displays the status of each Relay.
- The powerful data communication that connects with Full 2-Wire Bus through Data-Line.
- When downloading the data-base & modification for program, the control continuously performs its work.
- The interlocking program for each control panel has the Global Stand Alone function and it performs the work even the central monitoring panel is broken.

## Operation

The Relay Module is connected up to 999EA at one SCU and it performs the interlocking control for each program. The each Relay Module is designed as combined structure of Control Board, Relay Operation Board and Communication Board integrally. When you pulls out from the case cover, there will be data communication connection terminal and two sensor input terminal. Connect the necessary part to use the module. Each Relay and Operation Board is ready with LED indicator that display the status. Without separate cable for Relay, it can be mounted at DIN-Rail type Board for installation.



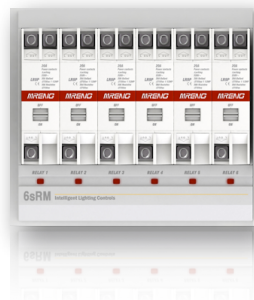
- The High-Voltage & Low-Voltage line is hidden inside of case cover to organize the cable neatly.
- The 20Ampere Latching Relay that has the on-site operational ON/OFF switch is installed at DIN-Rail type without separate cable.
- The large and small size of various project for application is possible by new design and compact design.

## Networking

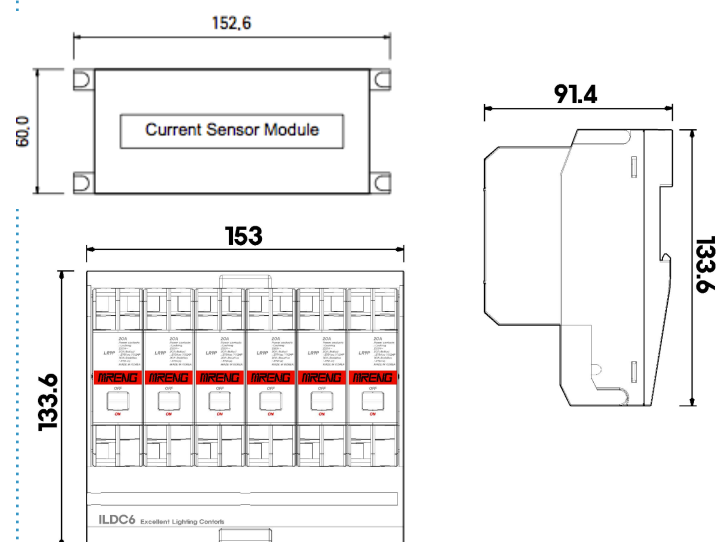
The Relay Module is connected at Full 2-Wire communication method. Also when installing the Relay Module at Up and Down position, there is the passage way to connect the Up and Down of Data-Line. The Data-Line cable is handled neatly.

## Specification

- 6EA - LED Status Indicators
- 6EA - 20 Latching Relay
- 2EA - Digital Input
- Full 2-Wire Communication
- Address Setting : 1-999
- 32Bit Stand Alone Control Processor
- Operation Condition : -10 ~ 60°C
- AC/DC24V, 50/60Hz, 7VA
- Weight :



## Dimension of Layout

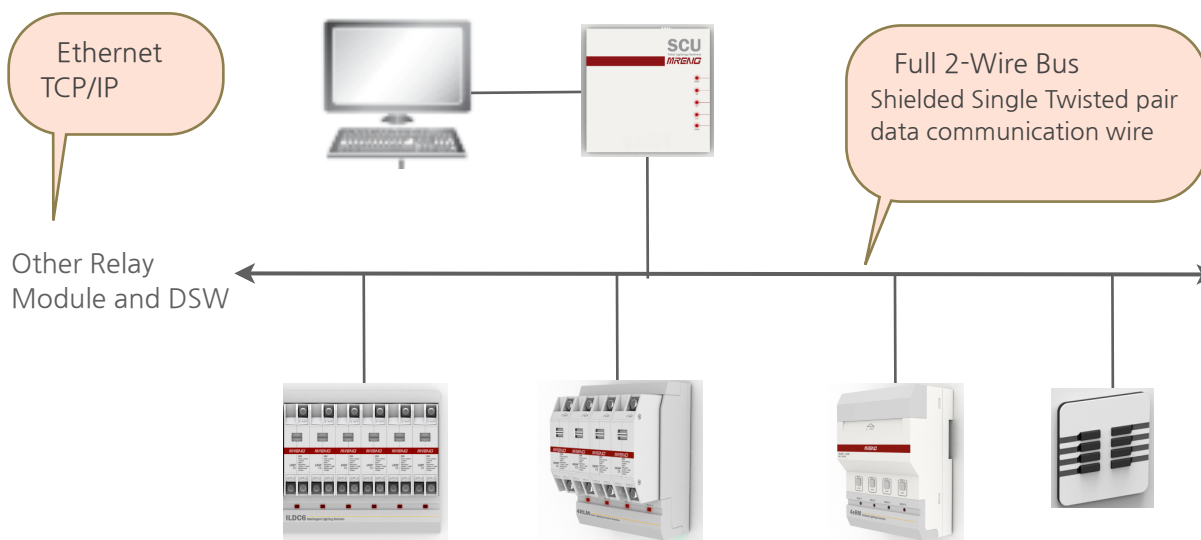




**6sRM** 6 Stand Alone Relay Module

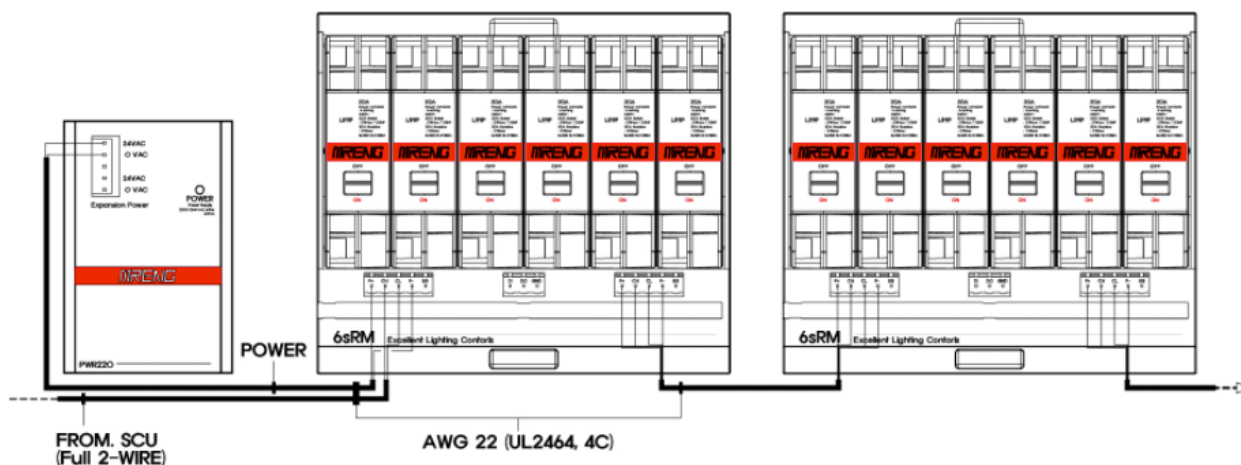
## ELC SYSTEM

## Specification



Each Max. 9997¢ for Each Relay Module (6sRM+6eCSM, 4sRM, 4eRM)  
 Each Max. 9997¢ for Data Line Switch(DSW4, DSW8, TS4, TS8, STS, SWS)  
 Each Max. 9997¢ for DALI Master & 2557¢ Wireless Gateway

## Connection Diagram







## Overview

4sRM is the RELAY ON/OFF Control module and it performs the function for Relay's ON/OFF control & display the operation status. It connects through ETLC Communication with SCU and through the ETLC protocol, it performs the schedule, ON/OFF operation, ON/OFF status display, Relay Group Control and Sunset/Sunrise Control. It stores the Operation Log of the Relay & Data for Run-Time.



## Main Feature

- The LED Status Indicator displays the status of each Relay.
- The powerful data communication that connects with Full 2-Wire Bus through data-line.
- When downloading the data-base & modification for program, the control continuously performs its work.
- The interlocking program for each control panel has the Global Stand Alone function and it performs the work even the central monitoring panel is broken.

- The High-Voltage & Low-Voltage line is hidden inside of case cover to organize the cable neatly.
- The 20 Ampere Latching Relay that has the on-site operational ON/OFF switch is installed at Din-Rail type without separate cable.
- The large and small size of various project for application is possible by new design and compact design.

## Operation

The Relay Module is connected up to 999EA at one SCU and it performs the interlocking control for each program. The each Relay Module is designed as combined structure of Control Board, Relay Operation Board and Communication Board integrally. When you pull out from the case cover, there will be data communication connection terminal and two sensor input terminal. Connect the necessary part to use the module. Each Relay and Operation Board is ready with LED Indicator that display the status. Without separate cable for Relay, it can be mounted at Din-Rail type board for installation.

## Networking

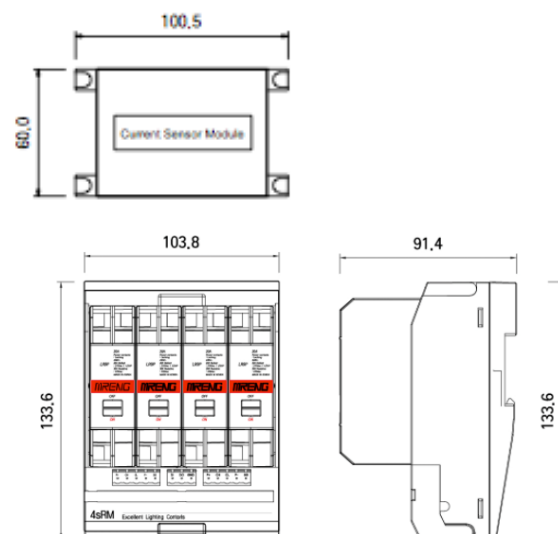
The Relay Module is connected with Full 2-Wire communication method. Also when installing the Relay Module at Up and Down position, there is the passage way to connect the UP and Down Data-Line. The Data-Line cable is handled neatly.

### Specification

- 4EA - LED Status Indicators
- 4EA - 20 Latching Relay
- 2EA - Digital Input
- Full 2-Wire Communication
- Address Setting : 1-999
- 32Bit Stand Alone Processor
- Operation Condition : -10 ~ 60°C
- AC/DC24V, 50/60Hz, 7VA



### Dimension of Layout



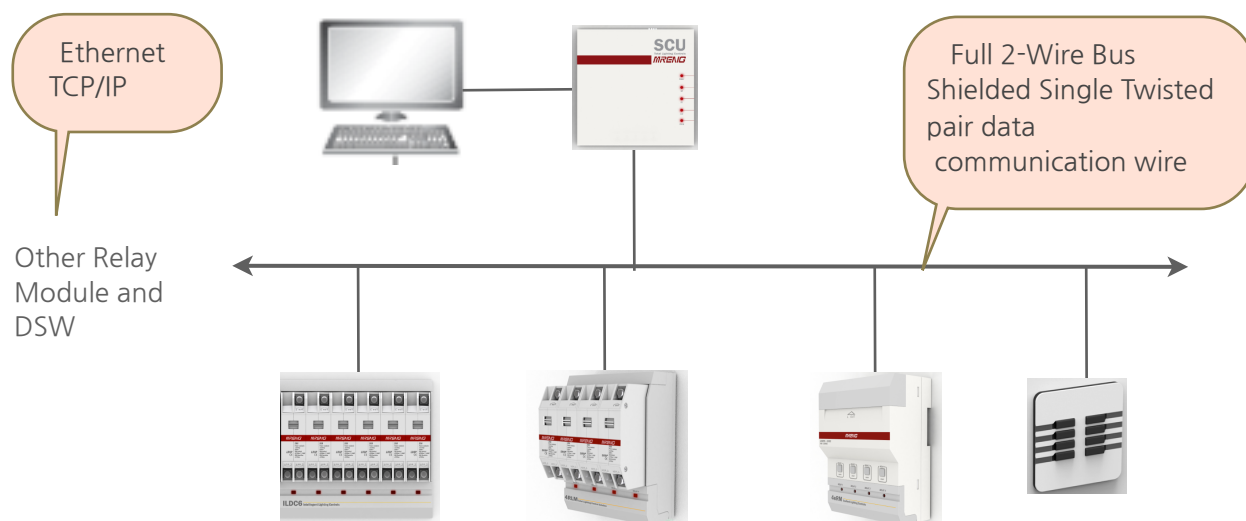


# LIGHTING CONTROLS

4sRM 4 Stand Alone Relay Module

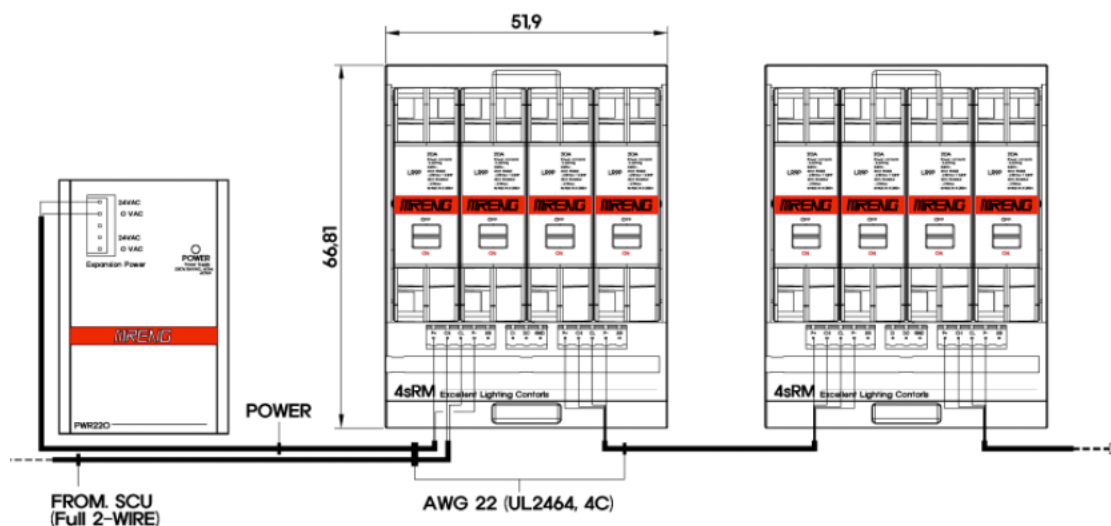
ELC SYSTEM

## System Diagram



Each Max. 999개 for Each Relay Module (6sRM+6eCSM, 4sRM, 4eRM)  
Each Max. 999개 for Data Line Switch(DSW4, DSW8, TS4, TS8, STS, SWS)  
Each Max. 999개 for DALI Master & 255개 Wireless Gateway

## Connection Diagram





## Overview

4eRM is the RELAY ON/OFF Control Module and it performs the function for Relay's ON/OFF control & display the operation status. It connects through ETLC Communication with SCU and through the ETLC protocol, it performs the schedule, ON/OFF operation, ON/OFF status display, Relay Group Control and Sunset/Sunrise Control. It stores the Operation Log of the Relay & data for Run-Time. Especially, this 4eRM is internal with 4 Latching Relay inside of Relay Module. It is adopted the current sensing IC for each Relay's ON/OFF feedback.

## Main Feature

- The Usage is accumulated by Daily and Monthly
- It stores the Energy usage and reporting (Save for 16 month and 32 days of maximum dates)
- The LED Status indicators that display the each LED.
- The LED Flick is able when Relay Fail.
- The Enable/Disable is possible for Demand Control Function.
- Data Line is connected at Full 2- Wire Bus
- The Control is able when operating for Down Load & modifying of Database.
- The each Control Panel is able for Global Stand Alone function.
- It keeps working even when the central monitoring system is not working.
- The Current Sensing is able through internal of 25A Latching Relay.
- Up to 1,000 EA is able to connect at one SCU (Communication Device).

## Operation

The Relay Module is connected up to 999EA at one SCU and it performs the interlocking control for each program. The each Relay Module is designed as combined structure of Control Board, Relay Operation Board and Communication Board integrally. When you pulls out from case cover, there will be data communication connection terminal and two sensor input terminal. The Relay is installed inside of Relay Module. The current sensing circuit is ready for monitoring the status. It is able to monitoring the Current & Status.



- The High-Voltage & Low Voltage line is hidden inside of case cover to organize the cable neatly.
- The 20 Ampere Latching Relay that has the on-site operational ON/OFF switch is installed at Din-Rail type without separate cable.
- The large and small size of various project for application is possible by new design and compact design.

## Networking

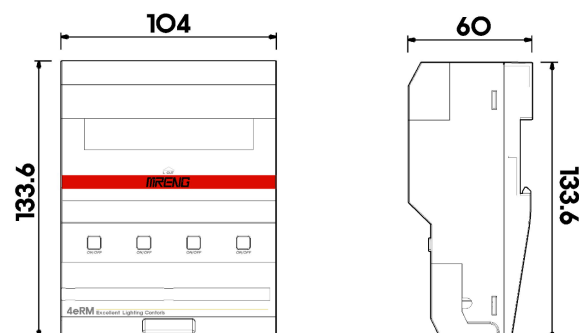
The Relay Module is connected with Full 2-Wire communication method. Also when installing the Relay Module at Up and Down position, there is the passage way to connect the Up and Down Data-Line. The Data-Line cable is handled neatly.

## Specification

- 4EA - LED Status Indicators
- 4EA - 25 Latching Relay(TV-8 Inrush Current 100A)
- Full 2-Wire Communication
- Address Setting : 1-999
- 32Bit Stand Alone Processor
- 2EA - Digital Input
- Operation Condition : -10 ~ 60°C
- AC/DC24V, 50/60Hz, 7VA



## Dimension of Layout





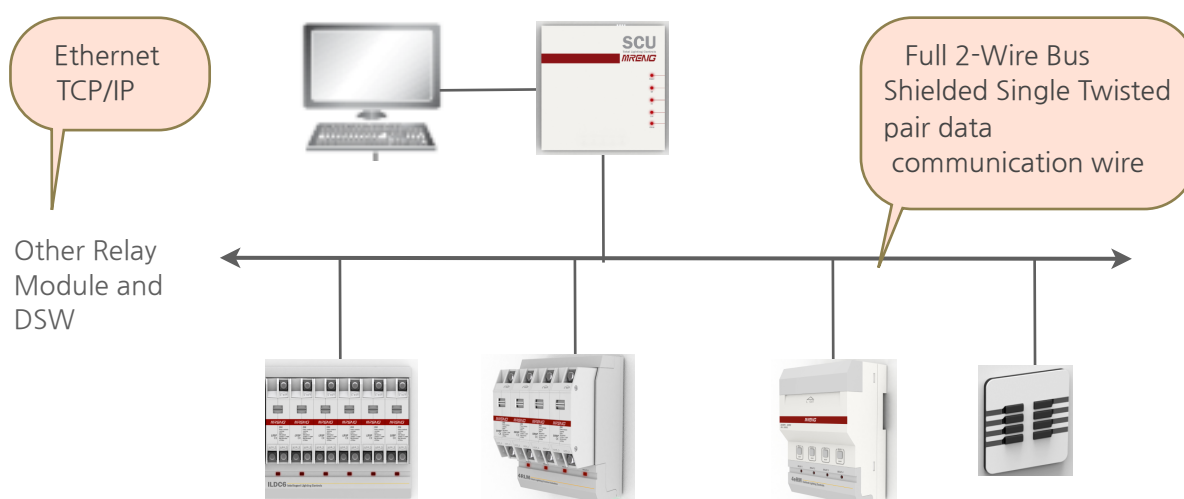


# LIGHTING CONTROLS

4eRM 4 economic Relay Control Module

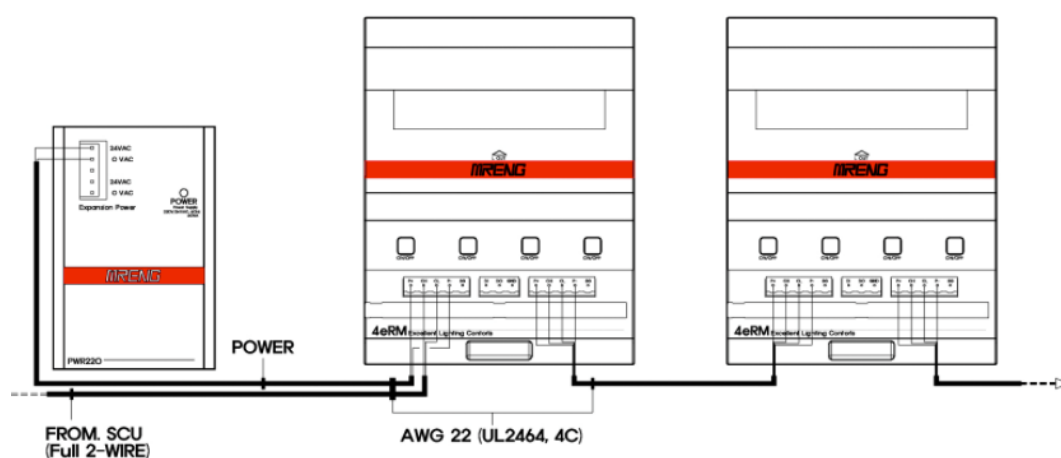
ELC SYSTEM

## System Diagram



Each Max. 999개 for Each Relay Module (6sRM+6eCSM, 4sRM, 4eRM)  
Each Max. 999개 for Data Line Switch(DSW4, DSW8, TS4, TS8, STS, SWS)  
Each Max. 999개 for DALI Master & 255개 Wireless Gateway

## Connection Diagram





## Overview

The 6eCSM is the module that capable of 6EA of Current Sensing for each circuit. This module is built-in with CT and mounted with Current Sensing Module to measure the Current Usage for Each Relay's Circuit. The Communication between Current Sensing Module for 6eCSM and 6sRM is connected with serial method. The connection between electrical line terminal for 6sRM's each relay and the electrical line of 6eCSM can be connected to Relay Terminal directly.

The Current Sensing method of this module is based on CT type of sensing method, and the Current Sensing is 1% accuracy for the accurate current measurement is possible.

## Key Feature

- Measure Current Consumption by each Circuit (Max 20A)
- Usage Integration(Daily, Monthly)
- Storage & Report for Electricity Usage (Up to 32 days at present, 16 months storage)
- Enable/Disable function for Demand Control.
- Data Line that connects to FULL 2 Wire BUS method
- Can be controlled during Down Load & Database modification operation
- Each Control Panel has Global Stand Alone function
- The continuous operation is able even when Central Control System is disabled
- To SCU (Comm. device), up to maximum of 999 EA can be connected (with xRM)

## Operation

This Current Sensing Module is connected to 6sRM and can perform the Current Sensing function in conjunction with ON/OFF control for 6sRM. It also has the DEMAND control function for Current Limit Cut-Off Control. Each Current Sensing Module is consist of Current Sensing Board and Communication Board as configured for integrated structure. Therefore, if the 6eCSM is additionally installed in the Lighting Control Panel where only the previous 6sRM is applied, the current consumption of each really circuit can be measured.

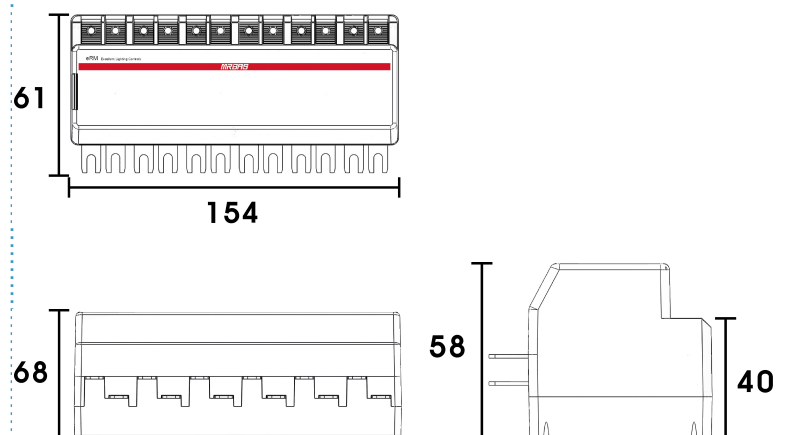
## Specification

- 6ea - LED Status Indicators
- 6ea - 20 Latching Relay(DIN RAIL : LR9P)
- 6ea - Current sensing IC : 20A AC220V
- Full 2-Wire Communication
- Address Setting : 1-999
- 32Bit Stand Alone Processor
- 2ea - Digital Input
- Operation Condition : -10 ~ 60°C
- AC/DC24V, 50/60Hz, 7VA

## Networking

It is connected through 6sRM and Uart communication (serial communication between each CPU) and operates as 6eCSM when connected. Also, the previous 6sRM is connected to the Data Line of the ELC System and it is connected and operated with up to 999 EA of 6sRM (including 6eSCM) for address up to 000-999.

## Dimension of Layout



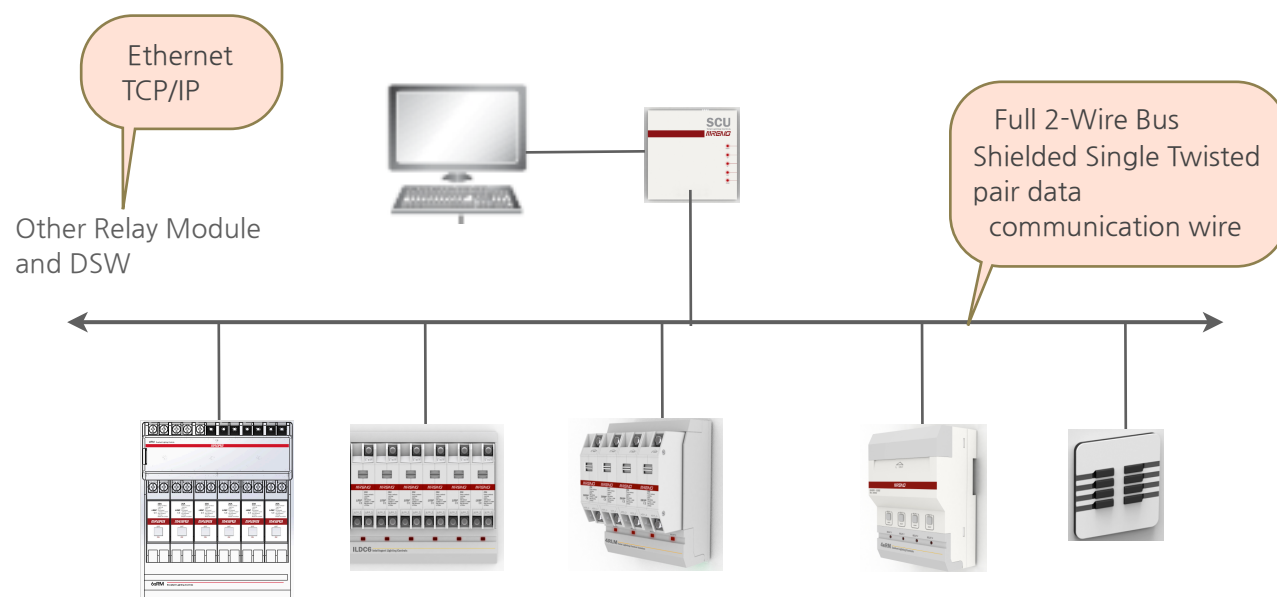


# LIGHTING CONTROLS

6eCSM 6 Electric Current Sensing Module

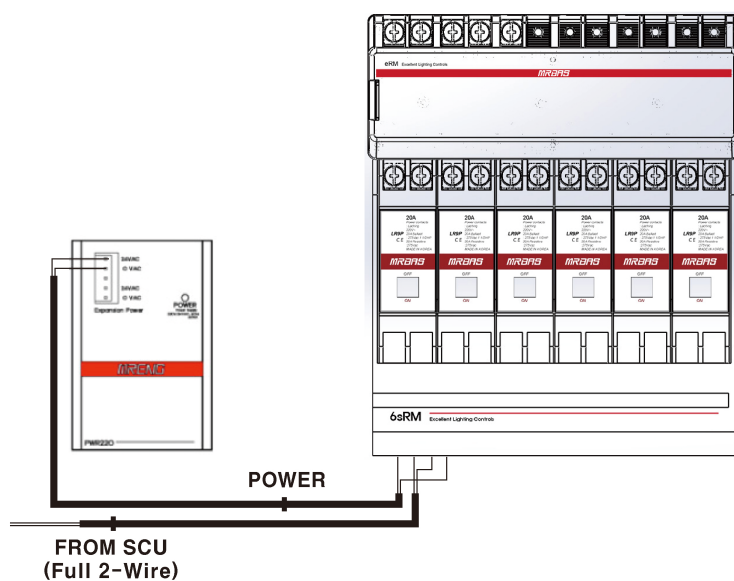
ELC SYSTEM

## System Diagram



Each Max. 999개 for Each Relay Module (6sRM+6eCSM, 4sRM, 4eRM)  
Each Max. 999개 for Data Line Switch(DSW4, DSW8, TS4, TS8, STS, SWS)  
Each Max. 999개 for DALI Master & 255개 Wireless Gateway

## Connection Diagram







## Overview

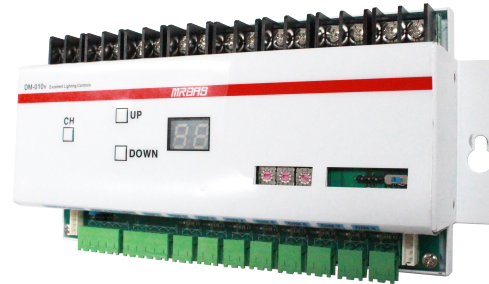
The DM-010V is the Dimming Control Module with the 8 channels for 0~10V Dimming Channel. Each of 0~10V Dimming Module is included with 16A Latching Relay for ON / OFF control. Also, in this module, the ON / OFF and Dimming can be manually operated for each channel and the dimming status of each channel can be checked from 00 to FF.

## Key Feature

- Equipped with 8 EA of 16 Ampere Latching Relays
- Equipped with 8 EA of 0~10V Dimming Modules
- It has the powerful data communication using Full 2-Wire Bus(ELC Network) that connects to the data line
- The Control is continuously operated even when downloading such as Database and Program modification.
- The interlocking program for each control panel is continuously operated by the Global Stand Alone function even when the central monitoring PC is disabled.

## Operation

The DM-010V module can be connected to one single for SCU up to 999 EA to operate the interlocking control for each program. Each module is designed to integrate Control board, Relay drive board, Communication board and 0 to 10 V Dimming board. This module has the display part for control and status of each channel for Relay ON/ OFF channel and Local Dimming. Able to control the Min, Max, 16 Group and Scene Control and also it has the various function for dimming control.



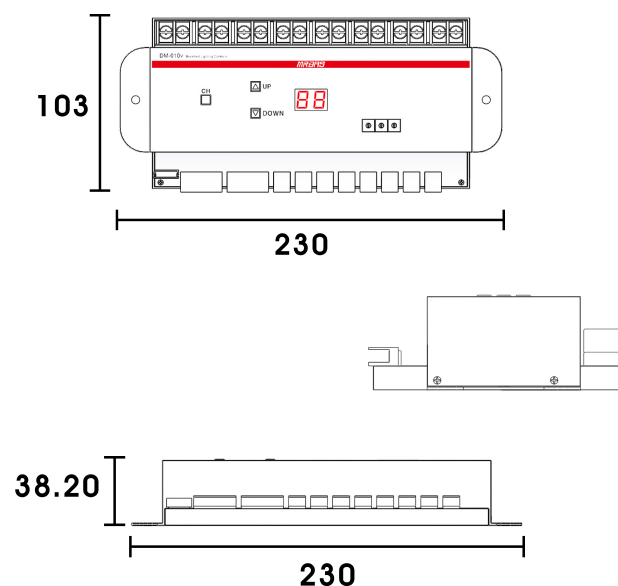
## Networking

The DM-010V Module is connected with Full 2-Wire communication method. Also if the each of module is installed in vertically, each module has the passageway so that the upper and lower data lines can be connected, making it easy to expand.

## Specification

- 8EA : 0 -10V Dimming Channel
- 8EA : 16 Ampere Latching Relay
- 0 -254 steps of Dimming Control
- 16 Groups / Scene Control
- Fade time, Fade rate
- Min/Max Control
- Use GDS, DSW, TS, STS Switch
- Local Control (Up/Down/Level)
- Full 2 - wire Communication (Support DALI Protocol)
- Address Setting : 1- 999
- 32 Bit Stand Alone Control Processor
- Operation Condition : 0 - 60°C
- AC/DC24V, 50/60Hz
- Weight :

## Dimension of Layout





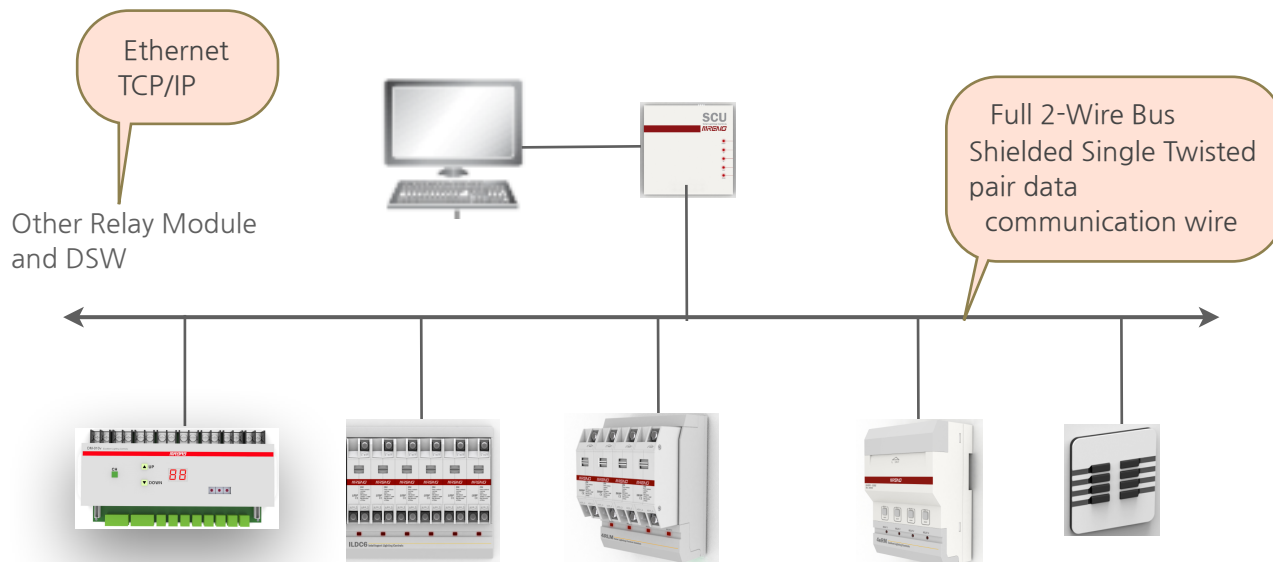
# LIGHTING CONTROLS

DM-010V

0-10V Dimming Module 8ch

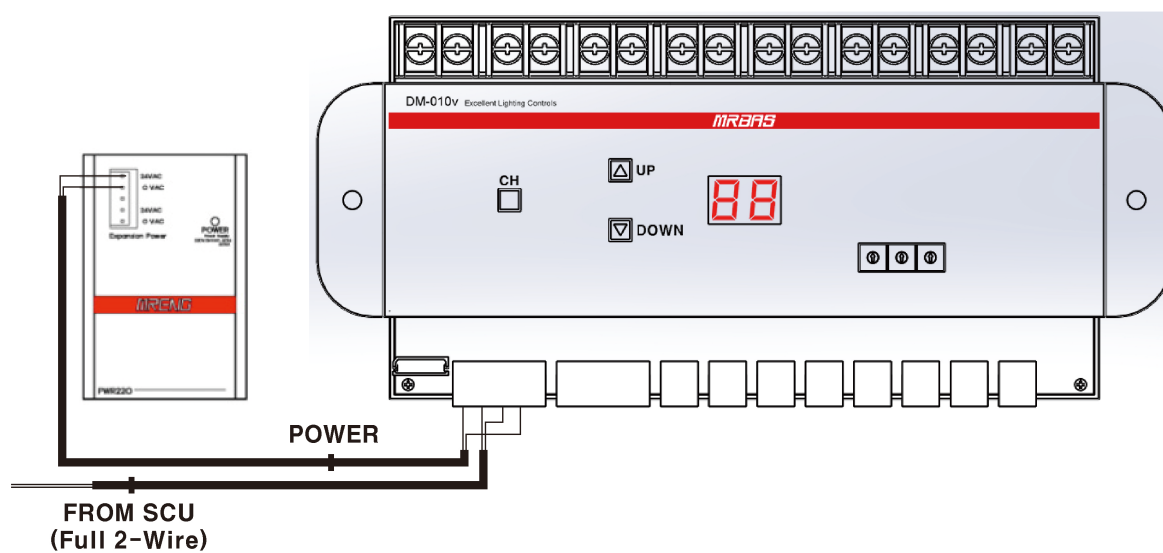
ELC SYSTEM

## System Diagram



Each Max. 999개 for Each Relay Module (6sRM+6eCSM, 4sRM, 4eRM, DM-010V)  
Each Max. 999개 for Data Line Switch(DSW4, DSW8, TS4, TS8, STS, SWS)  
Each Max. 999개 for DALI Master & 255개 Wireless Gateway

## Connection Diagram





### Overview

The EPWR Power Supply Device is installed at each of Lighting Control Panel of ELC System. The each Relay Modules like 6sRM, 4sRM, 4eRM and ELCC48 + ELDC 6 is used by Power Supply Device. One single EPWR can cover 10 to 20 of Relay Module. Suitable to use and installed within 10EA.



### Main Feature

- The Free Voltage is supplied within the AC 90 - 235V.
- It supplies to power to each Relay Module by converting into DC24V supplied by AC Power.
- One single Power Supply Device is suitable to connect the 10EA of Relay Module.
- When operating the Relay Module, 200mA of current is consumed for each Relay Module.

### Operation

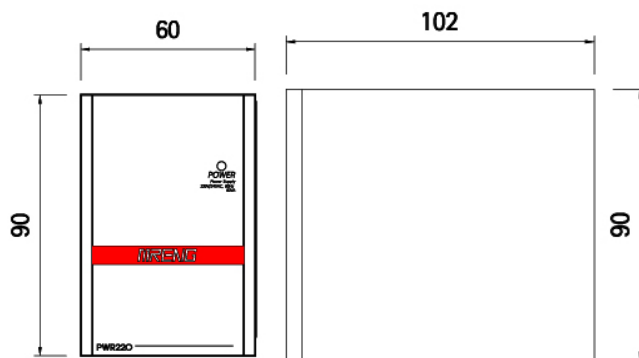
The secondary power performs the role for supplying the power to each Relay Module with DC24V by supplied the power of High-Voltage of 220V (90 - 235V). When power is supplied, the LED lamp of front side maintains ON status.

### Specification

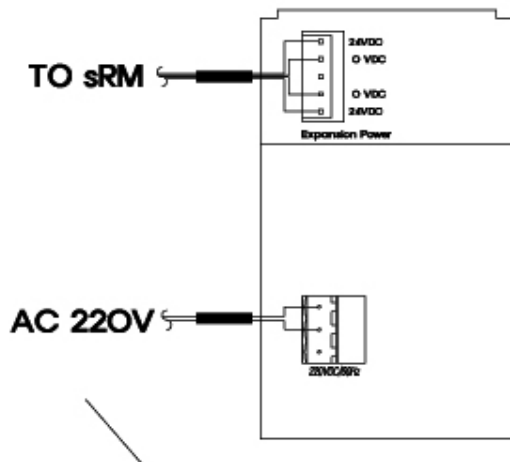
- Input Power : AC 90- 235V, 60Hz
- Output Power : DC24V
- Power Consumption : 40W
- Ambient Temp. 0 - 55°C
- When operating Relay Module : 200mA(0.7Watt), when not: 100mA(0.24Watt)
- Connect up to 10EA of Relay Module



### Dimension



### Connection Diagram







# LIGHTING CONTROLS

## REPEATER

## Data Line Amplifier

## ELC SYSTEM

### Overview

REPEATER is the communication device that amplify & recycle the data communication between SRLINK and Lighting Control Panel. The Lighting Control Panel's Low-Level network is TLC BUS which is the digital signal. Furthermore from certain distance, the output signal is decreasing. To solve this problem for longer distance data output, it may need to reset or device that amplify the output. Therefore, the REPEATER is the device that amplifies the transmission signal. It can expand the number of system by installing at the middle of SRLINK & Lighting Control Panel.

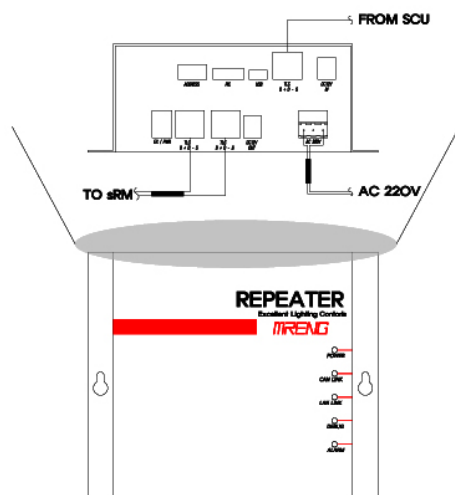
### Main Feature

- The distance is expanded due to signal amplification.
- The number of connecting system is expanded.
- Eliminates the communication line noise by configuring the noise filter.
- Display the transmission line status LED.
- Display the lighting control panel field status.
- Powerful data communication that connected by Full 2-Wire Bus.
- Continuous control is possible when downloading/modifying the program & data-base.

### Specification

- Input : 110/220 VAC
- DATALINE VOLTAGE : DC24V
- Distance : 1.2km
- CPU : ISOLATION 2CPU(32BIT Microprocessor 2Channel)
- Operation Environment: 14°F to 140°F(0°C to 60°C)
- Relative humidity: 0% to 95%,

### Connection Diagram



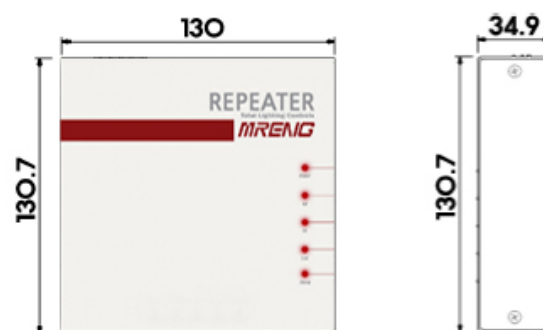
### Networking

REPEATER connects between High-Level & Low-Level communication. The High-Level communication is configured with Full 2-Wire Bus and it connects to SCU for use. The Low-Level communication is managed by expanding the each lighting control panel & data-line switch up to 250 nodes.

### Application

When the communication error occurred by the noise from certain ETLC Network section or requesting the distance above base Specification from ETLC NETWORK, it may uses as expansion or separation of Data-Line. The primary line and secondary line is managed by separated CPU anti cuts the data noise for between each line by isolation of electrical circuit. If it uses as expansion of separate data-line, the separate Low-Level network will be created. The Data-Line is able to expand for 1.2km and 250 nodes can be added for expansion.

### Dimension of Layout





## Overview

The SU is the UNIT that converts the Low-Level ETLC Communication Network to 2 LINE Communication method. This is the system that able to supply the power and 2 Line Communication by integrating the ETLC Communication method & Power into Frequency Modem Method. It applies to several types of switch by connecting 2 LINE DSW (DSW-4, DSW-8, TS-4 & TS-8) switches.

## Main Feature

- The existing Data-Line is divided into power line & data-line to connect at each switch. When apply this SU device, the power line & data-line can be reduced into two lines.
- The length of cable that connected at his SU device is 300m and it is suitable for use.
- The switches at one single SU is appropriate to use for 30 switches. And below 30 switches, it has high quality data communication.

## Specification

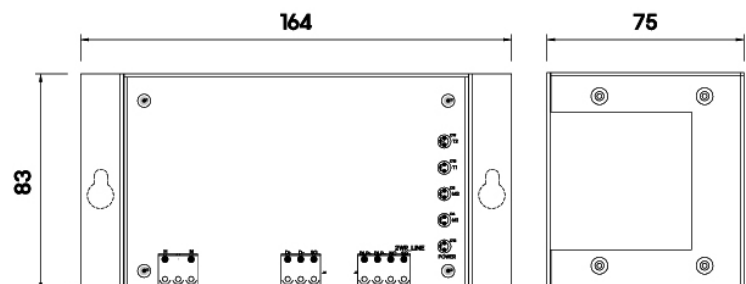
1. 2LINE CONVERTER
  - Input Power : AC220V 60Hz
  - Output Power : DC24V
  - CPU : 32Bit Micro Processor
  - Mount : Panel Mount
  - Operation Environment : -10°C ~ 60°C, 0~95% RH
  - Comm.Method : ETLC NETWORK / FieldBUS OR 2LINE
2. 2LINE SWITCH
  - Input Power : DC24V
  - CPU : 32Bit Micro Processor
  - Mount : Panel Mount
  - Operation Environment : -10°C ~ 60°C, 0~95% RH
  - Comm. Method : ETLC NETWORK / FieldBUS OR 2LINE



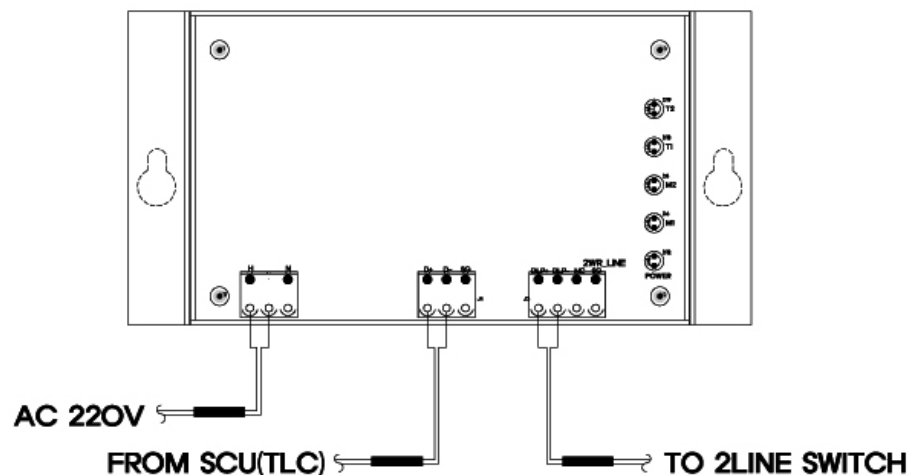
## Operation

SU is installed at each Lighting Control Panel and it performs the 2 lines that outgoing to Data Line Switch. It is suitable to apply at existing piping & wiring that uses 2 lines. Also if our system is designed at the beginning, it is suitable to use the switch line with 4 lines. The switches at one single SU is appropriate to use 30 switches below and apply them below 300m for high quality data communication. This SU device is installed at existing Lighting Control Panel and installed the separate Power Supply Device to supply the power is recommended.

## Dimension of Layout



## Connection Diagram





# LIGHTING CONTROLS

SM

Data Line Sensor Module

ELC SYSTEM

## Overview

SM(Data Line Sensor Module) is the sensor module that connects at Data-Line of ELC Communication Network. The one single SM is able to connect for 4 sensors. Basically, it connects occupancy sensor and photo sensor. Also it is ready for 2 Digital Input. By the occupancy sensor or photo sensor that connected at this SM, the interlocking control is able with DALI Module and each of Lighting Control Panel.

## Main Feature

- The sensor module that connects at ELC Communication Network
- Connection of 4 sensors : It connects at basic occupancy sensor and photo sensor for each and 2 Digital Input.
- By the 1 - 999 Address, the maximum of 999 sensor modules can be connected at one ELC Network.
- The Enable & Disable selection function is possible for self-operation.
- It has Sensor Interval Time Function



## Application

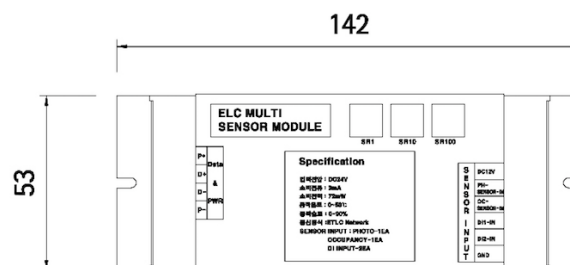
This is the Sensor Module that is able to apply at ELC Communication Network for connection. By the operation of occupancy sensor or photo sensor that connected at this Sensor Module, the interlocking control is possible for corresponding Lighting Control Panel or DALI Module.

This Sensor Module has 2 Digital Input separately. From the connection of Fire-fighting or Crime Prevention contact function, the interlocking control is possible. The piping and wiring for sensor is installed for each but when applying to this Sensor Module, connect the one Data-Line to sensor for operation is possible. It can save the cost for wiring and piping.

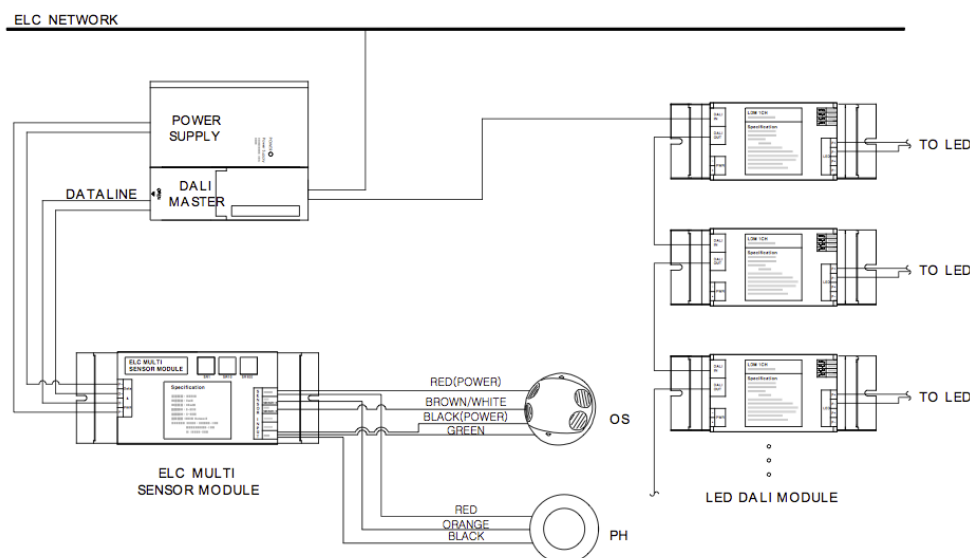
## Specification

- Interface : ETLC, SENSOR, DI
- Communication : ETLC Network
- Input Voltage : AC/DC 12V -24 V 350mA
- Current/Power : 3mA / 72 mW
- Operating Temp. : 0 - 50°C
- Operating Humidity : 0 - 90%RH
- Sensor Input : Photo, Occupancy, Digital Input 2 EA
- Operation Voltage : DC5V, 3.3V
- MCU : 32 bit Arm Processor

## Dimension of Layout



## Connection Diagram







## DALI SYSTEM

## DALI-M

## DALI Master

### Overview

The DALI Master is performing the role of converter that interface with the product (DALI Module) for using the DALI Protocol that is connected to ETLIC Communication network.

From this single DALI Master, connect the DALI Sensor or 64EA of DALI Module, to control the Dimming and several Scene, Pattern, Schedule and ON/OFF by LED Lighting.



### Main Feature

- ETLIC/DALI Protocol Converting.
- Connect Ballast and 64 EA of DALI Module.
- 16EA of Scene Setting Function.
- Setting for each DALI Module : Group, Scene and Etc.
- DALI Master is able to connect maximum of 999EA at ETLIC BUS and single system is able to control the maximum 64,000 EA of DALI Module.

### Specification

- DALI Protocol : IEC 60929
- Baud Rate : 1,200 BPS
- SYSTEM SIZE : 64 units
- CPU : 32Bit Micro Processor
- Mount : Panel Mount Type
- Environment Condition : -10℃ ~ 60℃, 0~95% RH
- Input Power : DC12~24V
- Consume Power : 15W
- Communication Method : TLC NETWORK / DALI

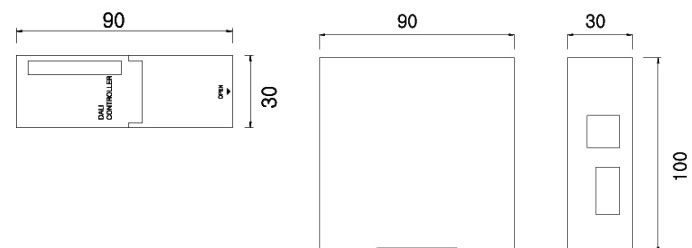
### Application

This DALI Master is able to connect up to max. of 999EA at existing lighting control data-line by 001 - 999 address. The each of DALI Master is able to connect up to max. of 64 EA of DALI Module and it is able to control the ON/OFF and Dimming for max. of 64,000 EA of LED Lighting.

The DALI Master is able to operate with existing TLC Network, it can receive the input signal from sensor and switch that connected at TLC Network to control the Preset, Pattern and Dimming. Also the Dimming control by the Photo Sensor and ON/OFF control and Dimming Control by occupancy sensor is possible. The power savings are enhanced greatly.

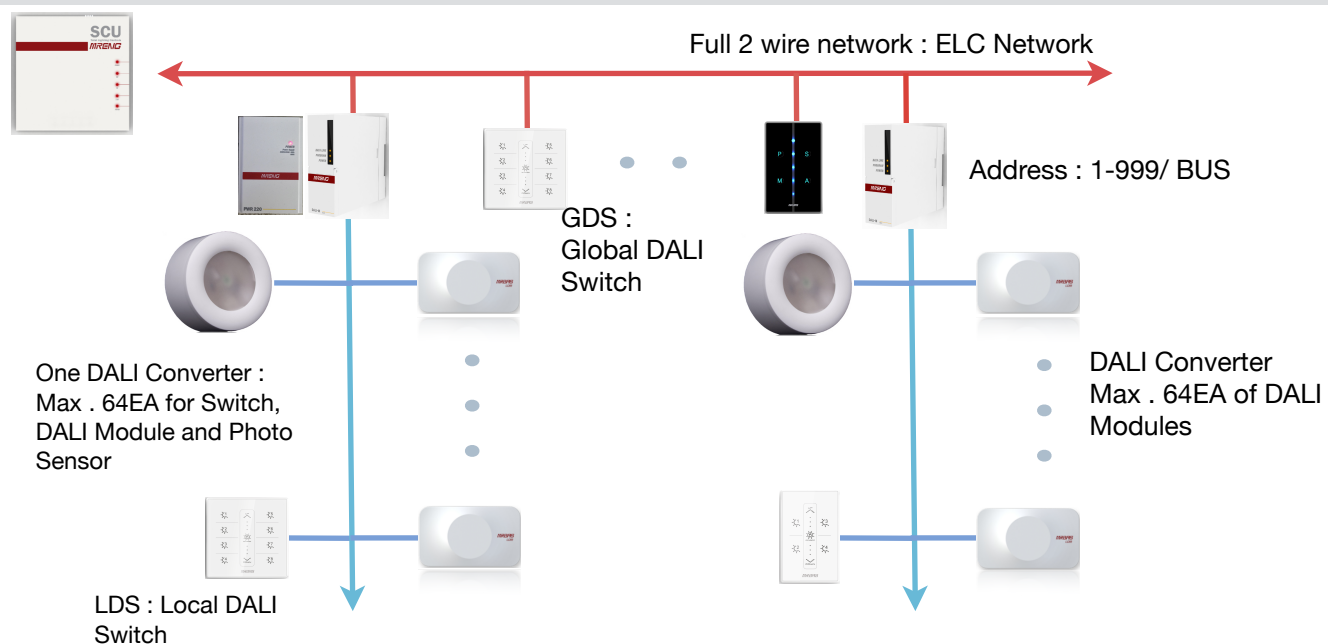
Also from the central computer, controlling the schedule (Time-Zone), group, pattern is possible by the program. It shows the Dimming Level in percent (%) to suitably used in Lighting Control Management.

### Dimension of Layout



### System Diagram

### DALI System Configuration





# LIGHTING CONTROLS

## LDM Series

## LED DALI Dimming Module

DALI SYSTEM

### Overview

LED DALI Dimming Module (LDM) is a Dimming Module connected to DALI Communication Line. This LDM is a device that controls ON / OFF and Dimming of LED lighting, and it is upgraded to enable more various interlocking control by connecting up to 64 to DALI Master through communication by DALI protocol. The LDM Series is classified into various types according to the type of output stage.

### Main Feature

- DALI PROTOCOL INTERFACE
- Photo adjustment function by 254 steps
- 16 sets of SCENE & Group Setting Function
- DALI Protocol : IEC 62386
- Baud Rate : 1,200 bps
- Data : Individual ON/OFF Control, Individual Dimming Control, Lamp Status/Alarm Signal, Ballast Status/Alarm Signal.
- Dimming Range : 1% ~ 100%
- Dimming times : Program
- Do not require a separate shielded communication cables, able to construct with general cable or cable wiring.
- When constructing the cable, able to use the 5C cable (3C-L/N/E, 2C-DALI). Also without installing a separate communication line, construction is possible.
- No need to distinguish between the polarity of the communication line.
- Type of output : Normal type is a module that is directly connected to LED luminaire, and there are modules to give PWM and 0-10v signal to SMPS (LED Driver), respectively.



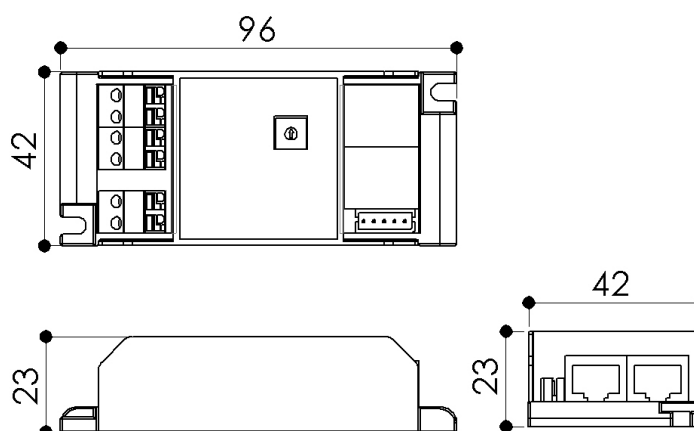
### Application

- LED lighting can be controlled through DALI communication by applying to various types of lighting such as flat panel lighting (downlight), downlight and LED bar..
- By applying the universal DALI Protocol (IEC 62386), compatible with all DALI Controllers (Master).
- Ballast of LED lighting shall use ballast less than 180W when output voltage of constant voltage method is below 60V / 3A.
- The LDM is mounted with screws or magnets next to the ballast at the back of the LED luminaire.
- In cable connection, ballast input voltage and LED output voltage should be connected with the polarity (+-) in mind.

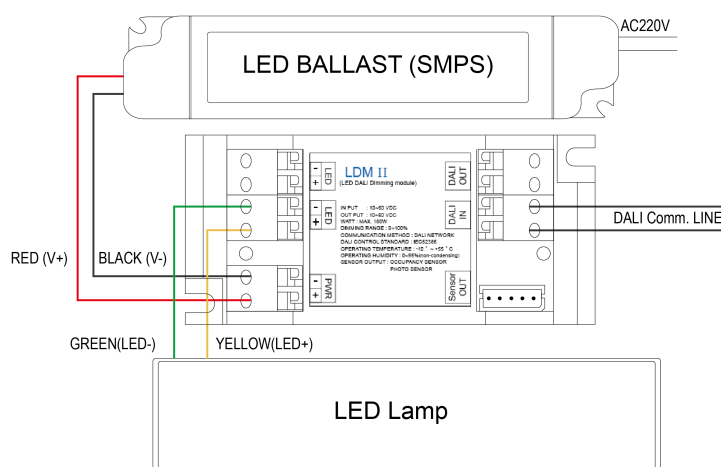
### Specification

- LED Min.10W - Max.180W Type
- Environment Condition: -10°C ~ 55°C, 0~95% RH
- Input Power : DC 10~60V Voltage
- Power consumption : 12 ~ 50W
- Communication Method : DALI
- Max. Comm. distance : 300M
- Output Power(POut) : Max. 180W
- Output Voltage(VOut) : 12 - 60VDC(LDM-n only)
- Outout Current(IOut) : Max.3,000mA(LDM-n only)
- Dimming Range : 1 - 100%
- OverLoad Protection : Yes
- LDM-pwm and LDM-010 are PWM and 0-10v Signal only for SMPS, respectively

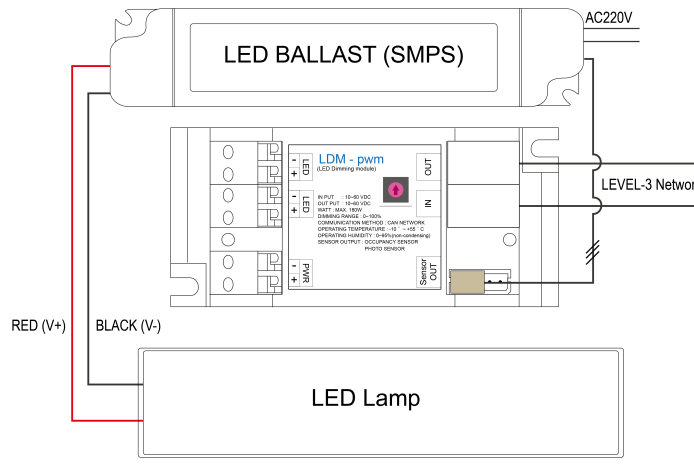
### Dimension of Layout



### Connection Diagram



LDM-n Type



LDM-pwm or O10 Type

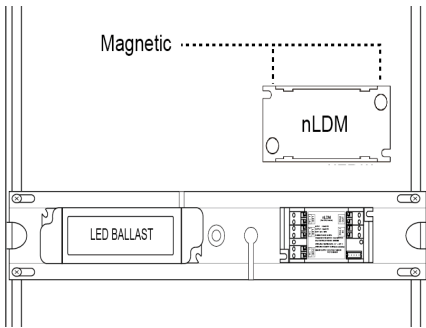
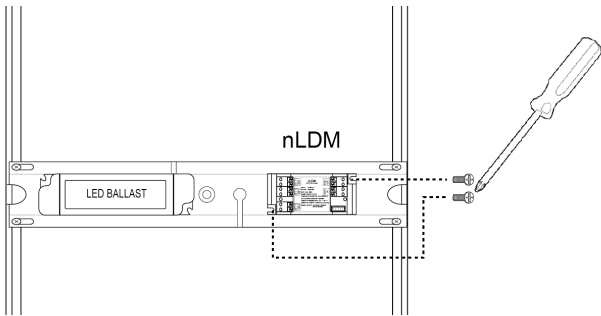


Application

- Up to Maximum of 64 LDM-2 can be connected on one DALI Master, allowing Individual/ Group/ Scene control
- 16 GROUP can be set
- 16 SCENE can be set
- Fade Time can be set
- Fade Rate can be set
- Min/Max. Level can be set
- Controllable by Occupancy sensor
- Controllable by Photo sensor

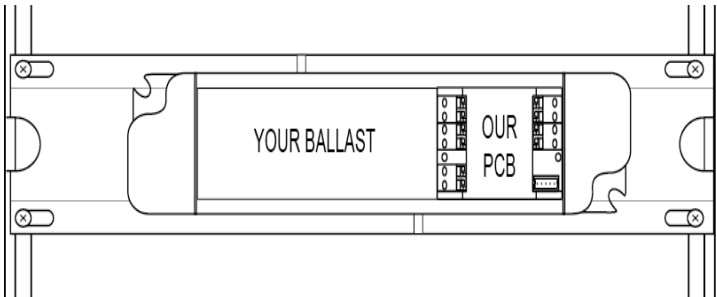


Installation Guide



Semi-finished from available

- It is available in PCB form so that our LDM-2 can be used as an integrated ballast.
- Using semi-finished product of LDM-2, use inside the ballast.
- See the illustration on the side.



Product List

Product Name	Model Number	Key Specification	Output Capacity for LED Load		
			10~20W	21~60W	61~180W
LED DALI Dimming Module with Output Circuit	LDM-L3-n	Input : DC10 -60V, Output : DC12-60V, Dimming Range : 1-100%, DALI Comm.	LDM-L3-n-20	LDM-L3-n-60	LDM-L3-n-180
LED DALI Dimming Module with PWM signal	LDM-L3-pwm	Input : DC10 -60V, Output : PWM signal Dimming Range : 1-100%, DALI Comm.	LDM-L3-pwm	LDM-L3-pwm	LDM-L3-pwm
LED DALI Dimming Module with 0-10v signal	LDM-L3-010	Input : DC10 -60V, Output : 0-10v signal Dimming Range : 1-100%, DALI Comm.	LDM-L3-010	LDM-L3-010	LDM-L3-010





# LIGHTING CONTROLS

LDM1CH(50W) LED DALI Module

DALI SYSTEM

## Overview

LED DALI Module is the device that control the Dimming and ON/OFF of LED Lighting and this device can connect up to maximum of 64EA to one DALI Master through the communication by DALI Protocol.



## Main Feature

- DALI PROTOCOL INTERFACE
- Photo adjustment function by 256 steps
- 16 sets of SCENE Setting Function
- Group Setting Function
- DALI Protocol : IEC 60929
- Baud Rate : 1,200 bps
- SYSTEM SIZE : 64 units
- Data : Individual ON/OFF Control, Individual Dimming Control, Lamp Status/Alarm Signal, Ballast Status/Alarm Signal.
- Dimming Range : 5% ~ 100%
- Scenes : 16 scenes
- Dimming times : Program
- Do not require a separate shielded communication cables, able to construct with general cable or cable wiring.
- When constructing the cable, able to use the 5C cable (3C-L/N/E, 2C-DALI). Also without installing a separate communication line, construction is possible.
- No need to distinguish between the polarity of the communication line.

## Application

The DALI Module is able to connect at each of DALI Master up to 64EA and the each module's address is recognized automatically. From central computer, it monitors the automatic recognized DALI Module and download the relevant program for control.

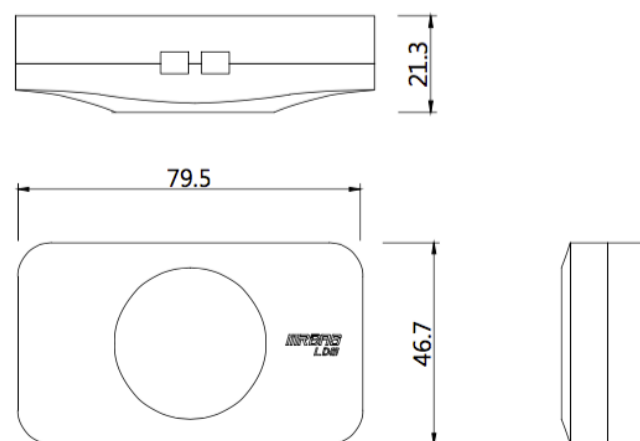
For example, from #1 Preset Switch, set to operate the 1,3,5,7,9 DALI Module, and then download it, all those modules will be operate from #1 switch. No need to enter the separate Address value. The automatic recognized Address setting will save time for Test-Run.

Each of DALI Module is installed at each LED Lighting and it can control the Dimming and Schedule at each of TIME-ZONE. The High-Level Communication of DALI Network is based on existing Lighting Control Data-Line and it can interlock with other ON/OFF System.

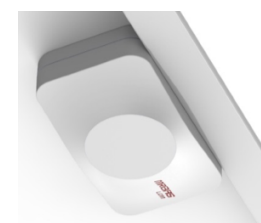
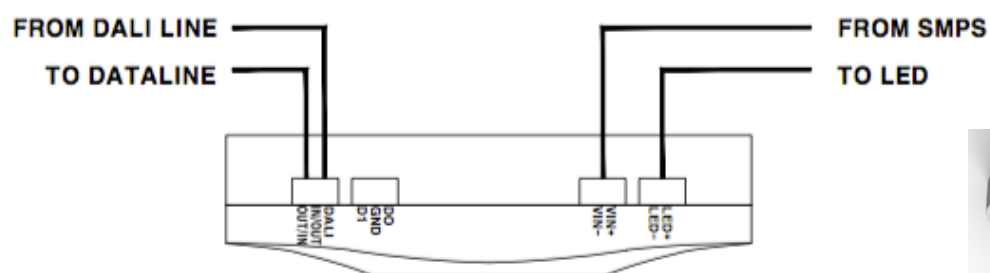
## Specification

- LED 50W Type
- Environment Condition: -10°C ~ 60°C, 0~95% RH
- Input power : DC 12 ~ 60V
- Power consumption : 12 ~ 50W
- Communication : DALI
- Max. Comm. distance : 300M
- Output Power(POut) : Max. 50W
- Output Voltage(VOut) : 12 ~ 60VDC
- Output Current(IOut) : Max.1A
- Dimming Range : 1 - 100%
- OverLoad Protection : Yes
- Short Circuit Protection : Yes

## Dimension of Layout



## Connection Diagram





## DALI SYSTEM

## LDM1CH(180W) LED DALI Module

### Overview

LED DALI Module is the device that controls the Dimming and ON/OFF of LED Lighting and this device can connect up to maximum of 64EA to one DALI Master through the communication by DALI Protocol.

### Main Feature

- DALI PROTOCOL INTERFACE
- Photo adjustment function by 254 steps
- 16 sets of SCENE setting function
- Group Setting function
- DALI Protocol : IEC 62386
- Baud Rate : 1,200 bps
- SYSTEM SIZE : 64 units
- Data : Individual ON/OFF Control, Individual Dimming Control, Lamp Status/Alarm Signal, Ballast Status/Alarm Signal
- Dimming range : 1% ~ 100%
- Scenes : 16 scenes
- Dimming times : Program
- Do not require a separate shielded communication cables, able to construct with general cable or cable wiring.
- When constructing the cable, able to use the 5C cable (3C-L/N/E, 2C-DALI). Also without installing a separate communication line, construction is possible.
- No need to distinguish between the polarity of communication line



### Application

The DALI Module is able to connect at each of DALI Master up to 64EA and the each module's address is recognized automatically. From central computer, it monitors the automatic recognized DALI Module and download the relevant program for control.

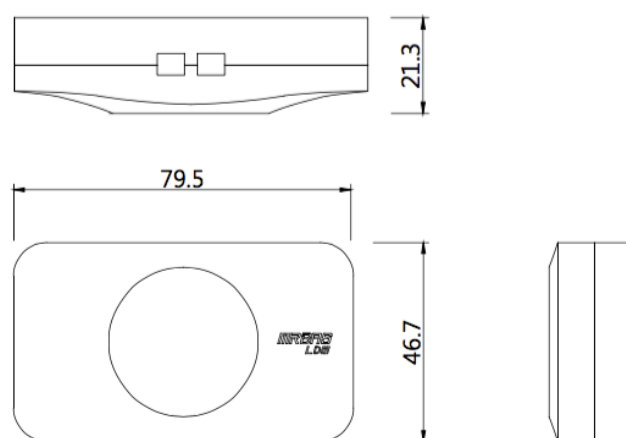
For example, from #1 Preset Switch, set to operate the 1,3,5,7,9 DALI Module, and then download it, all those modules will be operate from #1 switch. No need to enter the separate Address value. The automatic recognized Address setting will save time for Test-Run.

Each of DALI Module is installed at each LED Lighting and it can control the Dimming and Schedule at each of TIME-ZONE. The High-Level Communication of DALI Network is based on existing Lighting Control Data-Line and it can interlock with other ON/OFF System.

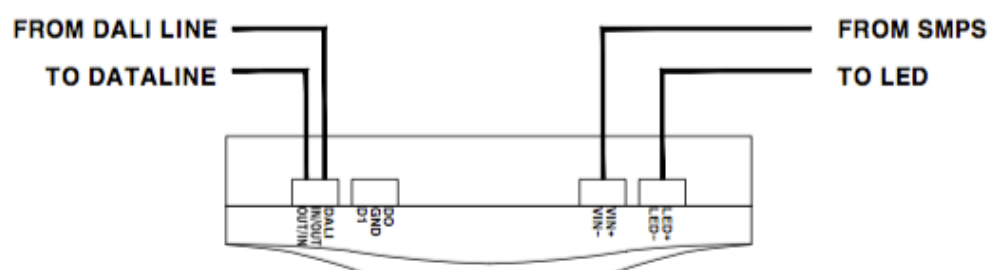
### Specification

- LED 180W Type
- Operation Environment : -10℃ ~ 60℃, 0~95% RH
- Input Power : DC 12~ 60V
- Consume Power : 12~ 180W
- Communication Method : DALI
- Maximum Communication Distance : 300M
- Output Power(POut) : Max. 180W
- Output Voltage(VOut) : 12 - 60VDC
- Outout Current(IOut) : Max.3A
- Dimming Range : 1 - 100%
- OverLoad Protection : Yes
- Short Circuit Protection : Yes

### Dimension of Layout



### Connection Diagram





# LIGHTING CONTROLS

EDM

LED Emotional Dimming Module

DALI SYSTEM

## Overview

The LED Emotional Dimming Module is a module that can produce the color temperature of the lighting as needed. Through the changes of illumination and color temperature, it is possible to realize the most suitable natural sunlight for people. It is connected to DALI-Master with polarity-free full 2-wire communication. 64 EDMs are connected to one DALI-Master. It is a device that enables ON / OFF and dimming control of LED luminaires by individual, group, scene, pattern, schedule, and color temperature.

## Main Feature

- EDM PROTOCOL INTERFACE
- The illumination adjustment function of step 254
- Color temperature control function in step 254
- 16 SCENE setting functions
- 16 groups setting function
- Communication speed: 1,200 bps
- SYSTEM SIZE: 64 units
- Dimming range: 1% to 100%
- No separate shielded communication line is needed, and it can be constructed by general wire or cable wiring
- 64EA LED Lights ON / OFF & Dimming & Color Temperature Control
- ON / OFF and dimming color temperature status display



## Application

- Up to 64 EDMs can be connected to each master, and the address of each module will be recognized automatically.
- It is a module that can control the brightness and color temperature of the LED by 254 steps by using the ballast as an input power.
- The central computer can monitor the EDM with the address set and download the program to control it.
- Group information, scene information, FADE TIME, FADE RATE ,, MIN / MAX information can be stored. Each EDM is installed for each LED luminaire, allowing individual dimming and color temperature control.
- The top of the network is the existing lighting control data line, which can be controlled by the central computer and the switch, and can be linked with the existing ON / OFF system if necessary.



6,000k Cool White

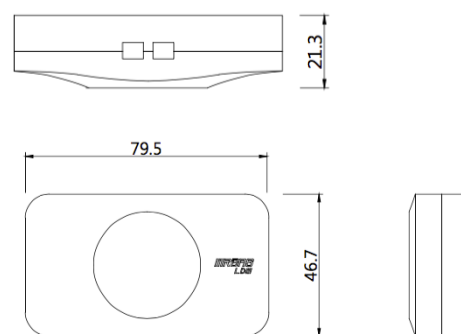


3,000k Warm White

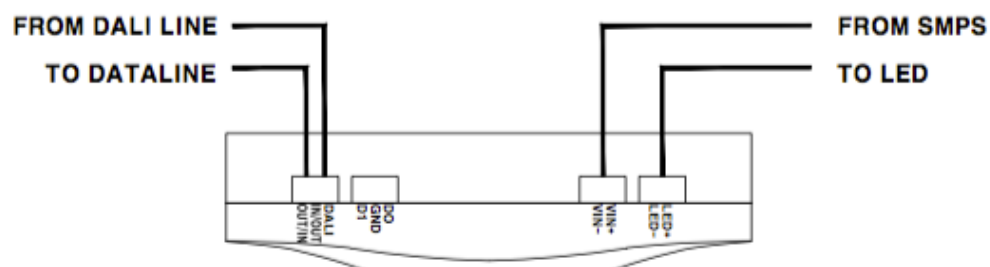
## Specification

- LED 180W Type
- Operation Environment : -10℃ ~ 60℃, 0~95% RH
- Input Power : DC 12~ 60V
- Consume Power : 12~ 180W
- Communication Method : DALI
- Maximum Communication Distance : 300M
- Output Power(POut) : Max. 180W
- Output Voltage(VOut) : 12 - 60VDC
- Outout Current(IOut) : Max.3A
- Dimming Range : 1 - 100%
- OverLoad Protection : Yes
- Short Circuit Protection : Yes

## Dimension of Layout



## Connection Diagram







## DALI SYSTEM

## LDM/w.Occ

## LED DALI Module with Occupancy

### Overview

The LDM/w.Occ is the Module that performs the DALI Control through the DALI Protocol which is connected to the DALI Master. The Occupancy Sensor is built-in to enable the interlocking control for the occupancy.

### Main Feature

- DALI PROTOCOL INTERFACE.
- Occupancy Sensor Function.
- 256 Steps of Level Control for LED.
- Setting function for 16EA of SCENE.
- Setting function for 16EA of Group.
- DALI Standard : IEC 62386
- Communication Speed : 1,200 bps
- SYSTEM Size : 64 Units
- Data : Individual ON/OFF Control, Individual Dimming Control, Lamp Status/Alarm Signal, Ballast Status/Alarm Signal.
- Dimming Range : 1% ~ 100%
- Dimming Times : Program
- Do not require a separate shielded communication cables, able to construct with general cable or cable wiring.
- When constructing the cable, able to use the 5C cable (3C-L/N/E, 2C-DALI). Also without installing a separate communication line, construction is possible.
- No need to distinguish between the polarity of communication line.



### Application

The LDM/w.Occ is the Module that performs the DALI Control through DALI Protocol which is connected to DALI Master.

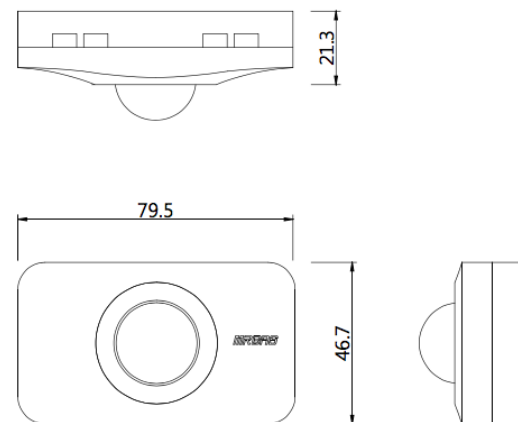
The DALI Master is connected to the FULL 2-Wire System with no polarity. This is the indispensable device that enables the ON/OFF, Dimming, Schedule, Pattern, SCENE, Individual and Group Control for 64EA of LED DALI Modules for LED Fixtures. This device is made with the existing LDM that is built-in with motion detecting sensor(infrared sensor) to perform the Individual, Group, On/Off and Min/Max Dimming Control. Especially when it is introduced into the conference room, it is automatically turned On/Off the LED Lighting to perform the Energy Saving Effect.

Also, this device has its own function (Hardware Min Max) to easily interface with LED Fixtures.

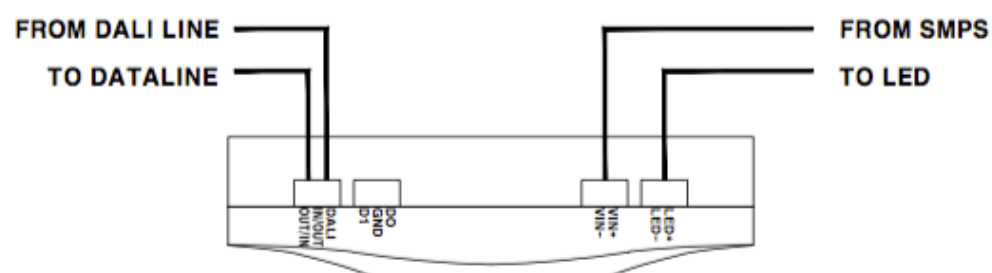
### Specification

- LED 12 - 180W Type
- Operation Environment : -10℃ ~ 60℃, 0~95% RH
- Input Power : AC 80~265V Free Voltage
- Consume Power : 12 ~ 180W
- Occupancy Distance Range : 5m
- Able to switch the Enable/Disable function for Occupancy Detection.
- Communication Method : DALI
- Max. Communication Distance : 300M
- Input Voltage : 12 - 60 VDC
- Output Power(POut) : Max. 180W
- Output Voltage(VOut) : 12 - 60VDC
- Output Current(IOut) : Max.3A
- Dimming Range : 1 - 100%
- OverLoad Protection : Yes
- Short Circuit Protection : Yes

### Dimension of Layout



### Connection Diagram





# LIGHTING CONTROLS

DALI-PH DALI Photo Sensor

DALI SYSTEM

## Overview

The DALI Photo Sensor is connected to the same communication line as existing DALI Module. It is applied as Photo Sensor Control for the 64EA of DALI Modules. The Photo Sensor is applied in the following two types.  
.. It is attached to the LDM(DALI Dimming Module) itself and operates as Photo Sensor for only one LED Fixture.  
.. By the one DALI-PH Sensor, the 64EA of LDMs can be controlled for the Photo Control.



## Main Feature

- DALI PROTOCOL INTERFACE
- 254 steps of Photo Monitoring function.
- Setting function for 16 SCENE.
- Group Setting Function.
- DALI Standard : IEC 62386.
- Communication Speed : 1,200 bps.
- Data : Individual ON/OFF Control, Individual Dimming Control, Lamp Status/Alarm Signal, Ballast Status/Alarm Signal..
- Dimming range : 5% ~ 100%.
- Dimming times : Program.
- Do not require a separate shielded communication cables, able to construct with general cable or cable wiring.
- When constructing the cable, able to use the 5C cable (3C-L/N/E, 2C-DALI). Also without installing a separate communication line, construction is possible.
- No need to distinguish between the polarity of communication line.

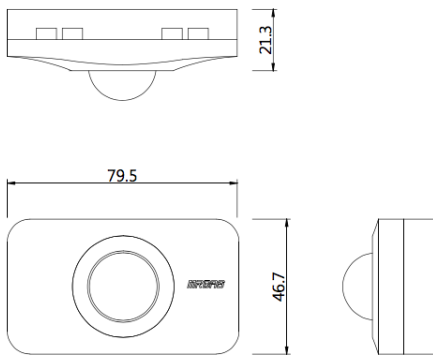
## Application

- DALI PROTOCOL INTERFACE.
- It detects the 254 steps of Photo to operate the Dimming Control for the LDM by Photo Level.
- Setting function for 16 SCENE.
- The Global Interlocking Control is possible so that it can interlock control with other DALI Master.
- When controlling by the Photo Sensor, the LDM that has no Photo Sensor can be interlock controlled.

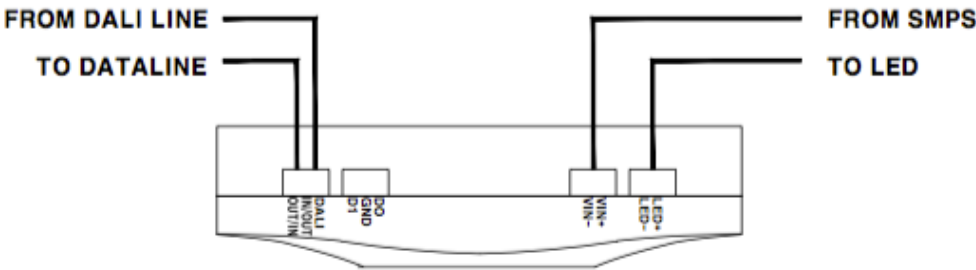
## Specification

- DALI-PH :
- Input Voltage : 12~60VDC
  - Input Current : 10mA
  - IP Rating : 32
  - Default Range : 0 - 753Lux(0-70FC)
  - Output Voltage : 12-24VDC
  - Operating Temp : 0°C to 55°C
  - Input : 12~60VDC
  - Operation Current : 50mA
  - DALI Control Standard : EN62386
  - Operating Temp : -10°C to 45°C

## Dimension



## Connection Diagram





### Overview

DALI Occupancy Sensor is connected to the same communication line as existing DALI Module. It is applied as Occupancy Control Sensor for the 64EA of DALI Modules. Occupancy Sensor is applied in the following two types.

- .. It is attached to the LDM (DALI Dimming Module) itself and operates as Occupancy Sensor for only one LED Fixture.
- .. By the DALI-OCC Sensor, the 64EA of LDMs can be controlled for the Occupancy Control.



### Main Feature

- DALI PROTOCOL INTERFACE
- It has the Disable & Enable function and it is applied with schedule control & interlocking control.
- 254 steps of Dimming Control Function
- Setting Function for 16EA SCENE.
- Group Setting Function.
- DALI Standard : IEC 62386
- Communication Speed : 1,200 bps
- Data : Individual ON/OFF Control, Individual Dimming Control, Lamp Status/Alarm Signal, Ballast Status/Alarm Signal.
- Dimming range : 5% ~ 100%
- Dimming times : Program
- Do not require a separate shielded communication cables, able to construct with general cable or cable wiring.
- When constructing the cable, able to use the 5C cable (3C-L/N/E, 2C-DALI). Also without installing a separate communication line, construction is possible.
- No need to distinguish between the polarity of communication line.

### Application

It is installed in meeting room or small office and it may be installed attach of LED fixture and also at separate sensor.

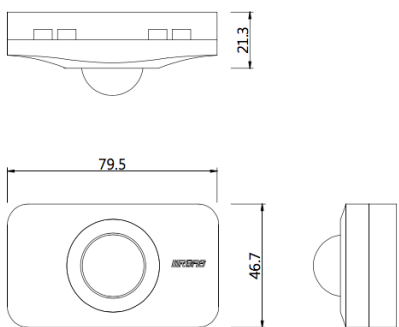
When the single Occupancy Sensor is applied at room, it can detect up to 64EA of LDM (LED DALI DIMMING MODULE) for control.

During Schedule and Interlocking Control, select this occupancy sensor function to Disable to only control the LED by the Schedule Control.

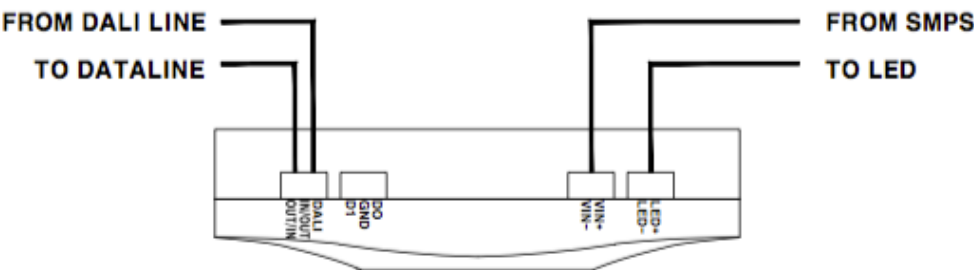
### Specification

- DALI-OCC:
- Input Voltage : 12~60VDC
  - Input Current : 10mA
  - IP Rating : 32
  - Disable / Enable switching function.
  - Default Range : 5M radius
  - Operating Temp : 0°C to 55°C

### Dimension



### Connection Diagram







# LIGHTING CONTROLS

LDS-4,-8

Local DALI Switch

DALI SYSTEM

## Overview

The Local DALI Switch is connected at same communication line with existing 64 EA of DALI Module. It operates the Dimming switch function for 64 EA of DALI Module. This LDS's quantity is to be include within the scope of 64 EA.

## Main Feature

- DALI PROTOCOL INTERFACE
- Photo Adjustment Function by 254 Steps.
- 16 sets of SCENE Setting Function
- 16 Group Setting Function
- DALI Protocol : IEC 62386
- Baud Rate : 1,200 bps
- Individual ON/OFF Control and Individual Dimming Control
- Lamp Status : Display the On/OFF status for each switch button by the Lamp Light.
- Dimming range : 1% ~ 100%
- Individual and Group control is possible by 64 EA of DALI Module.

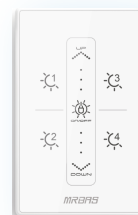
## Application

The LDS-4 & LDS-8 switch is connected at DALI Line. It can operate the ON/OFF and Dimming Control manually by grouping into several pattern for 64 EA of DALI Module.

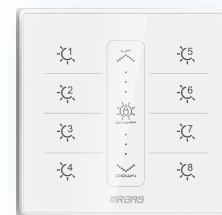
For the setting of corresponding switch button to DALI Module is done by SmarTrol Program and download to LDS switch to operate it.

Select the corresponding ZONE by the LDS-4 & LDS-8 buttons from both side and then operate the Dimming by the button in the central to ON/OFF and UP/DOWN manually.

Each switch is installed with international standard 1 Gang Box & 2 Gang Box and the each switch is transmitting the DALI communication and power to each switch by 2 wire.



LDS-4



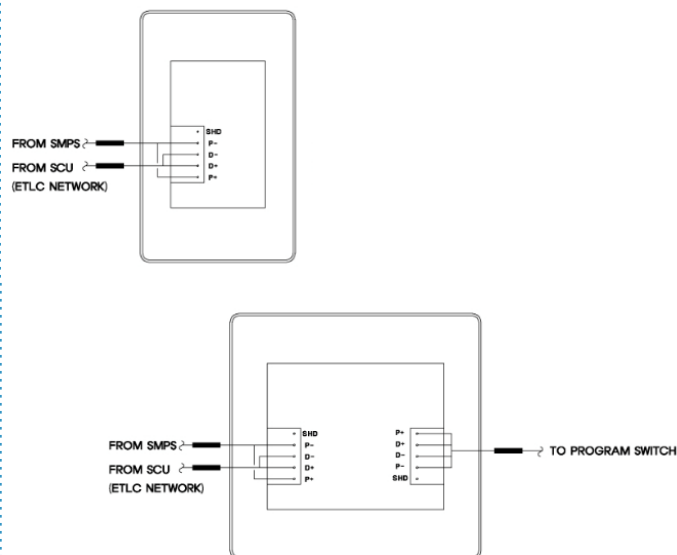
LDS-8

## Specification

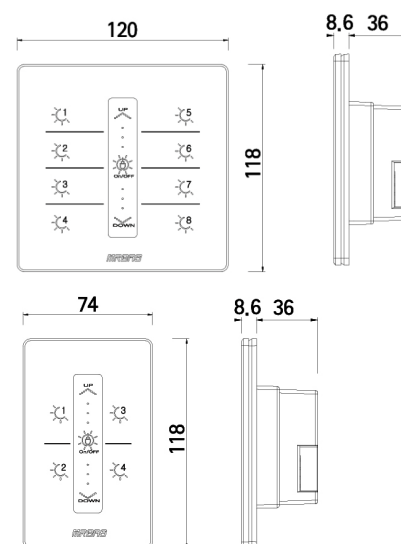
- Local DALI Switch : LDS-4
- Control 64ea DALI Modules within same DALI Master
- Address : 00- 64
- 1 - 4 Buttons
- Dimming Switching and Feedback LED
- Feedback On/Off LED
- Connected on DALI network
- 1Gang box size
- 2 wire (2- Data and Power Line)
- Color : Black and White

- Local DALI Switch : LDS-8
- Control 64ea DALI Modules within same DALI Master
- Address : 00- 64
- 5 - 8 Buttons
- Dimming Switching and Feedback LED
- Feedback On/Off LED
- Connected on DALI network
- 2Gang box size
- 2 wire (2- Data and Power Line)
- Color : Black and White

## Connection Diagram



## Dimension of Layout





## DALI SYSTEM

## GDS-4,-8

## Global DALI Switch

### Overview

The Global DALI Switch has function to control the entire DALI Modules. It is connected at ETLC communication line to control the individual and group for DALI Module that is connected at each of DALI Master.

### Main Feature

- DALI PROTOCOL INTERFACE
- Photo adjustment function by 254 steps
- 16 sets of SCENE Setting Function
- 16 Group Setting Function
- DALI Protocol : IEC 62386
- Baud Rate : 1,200 bps
- Individual ON/OFF Control and Individual Dimming Control
- Lamp Status : Display the ON/OFF status for each switch button by the lamp light.
- Dimming range : 5% ~ 100%
- It is connected at ETLC communication line for individual and group control for entire DALI Module

### Application

The GDS-4 & GDS-8 switch is connected at DALI Line. It can operate the ON/OFF and Dimming control manually by grouping into several pattern for 64 EA of DALI Module.

For the setting of corresponding switch button to DALI Module is done by SmarTrol Program and download to GDS switch to operate it.

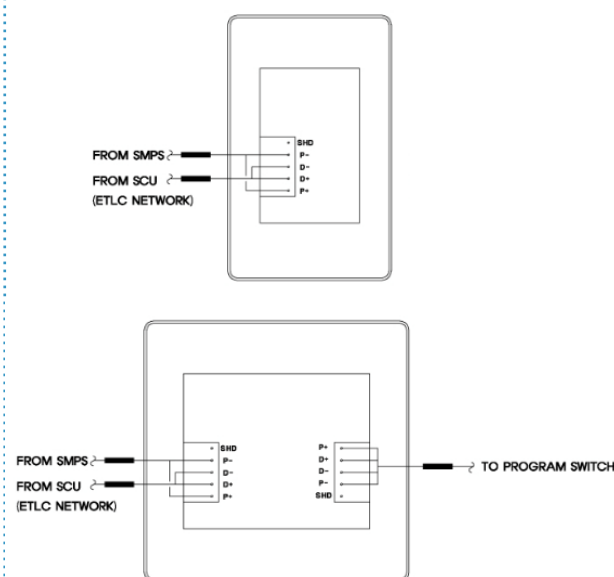
Select the corresponding ZONE by the GDS-4 & GDS-8 buttons from both side and then operate the Dimming by the button in the central to ON/OFF and UP/DOWN manually.

Each switch is installed with international standard 1 Gang Box & 2 Gang Box and the each switch is transmitting the DALI Communication and power to each switch by 2 wire.

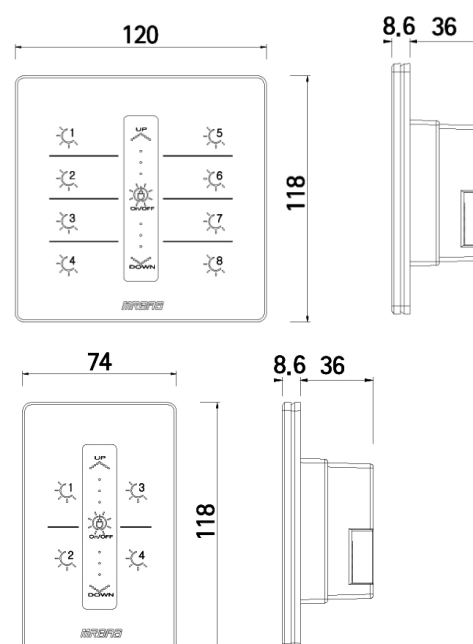
### Specification

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• Global DALI Switch : GDS-4</li> <li>• Control 64ea DALI Modules within same DALI Master</li> <li>• Address : 00- 64</li> <li>• 1 - 4 Buttons</li> <li>• Dimming Switching and Feedback LED</li> <li>• Feedback On/Off LED</li> <li>• Connected on DALI network</li> <li>• 1Gang box size</li> <li>• 2 wire (2- Data and Power Line)</li> <li>• Color : Black and White</li> </ul> | <ul style="list-style-type: none"> <li>• Global DALI Switch : GDS-8</li> <li>• Control 64ea DALI Modules within same DALI Master</li> <li>• Address : 00- 64</li> <li>• 5 - 8 Buttons</li> <li>• Dimming Switching and Feedback LED</li> <li>• Feedback On/Off LED</li> <li>• Connected on DALI network</li> <li>• 2Gang box size</li> <li>• 2 wire (2- Data and Power Line)</li> <li>• Color : Black and White</li> </ul> |
|--|--|

### Connection Diagram



### Dimension of Layout





## LIGHTING CONTROLS

WIRELESS SYSTEM

# WIRELESS LIGHTING CONTROL SYSTEM

WIRELESS DIMMING MODULE & GATEWAY



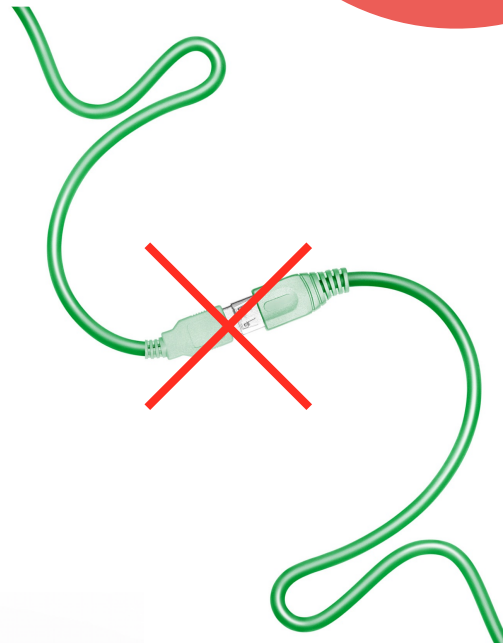
IEEE 802.15.4  
ZIGBEE

Feedback by Two way  
ZIGBEE Chip



WIRELESS DIMMING MODULE 64 EA /  
1 ACCESS GROUP

Max 254  
GATEWAY :  
1 SCU PER ELC  
SYSTEM



5 ACCESS GROUP  
/ 1 GATEWAY

WIRELESS GATEWAY

Our WIRELESS DIMMING MODULE is able to control the Dimming Control for each LED by SCENE specific and also it has the function for occupancy sensor and photo sensor.



## Overview

This Wireless Gateway is the ceiling mount type product. The one Gateway is able to configure unto maximum of 127 EA of AG (Access Group) but actually, the AG is configured for 5 EA to operate the Wireless Module.



## Main Feature

- International Standard Protocol IEEE 802.15.4 ZIGBEE Communication
- The maximum of 254 EA Gateway has Stand Alone Function.
- The maximum AG(Access Group) 127 EA
- Actually configured AG is below 5 EA.
- The one Gateway (WG) is configured of less than 5 EA of AG and one AG is designed to have 64 EA of Wireless Dimming Module.
- Each Wireless Dimming Module is able to control the Analog Dimming Control within the range of Max and Min Dimming Range.
- The Dimming Control is for each SCENE specific, it has the occupancy detecting and photo detection sensing function.
- Each Wireless Dimming Module is able to STEP UP and DOWN without Dimming's FADING.
- Each Wireless Dimming Module able to control by Group which the Group can be set for 1- 16 groups.
- The Photo Detecting Sensor and Occupancy Sensor that installed at each Wireless Dimming Module is operating or no operating due to selection of Enable.
- Each Wireless Dimming Module is internal with Stand Alone Function at CPU, the Dimming Control is able by sensor from site.
- It has Self-Diagnosis function to display the error status for communication error and dimming output error.

## Application

- Applied at Office area
- Applied at Underground Parking Lot area
- Applied at Conference Room
- Applied at Hallway and Lobby area
- Applied at Class room and Restaurant area
- Applied at Office Building, Shopping Mall, Hotel, Residential Complex, Terminal and Public Area to be as efficient management system for Lighting & Black-out.
- Dimming Scene Control for LED Lamp's Individual & Group.
- The Auto LED Dimming Control due to external Photo.
- The LED Dimming Control due to Movement Detecting Sensor.
- The Installation is easy due to Wireless Communication and the Maintenance is convenient.
- By the Self-Diagnosis Function, the Maintenance is convenient.
- The various function is taking advantage due to actual installation of the operating experience.

## Specification

- Performs the broadcasting role between the ELC Network & Wireless Communication.
- Wired and Wireless Communication Integrated Gateway
- Performs the communication between SCU & Smartrol and it is configured for 0 - 255 NODE and the maximum 254 EA of Gateway is configured.
- Stand Alone Function : Schedule, Group Info and Scene Function.
- Remote Control for Individual / Group LED Lighting and Time Schedule Control.
- IEEE 802.15.4 ZIGBEE TO ETHERNET Protocol Conversion
- Operation Power : 12 - 24VDC, 250mA
- Communication : IEEE 802.15.4 ZIGBEE
- Operation Environment : 0 - 40°C, 0 -90% RH

## Dimension







# LIGHTING CONTROLS

WG-WALL

Wireless Gateway for Wall

WIRELESS SYSTEM

## Overview

This Wireless Gateway is wall mount type product. The one Gateway is able to configure unto maximum of 127 EA of AG (Access Group) but actually, the AG is configured for 5 EA to operate the Wireless Module.

## Main Feature

- International Standard Protocol IEEE 802.15.4 ZIGBEE Communication.
- The maximum of 254 EA Gateway has Stand Alone Function.
- The maximum AG(Access Group) 127 EA
- Actually configured AG is below 5 EA.
- The one Gateway (WG) is configured of less than 5 EA of AG and one AG is designed to have 64 EA of Wireless Dimming Module.
- The Photo adjustment can be set for 254 steps
- 16 EA of SCENE Setting is possible
- 16 EA of GROUP Setting is possible
- Individual ON/OFF Control and Individual Dimming Control
- LAMP Status : By the each switch button's flashing itself, it display the ON/OFF status.
- Connected at ELC communication line and the group and individual control for entire WDM is possible
- The Dimming Control is able to control for each SCENE specific and it has the occupancy detecting and photo detecting sensing function.
- Each Wireless Dimming Module is able to STEP UP and DOWN without Dimming's FADING.
- The Photo Detecting Sensor and Occupancy Sensor that installed at each Wireless Dimming Module is to choose for operating or no operating due to selection of Enable..
- Each Wireless Dimming Module is internal with Stand Alone Function at CPU, the Dimming Control is able by sensor from site.
- It has Self-Diagnosis function to display the error status for communication error and dimming output error..
- It has the switch function for group, SCENE, DIRECT, INDIRECT function and LOCAL control is possible.



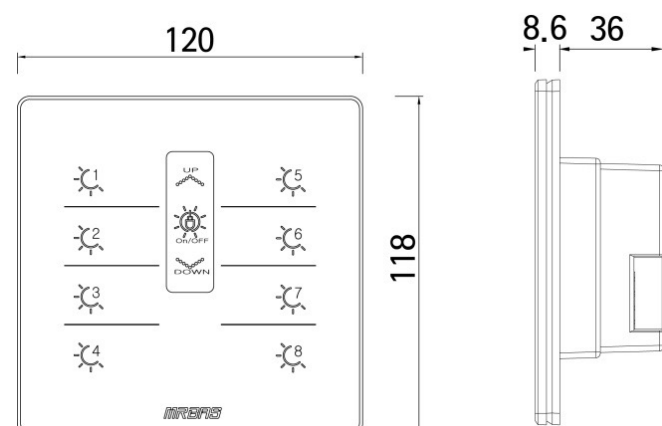
## Application

- Applied at Office area
- Applied at Underground Parking Lot area
- Applied at Conference Room
- Applied at Hallway and Lobby area
- Applied at Class room and Restaurant area
- Applied at Office Building, Shopping Mall, Hotel, Residential Complex, Terminal and Public Area to be as efficient management system for Lighting & Black-out.
- Dimming Scene Control for LED Lamp's Individual & Group.
- The Auto LED Dimming Control due to external Photo.
- The LED Dimming Control due to Movement Detecting Sensor.
- The Installation is easy due to Wireless Communication and the Maintenance is convenient.
- By the Self-Diagnosis Function, the Maintenance is convenient
- The various function is taking advantage due to actual installation of the operating experience.

## Specification

- Performs the broadcasting role between the ELC Network & Wireless Communication.
- Wired and Wireless Communication Integrated Gateway
- Performs the communication between SCU & Smartrol and it is configured for 0 - 255 NODE and the maximum 254 EA of Gateway is configured.
- Stand Alone Function : Schedule, Group Info and Scene Function.
- Remote Control for Individual / Group LED Lighting and Time Schedule Control.
- IEEE 802.15.4 ZIGBEE TO ETHERNET Protocol Conversion
- Operation Power : 12 - 24VDC, 250mA
- Communication : IEEE 802.15.4 ZIGBEE
- Operation Environment : 0 - 40°C, 0 - 90% RH

## Dimension of Layout





## Overview

Wireless Dimming Module is configured as International Standard Protocol IEEE802.15.4 ZIGBEE Communication that included with Occupancy Detection and Photo Detecting Sensor function. As Wireless Dimming Module of LED Lamp, the Maximum Control Output is 180W.

## Main Feature

- International Standard Protocol IEEE 802.15.4 ZIGBEE Communication
- The maximum of 254 EA Gateway has Stand Alone Function.
- The maximum AG(Access Group) 127 EA
- Actually configured AG is below 5 EA.
- The one Gateway (WG) is configured of less than 5 EA of AG and one AG is designed to have 64 EA of Wireless Dimming Module.
- Each Wireless Dimming Module is able to control the Analog Dimming Control within the range of Max and Min Dimming Range.
- The Dimming Control is for each SCENE specific, it has the occupancy detecting and photo detection sensing function.
- Each Wireless Dimming Module is able to STEP UP and DOWN without Dimming's FADING.
- Each Wireless Dimming Module able to control by Group which the Group can be set for 1- 16 groups.
- The Photo Detecting Sensor and Occupancy Sensor that installed at each Wireless Dimming Module is to choose for operating or no operating due to selection of Enable.
- Each Wireless Dimming Module is internal with Stand Alone Function at CPU, the Dimming Control is able by sensor from site.
- It has Self-Diagnosis function to display the error status for communication error and dimming output error.

## Application

- Applied at Office area
- Applied at Underground Parking Lot area
- Applied at Conference Room
- Applied at Hallway and Lobby area
- Applied at Class room and Restaurant area
- Applied at Office Building, Shopping Mall, Hotel, Residential Complex, Terminal and Public Area to be as efficient management system for Lighting & Black-out.
- Dimming Scene Control for LED Lamp's Individual & Group.
- The Auto LED Dimming Control due to external Photo.
- The LED Dimming Control due to Movement Detecting Sensor.
- The Installation is easy due to Wireless Communication and the Maintenance is convenient
- By the Self-Diagnosis Function, the Maintenance is convenient
- The various function is taking advantage due to actual installation of the operating experience.

## Specification

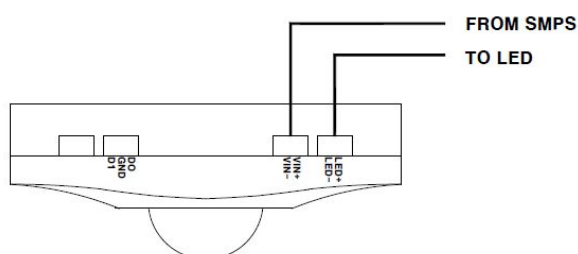
### Electrical Specification

- Input voltage : DC 10V ~ 60V
- Output current : Max. 3A
- Output power : Max. 180W @60V
- Internal power consumption : 0.4W max
- Communication : IEEE 802.15.4 ZIGBEE
- Dimension : 78(W)\*46(H)\*12(D), Sensor Radius 6mm

### Basic Function

- 1 - 254 step Dimming
- Setting the Max and Min range of Dimming
- Setting the Fading Rate & Fading Time
- Select the Enable for Body Detecting Sensor & Photo Sensor function
- Setting the Interval Time for Body Detecting Sensor & Operation of Photo Sensor
- When the Sensor's Operation is OFF, select the Dimming to OFF or Minimum
- Setting the Address of each Wireless Module in the order of Gateway-Access Group-WDM
- Setting the Scene for 1- 16
- Setting the Group for 1 - 16
- Setting the Wireless Module that is able to interlock with each Wireless Module's sensor
- The LED FLASH ON/OFF function for Warning & Circuit Line Check
- Self-Diagnosis Function : Communication Error & Dimming Output Error
- It has the information for its status (FADE RATE, FADE TIME, MAX Value, Min Value, Group Info, SCENE Info and Sensor Enable or not)

## Connection Diagram





# LIGHTING CONTROLS

WOM

Wireless ON/OFF & 0-10VDC Module

WIRELESS SYSTEM

## Overview

The Wireless ON/OFF Module includes the 1EA of 10Ampere Latching Relay and it is consist of International Standard IEEE802.15.4 ZIGBEE communication. Several LED fixtures can be grouped together to turn On/Off wirelessly at once and if necessary, send out the 0-10VDC signal to control the Dimming of LED Fixture.

## Main Feature

- International Standard IEEE 802.15.4 ZIGBEE Communication.
- The Max. 254EA of Gateways have Stand Alone Function.
- The Max. 127EA of AG(Access Group).
- Less than 5EA of actual AG configuration.
- The one Gateway(WG) is configured within 5EA of AGs, and one AG is designed with 64EA Wireless Dimming Modules.
- The LED Fixture Load control up to 10 Ampere circuit.
- 100% Dimming by the 0-10VDC Signal.(1 - 254 Steps)
- It has the Self-Diagnosis function to indicate the status of dimming output error & communication error.



## Application

- Applied at Office area
- Applied at Underground Parking Lot area
- Applied at Conference Room
- Applied at Hallway and Lobby area
- Applied at Class room and Restaurant area
- Applied at Office Building, Shopping Mall, Hotel, Residential Complex, Terminal and Public Area to be as efficient management system for Lighting & Black-out.
- Dimming Scene Control for LED Lamp's Individual & Group.
- The Auto LED Dimming Control due to external Photo.
- The LED Dimming Control due to Movement Detecting Sensor.
- The Installation is easy due to Wireless Communication and the Maintenance is convenient
- By the Self-Diagnosis Function, the Maintenance is convenient
- The various function is taking advantage due to actual installation of the operating experience.

## Specification

### 1.Hardware Function & Structure

- 220VAC Power Supply.
- Operating Part : Relay ON/OFF control part, 0~10V Dimming Control part, Current Sensing part.
- MCU : ZigBee Core Processor.

### 2.Power

- Input Power : AC220V, 60Hz
- Operating Power : DC12V, 3.3V, and Other power.
- Operating Part : Relay ON/OFF control,

### 3.Setting

- Address Setting : 1~64.
- Dimming Control (0~10V) - 1CH Support.
- Latch Relay (16A) - 1EA Internal.

### 4.Operation Environment

- Operation Source : 220VAC (+-10%), 60Hz.
- Operation Condition : 0 ~ 60°C, 0 ~ 90% RH.

### 5.Communication Method

- ZigBee Network : (IEEE 802.15.4).

### Basic Function

- The Address of each Wireless Module is set in order of Gateway > Access Group > WDM.
- The LED FLASH ON/OFF for Warning & Checking Circuit Function
- Self-Diagnosis Function : Communication Error, Dimming Output Error, Group Info, Scene Info and Sensor Enable or not)
- Relay ON/OFF Control.
- Group Feeder ON/OFF Control.
- 0 ~ 10V Dimming Control (0~100%).
- Address Setting : 1~64.

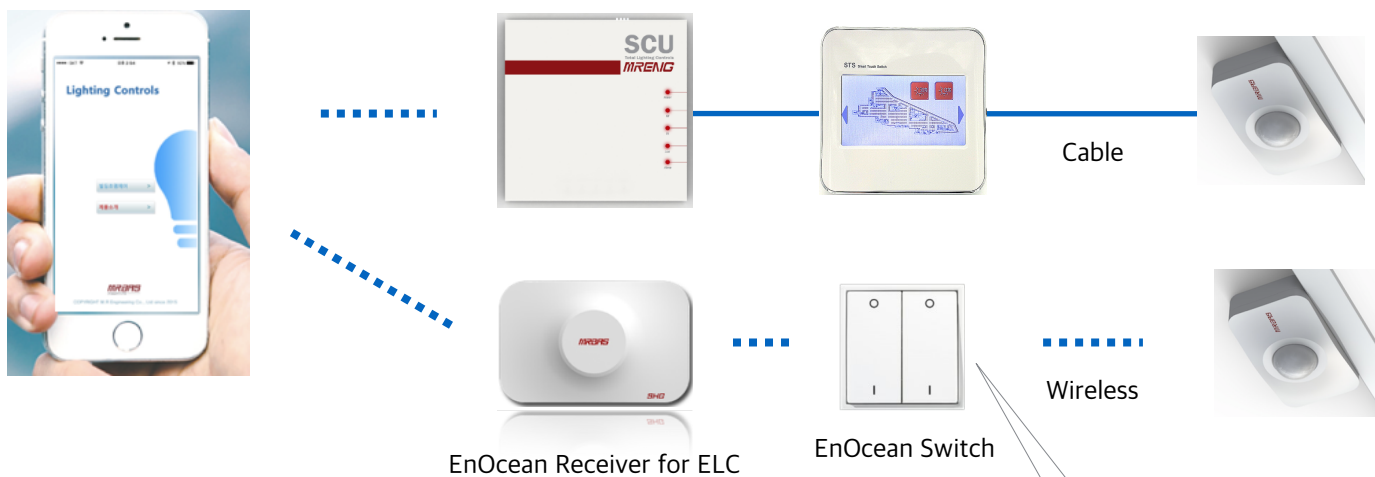
## Connection Diagram





## ENERGY HARVESTING WIRELESS TECHNOLOGY

ENOCEAN SELF POWERED SWITCHES



**The Lighting Control can now be realized without any Piping & Wiring !**

Use our Wireless Dimming Module & EnOcean Solution together properly to install the Lighting Control System at your office and conference room without any piping & wiring. After installing this system, it is possible to control the Schedule by Smart-Phone App, Occupancy Control, various Group & Individual Control and SCENE for the Conference Room.



## Energy Harvesting Wireless Power for Green and Intelligent Buildings

EnOcean is the energy harvesting wireless standard for building automation and smart homes.

[Read more](#)





# LIGHTING CONTROLS

E-RECEIVER

EnOcean Receiver for ELC

WIRELESS SYSTEM

## Overview

This Receiver is connected at ELC System for SWS(Smart Wireless Switch) to operate the DALI Dimming Module, Wireless Dimming Module and Each of Relay by SWS(Wireless Switch). The capacity of this Receiver is similar to the Wireless Gateway. Therefore, one Receiver is connected at 24EA of SWS to control the Relays & Dimming Modules.



## Main Feature

- International Standard IEEE 802.15.4 ZIGBEE Communication
- Connects the 24EA of SWS to 1EA of Receiver.
- Connects up to 254 Receivers to 1EA of SCU (ELC System).

## Application

- Applied at Office area
- Applied at Underground Parking Lot area
- Applied at Conference Room
- Applied at Hallway and Lobby area
- Applied at Class room and Restaurant area
- Applied at Office Building, Shopping Mall, Hotel, Residential Complex, Terminal and Public Area to be as efficient management system for Lighting & Black-out.
- Dimming Scene Control for LED Lamp's Individual & Group.
- The Auto LED Dimming Control due to external Photo.
- The LED Dimming Control due to Movement Detecting Sensor.
- The Installation is easy due to Wireless Communication and the Maintenance is convenient
- By the Self-Diagnosis Function, the Maintenance is convenient
- The various function is taking advantage due to actual installation of the operating experience.

## Specification

- It performs the Broadcast Communication role between ELC Network & Wireless Communication.
- Integrated Wired & Wireless Communication Gateway.
- It communicates between SCU & SWS and it is consist of 0 - 255 NODEs to configure the Max. 254EA of Receivers.
- IEEE 802.15.4 ZIGBEE TO ETHERNET Protocol Conversion
- Operating Power : 12 - 24VDC, 250mA
- Communication : IEEE 802.15.4 ZIGBEE
- Operation Environment : 0 - 40°C, 0 -90% RH

## Dimension



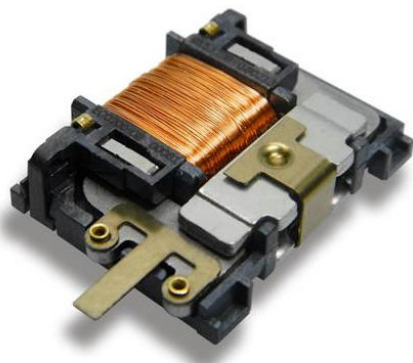


## Overview

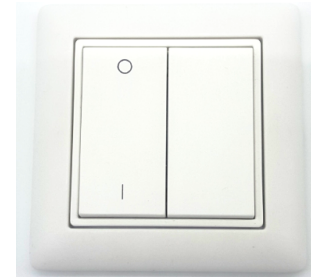
This Wireless Switch (SWS-4CH) has its own Power Generator so that it does not require the separate Power Lines. In addition, it is selected with ZIGBEE CHIP for communication. It can be directly connected to each Relay Module & Dimming Module through reliable communication for Lighting Control.

## Main Feature

- International Standard IEEE 802.15.4 ZIGBEE Communication.
- It is configured with 4CH Switch buttons to control the 4 channels.
- Individual & Group Control.
- Set Scene Control.
- The Wireless Switch that do not require the Power Lines.



ECO 200 ( Energy Converter)



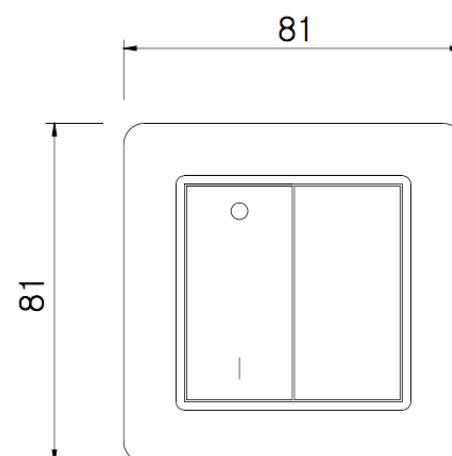
## Application

- Applied at Office area
- Applied at Underground Parking Lot area
- Applied at Conference Room
- Applied at Hallway and Lobby area
- Applied at Class room and Restaurant area
- Applied at Office Building, Shopping Mall, Hotel, Residential Complex, Terminal and Public Area to be as efficient management system for Lighting & Black-out.
- The LED Dimming Control due to Movement Detecting Sensor.
- The Installation is easy due to Wireless Communication and the Maintenance is convenient.

## Specification

- Antenna : PCB Integrated Antenna.
- Wireless Standard : 2.4GHz / IEEE 802.15.4 Channels 11...26.
- Default Wireless Channel : IEEE 802.15.4. Radio channel 11.
- Wireless Channel Selection : User Selection (Commissioning)
- Device Identification : Individual 32 Bit Device ID(Factory Programmed)
- Security : AES128(CBC) with Sequence Counter
- Transmission Distance : typ. 175m free field / 20 m indoor
- Operating Power : Integrated Kinetic Energy Harvester
- Input Button : 4 Channel Button : Each button has separate control.
- Button Operating Durability : typ. 100,000(tested according to EN60669 / VDE 0632)
- Wireless Certification : R & TTE(Europe) / FCC(US)/ IC(Canada)
- Operation Environment : -25 - 65°C, 0 -95% RH

## Dimension of Layout





# LIGHTING CONTROLS

WBP

Wireless Basic Program

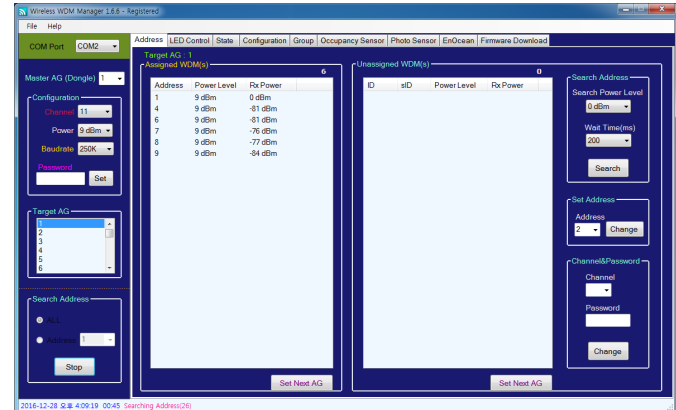
WIRELESS SYSTEM

## Overview

WBP(Wireless Basic Program) is the basic program that can set the Control Program & Basic Setting for each Wireless Module. 이 This Program is installed at PC & Laptop to connect the communication at each of Wireless Dimming Module through the Dongle. By this program, the setting for Address of each Wireless Dimming Module and Function can be done.

## Main Feature

- Address Setting for WDM(Wireless Dimming Module).
- Setting for Address changing & AG(Access Group) changing.
- Broad, Group and Individual Setting.
- Min/Max. Setting
- Fade Time / Fade Rate Setting,
- Setting for Scene.
- Setting for PWM Frequency.
- Option Enable/Disable Setting.
- Lighting Control for Direct Brightness (0 - 254 Steps)
- Indirect Lighting Control : Off, Up(to Max.), Down(to Min.), Step Up(No Fading), Step Down(No Fading), Max, Min, Step Down and Off, On and Step Up, Flash On, Flash Off, Scene 1 ~ 16



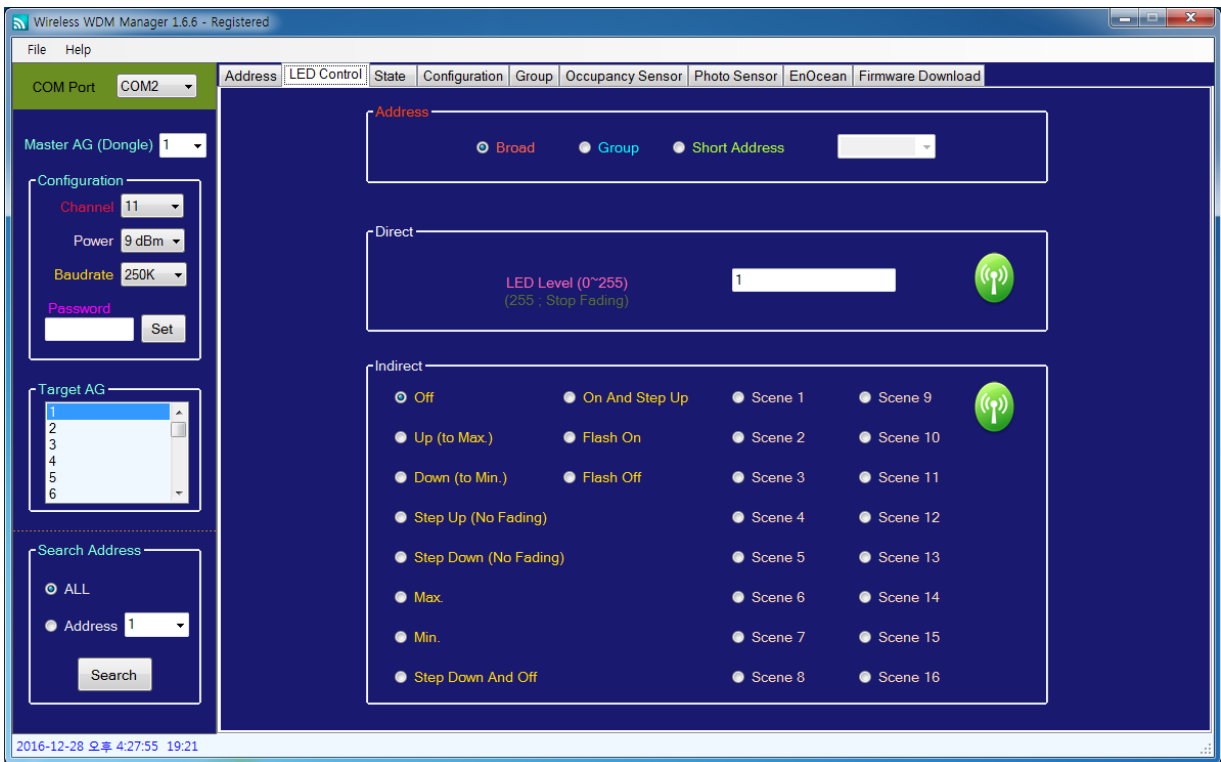
## PROGRAM DISPLAY



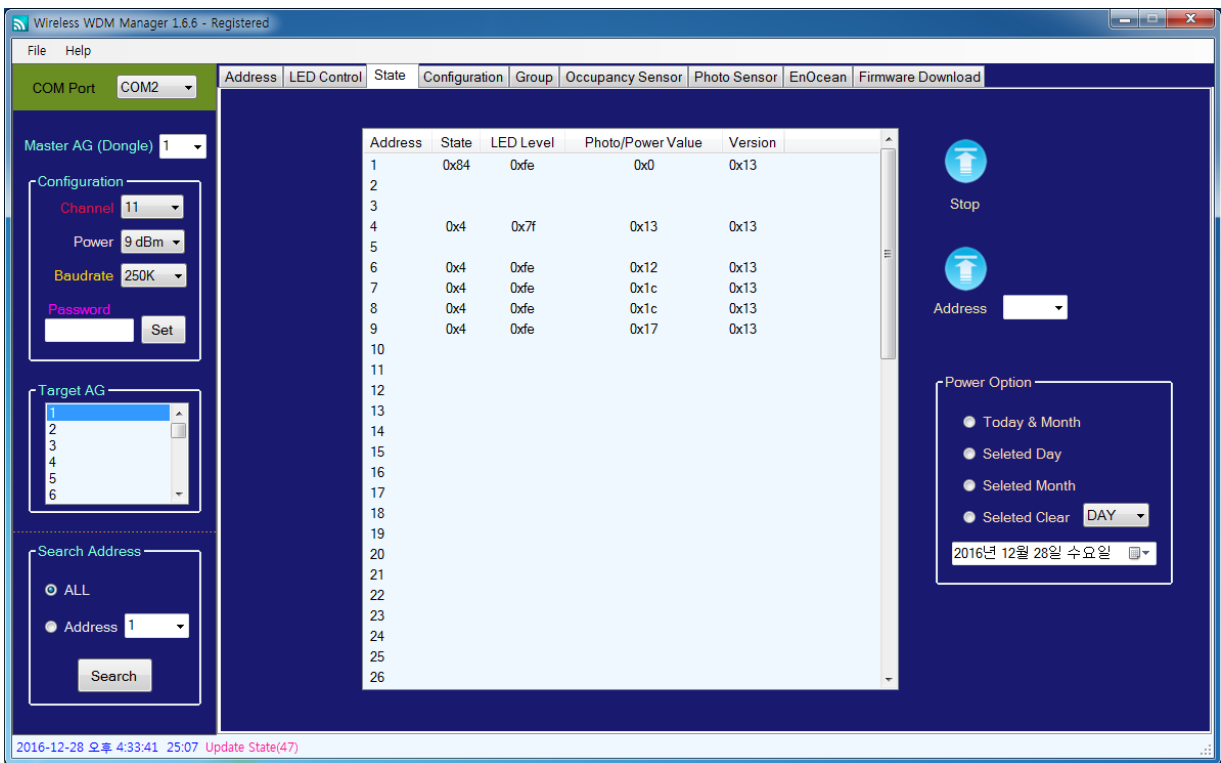
- Setting for Address Changing & AG(Access Group) Changing.
- Broad, Group and Individual Setting.
- Min/Max. Setting.
- Fade Time / Fade Rate Setting.
- Scene Setting.
- PWM Frequency Setting.
- Option Enable/Disable Setting.



## PROGRAM DISPLAY



- Broad, Group and Individual Control can be Selected
- Lighting Control for Direct Brightness (0 - 254 steps)
- Indirect Lighting Control : Off, Up(to Max.), Down(to Min.), Step Up(No Fading), Step Down(No Fading), Max, Min, Step Down and Off, On and Step Up, Flash On, Flash Off, Scene 1 ~ 16



- Check the current status of WDM.
- Check Firmware Version.
- Check LED LEVEL.





# LIGHTING CONTROLS

WBP

Wireless Basic Program

WIRELESS SYSTEM

## PROGRAM DISPLAY

- Setting for Broad, Group and Individual Occupancy Control.
- Sensor Enable.
- Sensor Interlocking function.
- Interval Time Setting.
- Dimming Step Setting.
- Setting & Download.

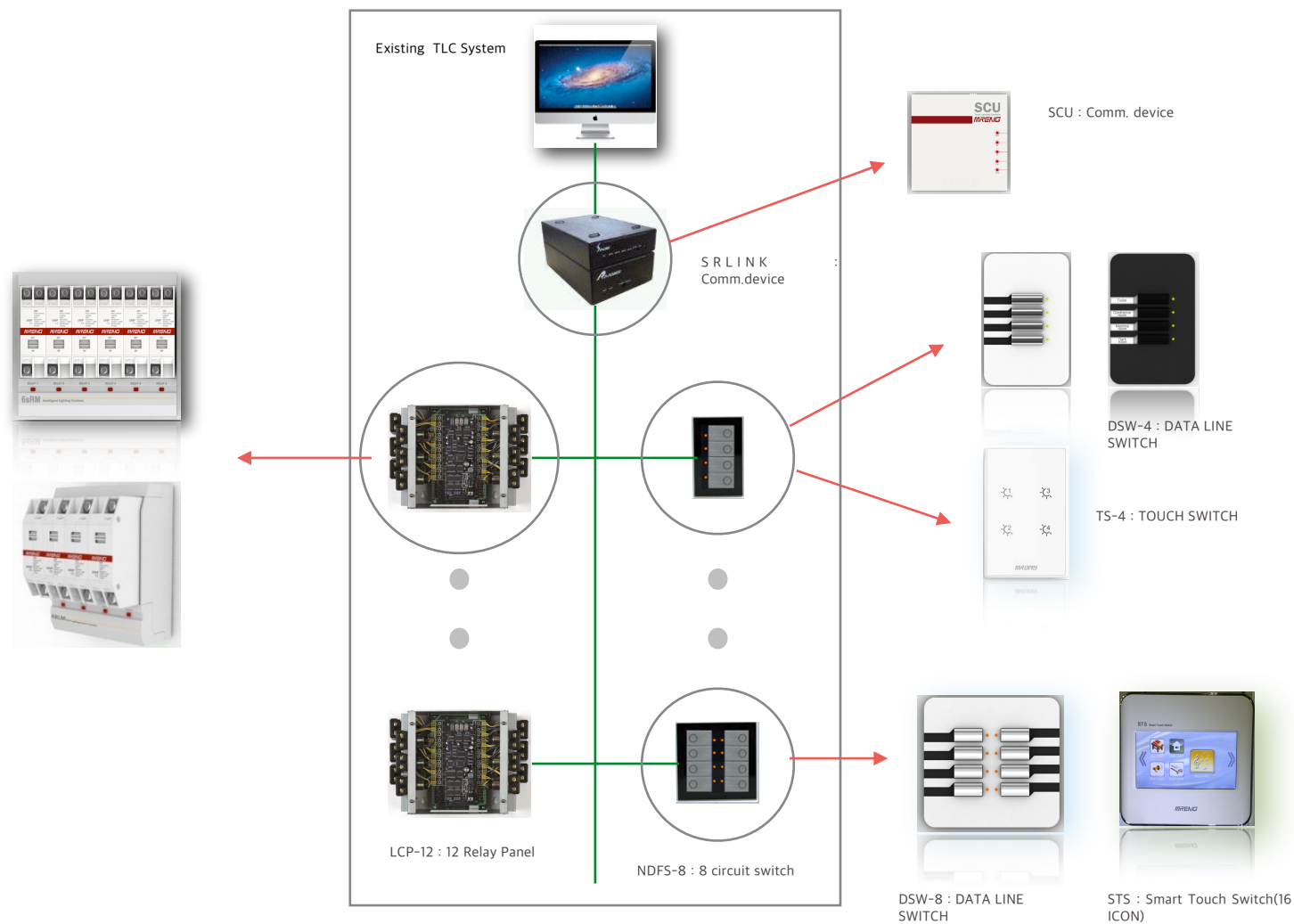
- EnOcean Switch Search.
- Function by EnOcean Switch Button or WDM Setting (Broad, Group and Individual).
- The 4 Switch Buttons can be set individually.
- Setting for Control Type (Direct, Indirect).



TLC Rmodeling

TLC Remodeling

The previous TLC & SLC Lighting Control System can be UPGRADED to latest ELC(Excellent Lighting Controls) system for each product with one by one.



# Existing Lighting Controls REMODEL

The previous Lighting Control's REMODELING can be replaced easily

Best event

The previous TLC (SLC & ILC) Lighting Control System can be upgraded to latest ELC System with one by one

Upgrade the Building Lighting Control System to Enhance its value

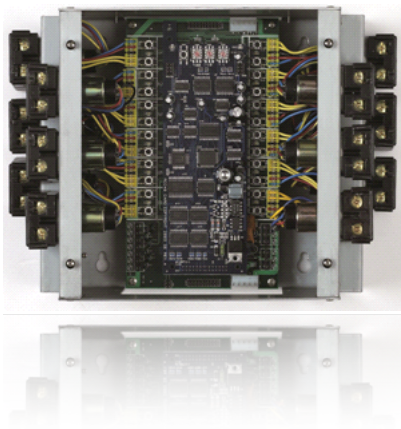
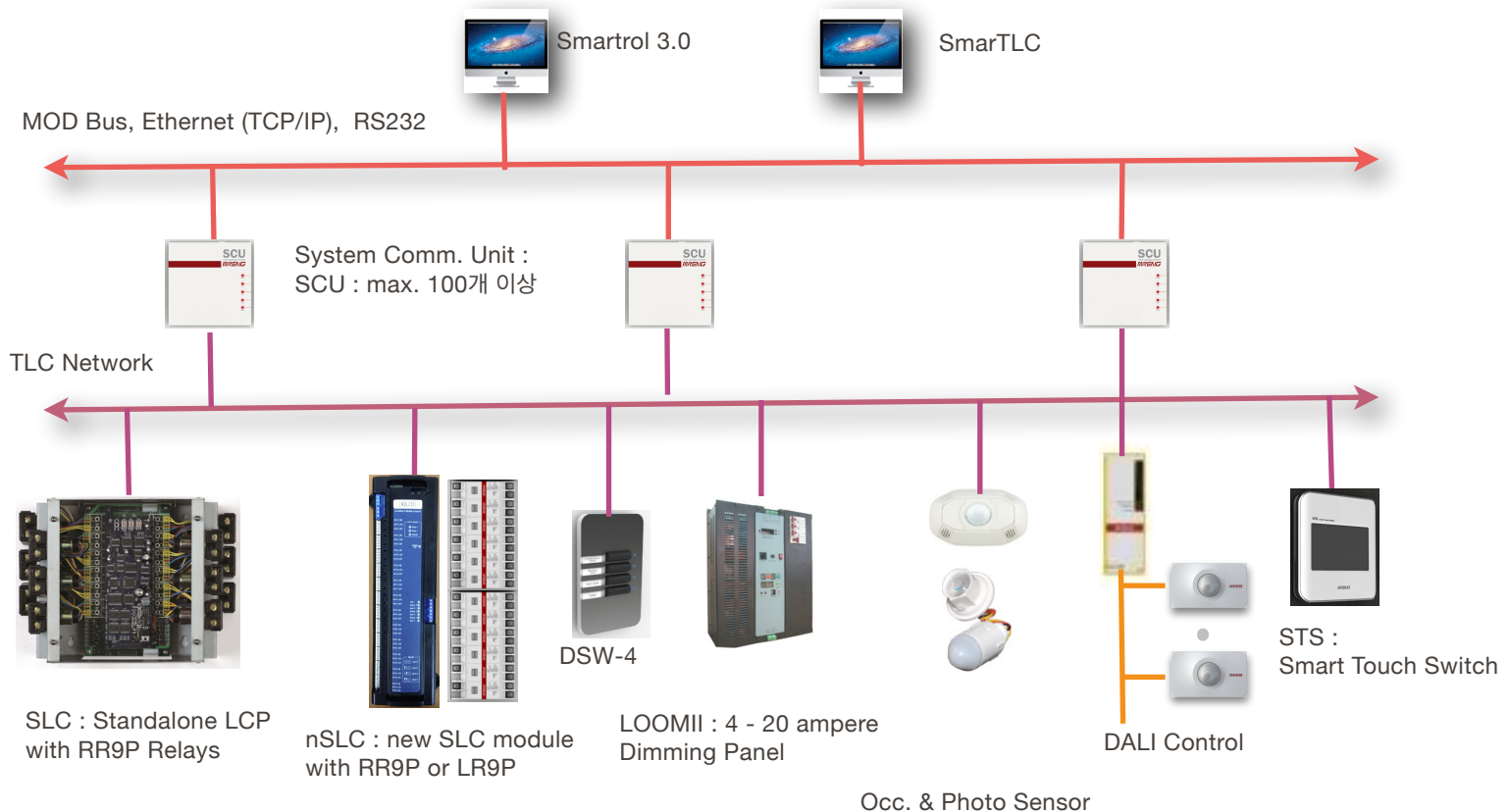


# LIGHTING CONTROLS

SLC SYSTEM Configuration / Concept

SLC SYSTEM

The Lighting Control Panel of STAND ALONE TYPE is configured with 3 steps of protection device and it will perfectly manage the customer's Building Lighting Control.



The Relay, Control Board, Relay Driver Board and POWER of lighting control panel is the PLUG IN TYPE that can be easily expanded within the 12 Relays unit that is created by Board Type which is mounted at each of internal interior plate.

Especially, even if the central monitoring device is crashed, the SLC System is able to control the pattern, group and schedule with the Stand Alone CPU that is equipped at local control panel. Also, it has the self-diagnosis function to identify the failure of device & data-line.

We are always maintaining reliable system and providing stable system to building manager.



## Overview

SCU-S is the device that communicates the data between PC and Lighting Control Panel. Set the DATA BASE of each IRelay Control Module, switch, sensor and DALI Master. Also process the transmitting data operation through this SCU-s by creating each program. The low-level of Lighting Control communication is configured with TLC Bus and the high-level of PC communication is configured with Ethernet TCP/IP. The LED that indicates the status of Power and Data Communication is located at front side to understand the real-time status for Data Communication Lighting Control Panel.

## Main Feature

- LED Status Indicators that display the status of System.
- The Powerful Data Communication which is the DATA LINE that connects at Full 2-Wire Bus : it maintains the reliability of data communication even the communication environment has ungrounded system & induced power..
- When downloading the program & editing the data-base, the control is operating continuously.
- The interlocking program of each control panel is operating continuously cause of Global Stand Alone function even when the central monitoring panel is not working.
- The installation of SCU-s is wall mounted type and on the desk type.
- It is configured with high-level network to interlock with other system for interface. Ethernet TCP/IP, MOD Bus are possible.

## Operation

The single SCU-s is able to communicate up to 1,000 EA of lighting control module and 1,000 EA of data-line switch. The SCU-s is located at central monitoring panel and it execute the controlling and monitoring for communication and each of local control panel that connected at PC.

## Networking

SCU-s is connecting the low-level and high-level communication. The low-level communication is configured with Full 2-Wire Bus. It operates by connecting the lighting control panel and data-line switch up to 999 EA for each. The high-level operates by connecting the Ethernet TCP/IP communication basically. If necessary, MOD Bus communication is possible and it can be interfaced with BAS and other product.

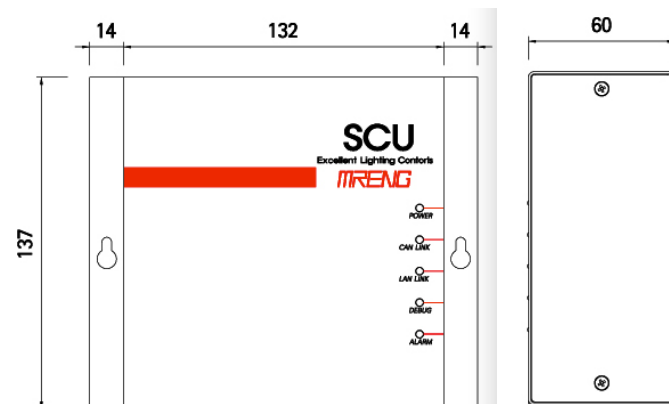


## Specification

- LED Status Indicators : Power, ETLC Link, Data Status, On Line, Alarm
- Connection for PC : Ethernet TCP/IP, MOD Bus
- Power : AC220/110V, 50/60 Hz.
- Size : 160(W) 60(H) 137(D)
- Weight : 980g



## Dimension of Layout





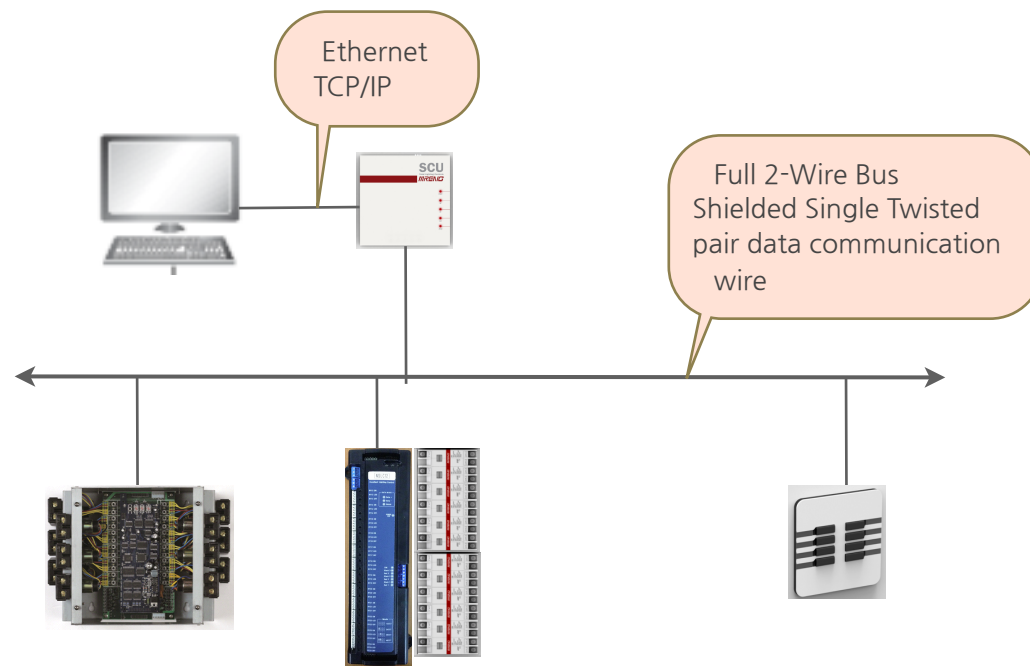


## LIGHTING CONTROLS

**SCU-s**    System Communication Unit for SLC

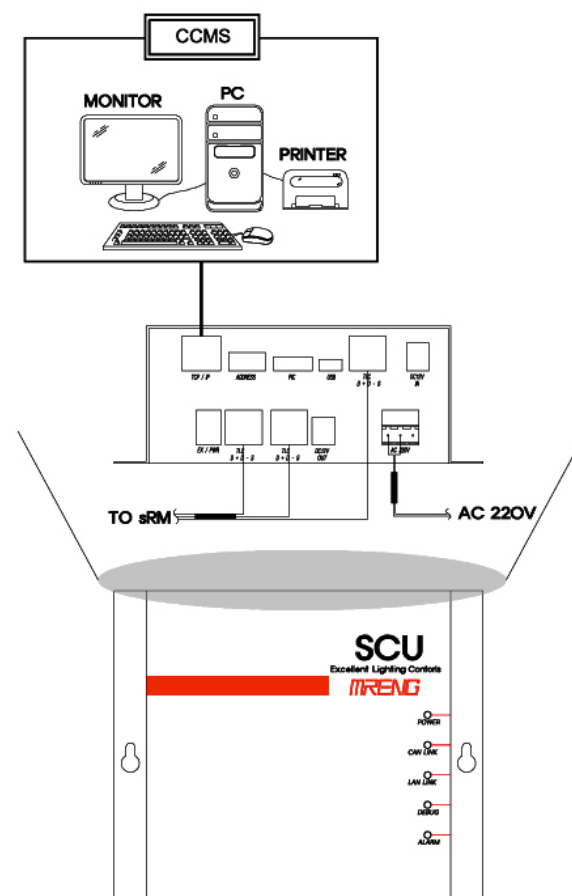
## SLC SYSTEM

## System Diagram



Each Max. 9997개 for Each Relay Module (SRCC48)  
Each Max. 9997개 for Data Line Switch(DSW4, DSW8, TS4, TS8)

### Connection Diagram





## SLC SYSTEM

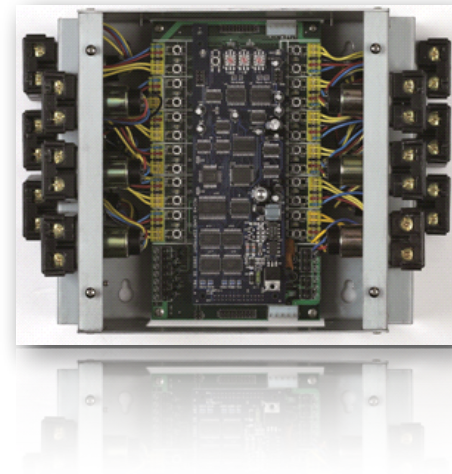
## SLC LCP Stand Alone LCP

### Overview

SLC LCP is the Lighting Control Panel that can operate the Stand Alone function by configuring with 12 Relays. This panel is the representative Control Panel that can be used by connected to Central Monitoring Device but if necessary it has the Stand Alone function to apply at small office area by connecting at several panel or one single panel.

It monitors the status of each Relay by LED Lamp from Lighting Control Panel itself and the each relay is operated by manually from local site. Usually, by the SRCC48 Controller's function that is internal at control panel. The previously contents of program will be applied as auto mode by the Lighting Control's scenario.

This panel is installed inside of Lighting Control's Enclosure or next to it. Also the relay is connected at secondary line of this panel's breaker to control the Lighting by each ZONE section. The each panel is operating the proper lighting control operation with individual control and interlocking control by inputting the corresponding number to each Address Switch. Also the dozens and hundreds of panels are connected at one single DATA-LINE.



### Main Feature

- The basic Relay quantity for LCP is 12 EA and one single enclosure can be installed with 4 panels. Therefore Max 48 relays can be operated by one single control card.
- The monitoring the status of each relay and manual operation from local site is available.
- For the fails of each Relay, after eliminating the corresponding relay from connection, then to replace it with normal relay.
- By the independent control program, the each LCP is the Stand-Alone type for Lighting Control Panel that managed separately even when the central monitoring device is broken.
- The mother-board that is mounted with control board & relay operating card is installed inside of the panel hardly.

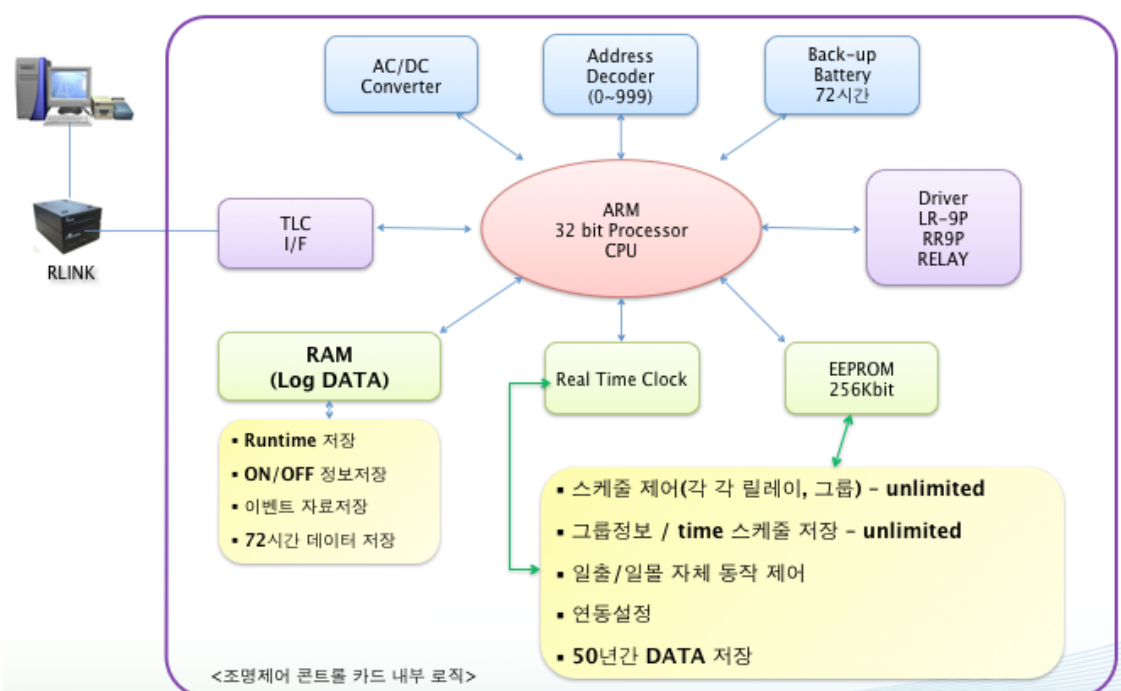
### Component

- 12 - 20 Ampere Latching Relay(GE RR9P)
- 1 - SRCC48 Stand alone Controller
- 1 - SRDC12 Relay Driving and Mother Board
- 1- Interior panel
- 1- power supply unit (220/24VAC, 40VA)

### Application

By the independent control panel with Stand Alone function, it operates the each control program by CPU itself.

### System Diagram





# LIGHTING CONTROLS

SRCC48

Stand Alone Controller

SLC SYSTEM

## Overview

The SRCC48 Controller is the important device for the SLC System of the Lighting Control Panel. This device features the Stand Alone function of Lighting Control Panel and it executes the continuous lighting control function even the data-line or central monitoring panel fails.

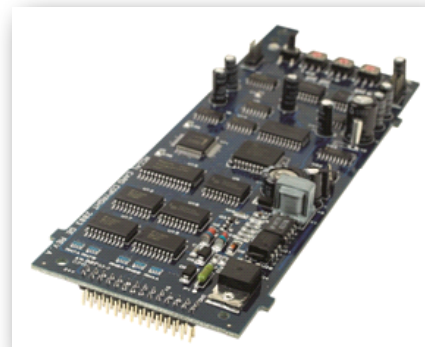
This SRCC48 Controller is able to mutual GLOBAL interlocking control that is connected for Max. 500 EA at data-line which is connected to SRLINK device. Also, it memories the on-site operation status which is stored at Memory Chip itself of device and when it is needed, it can Uploading to the central computer.

When the central computer lost its program because of virus, it can Upload the lost data from Controller and also it can Back up the data to program. This SRCC48 has the function to control the Max. of 48 Relays. The each relay is consist of 3 Points of ON/OFF status and when the  $48 * 3 = 144$  points and add 14 EA sensor input terminal will control the Max. of 160 points.

Also, this SRCC48 Controller is ready with RS232C Port and it can easily modify the simple program at on-site.

## Main Feature

- Set the Control Program for 48 Relays
- Mounted with Distribution Control CPU with Stand Alone function
- EEPROM Internal : Stores 50 years of Data
- RS-232 Port : Direct Comm with PC
- Address Setting : 0 ~ 999 EA
- Control 4 Relay Operating Cards
- The battery is internal that is able to Back-Up the memory when Black Out



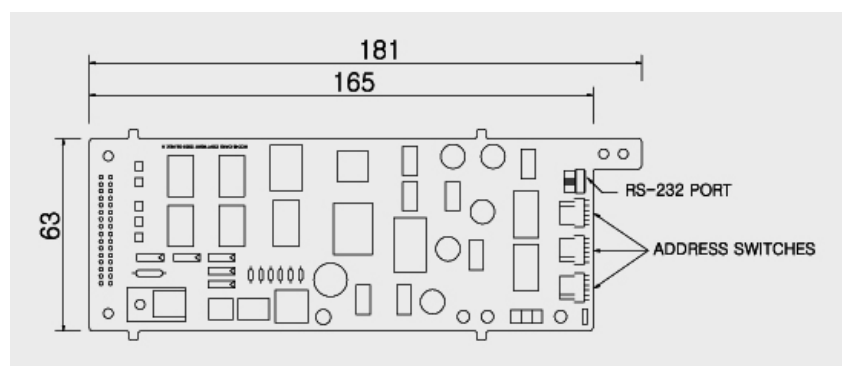
## Application

- Applied Programable EEPROM.
- Processing is possible with CPU is 16BIT (Expansion is able)
- ONECHIP Processing
- TLC Protocol Enable
- Control the Mother Board and 12 Circuit Module.
- Connect the SRCC48 + 4 SRDC12 to use
- CAN communication for Module to Module
- Simplifying the Data-Line when configuring with 12 Circuits over.
- Within 12 Circuit Module, it is included with CONTROL, TLC communication and CAN communication internal.
- Connects at TLC Network, at low-level, connect with CAN Communication
- Performs the Schedule, Dimming and Group Control.
- With Stand alone type's Lighting Control Panel, it is internal with 32bit Processor.
- By the Peer to Peer method, the relay of panel is able to control with individual and group by the input terminal of other panel.
- The individual programming is possible for local control panel.
- It counts the operation number and Run-Time of Relay, to monitor the Life Cycle of Relay and Energy Usage of Lighting load.
- The Lighting Board is configured as small size to be installed inside of Lighting Distribution Panel.

## Specification

- CPU : 16Bit Micro-Processor
- Mount : Plug-in Type
- Operating Environment : -10°C ~ 60°C, 0~95% RH
- Operating Voltage : DC5V, DC24V
- Relay Test ON/OFF button
- Use 256K SRAM/ EEPROM

## Dimension of Layout





## Overview

The SRDC12 board is the key important board that is installed at Lighting Control Panel. It plays the role as mother-board for SRCC48 Controller and it has the function to operate the actual relay driving. This board is configured of circuit that operates the 12 relay and the board itself has the manual switch installed. Each relay is able to control even the program is not done. This board operates by the direct connection to each Relay.

Also, the sensor input terminal is ready with 3 EA and when it is needed, connect the sensors to use it. The one SRCC48 Controller is operated by connecting the 4 EA SRDC12 board. The 48 Relays that are mounted at this board are able for interlocking control in any combination.



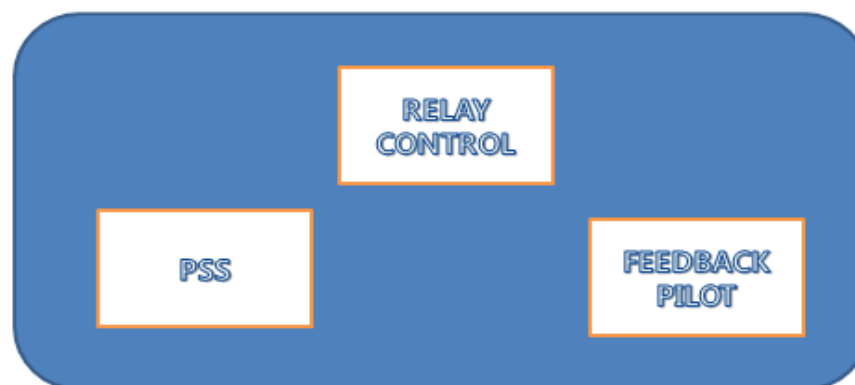
## Main Feature

- ON/OFF control for 12 Relays
- Plug-in modular configuration.
- Monitoring the Status of Relay
- Monitoring the input status for 3 program switches

## Application

SRDC12 is operating the Bank to monitor the status and ON/OFF of 12 Relays. It is monitoring and detecting the input of 3 Program Switches. Operate the Relay that is suitable for each and analyze the inputted command from SRCC. Transmit the feedback information to SRCC card. Each card is related with 12 EA of Relay Bank. The SRDC is configured majorly with Relay Operation part, Feedback Contact part and PSS input part.

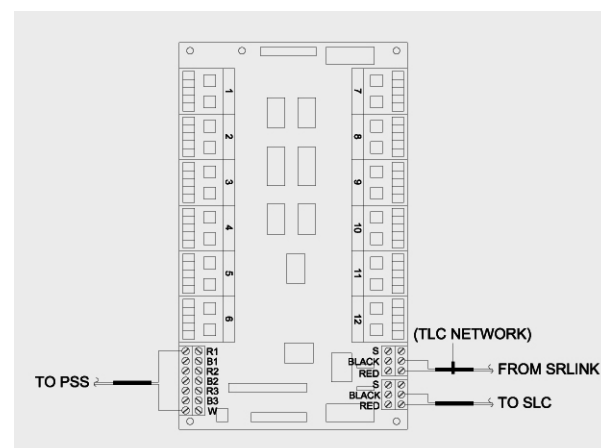
SRDC



## Specification

- Mount : Plug-in Type
- Operation Environment : -10°C ~ 60°C, 0~95% RH
- Operation voltage : DC5V, DC24V
- PILOT FEEDBACK CONTACT CIRCUIT
- PLUG IN TYPE

## Dimension of Layout







# LIGHTING CONTROLS

SPWR Power Supply Unit

SLC SYSTEM

## Overview

The SPWR Power Supply Device is installed at each of Lighting Control Panel of SLC System. The each Relay Modules like SRCC48, SRDC12 and NSLC12 & NSLDC12 is used by Power Supply Device. One single SPWR can cover 10 to 20 of Relay Module. Suitable to use and install within 10 EA.



## Main Feature

- The Free Voltage is supplied within the AC 90 - 235V.
- It supplies to power to each Relay Module by converting into DC24 supplied by AC power.
- One single Power Supply Device is suitable to connect the 10 EA of Relay Module.
- When operating the Relay Module, 200mA of current is consumed for each Relay Module.

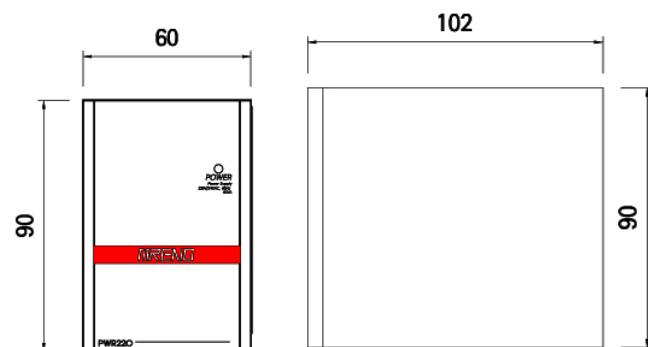
## Operation

The secondary power performs the role for supplying the power to each Really Module with DC24V by supplied the power of high-voltage of 220V (90 - 235V). When power is supplied, LED lamp of front side maintains ON status.

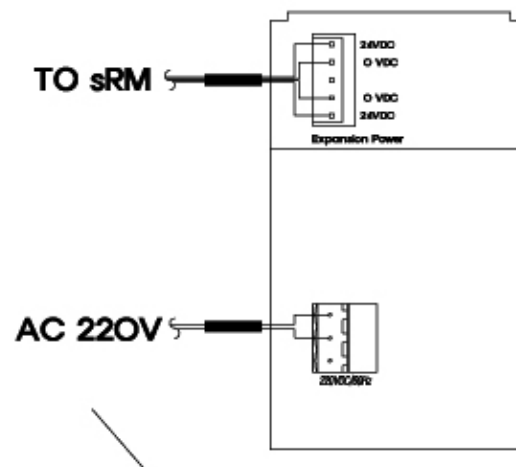
## Specification

- AC 90- 235V, 60Hz
- Ambient Temp. 0 - 55°C
- When operating Relay Module : 200mA(0.7Watt), When not: 100mA(0.24Watt)
- Connect up to 10 EA of Relay Module

## Dimension



## Connection Diagram





## Overview

The SU-s is the UNIT that converts the Low-Level ETLC Communication Network to 2 LINE Communication Method. This is the system that able to supply the Power and 2 LINE Communication by integrating the ETLC Communication Method & Power into Frequency Modem Method. It is applied at several types of switch by connecting at 2 LINE of DSW (DSW-4, DSW-8, TS-4 & TS-8) switches.

## Main Feature

- The previous Data-Line is divided into Power Line & Data Line to connect at each switch. When applying this SU device, the Power Line & Data Line can be reduced into Two Lines (2 Cables).
- The length of cable that connected at this SU device is 300m and it is suitable for use.
- The switches at one single SU is appropriate house 30 switches below for High Quality Data Communication.



## Operation

SU is installed at each LCP and it performs the 2 lines that outgoing to Data Line Switch. It is suitable to apply at previous piping & wiring that uses 2 lines of cable. Also if our system is designed at the beginning, it is suitable to use the switch line with 4 lines of cable.

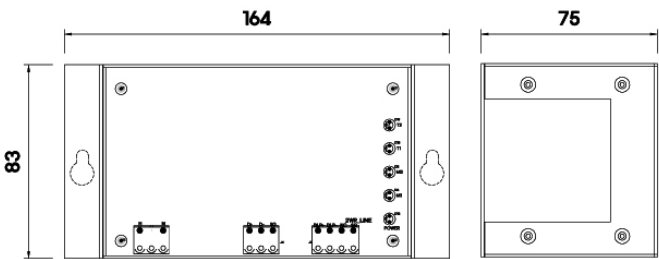
The switches at one single SU is appropriate to use 30 switches below and apply them below 300m for High Quality Data Communication.

This SU device is installed at previous LCP and installed with separate Power Supply Device to supply the power is recommended.

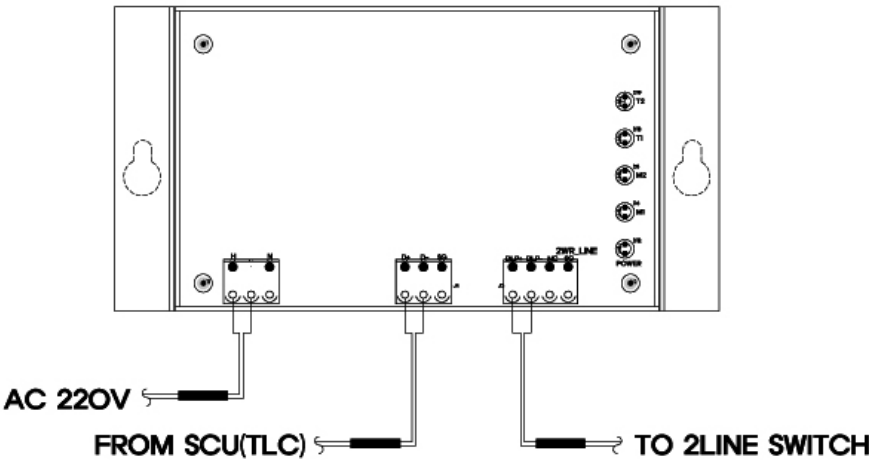
## Specification

1. 2LINE CONVERTER
  - Input Power : AC220V
  - CPU : 32Bit Micro Processor
  - Mount : Panel Mount
  - Operation Environment : -10°C ~ 60°C, 0~95% RH
  - Comm. Method : TLC NETWORK / FieldBUS OR 2LINE
2. 2LINE SWITCH
  - Input Power : DC24V
  - CPU : 32Bit Micro Processor
  - Mount : Panel Mount
  - Operation Environment : -10°C ~ 60°C, 0~95% RH
  - Comm. Method : TLC NETWORK / FieldBUS OR 2LINE

## Dimension



## Connection Diagram





# LIGHTING CONTROLS

## SRBRIDGE REPEATER AND ISOLATION UNIT

SLC SYSTEM

### Overview

SRBRIDGE is the communication device that amplify the data communication between SCU and Lighting Control Panel. The Lighting Control Panel's low-level network is ETLB BUS which is the digital signal. Furthermore from certain distance, the output signal is decreasing. To solve this problem for longer distance data output, it may need to reset or device that amplify the output. Therefore, the SRBRIDGE is the device that amplifies the transmission signal. It can expand the number of system by installing at the middle of SCU & Lighting Control Panel.

### Main Feature

- The distance is expanded due to signal amplification
- Number of connecting system is expanded
- Eliminates the communication line noise by configuring the noise filter
- Display the transmission line status LED
- Display the lighting control panel field status
- Powerful data communication that connected by Full 2-Wire Bus
- Continuous control is possible when downloading / modifying the program & data-base

### Networking

The SRBRIDGE connects the High-End & Low-End Communications. The High-End Communication is configured with Full 2-Wire Bus to operate with SRLINK. The Low-End Communication is operating to expand the each Lighting Control Panel and Data Line Switch to 250 nodes.

### Specification

- Input : 110/220 VAC
- DATALINE VOLTAGE : DC24V
- Distance : 1.2km
- CPU : ISOLATION 2CPU(16BIT Microprocessor 2Channel)
- Operation Environment: 14°F to 140°F(0°C to 60°C)
- Relative humidity: 0% to 95%,



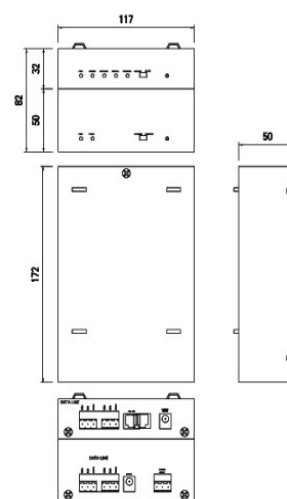
### Application

When communication error occurred by the noise from certain TLC Network section or requesting the distance above base Specification from TLC Network, it may uses as expansion or separation of Data-Line.

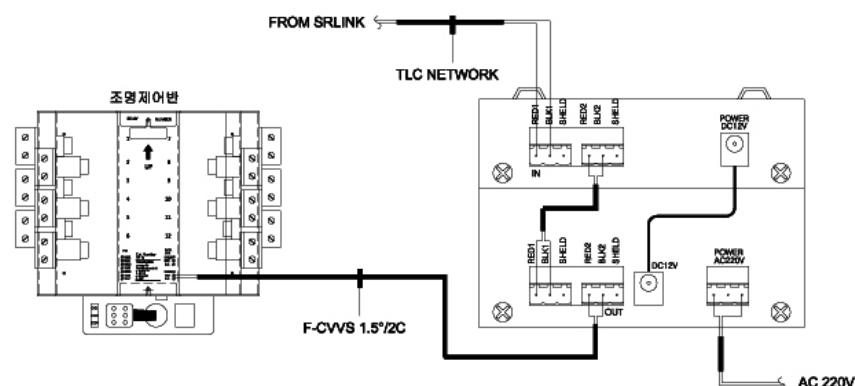
The primary line and secondary line is managed by separated CPU and it cuts the data noise for between each line by Isolation of electrical circuit.

If it uses as expansion of separate data-line, the separate low-level network will be created. The data-line is able to expand for 1.2Km and 500 nodes can be added for expansion.

### Dimension



### Connection Diagram





## RELAYS

### LR9P 20Ampere Latching Relay

#### Overview

The LR-9P Relay is the Magnetic Latching type Relay that can be mounted with Plug-In type inside at ELC Relay Module. It has the 1 EA of auxiliary contact point and display the feedback status. The LR-9P is able to open and shut by applying the half-waved rectified 24 VAC (MAC type) and it is able to apply the Max. usable capacity that is shown at specification about resistive load, ballast and tungsten filament. It has the manual Override switch to ON/OFF the Relay when emergency.

#### Main Feature

- Install it inside of enclosure that is near to the brake panel at electrical box.
- By selecting the two separate low-voltage coil (24V), it maintains and ON(OFF) the contact point by mechanically.
- It maintains the ON/OFF status to make no change of status when black-out.
- It minimizes the power consumption by charging the status of Relay when power is consumed.
- The manual control is possible through the lever that placed at top of Relay.
- It is easy to install at DIN-Rail to save the time and space for installation.

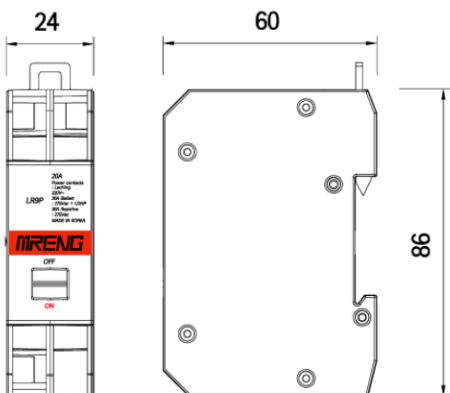
#### Application

The LR9P Relay is mounting inside of 4sRM or 6sRM Relay Module by Plug-In Type. The status display & switch is located at top of Relay. It can verify the current ON/OFF status. It can mounted at Relay Module without separate connector. The bottom of Relay has connection terminal for Relay Module. It can saves time for installation. This Relay's LED status is displayed at front of Relay Module. The Relay itself has the switch to ON/OFF control manually. This Relay has the separate connector terminal that can connect at GE TLC System & Wattstopper System without any modification.

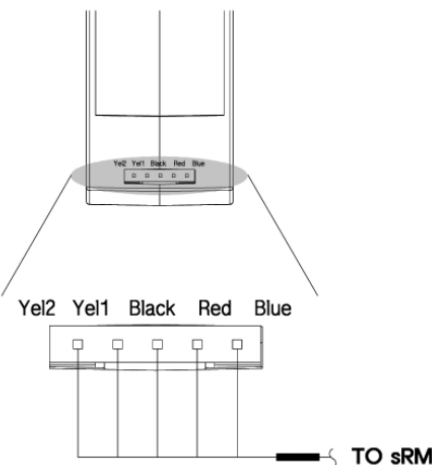
#### Specification

- Lamp Load : 20A Tungsten Filament 125VAC
- 20A Ballast 277VAC
- Resistive Load : 20A 277VAC
- Motor Load : 1/2 Hp @ 110- 125VAC
- 1/2Hp @ 220-277VAC
- Operation Environment : Temp - 10 - 60°C
- Relative Humidity : 10 -95%RH
- Durability : 150,000 cycles (Full Load)
- 200,000 cycles(No Load)
- Line Voltage Feature :
  - Contacts : SPST Maintained(Mechanical latching) with override on.off switch
  - Terminal : 3 Terminal, Screw- Actuated Clamp for using with #14-10 AWG
- CE Approval.

#### Dimension of Layout



#### Connection Diagram







# LIGHTING CONTROLS

## RR-7 20Ampere Latching Relay w/o Feedback

### RELAYS

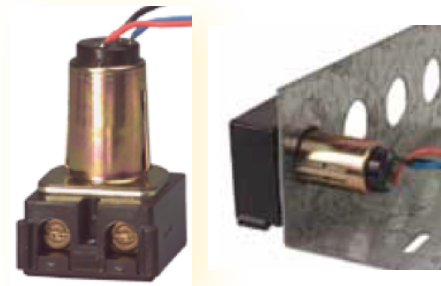
#### Overview

RR-7 Relay is the mechanical Latching Relay that imported by GE. By the 24 VAC momentary pulse signal, it Close & Open the high-voltage relay.

The load of this relay is tungsten filament, ballast and resistive load and this RR-9P relay has not the Feedback electric point for relay's operation.

#### Main Feature

- This is the 20 Ampere mechanical latching relay and it has the Feedback electric point to check the operation status for actual relay.
- It uses the bracket to install.
- It ON/OFF control by instant pulse signal and this is the mechanical latching type.
- 1 year warranty



#### Application

It usually applied at simple lighting control system. Even when the instant black out happens, it is maintaining the electric point by latching type. When the lights are back, it maintains the ON/OFF mode before of black-out.

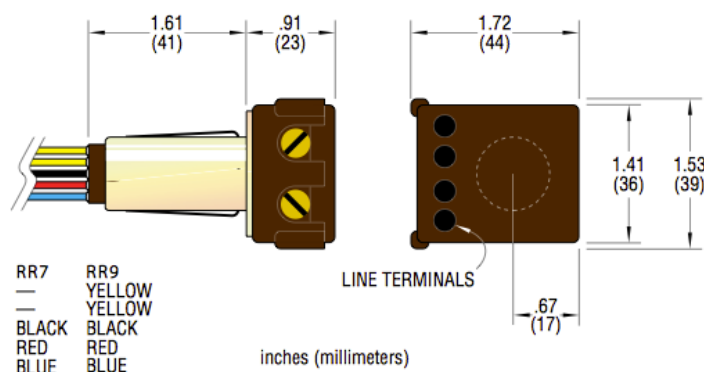
This relay is installed using by bracket and also installed next to lighting control card. The bracket is operating as ISOLATION role.

The manual operation for relay at local-site is operated by manual operating button.

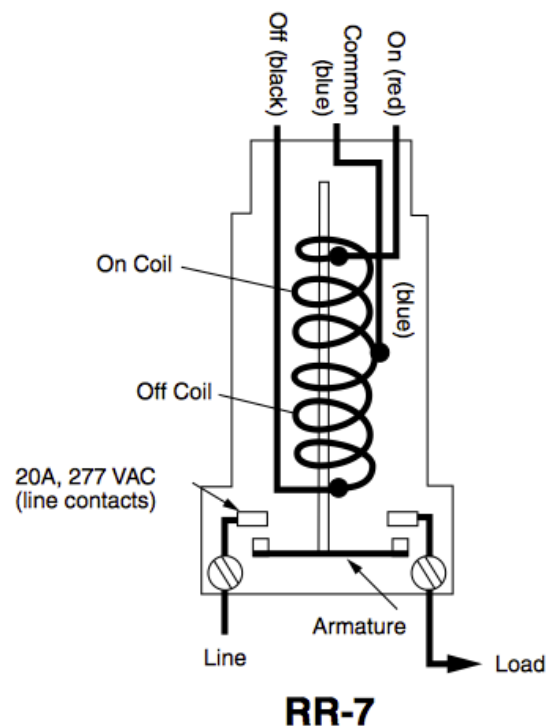
#### Specification

- Power Supply : 21-30VAC(class 2) momentary  
30-38VDC momentary
- Relay Type : SPST Maintained mechanical latching
- Coil impedance : 75- 85 $\Omega$  60Hz un-rectified 55-60 $\Omega$  DC resistance
- Coil Inrush Current : 325mA @24VAC  
450mA @35VDC
- Electric point for ballast : 20A @ 277VAC
- Electric point for motor : 1/2 hp @ 110-125 VAC  
1/2 hp @ 220-277 VAC
- Electric point for tungsten : 20A filament 125VAC
- Resistive load : 30A @ 277VAC
- Electric point for PILOT : 1A, 24VAC isolated
- Pulse RATE : Min. operates at 50ms.
- Length of Lead line : 6 inch(15cm)
- Durability : 100,000 times
- Operating Temp : 0 $^{\circ}$  - 60 $^{\circ}$ C
- Operating Humidity : 10%-95%RH
- Certification : UL listed File # E18830, CSA certified.
- Weight : 0.12kg

#### Connection Diagram



#### Dimension





## RELAYS

### RR-9P 20Ampere Latching Relay w/Feedback

#### Overview

RR-9P Relay is the mechanical Latching Relay that imported by GE. By the 24 VAC momentary pulse signal, it Close & Open the high-voltage relay.

The load of this relay is tungsten filament, ballast and resistive load and this RR-9P relay has the Feedback electric point for relay's operation. It operates the Feedback by the secondary electric point that relay's main electric point is working normally without failure.

#### Main Feature

- This is the 20 Ampere mechanical latching relay and it has the Feedback electric point to check the operation status for actual relay.
- It uses the bracket to install.
- It ON/OFF control by instant pulse signal and this is the mechanical latching type.
- 1 year warranty



#### Application

It usually applied at simple lighting control system. Even when the instant black out happens, it is maintaining the electric point by latching type. When the lights are back, it maintains the ON/OFF mode before of black-out.

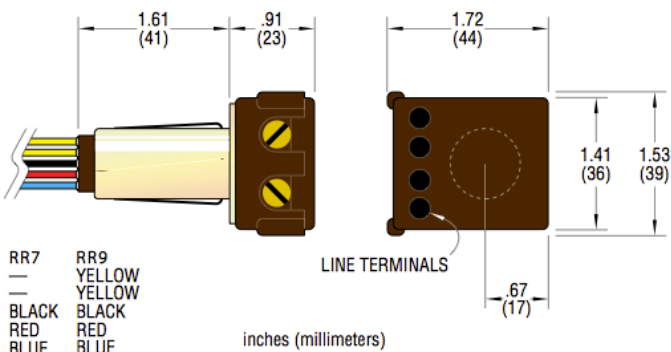
This relay is installed using by bracket and also installed next to lighting control card. The bracket is operating as ISOLATION role.

The manual operation for relay at local-site is operated by manual operating button.

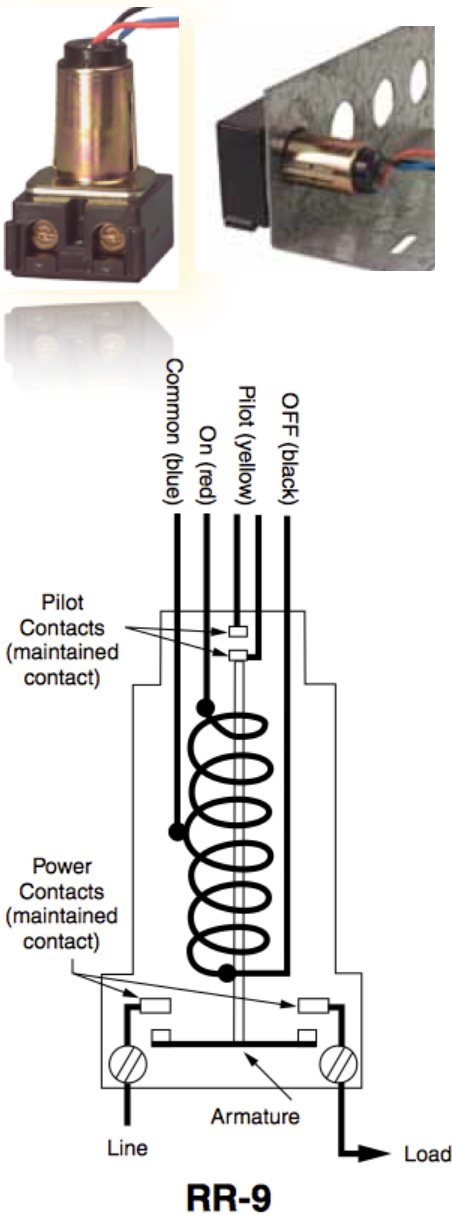
#### Specification

- Power Supply : 21-30VAC(class 2) momentary  
30-38VDC momentary
- Relay Type : SPST Maintained mechanical latching
- Coil impedance : 75- 85 $\Omega$  60Hz un-rectified 55-60 $\Omega$  DC resistance
- Coil Inrush Current : 325mA @24VAC  
450mA @35VDC
- Electric point for ballast : 20A @ 277VAC
- Electric point for motor : 1/2 hp @ 110-125 VAC  
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- Electric point for tungsten : 20A filament 125VAC
- Resistive load : 30A @ 277VAC
- Electric point for PILOT : 1A, 24VAC isolated
- Pulse RATE : Min. operates at 50ms.
- Length of Lead line : 6 inch(15cm)
- Durability : 100,000 times
- Operating Temp : 0 $^{\circ}$  - 60 $^{\circ}$ C
- Operating Humidity : 10%-95%RH
- Certification : UL listed File # E18830, CSA certified.
- Weight : 0.12kg

#### Dimension of Layout



#### Connection Diagram





# LIGHTING CONTROLS

LR25(HID)-AC24V

20Ampere Latching Relay for Panasonic

RELAYS

## Overview

The LR25(HID)-AC24V Relay is the Latching Type Relay that can be mounted by Plug-In Type. It has the Main Contact & Auxiliary Contact indicating ON/OFF and feedback status. This Relay can be Opened & Closed by applying Half-Wave Rectified 24VAC and also for the Load of Tungsten Filament, Ballast and Resistive can be usable for Maximum capacity indicated in the Specification. It has the Manual OVERRIDE switch to enable the ON/OFF in case of need.

## Main Feature

- The Relay is installed at Inner Panel inside of Enclosure that near to the Breaker Panel.
- It is selected with Low Voltage(24V) Coil that separated into Two ways for maintaining the ON/OFF status contact point by mechanically.
- The Relay maintains the ON & OFF status to prevent the change of status during Black-Out.
- The power is consumed only when the status of relay is changed.
- The manually controlled by the lever located at top of the relay.
- Easy Mounting at DIN-Rail Type.
- The Manual override switch for manual operation in case of need.



## Application

The LR25(HID)-AC24V Relay is the Plug-In Type Relay with the status display for the Manual Operation at the upper side of the relay.

The Relay has Wired Connection Terminal that can connect to the Relay Module and Relay itself has status indicator on the manual switch.

This Relay can be directly connected to the PANASONIC & TOSHIBA System.

## Specification

### LAMP LOAD :

- . 20A Tungsten Filament 125VAC 20A Ballast 277VAC
- . Resistive Load : 20A, 300VAC(General Use), 60,000Cycles
- 20A, 300VAC(Standard Ballast)
- 16A, 120/277VAC(Electric Ballast)
- 2,400W, 120VAC(Tungsten)
- 4,800W, 240VAC(Tungsten)
- 20A, 300VAC(Fluorescent)
- . Short Circuit Rating(MAX) 14,000A, 277VAC
- . Max. Surrounding Air Temp. : 40°C

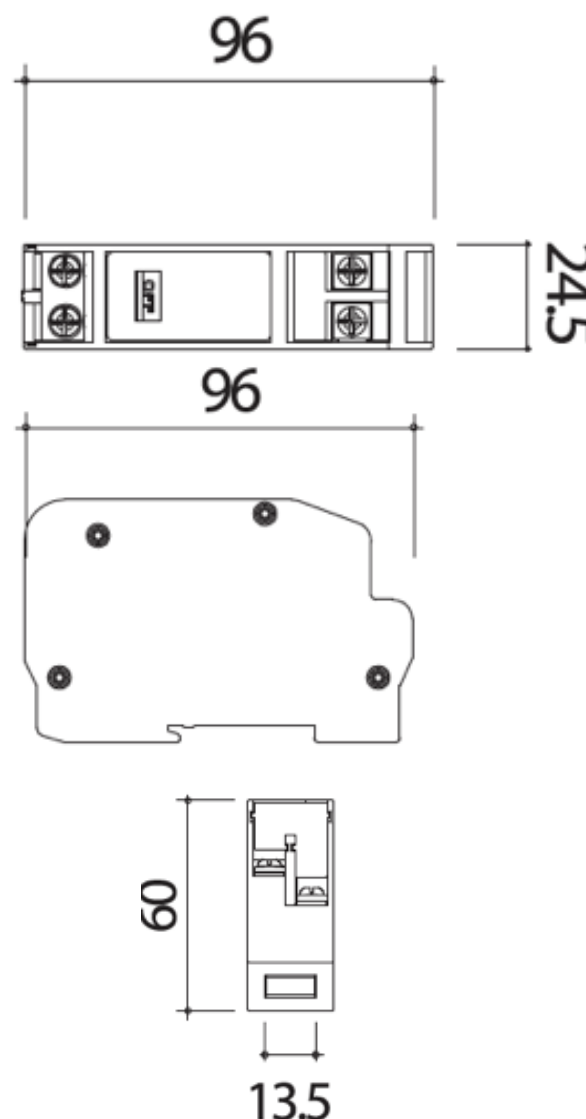
Operation Environment : Temp. -10 ~ 60°C

Relative Humidity : 10 - 95%RH

Durability : 60,000 Cycles(Full load)



## Dimension of Layout



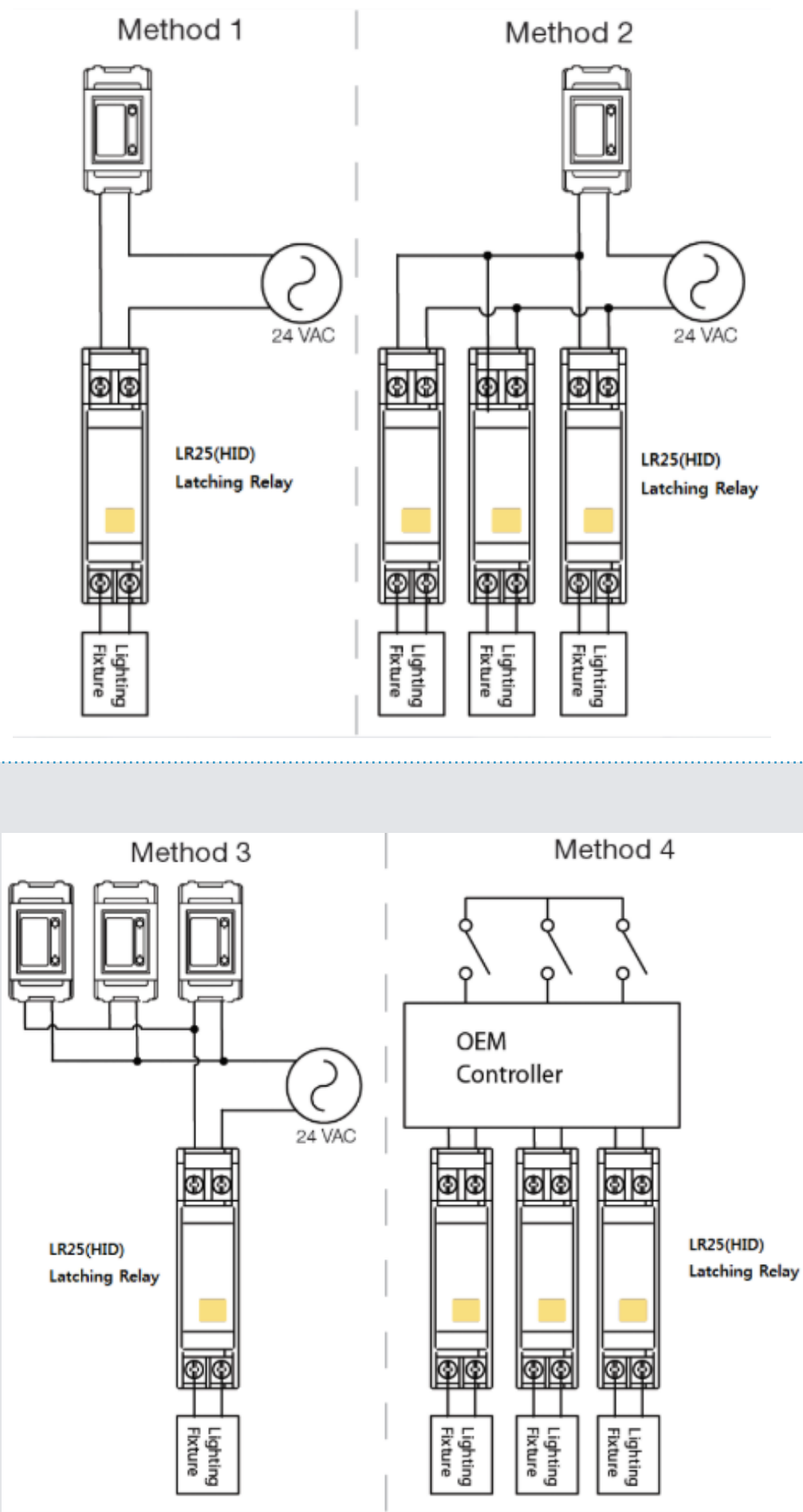


# LIGHTING CONTROLS

RELAYS

LR25(HID)-AC24V      20Ampere Latching Relay

Connection Diagram



LIGHTING CONTROLS





# LIGHTING CONTROLS

SmarTLC

Software for SLC & ON/OFF Control

SmarTrol v.3.1

Software for ELC, DALI & Wireless System

SOFTWARE

## Background of Development

Our Software has been developed with evolution of advanced IT technology. By the release of Window OS from the DOS version in early MS, our software is also been developed at Window OS to control the Lighting Control Program conveniently at early of 2000 year. Therefore, after 14 years, our Software has been Upgrade to many steps.

At early, the Lighting Control System is applied at only for ON/OFF control and the Software that meets the eye was SmarTLC. We have been exported this S/W in the name of Light-X to GE America.

SmarTrol v.1.0 is applied and developed for our iSLC System and Dimming Control System. Recently, The SmarTrol v.3.1 is the software that is developed and applied for ELC System, DALI & Wireless System since 2013. This software is certified with BTL Listing at 2013. This Software is the Lighting Control only with power USER INTERFACE function and much better graphic function than other Software.

## Overview

The SmarTrol v.3.1 is developed to control and manage the power of building, facility, lighting and integrated system software efficiently. Therefore the SmarTrol v.3.1 is managed as individual system and if necessary, it is managed integrally with power and facility auto control to perform the interlocking control. The SmarTrol v.3.1 is installed at server and client to perform the BACK UP function for each other and it can monitor the modified program from server and also monitoring the contents of DB from client.

## Application

It can be applied at various places like small and medium sized buildings and large buildings. It can be applied at shopping mall, office only building, airport, convention center, gym, gymnasium, APT and public area where the Lighting Control is needed. It is configured with Lighting Control Only Program. Also the schedule, sunset/sunrise, occupancy, group, pattern, DALI Dimming and Photo control is available.



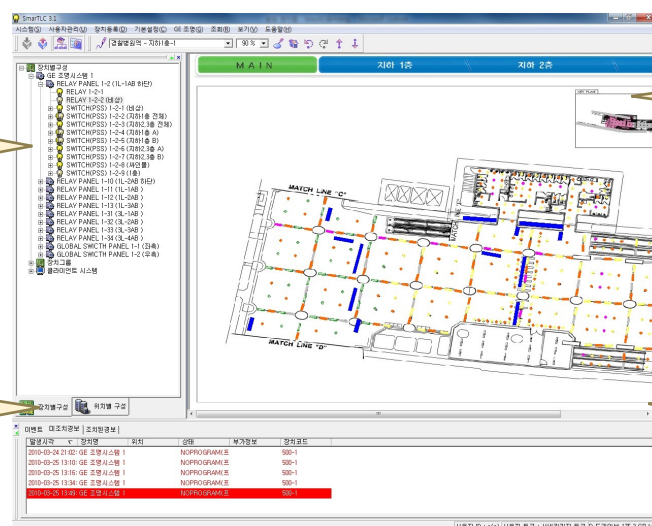
## Main Feature

- Use the client mode and server mode with general PC class computer to apply the interlock BACK UP & STANDBY function.
- Limits the monitoring range & control range for management users.
- Monitoring the real time load capacity usage by Trend Graph.
- The Local Control Panel is continuously operating the control even in the event of modifying the program & transmitting the data.
- The each menu of the screen is placed as Icon to re-locate freely.
- For the operation of graphic blueprint from the screen, the graphic file is supporting with ... BMP, WMF, JPEG, AVI, PCX, DCX
- The TREE structure is ready for display the device-specific, location-specific, group-specific..
- Even though the graphic screen is enlarged, the screen will not cracking.
- When alarm goes off, it automatically finds the corresponding device and relay.

## Screen of SmarTrol v.3.1

Real time programming and monitoring.

Graphic edit, On Line monitor, Diagnostic Pop up



Schedule, Pattern and Group Down Loading

Ethernet, Mod bus, BACNet interface

# LIGHTING CONTROLS



SOFTWARE

SmarTLC

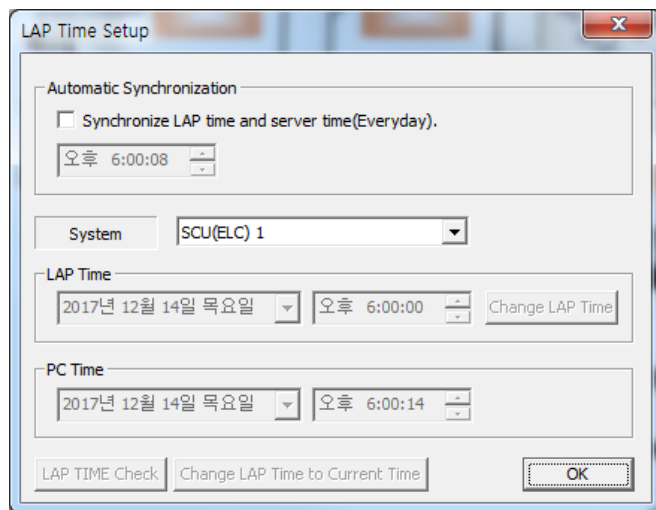
Software for SLC & ON/OFF Control

SmarTrol v.3.1

Software for ELC, DALI & Wireless System

Configure : Communication, User Level, Location and Device configuration

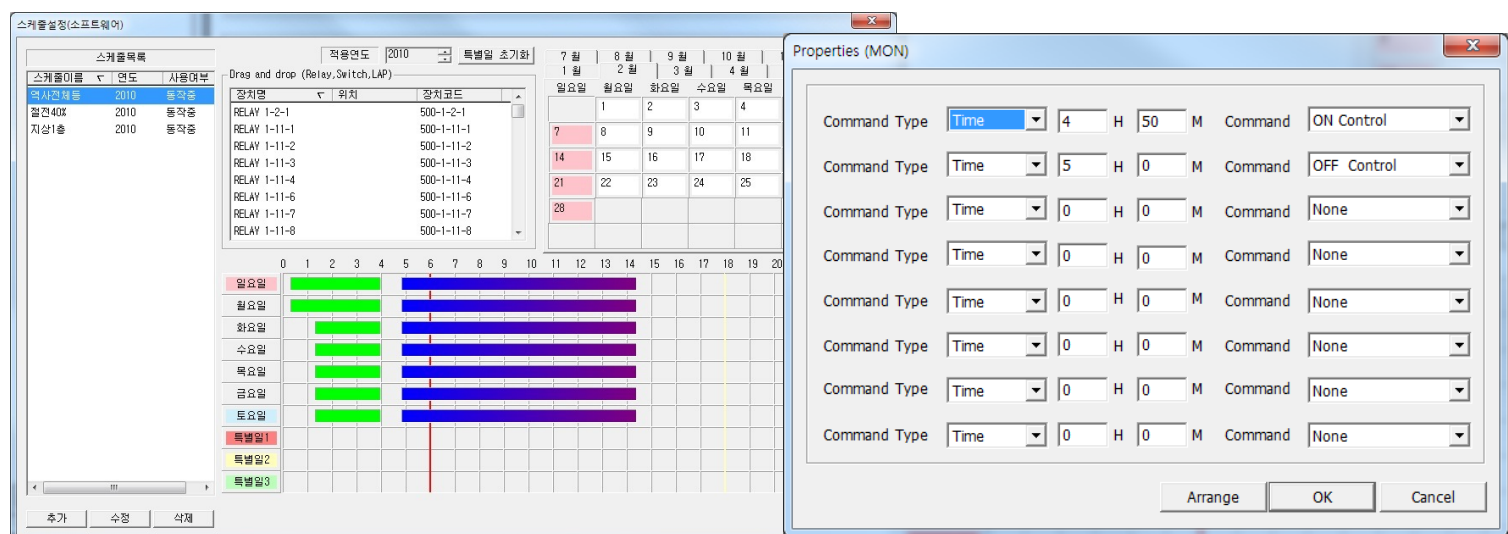
## Operation



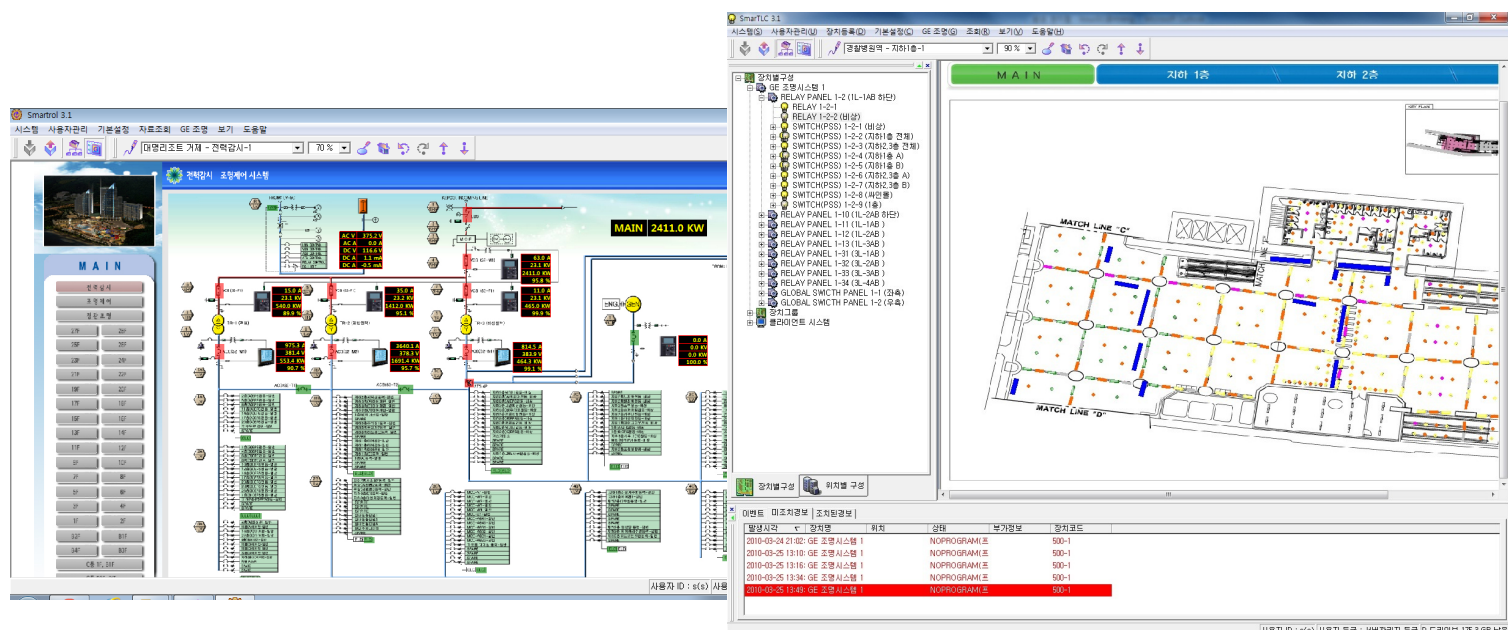
Install the Smatrol 3.1 Installation Program at PC that is managed by general Window OS. First, install the Smatrol 3.1, then log-in to set the communication. Set the communication between SCU & PC and then the computer will select the server mode or client mode. Input the data for each site's data-base and also input the program for each control scenario. After the data is inputted, start the downloading from Online status. After check the feedback status of each downloaded program, again re-download the exact program.

The Graphic Editing Function is simply done by DROP down at the graphic screen by dragging the corresponding Circuit (Relay) from the Data-Base. The contents of each program & event is remained at data login record. The user can analysis the real load status for each data by looking at the data record of real management operation and also looking at the processing of creating the program.

Program : Schedule, Pattern and Group, Down and Up Loading



Monitor : Graphic edit and On line monitor , Run time, Data Logging and Diagnostic pop up





# LIGHTING CONTROLS

SmarTrol OPC Software for OPC Interface

SOFTWARE

## Background of Development

The Smartrol which is our Company(MRENG)'s HMI SOFTWARE is able to control the Lighting, Facility, Electrical, Monitoring Program. This software is setting for each system and creating the program to download the data to control panel and device at site. From the Central Monitoring Program, it is possible to monitor and remote control for each control panel and status of device at site.

To integrated management and interlocking control with other company's automation control software and SI Server for these kind of function of Software or to interface it easily, we(MRENG) have developed the OPC Program of Smartrol. Through this OPC, it is connected at Central Server of Facility Automation Control and from this system, the Lighting Control can be monitored and controlled.

## Overview

The OPC(OLE for Process Control) is the Communication Interface Standard between International Standard Application that OPC Foundation made it. It is interfacing through the point name which the communication is the primary between the application.

In other words, this means that connection between data and data comes from window. The connected data will be stored when modify it.

For example, the graphic program that supports the OLE, after drawing the graphic, connect with text editor then when the graphic is changed later on, the picture of the text editor will be changed too. For this, the OLE is connecting the information between the data.



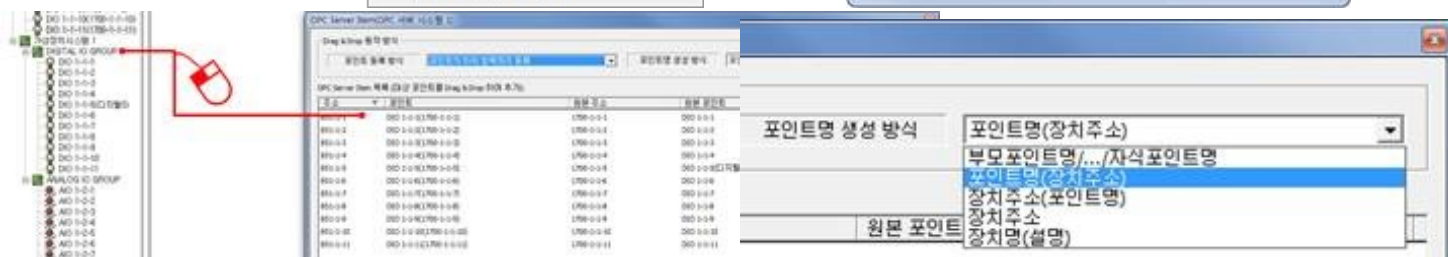
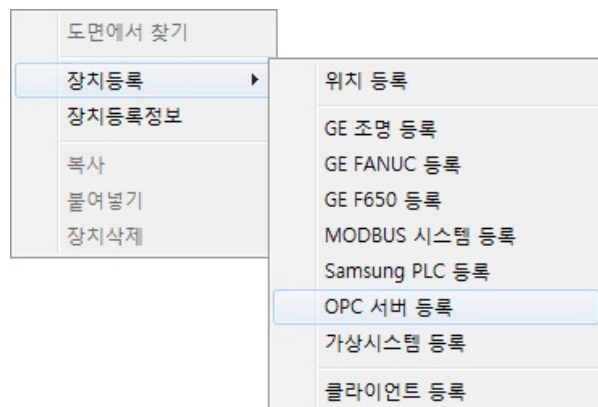
## Application

It is configured our Lighting Control System as Independent System and Software and if necessary, interface with SI Server or Facility Automation Control to monitor and remote control our Lighting Control from Central Monitoring Program.

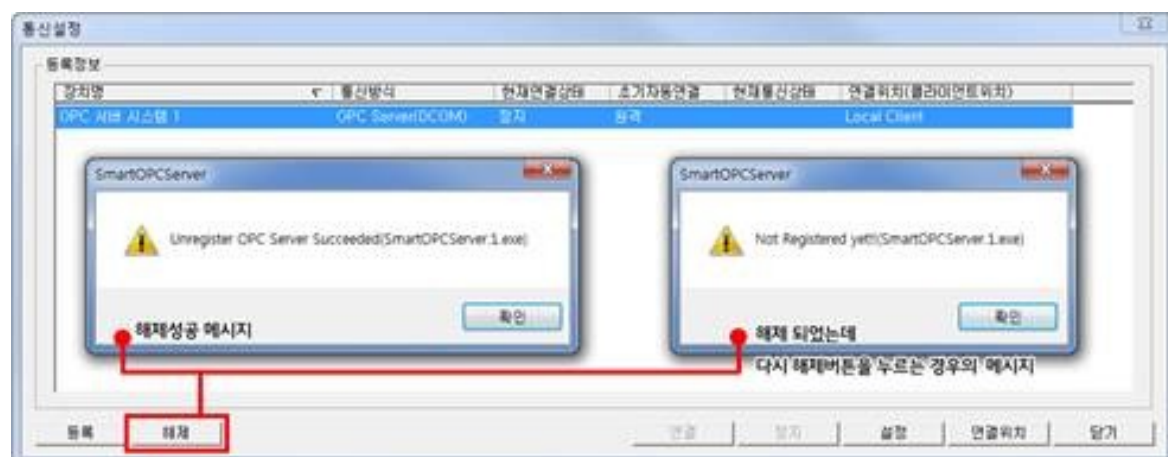
From Smartrol, do the setting and registration for the OPC Server connection to interface between the system can be easy.

## OPC Item Registration

### OPC Server Registration



### Bring ITEM







## SOFTWARE

WeBAS v.1.0

Web Bases Software for ELC, DALI, & Wireless System

### Background of Development

The Software of MRBAS has been developed together with the development of IT technology. With the launch of Window OS in the initial MS version of DOS, Software of MRBAS was also developed as a lighting control program in early 2000 and has been continuously upgraded for 17 years and fully developed.

Initially, the lighting control system is applied on / off-oriented control method, and the suitable software is SmartTLC. This software is exported to USA GE under the name of Light-X.

Smartrol v.1.0 is developed and applied to ILC system, SLC system and dimming control system. Smartrol v.3.1 is the software that has been applied since 2013, recently developed for ELC system and DALI system. The software is BTL certified and GS certified in 2013. It is dedicated software for lighting control which is more convenient and powerful USER INTERFACE function than other software because it is an excellent function of graphic. Based on this accumulated technology of Client Server based solution, WEBAS based WEB which can be used anytime and anywhere is launched in 2017 and it has also been certified by BTL



### Overview

WeBAS software was developed as a software that controls and monitors integrated management such as Lighting control and Electric power control in a building in a WEB environment. If necessary, it can be operated by other HVAC control and integration. It is possible to monitor various functions such as graphic monitoring, Dashboard monitoring, widget setting and chart, and it is an excellent WEB-based MMI program using the cloud service.



### Main Feature

- Monitoring control and setting function using WEB browser
- Dashboard Builder and Surveillance
- Split screen and full mode, slide monitoring
- Easy Drag-Drop Graphic Point SettingWidget creation function using TREND DATA
- Watched, manipulated, and exported data to PDF files
- CAD vector file background (no cracking on enlargement)
- Monitoring and setting on smartphone
- CLOUD service for device information and DB backup management
- Ability to see sub-device list
- Convenient journaling with diary form import function
- Control various user rights settings

### Main Function

WeBAS software. It provides WEB monitoring control, graphic studio, and cloud service anytime and anywhere.

- Various monitoring control
- Dashboard Watch
- Easy device setup

- Create convenient graphics
- Layer creation
- Various effects settings

- Data Backup
- Site Management
- Maintenance community





# LIGHTING CONTROLS

WeBAS v.1.0

Web Based Software for ELC, DALI, & Wireless System

SOFTWARE

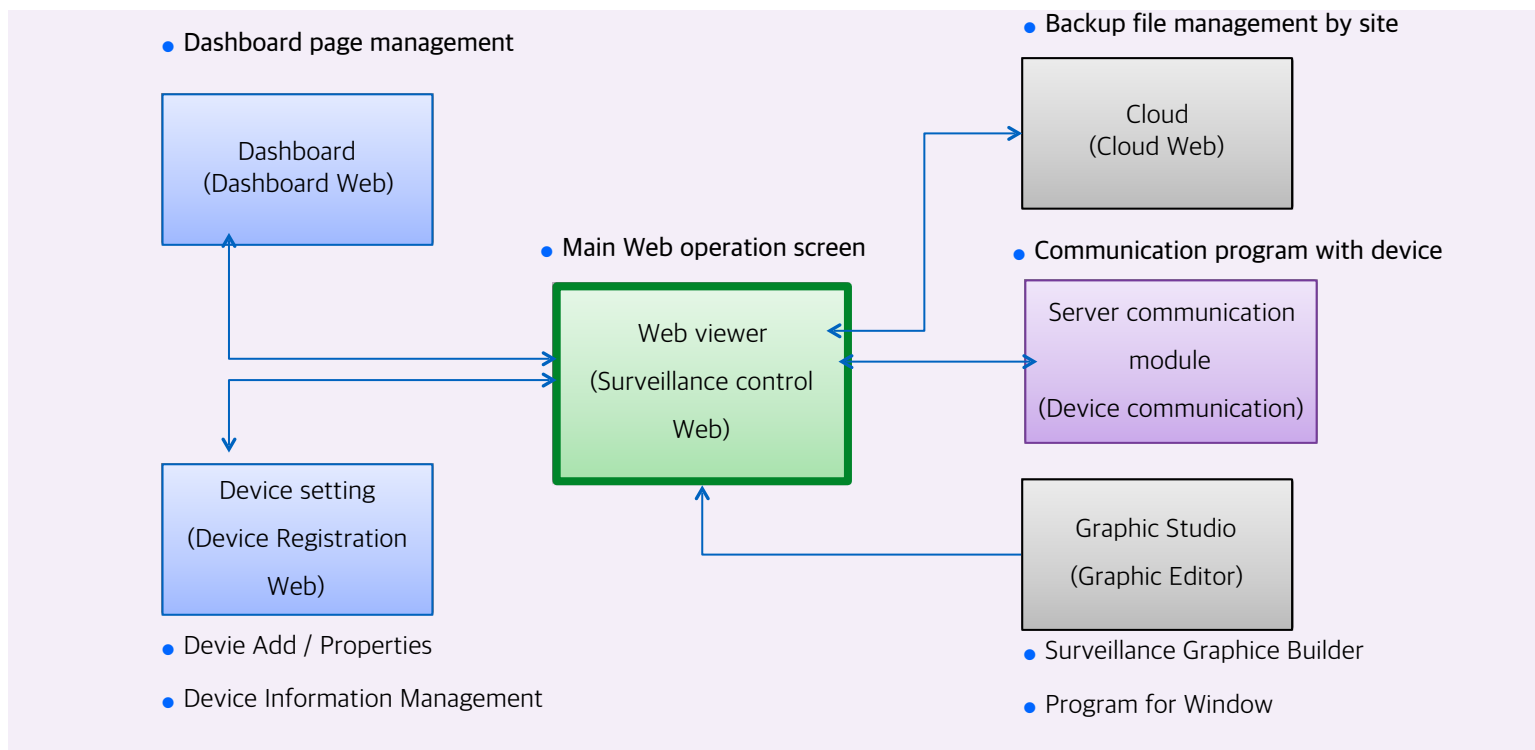
## Application

WeBAS can be applied to various buildings ranging from small, medium and large buildings. It can be applied to any area where lighting control is required, such as residential and commercial buildings, department stores, shopping malls, office buildings, airports, public service centers, playgrounds, gymnasiums, apartment public areas and public places. It is composed of dedicated programs of lighting control program, and it is possible to control the schedule, sunset sunrise control, room sensor control, group and pattern control, different dimming control, illumination control according to illumination measurement, and the like. Also, various monitoring such as graphic surveillance, dashboard surveillance, widget setting, chart, etc. are possible and it is possible to maintain using cloud service.

## Operation

When a user accesses and logs in to the site through a web browser, the Smartrol Web program is executed and can perform all functions necessary for monitoring control, device setting, Dashboard, downloading, and so on. Surveillance graphic editing can download and run Gaphic Studio. It processes the circuit on database by drag & drop directly with mouse.

## Program Configuration

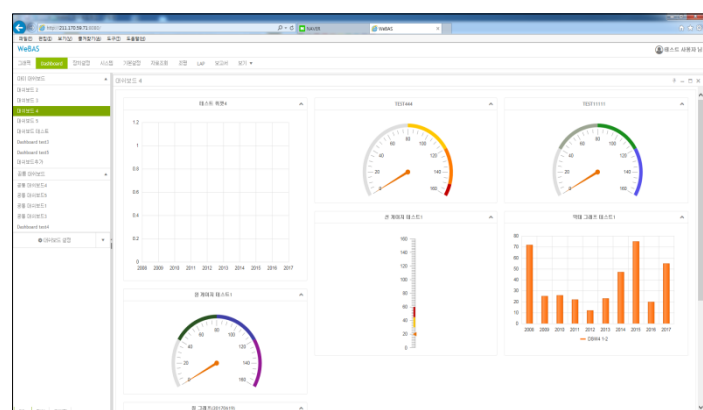


## Screen of WeBAS

Overall screen layout and Menu layout



Graphical monitoring / Dashboard function



# LIGHTING CONTROLS



SOFTWARE

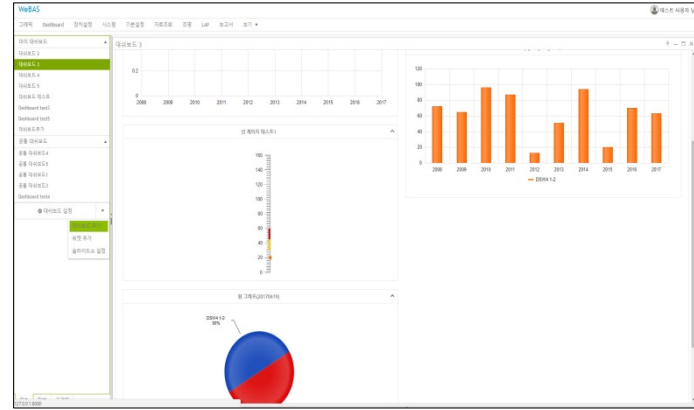
WeBAS v.1.0

Web Bases Software for ELC, DALI, & Wireless System

Screen monitoring mode(Full, Split, Slide)



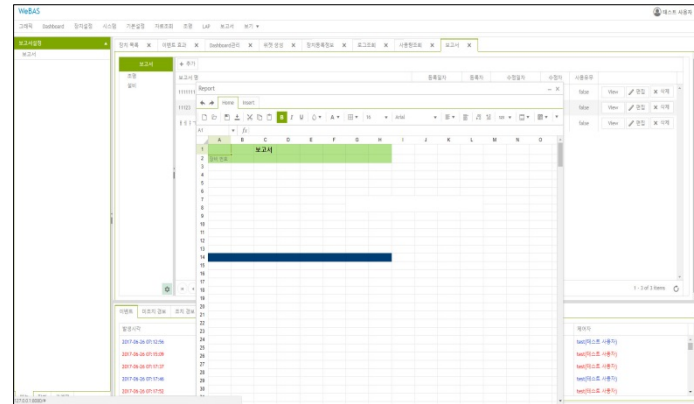
Set up Chart diversification and send Files



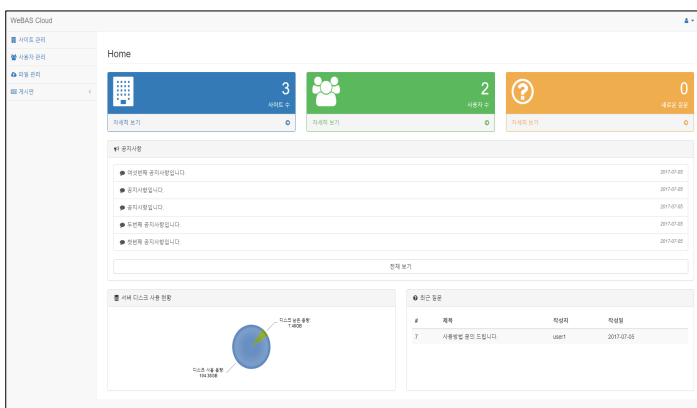
Device Configuration List and Registration

장치명	장치번호	장치종류	장치위치	장치상태	장치정보
RELAY-DIMMER	RELAY-DIMMER-001	RELAY-DIMMER	RELAY-DIMMER-001	ON	RELAY-DIMMER-001
RELAY-DIMMER	RELAY-DIMMER-002	RELAY-DIMMER	RELAY-DIMMER-002	ON	RELAY-DIMMER-002
RELAY-DIMMER	RELAY-DIMMER-003	RELAY-DIMMER	RELAY-DIMMER-003	ON	RELAY-DIMMER-003
RELAY-DIMMER	RELAY-DIMMER-004	RELAY-DIMMER	RELAY-DIMMER-004	ON	RELAY-DIMMER-004
RELAY-DIMMER	RELAY-DIMMER-005	RELAY-DIMMER	RELAY-DIMMER-005	ON	RELAY-DIMMER-005
RELAY-DIMMER	RELAY-DIMMER-006	RELAY-DIMMER	RELAY-DIMMER-006	ON	RELAY-DIMMER-006
RELAY-DIMMER	RELAY-DIMMER-007	RELAY-DIMMER	RELAY-DIMMER-007	ON	RELAY-DIMMER-007
RELAY-DIMMER	RELAY-DIMMER-008	RELAY-DIMMER	RELAY-DIMMER-008	ON	RELAY-DIMMER-008
RELAY-DIMMER	RELAY-DIMMER-009	RELAY-DIMMER	RELAY-DIMMER-009	ON	RELAY-DIMMER-009
RELAY-DIMMER	RELAY-DIMMER-010	RELAY-DIMMER	RELAY-DIMMER-010	ON	RELAY-DIMMER-010

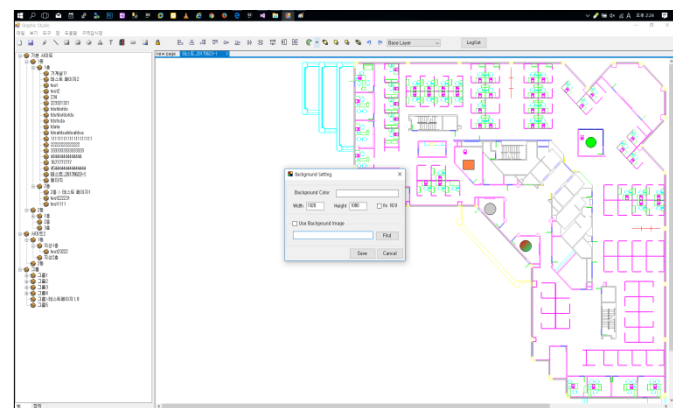
Electric report and log data monitoring



Cloud service



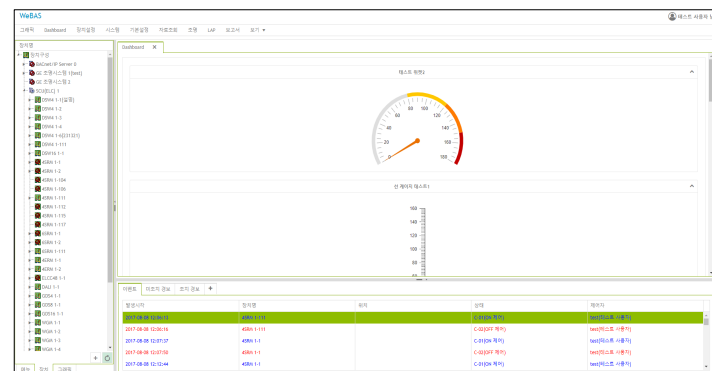
CAD Vector file Import



Check Device configuration and search for upper and lower level device

장치명	장치번호	장치종류	장치위치	장치상태	장치정보
RELAY-DIMMER	RELAY-DIMMER-001	RELAY-DIMMER	RELAY-DIMMER-001	ON	RELAY-DIMMER-001
RELAY-DIMMER	RELAY-DIMMER-002	RELAY-DIMMER	RELAY-DIMMER-002	ON	RELAY-DIMMER-002
RELAY-DIMMER	RELAY-DIMMER-003	RELAY-DIMMER	RELAY-DIMMER-003	ON	RELAY-DIMMER-003
RELAY-DIMMER	RELAY-DIMMER-004	RELAY-DIMMER	RELAY-DIMMER-004	ON	RELAY-DIMMER-004
RELAY-DIMMER	RELAY-DIMMER-005	RELAY-DIMMER	RELAY-DIMMER-005	ON	RELAY-DIMMER-005
RELAY-DIMMER	RELAY-DIMMER-006	RELAY-DIMMER	RELAY-DIMMER-006	ON	RELAY-DIMMER-006
RELAY-DIMMER	RELAY-DIMMER-007	RELAY-DIMMER	RELAY-DIMMER-007	ON	RELAY-DIMMER-007
RELAY-DIMMER	RELAY-DIMMER-008	RELAY-DIMMER	RELAY-DIMMER-008	ON	RELAY-DIMMER-008
RELAY-DIMMER	RELAY-DIMMER-009	RELAY-DIMMER	RELAY-DIMMER-009	ON	RELAY-DIMMER-009
RELAY-DIMMER	RELAY-DIMMER-010	RELAY-DIMMER	RELAY-DIMMER-010	ON	RELAY-DIMMER-010

Widget function using Trend data





# LIGHTING CONTROLS

m.r.Lighting Control.S  
m.r.Lighting Control

App. for Building Lighting Control

MOBILE APP

Smart-Phone App : Building Lighting Control

## m.r. Lighting Control

The Building Occupants does not need Local Switches Anymore!

Our(MRBAS) Smart-Phone App can control the office and conference room with various Lighting Control by My Page & My Scene Function.

The Building Lighting Control System is no longer need any of Computer & Software.



My Choice is NOT one anymore!!!



The conventional Lighting Control System can control each lighting control panel by installing the Computers & Software at Monitoring PC. However, it is said that this Control is possible by installing the MRBAS APP to my Smart-Phone. Is it necessary to install the Computer Monitoring System for our building also in small size???



## Background of Development

In a recent situation, where the Smart-Phones have become accustomed, building tenants want to control the Lighting for their area by Smart-Phone instead of local switch. From this background, we have developed the Smart-Phone App program that can be connected to our ELC Lighting Control System. It was developed as an APP Program that can run on Android of Google or IOS of Apple and even from the Internet Browse Window, simply register our System's IP address to run this program more easily.

This App program is available to control the ON/OFF & Dimming for lighting and also for the Relay's ON/OFF control for the Lighting Control as well. The Schedule Program Setting Control for each area and region was also can be done from this Smart-Phone App Program. In addition, the My Page & My Scene functions have been added to this App Program to make it more easier to Residents to control and manipulate the Lighting of people's area and moving line.

## Overview

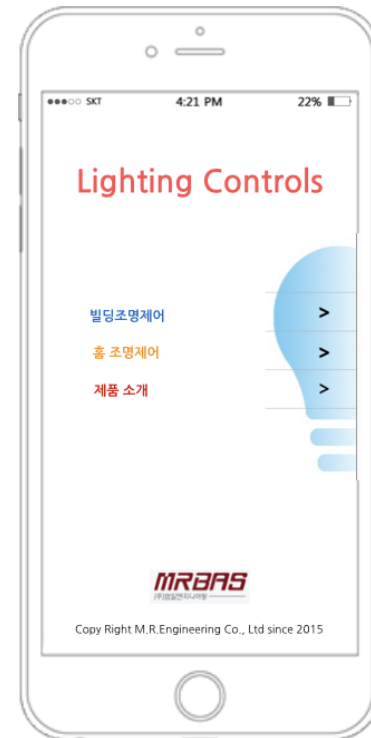
Our (MRBAS) Smart-Phone App Program is based on our Software (Smartrol V.3.1). We have created the Smart-Phone specific App Program by extracting the Key Points from our Lighting Control Software (Smartrol V.3.1).

We have covered the essential functions of our ELC Lighting Control System to our Smart-Phone App Program.

Especially, this App Program has various functions such as Schedule Program, MY PAGE, MY SCENE setting and programmed contents downloading to replace the software of Monitoring PC.

## Main Feature

- Applicable to all Smart-Phone for Android & iPhone,
- It operates with two types of APP. One with the Server and one without the Server.
- Communication Setting : The Communication Connection with ELC System and SCU.
- Device Setting : Various Relay Module, DALI Dimming Module, Wireless Dimming Module, Switches and Group Switches.
- Lighting Control Setting : The specific control program setting for each device that created from device setting.
- Data transmission & Schedule Control.
- Data Inquiry : LOG & Run Time

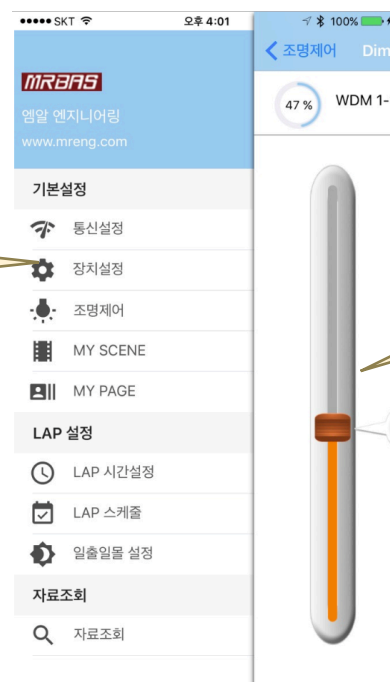


## Application

The user who wants to install the mrapp, search the "m.r. Lighting Control" app from the App Store to download it. Install this App to Smart-Phone and building tenant is able to establish the communication setting for SCU and ELC System. Then register the location setting of the corresponding project. Also, register the Device Setting for each lighting control device & switches. Able to set up the Schedule Control Program for their area and select the data transmission to download the Programmed APP Contents to each of Lighting Control Device. The residents can set up and operate the MY PAGE & MY SCENE functions for their own area.

## Smart-Phone Screen Configuration

Select the each menu on Smartrol's Main Menu to configure the program.  
Communication Setting.  
Device Setting.  
Lighting Control.  
MY SCENE.  
MY PAGE.  
Schedule Setting.  
Data Management.  
LAP Setting.  
Group Management.  
Relay Test.  
Data Inquiry.  
Location Setting.



Execute the actual ACTION such as Program Setting, Configure, On/OFF, Dimming Control.



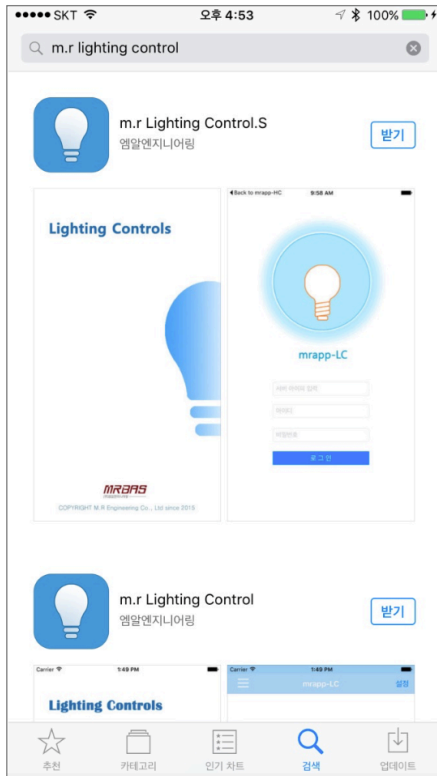


# LIGHTING CONTROLS

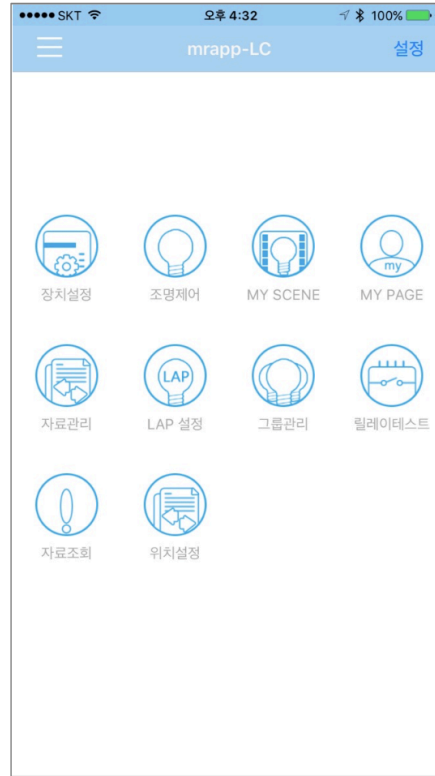
m.r.Lighting Control.S  
m.r.Lighting Control

App. for Building Lighting Control

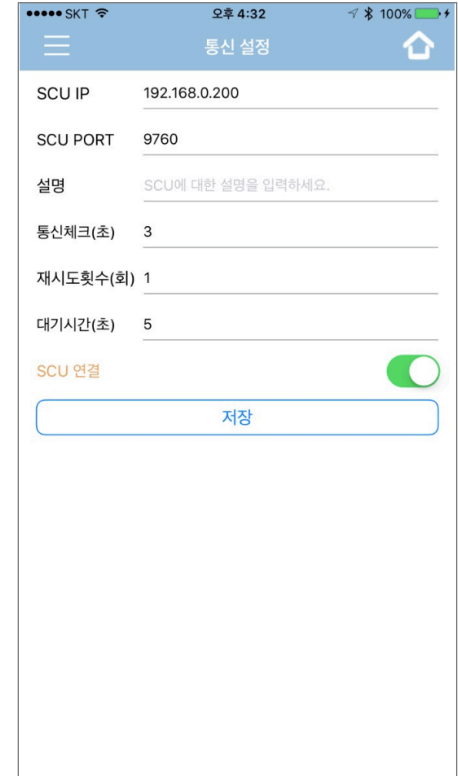
MOBILE APP



Can be downloaded it from APP STORE or Android Store.



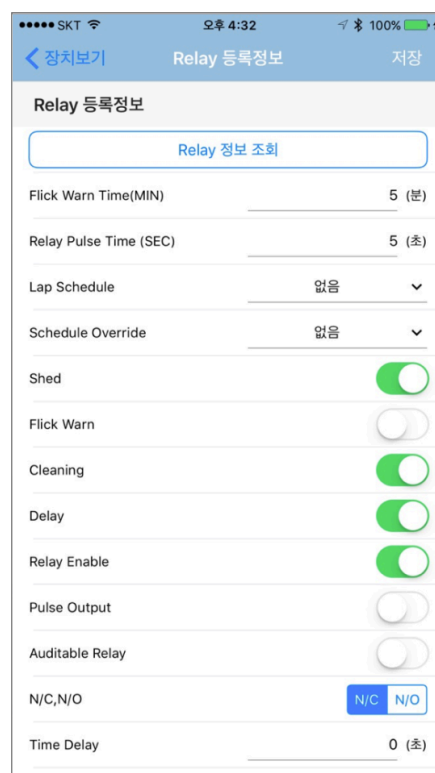
Communication Setting, Device Setting, Program Setting and Menu for each Lighting Control.



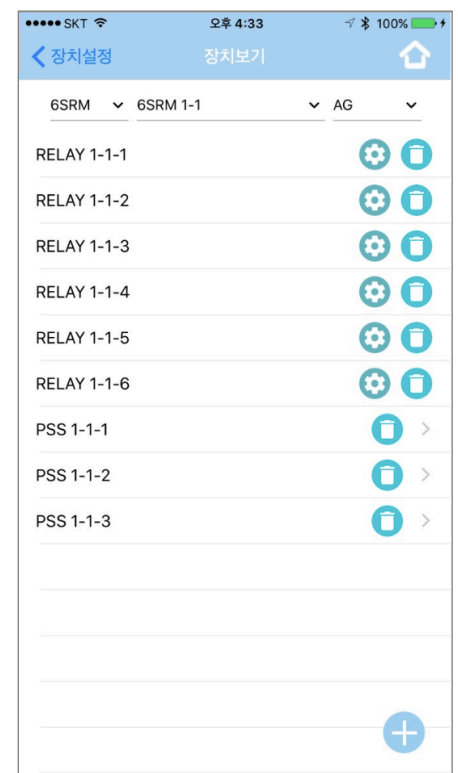
After setting the communication for SCU, execute the APP Program to control the Program & Setting.



From Device Setting, select each of Lighting Control Device (6sRM) and save it. The setting for additional control device is set.



From Device Setting, set the detailed information of each relay.



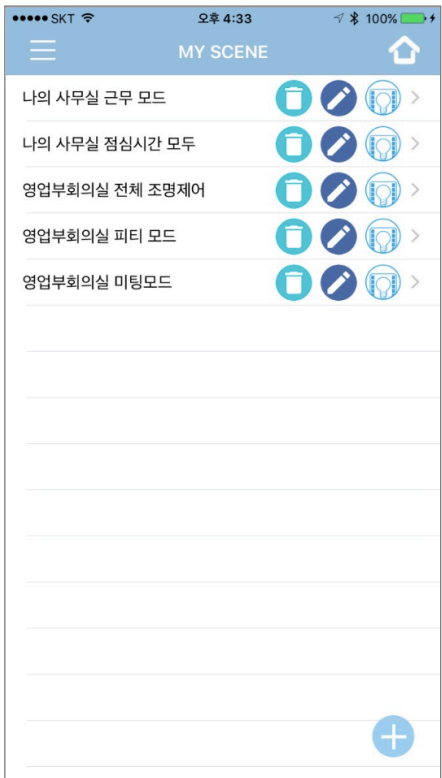
This is the screen after setting the 6sRM from Device Setting. In this screen, control the each relay directly.



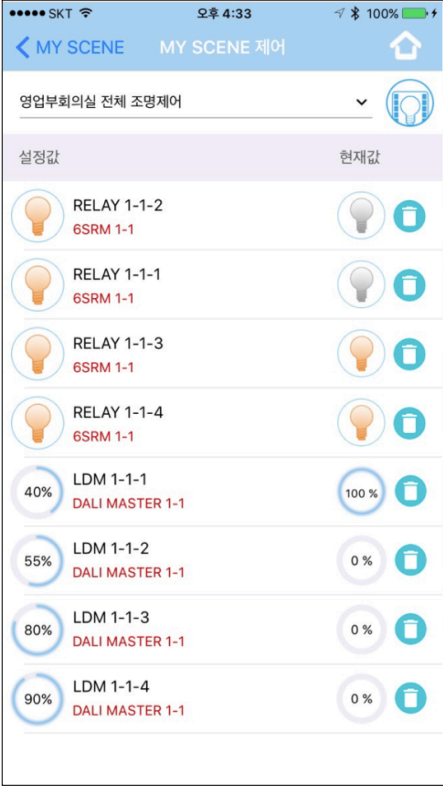
MOBILE APP

m.r.Lighting Control.S  
m.r.Lighting Control

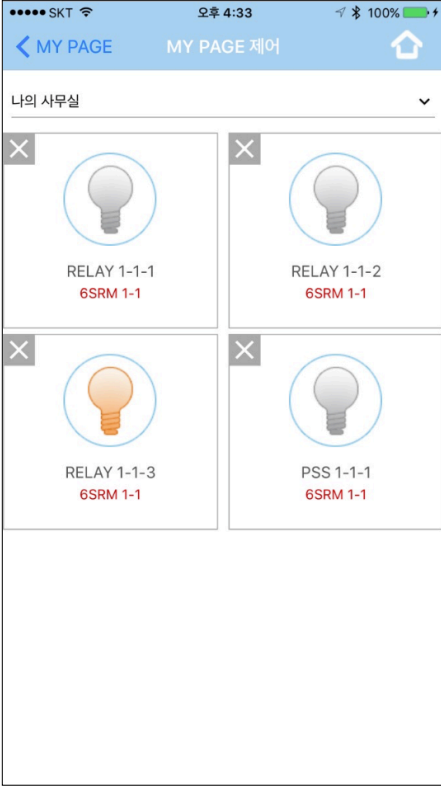
App. for Building Lighting Control



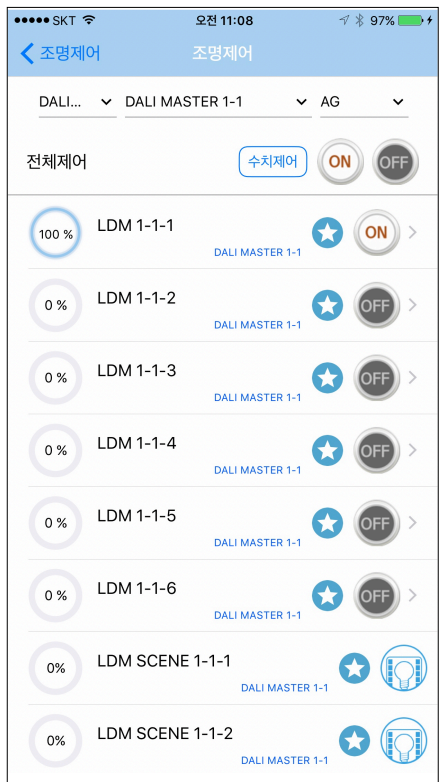
MY SCENE is able to operate the SCENE Mode by setting the contents that occupant wants.



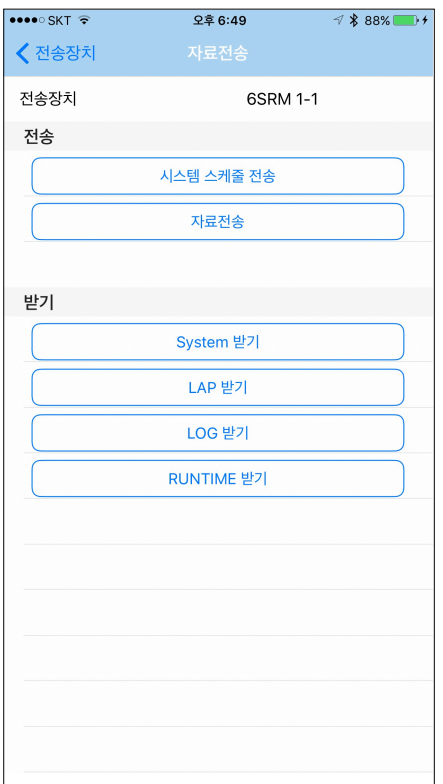
Able to see the setting value of each Lighting object at MY SCENE mode.



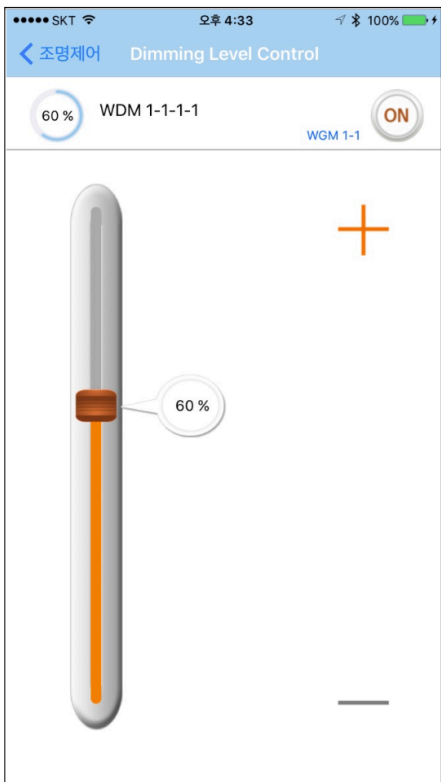
The control status of each lighting circuit for set group at MY PAGE.



It indicates the status of each LED DALI Module that connected to the DALI MASTER.



This is the Menu to create the Program and transfer the data to Lighting Control Device.



Select the Wireless Dimming Module to operate the Dimming Control in manually.



# LIGHTING CONTROLS

DSW-4 1 - 4 ON/OFF Data Line Switch

SWITCHES

## Overview

DSW switch is able to control the group and individual lighting control of Relay and it can check the ON/OFF status of Relay by the LED of switch. Also, the displaying the name at each switch button is shown with NAME TAG with invisible plastic cover that can be attached neatly. The unplugged button will be BLANK button.

## Main Feature

- 4 button switch structure
- Name Tag that is able to locate the place
- Circuit-specific, individual, group and total ON/OFF can be set randomly.
- Indicates the status of LED LAMP
- Signal transmission Distance : 4,000ft
- Address Setting Method adopted (000~999)

## Application

DSW-4 switch is connected at ETLC communication line and it has the function to control the each Relay by individual and group from each Relay Module.

This DSW-4 switch is installed at 1Gang Box and basically it is connected with 4wire cable. Also, it is configured with 4 or 8 buttons and when using 3 buttons only the left one is finessed as BLANK Button.

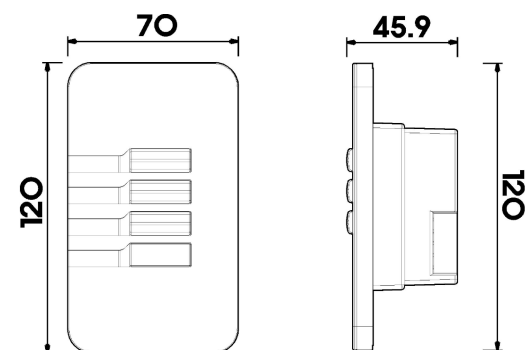
It is configured with switch button, LED for status display and Name Tag. It will enhance the value of this switch by simple and clean design.



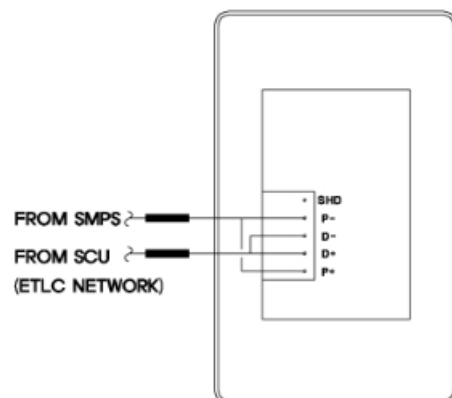
## Specification

- Operating Power : AC/DC24V(Supplied from LCP)
- Operation Environment : -10~60 °C, 0~95%
- Consumed Current :15mA
- Cable : : 4-Wire (Power 2Core, Data 2Core)
- Installation Size : Standard 1GANG SWITCH BOX
- 1,2,3,4 circuit type - 1GANG(100x50mm)
- 5,6,7,8 circuit type - 2GANG(100x100mm)
- Color : Black and White

## Dimension of Layout



## Connection Diagram





#### Overview

DSW switch is able to control the group and individual lighting control of Relay and it can check the ON/OFF status of Relay by the LED of switch. Also, the displaying the name at each switch button is shown with NAME TAG with invisible plastic cover that can be attached neatly The unplugged button will be BLANK button.

#### Main Feature

- 5 button & 8 button switch structure
- Name Tag that is able to locate the place
- Circuit-specific, individual, group and total ON/OFF can be set randomly.
- Indicates the status of LED LAMP
- Signal transmission Distance : 4,000ft
- Address Setting Method adopted (000~999)



#### Application

DSW-8 switch is connected at ETLC communication line and it has the function to control the each Relay by individual and group from each Relay Module.

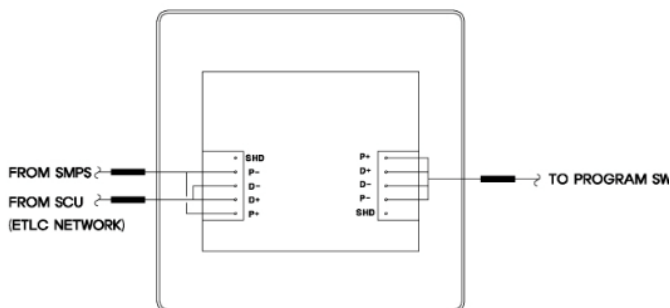
This DSW-8 switch is installed at 2Gang Box and basically it is connected with 4wire cable. Also, it is configured with 8 buttons and when using 7 buttons only the left one is finessed as BLANK Button.

It is configured with switch button, LED for status display and Name Tag. It will enhance the value of this switch by simple and clean design.

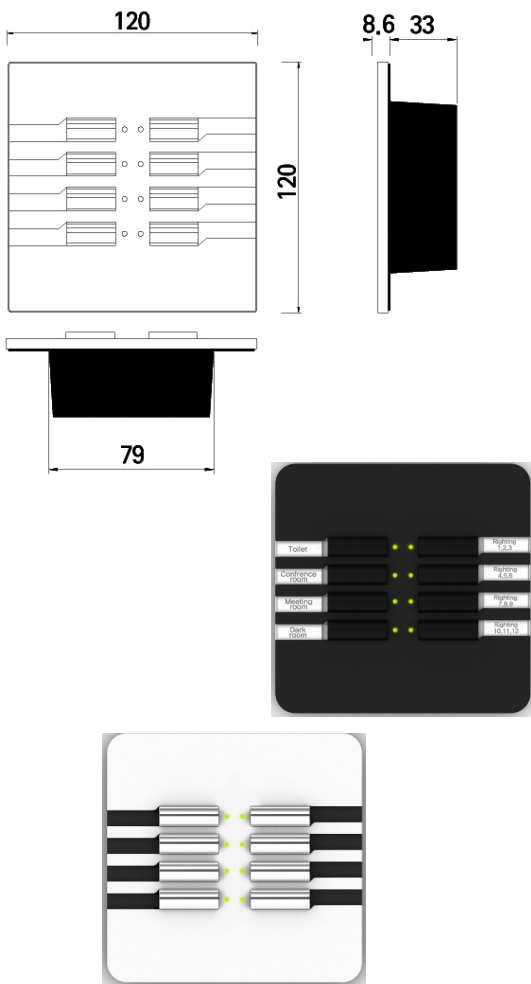
#### Specification

- Operating Power : AC/DC24V(Supplied from LCP)
- Operation Environment : -10~60 °C, 0~95%
- Consumed Current :15mA
- Cable : : 4-Wire (Power 2Core, Data 2Core)
- Installation Size : Standard 1GANG SWITCH BOX
- 1,2,3,4 circuit type - 1GANG(100x50mm)
- 5,6,7,8 circuit type - 2GANG(100x100mm)
- Color : Black and White

#### Connection Diagram



#### Dimension of Layout







# LIGHTING CONTROLS

## TS-4 1 - 4 ON/OFF Data Line Touch Switch

SWITCHES

### Overview

TS-4 switch is able to check the ON/OFF status by the LED display that is located on the switch and it is possible to control the individual and group for lighting control. This switch is the touch type switch to operate the ON/OFF control by touching the buttons of the switch.

TS switch is able to change its shape by the laser processing however the rise of price is inevitable.



### Main Feature

- 1 - 4 buttons standard shape
- The rise of price when changing the shape of Switch
- Circuit-specific, individual, group and total ON/OFF can be set selectable.
- Indicates the status of LED LAMP
- Signal Transmission Distance : 4,000ft
- Address Setting Method Adopted (000~999)

### Application

TS-4 switch is connected at ETLC communication line and it has the function to control the each Relay by individual and group from each Relay Module.

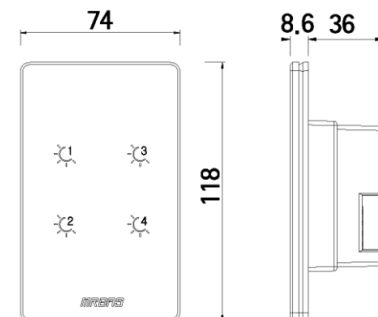
This TS-4 switch is installed at 1 Gang Box and basically, it is connected with 4wire cable. Also, it is configured with 4 buttons and when using 3 buttons only the left one is finessed as BLANK Button.

The LED is configured at switch button to display the status with LED. It will enhance the value of this switch by simple and clean design.

### Specification

- Operating Power : AC/DC24V (Supplied from LCP)
- Operation Environment : -10~60 °C, 0~95%
- Consumed Current :15mA
- Cable : : 4-Wire (Power 2Core, Data 2Core)
- Installation Size : Standard 1GANG SWITCH BOX
- 1,2,3,4 Circuit - 1GANG(100x50mm)
- 5,6,7,8 Circuit - 2GANG(100×100mm)
- Color : White

### Dimension



### Connection Diagram





## SWITCHES

### TS-8 5 - 8 ON/OFF Data Line Touch Switch

#### Overview

TS-8 switch is able to check the ON/OFF status by the LED display that is located on the switch and it is possible to control the individual and group for lighting control. This switch is the touch type switch to operate the ON/OFF control by touching the buttons of the switch.

TS switch is able to change its shape by the laser processing however the rise of price is inevitable.

#### Main Feature

- 5 - 8 buttons standard shape
- The rise of price when changing the shape of Switch
- Circuit-specific, individual, group and total ON/OFF can be set selectable.
- Indicates the status of LED LAMP
- Signal Transmission Distance : 4,000ft
- Address Setting Method Adopted (000~999)



#### Application

TS-8 switch is connected at ETLC communication line and it has the function to control the each Relay by individual and group from each Relay Module.

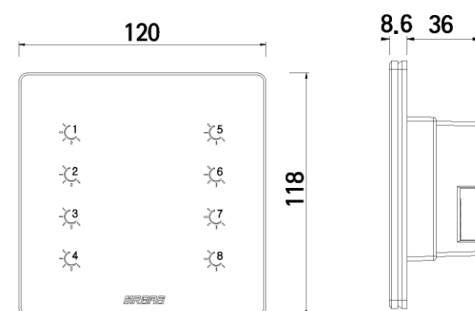
This TS-8 switch is installed at 2 Gang Box and basically, it is connected with 4wire cable. Also, it is configured with 8 buttons and when using 7 buttons only the left one is finessed as BLANK Button.

The LED is configured at switch button to display the status with LED. It will enhance the value of this switch by simple and clean design.

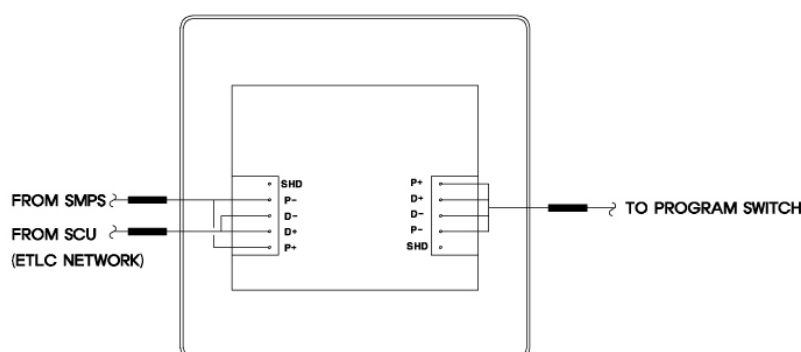
#### Specification

- Operating Power : AC/DC24V (Supplied from LCP)
- Operation Environment : -10~60 °C, 0~95%
- Consumed Current :15mA
- Cable : : 4-Wire (Power 2Core, Data 2Core)
- Installation Size : Standard 1GANG SWITCH BOX
- 1,2,3,4 Circuit - 1GANG(100x50mm)
- 5,6,7,8 Circuit - 2GANG(100x100mm)
- Color : White

#### Dimension of Layout



#### Connection Diagram





# LIGHTING CONTROLS

nTS-4-Scene 1- 4 new Touch Switch with Scene & Led.

SWITCHES

## Overview

The nTS-4-Scene switch is a switch set to enable pre-directed scene control for the lighting control relay and each dimming module. When the corresponding scene button is selected, the dimming status display of the scene is indicated by the middle LED. For example, when the button for the Presentation Mode is selected, each of the corresponding dimming modules performs dimming control so that a scene suitable for the presentation mode can be produced. This nTS-4-Scene switch is for 1Gang Box, with 4 buttons and the middle LED lamp is provided to indicate the status of the scene.

## Main Feature

- Four buttons and LED lamp to indicate dimming status.
- The rise of price when changing the shape of Switch
- Each button can be set by Scene Mode in advance by program
- Dimming status is divided into 5 steps and displayed by LED.
- Signal Transmission Distance : 4,000ft
- Address Setting Method Adopted (000~999
- )Unlock function: If you want to control by group or time schedule from central to central, you can lock function to prevent manual operation from this switch itself. In such a situation, the facility manager switches to the lock release mode by selecting several pre-registered numbers as the lock release button, such as pressing a password code, using a plurality of switch buttons to release the lock from the field switch.

## Specification

- Operating Power : AC/DC24V (Supplied from LCP)
- Operation Environment : -10~60 °C, 0~95%
- Consumed Current :15mA
- Unlock function: Select multiple buttons as if you had selected a password
- Cable : : 4-Wire (Power 2Core, Data 2Core)
- Installation Size : Standard 1GANG SWITCH BOX
- 4 Circuit - 1GANG(100x50mm)
- Color : Black & White

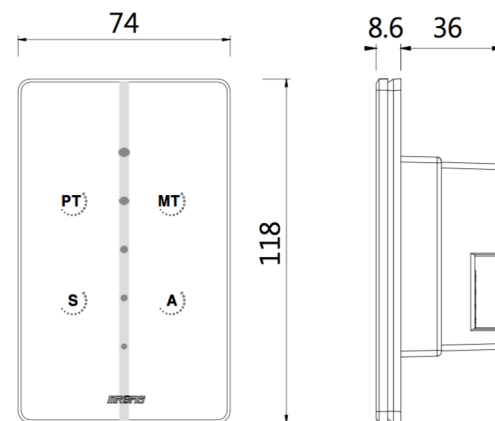


## Application

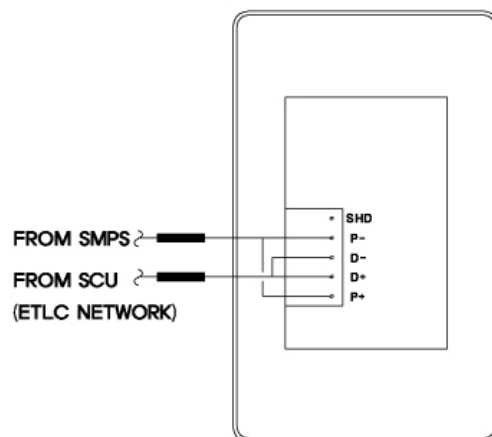
The nTS-4-scene switch is connected to the ETLC communication line. For each relay module or each dimming module, set the preset dimming value and output value, set each scene, download the set program to this switch, and use it as scene switch.

This nTS-4-Scene switch is installed in 1 Gang Box, and it is connected by 4wire cable basically. It is composed of static touch type buttons. It consists of status monitor LED on switch button and button part, and LED that shows dimming status in 5 steps in the middle part.

## Dimension of Layout



## Connection Diagram





## SWITCHES

### nTS-8-Scene 5 - 8 new Touch Switch with Scene & Led.

#### Overview

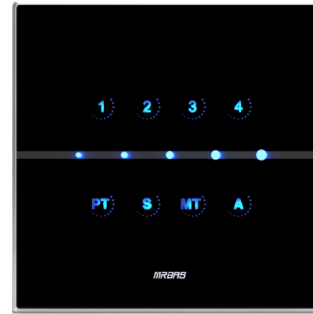
The nTS-8-Scene switch is a switch set to enable pre-directed scene control for the lighting control relay and each dimming module. When the corresponding scene button is selected, the dimming status display of the scene is indicated by the middle LED. For example, when the button for the Presentation Mode is selected, each of the corresponding dimming modules performs dimming control so that a scene suitable for the presentation mode can be produced. This nTS-8-Scene switch is for 2Gang Box, with 8 buttons and the middle LED lamp is provided to indicate the status of the scene.

#### Main Feature

- 8 buttons and LED lamp to indicate dimming status.
- The rise of price when changing the shape of Switch
- Each button can be set by Scene Mode in advance by program
- Dimming status is divided into 5 steps and displayed by LED.
- Signal Transmission Distance : 4,000ft
- Address Setting Method Adopted (000~999
- )Unlock function: If you want to control by group or time schedule from central to central, you can lock function to prevent manual operation from this switch itself. In such a situation, the facility manager switches to the lock release mode by selecting several pre-registered numbers as the lock release button, such as pressing a password code, using a plurality of switch buttons to release the lock from the field switch.

#### Specification

- Operating Power : AC/DC24V (Supplied from LCP)
- Operation Environment : -10~60 °C, 0~95%
- Consumed Current :15mA
- Unlock function: Select multiple buttons as if you had selected a password
- Cable : : 4-Wire (Power 2Core, Data 2Core)
- Installation Size : Standard 2GANG SWITCH BOX
- 8 Circuit - 2GANG(100x100mm)
- Color : Black & White

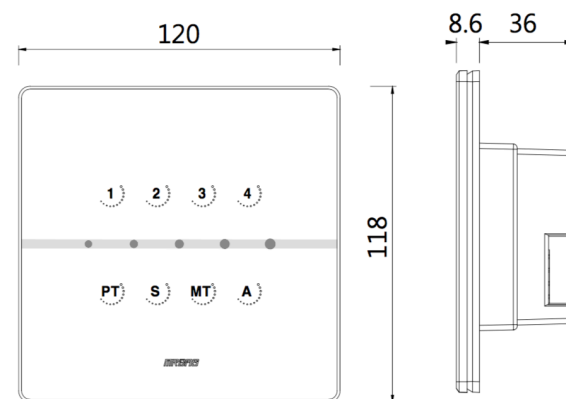


#### Application

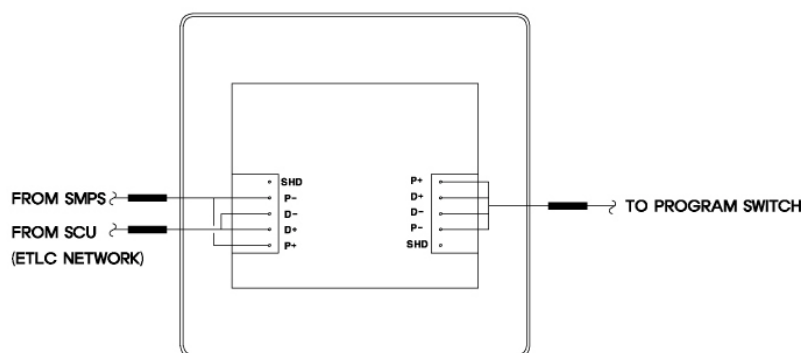
The nTS-8-scene switch is connected to the ETLC communication line. For each relay module or each dimming module, set the preset dimming value and output value, set each scene, download the set program to this switch, and use it as scene switch.

This nTS-8-Scene switch is installed in 2 Gang Box, and it is connected by 4wire cable basically. It is composed of static touch type buttons. It consists of status monitor LED on switch button and button part, and LED that shows dimming status in 5 steps in the middle part.

#### Dimension of Layout



#### Connection Diagram







# LIGHTING CONTROLS

nTS-4-Dim 1- 4 new Touch Switch with Dimming Slide & Led.

SWITCHES

## Overview

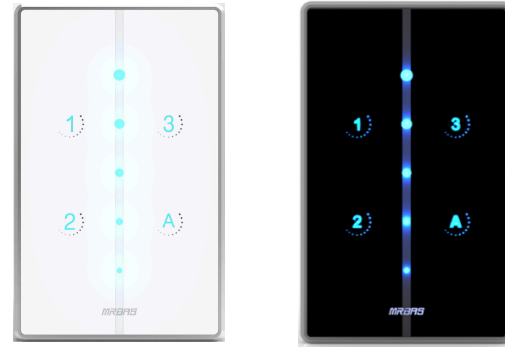
The nTS-4-Dim switch is a direct dimming switch for each dimming module. When the corresponding button is selected, the dimming module linked to the switch button is turned on. And, when the switch button is turned on and the middle LED part is swept up from bottom to top, the dimming becomes bright from 0 to 100%. To turn off the dimming module connected to that button, swipe the Dimming Slide switch down and turn it off to 0%. The LED indicating the middle dimming status is displayed in five steps.

## Main Feature

- Four buttons and middle Dimming Slide switch with LED.
- The rise of price when changing the shape of Switch
- Manually dimming operation for individual and group.
- Dimming status is divided into 5 steps and displayed by LED.
- Signal Transmission Distance : 4,000ft
- Address Setting Method Adopted (000~999)
- Unlock function: If you want to control by group or time schedule from central to central, you can lock function to prevent manual operation from this switch itself. In such a situation, the facility manager switches to the lock release mode by selecting several pre-registered numbers as the lock release button, such as pressing a password code, using a plurality of switch buttons to release the lock from the field switch.

## Specification

- Operating Power : AC/DC24V (Supplied from LCP)
- Operation Environment : -10~60 °C, 0~95%
- Consumed Current :15mA
- Unlock function: Select multiple buttons as if you had selected a password
- Cable : : 4-Wire (Power 2Core, Data 2Core)
- Installation Size : Standard 1GANG SWITCH BOX
- 4 Circuit - 1GANG(100x50mm)
- Color : Black & White

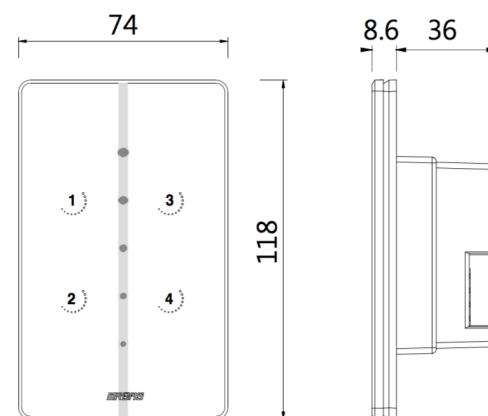


## Application

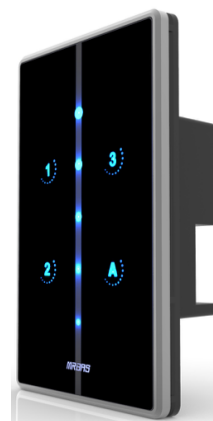
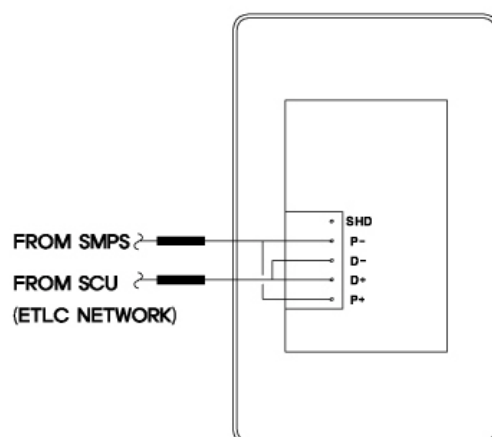
The nTS-4-Dim switch is connected to the ETLC communication line. For each dimming module, it is applied as a switch capable of manual dimming operation directly. For example, if you have programmed several dimming modules in the switch button 1, you can turn on the switch 1 and raise the middle slide switch to the bottom.

This nTS-4-Dim switch is installed in 1 Gang Box, and it is connected by 4wire cable basically. It is composed of static touch type buttons. It consists of status monitor LED on switch button and button part, and LED that shows dimming status in 5 steps in the middle part.

## Dimension of Layout



## Connection Diagram



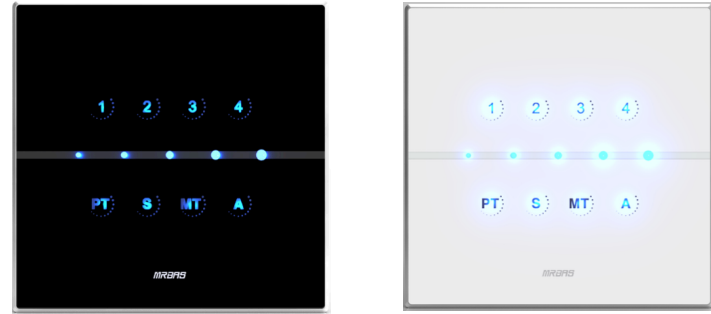


## SWITCHES

### nTS-8-Dim 5 - 8 new Touch Switch with Dimming Slide Switch & Led.

#### Overview

The nTS-8-Dim switch is a direct dimming switch for each dimming module. When the corresponding button is selected, the dimming module linked to the switch button is turned on. And, when the switch button is turned on and the middle LED part is swept up from bottom to top, the dimming becomes bright from 0 to 100%. To turn off the dimming module connected to that button, swipe the Dimming Slide switch down and turn it off to 0%. The LED indicating the middle dimming status is displayed in five steps.



#### Main Feature

- 8 buttons and middle Dimming Slide switch with LED.
- The rise of price when changing the shape of Switch
- Manually dimming operation for individual and group.
- Dimming status is divided into 5 steps and displayed by LED.
- Signal Transmission Distance : 4,000ft
- Address Setting Method Adopted (000~999)
- Unlock function: If you want to control by group or time schedule from central to central, you can lock function to prevent manual operation from this switch itself. In such a situation, the facility manager switches to the lock release mode by selecting several pre-registered numbers as the lock release button, such as pressing a password code, using a plurality of switch buttons to release the lock from the field switch.

#### Specification

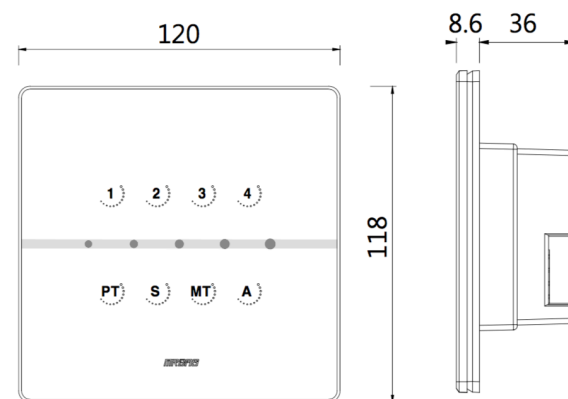
- Operating Power : AC/DC24V (Supplied from LCP)
- Operation Environment : -10~60 °C, 0~95%
- Consumed Current :15mA
- Unlock function: Select multiple buttons as if you had selected a password
- Cable : : 4-Wire (Power 2Core, Data 2Core)
- Installation Size : Standard 2GANG SWITCH BOX
- 8 Circuit - 2GANG(100x100mm)
- Color : Black & White

#### Application

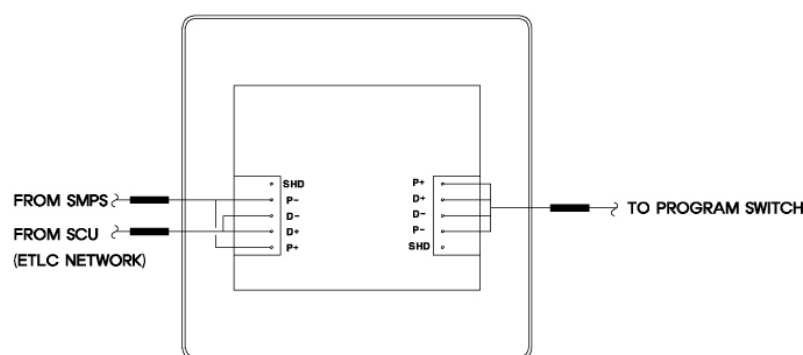
The nTS-8-Dim switch is connected to the ETLC communication line. For each dimming module, it is applied as a switch capable of manual dimming operation directly. For example, if you have programmed several dimming modules in the switch button 1, you can turn on the switch 1 and raise the middle slide switch to the bottom.

This nTS-8-Dim switch is installed in 2 Gang Box, and it is connected by 4wire cable basically. It is composed of static touch type buttons. It consists of status monitor LED on switch button and button part, and LED that shows dimming status in 5 steps in the middle part.

#### Dimension of Layout



#### Connection Diagram





# LIGHTING CONTROLS

## TS-12 9 - 12 ON/OFF Data Line Touch Switch

SWITCHES

### Overview

TS-12 switch is able to check the ON/OFF status by the LED display that is located on the switch and it is possible to control the individual and group for lighting control. This switch is the touch type switch to operate the ON/OFF control by touching the buttons of the switch.

TS switch is able to change its shape by the laser processing however the rise of price is inevitable.



### Main Feature

- 9 - 12 buttons standard shape
- The rise of price when changing the shape of Switch
- Circuit-specific, individual, group and total ON/OFF can be set selectable.
- Indicates the status of LED LAMP
- Signal Transmission Distance : 4,000ft
- Address Setting Method Adopted (000~999) Unlock function: If you want to control by group or time schedule from central to central, you can lock function to prevent manual operation from this switch itself. In such a situation, the facility manager switches to the lock release mode by selecting several pre-registered numbers as the lock release button, such as pressing a password code, using a plurality of switch buttons to release the lock from the field switch.

### Application

TS-12 switch is connected at ETLC communication line and it has the function to control the each Relay by individual and group from each Relay Module.

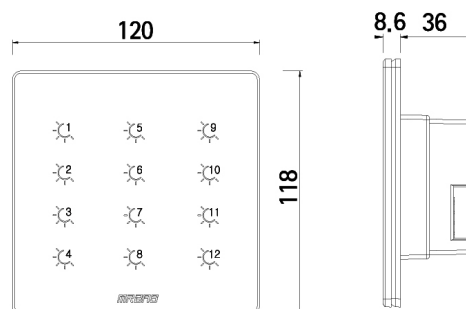
This TS-8 switch is installed at 2 Gang Box and basically, it is connected with 4wire cable. Also, it is configured with 10 buttons and when using 2 buttons only the left one is finessed as BLANK Button.

The LED is configured at switch button to display the status with LED. It will enhance the value of this switch by simple and clean design.

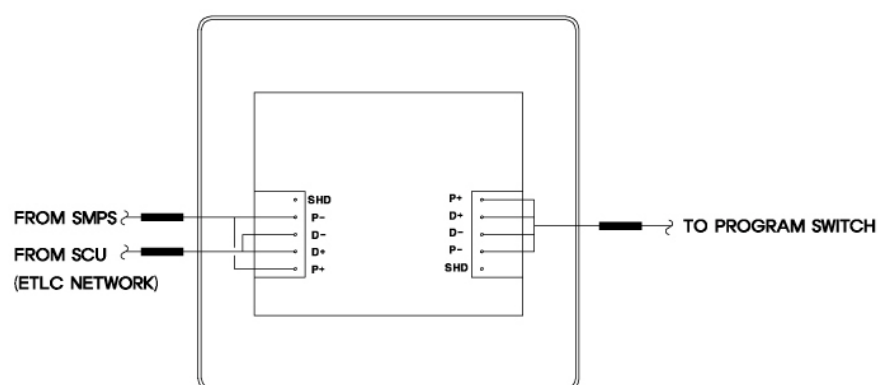
### Specification

- Operating Power : AC/DC24V (Supplied from LCP)
- Operation Environment : -10~60 °C, 0~95%
- Consumed Current :15mA
- Unlock function: Select multiple buttons as if you had selected a password
- Cable : : 4-Wire (Power 2Core, Data 2Core)
- Installation Size : Standard 2GANG SWITCH BOX
- 8 Circuit - 2GANG(100x100mm)
- Color : Black & White

### Dimension



### Connection Diagram





## Overview

The NDFS switch is able to check the ON/OFF status by the LED display that is located on the switch and it is possible to control the individual and group for lighting control. This NDFS switch can be configured for needed button types. It means 1 button to 8 buttons are possible to configure the switch.

## Main Feature

- One touch means ON and Another Touch means OFF.
- Circuit-specific, Individual, Group and Total ON/OFF can be selectable.
- The each of individual & group of switch button can be monitored the status by LED.



## Application

The NDFS switch is connected at TLC communication line and it has the function to control the each Relay by individual and group from each Relay Module.

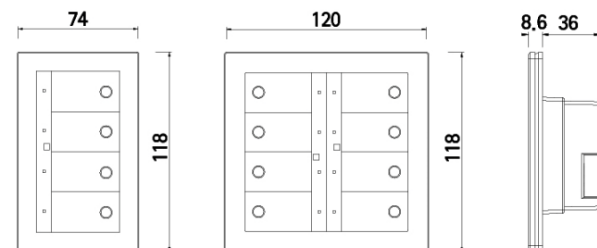
This NDFS switch is installed at 1 or 2 Gang Box and basically, it is connected with 4wire cable.

The LED is configured at switch button to display the status with LED. It will enhance the value of this switch by simple and clean design.

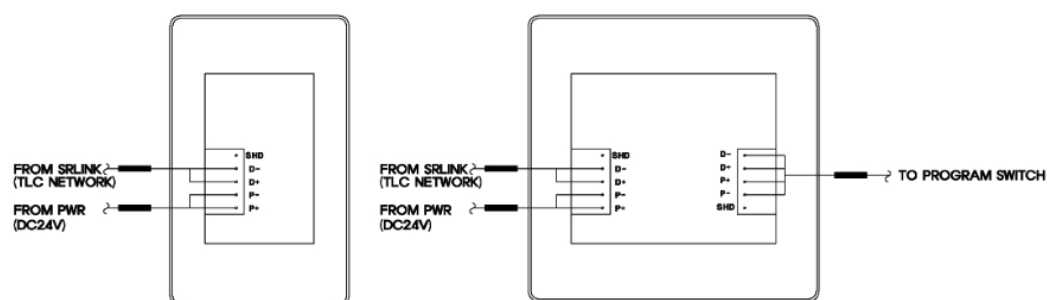
## Specification

- One-Button Switch Structure
- Circuit-Specific, Individual, Group and Total On/Off can be set selectable.
- Indicates the Status of LED Lamp
- Red LED ON - Relay ON
- Green LED ON - Relay OFF
- Signal Transmission Distance : 4,000FT(1,200M)
- Address Setting Method (001~999)
- Installation Size : Standard 1GANG SWITCH BOX
- 1,2,3,4 Circuit - 1GANG(100x50mm)
- 5,6,7,8 Circuit - 2GANG(100x100mm)

## Dimension of Layout



## Connection Diagram







# LIGHTING CONTROLS

## STS Smart Touch Switch

### SWITCHES

### Overview

STS : The Smart Touch Switch is the product that is able to install at existing switch box and it is the multi-function switch ever made in country. The screen is configured for TFT LCD display screen that is similar as Smart-Phone. Also it is able for pressure sensitive touch and even the ON/OFF lighting can be worked by gloved hands.

Also, at existing switch, the customer can set the wanted shape & Name Plate at the name of corresponding area. By creating and using the wanted shape of Icon and back screen, it can easily ON/OFF the corresponding area.

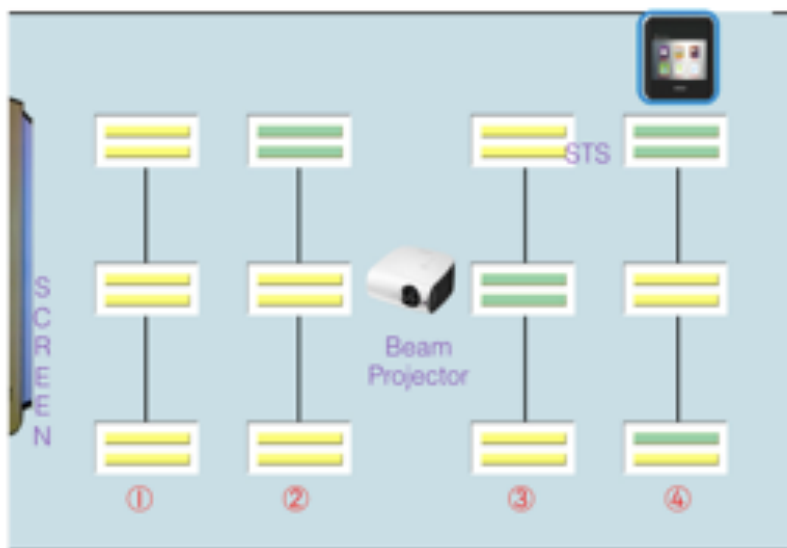
Also, The screen of switch is normally used for screen-saver and it is used for building guidance system by displaying the various contents at screen. It can display the company name, department name and announcement. Resident can used this switch for work and understand the information through the screen of switch

### Main Feature

- . Pressure sensitive Soft-Touch Type.
- . No need to order separate BACK BOX because of the installation at existing international standard BOX.
- . Use the program to draw the back-screen of touch switch, switch button, NAME PLATE and Etc. that desired by the users and download it to STS.
- . The easy & simple monitoring is possible from the high-definition of TFT LCD TYPE compared to existing LCD TYPE.
- . The five function can be implemented from one single touch switch : Global Data Line ON/OFF, Preset Switch, Dimming Slide Switch, interlocking control with other system and display the building information.
- . By the 3 page screen configuration, the various switch icons can be configured per page.



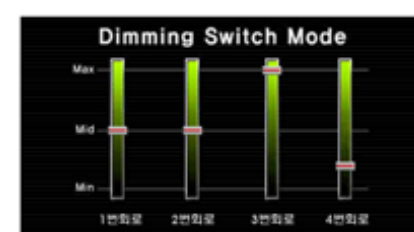
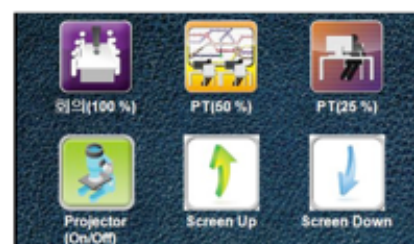
### Application



Content for STS Switch Icon

1. Meeting Mode 100%
2. P/T ( Presentation Mode) 25%
3. Screen Up/Down Mode
4. Beam Projector On/Off Mode

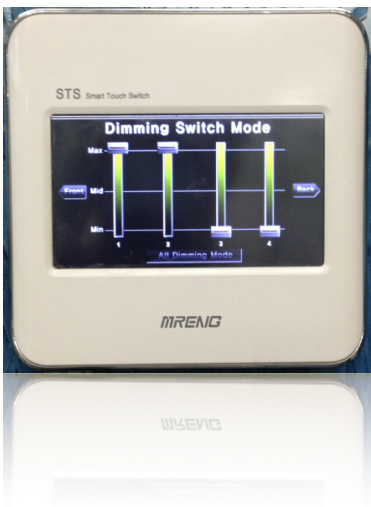
Projector control and lighting control at conference room by STS



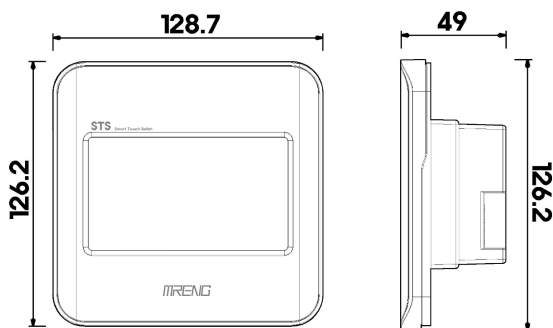


## Specification

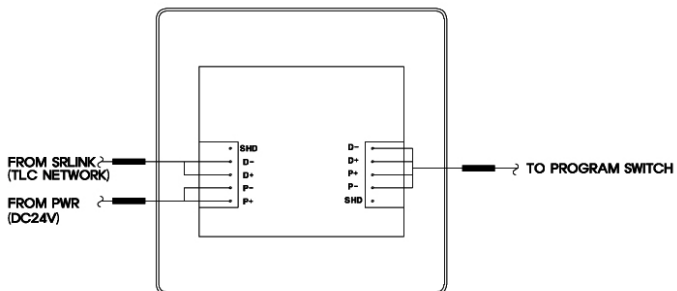
- Multi Switch Function :
  - .. Group control
  - .. Pattern control
  - .. Preset switch
  - .. Dimming slide switch
  - .. PSS switch
- Data Line Switch Address : 001- 999
- Max 16 Icon buttons
- Change of Icon by the Feedback of ON/OFF status display
- Location Name Tag is shown at top, bottom and inside of Icon by program
- Screen Saving Function : Display the Info. & Guide for Building
- 2 Gang Box size, Color : Black and White
- AC/DC24V, 50/60Hz, 12VA
- Display : 3.2 inch Wide(320\*240)
- Color : 65,000 Color available



## Dimension



## Connection Diagram



## Actual applied Pictures





# LIGHTING CONTROLS

RSENSOR-1 Single Direction Ultrasonic Sensor

SENSORS

## Overview

Rsensor-1 occupancy sensor is the Single Direction Ultrasonic Type Sensor. The maximum detecting distance is 45m2. It has the control switch that delays the operation of sensor and switch that can adjust the sensing distance is installed at next to sensor.



## Main Feature

- Single Direction Ultra Sonic Detecting Type
- The Max. detecting distance is 45m2
- Able to select the operation of detecting sensor by adjust switch for operation delay time switched sensing distance switch.
- It is ceiling mountable type to operate the LED in the center when the movement is detected.

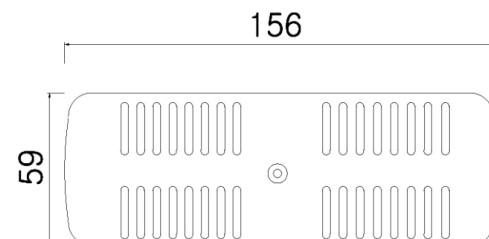
## Application

This sensor is connected at DI input terminal of LCP or Relay Module to operate the corresponding Relay. Also to prevent the frequent operation of sensor, the sensor itself has the adjust switch to set the delay time. For maximum of 30 mins, it can delay the movement. This means, it will catch the movement when person is moving and when the person is out of range it will not turn OFF the Relay. It will wait for certain time that has been set for delay time to Turn OFF the Relay.

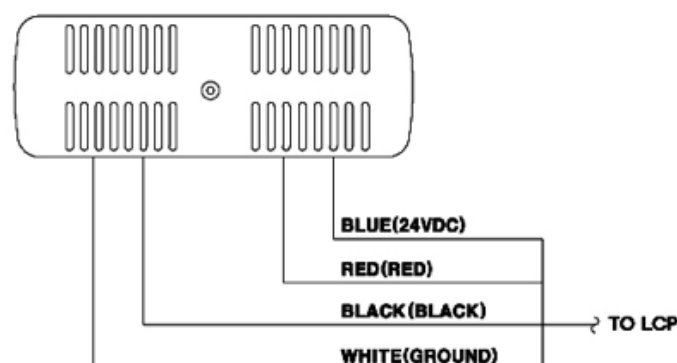
## Specification

- Technology : Ultrasonic
- Power : DC24V
- Wiring : RED: +24VDC, BLUE: ON, BLACK: Ground
- Time Delay : 15 sec - 30 min
- Operation Environment : 15°C - 26°C
- Certification : UL Listed

## Dimension of Layout



## Connection Diagram





## Overview

Rsensor-2 occupancy sensor is the Dual Direction Ultrasonic Type Sensor. The maximum detecting distance is 90m2. It has the control switch that delays the operation of sensor and switch that can adjust the sensing distance is installed at next to sensor.



## Main Feature

- Dual Direction Ultra Sonic Detecting Type
- The Max. detecting distance is 90m2
- Able to select the operation of detecting sensor by adjust switch for operation delay time switched sensing distance switch.
- It is ceiling mountable type to operate the LED in the center when the movement is detected.

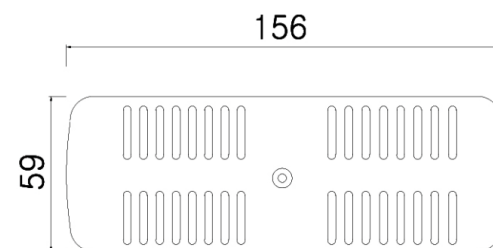
## Application

- Dual Direction Ultra Sonic Detecting Type
- The Max. detecting distance is 90m2
- Able to select the operation of detecting sensor by adjust switch for operation delay time switched sensing distance switch.
- It is ceiling mountable type to operate the LED in the center when the movement is detected.

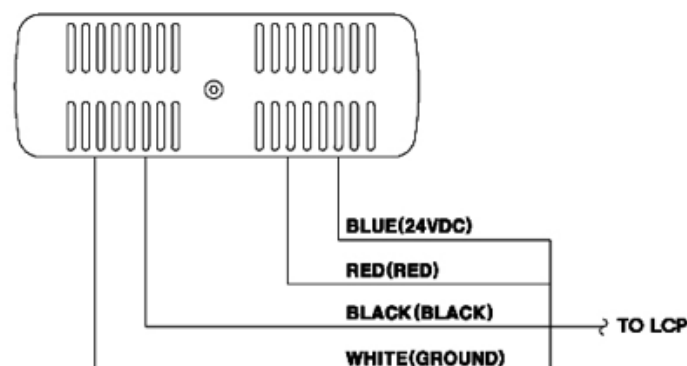
## Specification

- Technology : Ultrasonic
- Power : DC24V
- Wiring : RED: +24VDC, BLUE: ON, BLACK: Ground
- Time Delay : 15 sec - 30 min
- Operation Environment : 15°C - 26°C
- Cetrification : UL Listed

## Dimension of Layout



## Connection Diagram







# LIGHTING CONTROLS

OSC04-RIW

Passive Infrared Sensor

SENSORS

## Overview

The occupancy sensor of OSC04-RIW is the infrared heat sensor. The Max. detection distance is 42m2. The adjustment switch that delays the operation of sensor & the adjustment switch that detects the distance are installed inside of this sensor itself.

## Main Feature

## Application

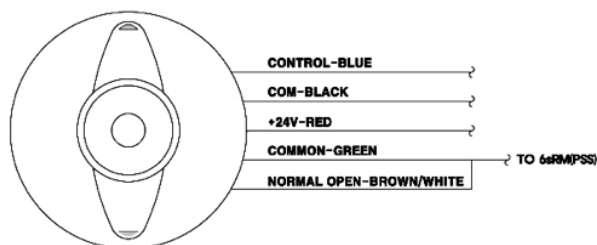
This sensor is operating the corresponding relay by connecting at DI input terminal of Relay Module or Lighting Control Panel.

Also to prevent the frequent operation of sensor, it can delay the operation in Max. 30 min by adjustment switch that delay the time for sensor itself. When people is out of detecting range, it does not turn OFF the relay right away. It waits until the set time and after that time it turns OFF the lights.

## Specification

- Passive Infrared.
- Mount : Ceiling
- Detecting Distance : 42m2
- Pattern Degrees : 360 degree
- Adjustment : Self- Adjustment
- Isolated Relay : Yes
- Manual Time Adjustment : 30 sec - 30 min, Test Mode for 6 seconds
- Input Voltage : 24VDC
- Consumed Current : 15mA
- Operation Environment : 0 - 40°C, 0 - 90%
- Certification : CUL/US(Listed 9034), ANCE, ASHRAE, FCC

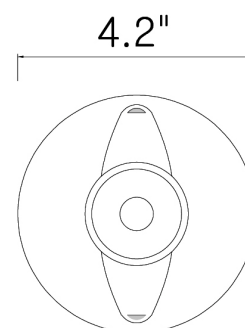
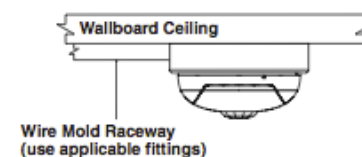
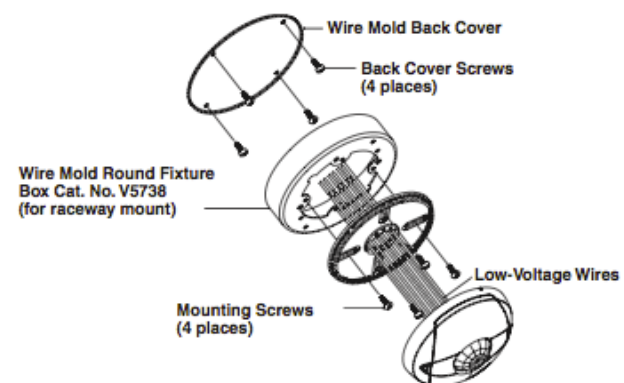
## Connection Diagram



- The infrared heat sensor
- The Max. detecting distance is 42m2
- It has the switch that adjust the distance of detection & the switch that adjust the delay time for movement. Select the suitable operation for the sensor.
- The small size of the sensor can be installed at ceiling by mounting simply.



## Mounting





## Overview

The occupancy sensor of OSC05-RMW is the Multi-Tech sensor that has the Infrared Heat & Ultrasonic Detecting function. The Max. detection distance is 42m2. The adjustment switch that delays the operation of sensor & the adjustment switch that detects the distance are installed inside of this sensor itself.



## Main Feature

- The small sized sensor
- The Max. detecting distance is 42m2
- It has the switch that adjust the distance of detection & the switch that adjust the delay time for movement. Select the suitable operation for the sensor.
- The small size of the sensor can be installed at ceiling by mounting simply.

## Application

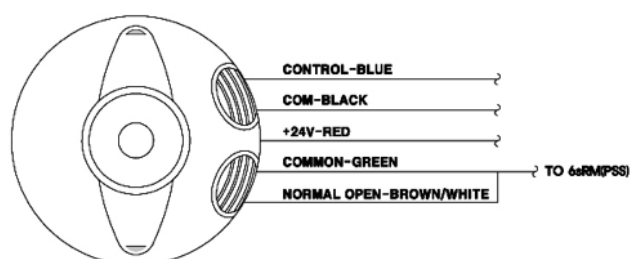
This sensor is operating the corresponding relay by connecting at DI input terminal of Relay Module or Lighting Control Panel.

Also to prevent the frequent operation of sensor, it can delay the operation in Max. 30 min by adjustment switch that delay the time for sensor itself. When people is out of detecting range, it does not turn OFF the relay right away. It waits until the set time and after that time it turns OFF the lights.

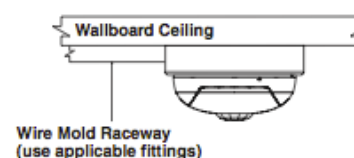
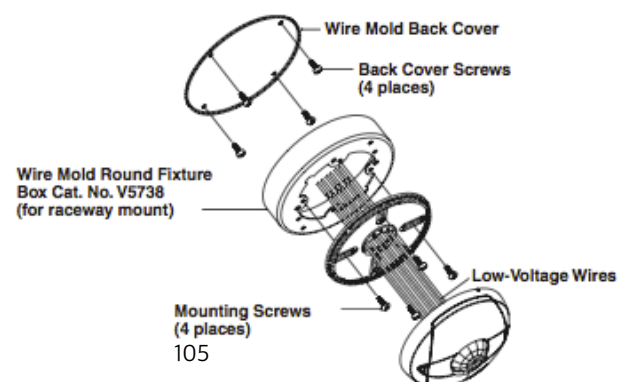
## Specification

- Passive Infrared.
- Mount : Ceiling
- Detecting Distance : 42m2
- Pattern Degrees : 360 degree
- Adjustment : Self- Adjustment
- Isolated Relay : Yes
- Manual Time Adjustment : 30 sec - 30 min, Test Mode for 6 seconds
- Input Voltage : 24VDC
- Consumed Current : 15mA
- Operation Environment : 0 - 40°C, 0 - 90%
- Certification : CUL/US(Listed 9034), ANCE, ASHRAE, FCC

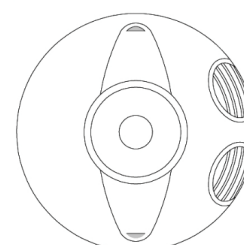
## Connection Diagram



## Mounting



4.2"





# LIGHTING CONTROLS

OSC10-RIW Multi-Tech. PIR/Ultrasonic Sensor

SENSORS

## Overview

The occupancy sensor of OSC10-RMW is the multi-tech sensor that has the Infrared Heat & Ultrasonic Detecting function.

The Max. detecting distance is 92.9m2. The adjustment switch that delays the operation of sensor & the adjustment switch that detects the distance are installed inside of this sensor itself.



## Main Feature

- Small sized Sensor
- The Max. detecting distance is 92.9m2 and it detects around 360 degree.
- It has the switch that adjust the distance of detection & the switch that adjust the delay time for movement. Select the suitable operation for the sensor.
- The small size of the sensor can be installed at ceiling by mounting simply.

## Application

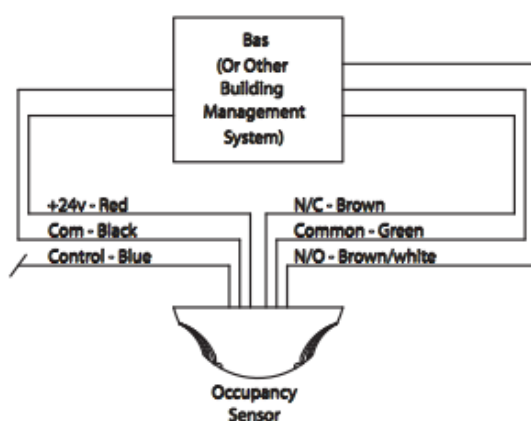
This sensor is operating the corresponding relay by connecting at DI input terminal of Relay Module or Lighting Control Panel.

Also to prevent the frequent operation of sensor, it can delay the operation in Max. 30 min by adjustment switch that delay the time for sensor itself. When people is out of detecting range, it does not turn OFF the relay right away. It waits until the set time and after that time it turns OFF the lights.

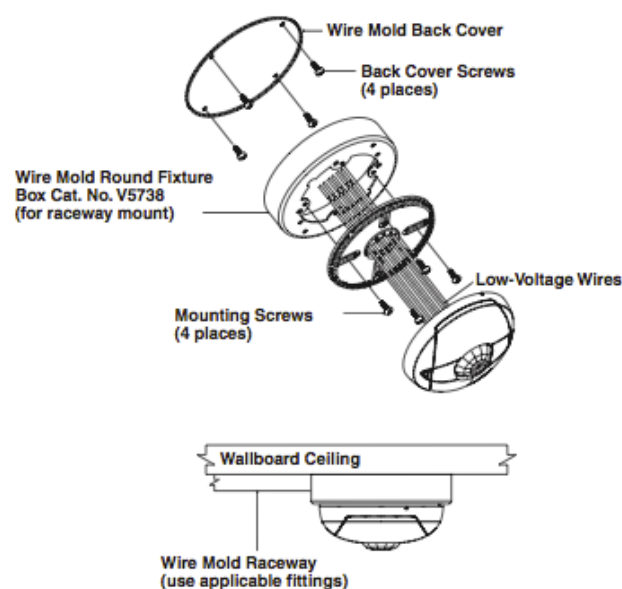
## Specification

- Passive Infrared.
- Mount : Ceiling
- Detecting Distance : 92.9m2
- Pattern Degrees : 360 degree
- Adjustment : Self- Adjustment
- Isolated Relay : Yes
- Manual Time Adjustment : 30 sec - 30 min, Test Mode for 6 seconds
- Input Voltage : 24VDC
- Consumed Current : 15mA
- Operation Environment : 0 - 40°C, 0 - 90%
- Certification : CUL/US(Listed 9034), ANCE, ASHRAE, FCC

## Connection Diagram



## Mounting





## SENSORS

### RPSEN

### Photo Sensor

#### Overview

The PHOTO SENSOR is divided into three major type. It is indoor, outdoor and atrium type. The one that we introduced here is for indoor type. This sensor is setting the photo from program and it measures the photo from lighting control system that is connected at photo sensor controller. It perform the ON/OFF of the relay that is related to lamp by set photo.

#### Main Feature

- Measuring the Photo by receiving the 24VDC power from Lighting Control Panel.
- Detecting the Photo in the range of 0 - 100FC.
- The Photo Sensor Controller and 4 Wire Connection.



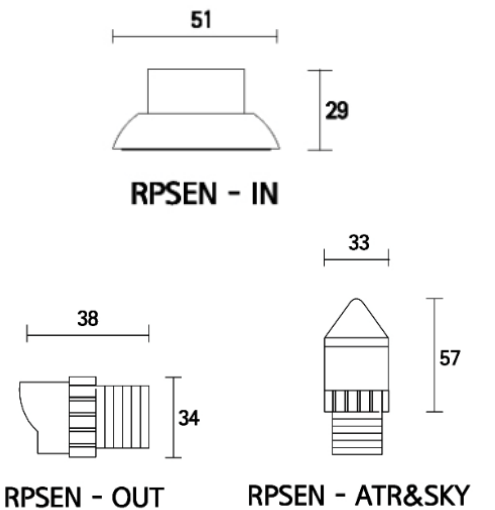
#### Application

The Photo Sensor for lighting control type is mostly installed at window area inside of the building. It can control the several lighting control relay by the detected photo from one single Photo Sensor. Mostly control the window area by Photo Sensor. This Photo Sensor is controlling the corresponding lighting control Relay according to the setting of photo and monitoring the photo from window side also it is able to display the photo value at Central Monitoring PC by measuring the photo value.

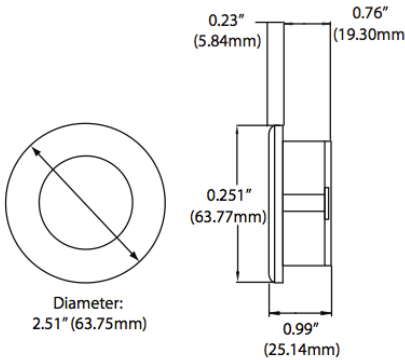
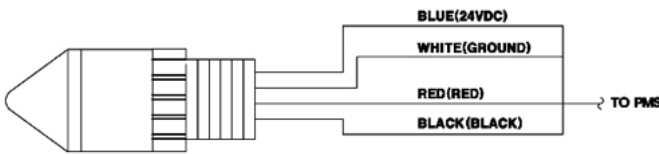
#### Specification

Accuracy :  $\pm 1\%$  at  $21^{\circ}\text{C}$   
Derated to  $\pm 5\%$  at  $-18^{\circ}\text{C}$  to  $49^{\circ}\text{C}$   
Operating Environment :  
• Temp :  $-11^{\circ}\text{C}$  -  $60^{\circ}\text{C}$   
Warranty : 5 year.  
Input Voltage : 24VDC  
Output Voltage : 10 VDC full output  
Output Offset : 0 VDC or 1 VDC analog - total darkness  
Wiring : Three conductors 18 gauge standard cable  
• Red : Pos, DC Input  
• Black : DC common  
• Yellow : Output  
PC-I(Indoor) : Downward, 0-100FC, Lens(Clear Fresnel)  
PC-O(Outdoor) : Horizontal, 0- 250FC, Lens(Clear Flat)  
PC-A(Atrium) : Horizontal, 2-1000FC, Lens(Opaque Dome)  
PC-S(Skylight) : Upward, 10-2000FC, Lens(Dark Dome)  
PC-1-OL(Open loop) : 45', 30-3000FC, Lens(Opaque Flat)

#### Dimension



#### Connection Diagram







# LIGHTING CONTROLS

STS-L2,  
STS-SCH

Smart Touch Switch w/Setting of I.G.S.  
Smart Touch Switch w/Setting of I.G.S. & Schedule

RLCM

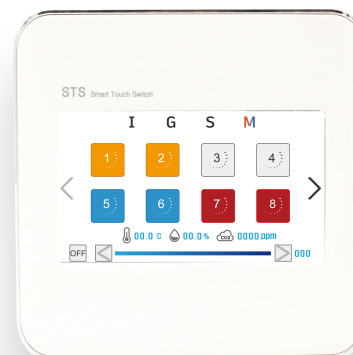
## Overview

Smart Touch Switch (STS-L2) in RLCM (Room Lighting Control Management) is used as a Switch and also used as a Program Setting Device.

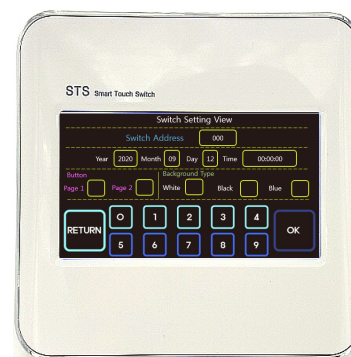
STS-L2 sets the Relay Setting, Relay Group Setting, Dimming Channel Group Setting and Dimming Scene. STS-SCH is used as a device to set the Time Schedule.

Unlike the IGS-TS Switch, the method of setting the control module of the STS-L2 in RLCM System has a Separate Setting Screen to conveniently set up for individual, 16EA of Groups and 16EA of SCENE for each Control Module such as Relay Control Module, 0-10V Dimming Module, LDM and Etc.

From RLCM System, including the STS-L2 Switch, maximum of 32 EA of devices can be connected and controlled for the RLCM System.



STS- L2



STS- SCH

## Feature

- Pressure Sensitive Soft Touch type.
- There is no need to order a Separate Back Box because it is installed in the existing international Standard Installation Back Box.
- User is able to create the graphics and contents of back screen, buttons, icons freely and also download the data to STS-L2 switch.
- Definition : TFT-LCD TYPE is easy to monitor with high definition compared to existing LCD TYPE.
- STS-L2 : Set the Relay and 16EA of Groups & SCENE. Able to control the each functions from Switch Button.
- STS-SCH : Set the Time Schedule and download the data to Control Module.

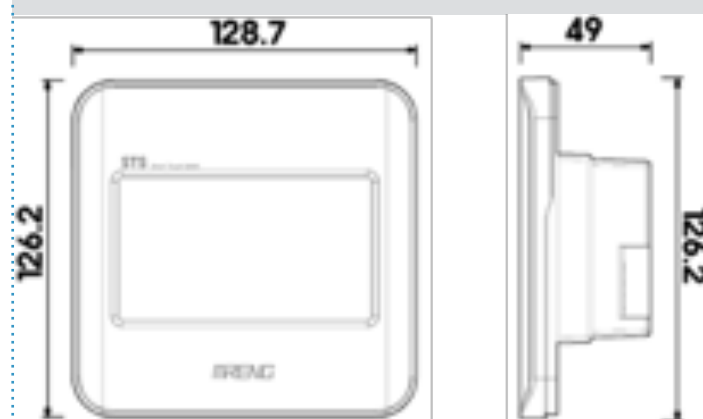
## Application

On the RLCM System, the STS-L2 has configuration screen where you can set the Control Module associated with the Switch Button after installation. The user is able to set and change the program which is related to each Switch and Control Modules.

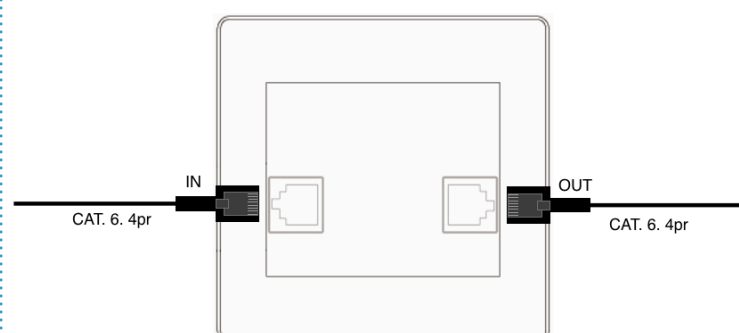
### Specification

- Data Line Switch Address : 01- 00
- Max 16 Icon buttons.
- Able to change the Icon Color to indicate the feedback for ON/OFF Status.
- Program Setting Display.
- 3 Page Screen.
- Screen Saving Function : Display Building & Information Guide.
- Communication Cable & Connector : CAT.6.4pr & RJ45 Jack.
- 2 Gang Box Size, Color : Black and White.
- AC/DC24V, 50/60Hz, 12VA.
- Display :4.3 inch Wide(480\*272).
- Color : 65,000 Color available.

### Dimension



### Connection Diagram





# LIGHTING CONTROLS

RLCM

IGS TS-4

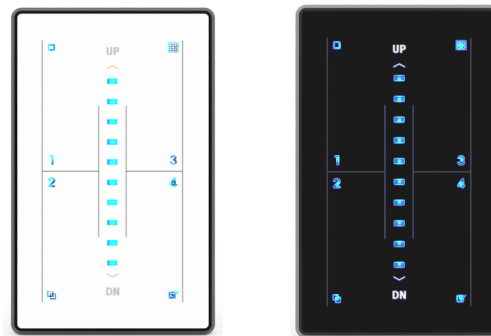
IGS Touch Switch-4 w/Setting of I.G.S

## Overview

The IGS Touch Switch is used as Switch and Program Setting Device from RLCM System.

This switch has 4EA switch buttons & 4EA program setting buttons. The LED that displays the Dimming Status in the middle of the switch is indicated by the UP / DN button.

The Dimming Status of the current switch button can be displayed in 10 steps. The Dimming Status can be displayed in 10% increments between 0 ~ 100%.



## Feature

- 4 switch buttons, 4 setting buttons, 10 levels of LED display and Dimming UP/DOWN button.
- Manual Dimming Operation for Individual & Group.
- The Dimming Status is divided into 10 levels and displayed by LED.
- Signal Transmission Distance : 500 Meter.
- Address Setting : 01~99.
- If you have 1EA Switch and 1EA Control Module, they can automatically recognized each other for address and settings. Only 1EA of Switch Button is able to control 1EA of Relay.
- Use the R (Relay), G (Group), S (Scene) and M (Mixing) buttons of the Program Setup function to set individual, group and scene settings for the switches for each control module.
- The part where the corresponding program setting LED display is On is the mode that is operated in the current switch.

## Application

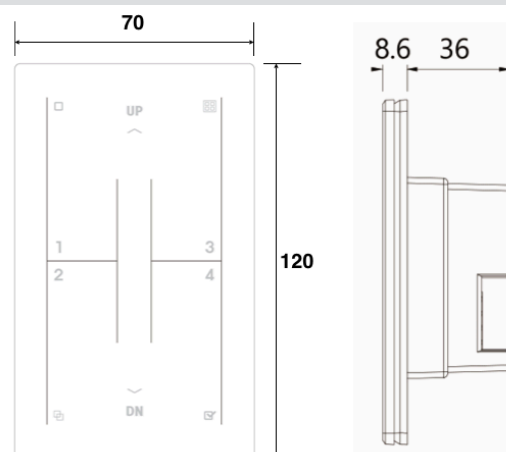
This IGS Touch Switch automatically recognizes mutual devices when only one control module is connected. For example, #1 Switch is connected with #1 Relay and #2 Switch is connected with #2 Relay. And if there are several control modules connected to one IGS Touch Switch, set the program by operating the top button of the switch. For example, with 4eRM powered on, the other control module is powered off, and the #1 and #2 relays are powered on, Press the #1 Switch Button for 5 seconds. Then, #1 and #2 Relays are Grouped and set to the #1 Switch Button for setting with the sounds. Also, use the Switch while the LED display of the group button is ON.

For setting, use the upper left button when selecting individual relays. For group, use the upper right button when selecting group relays. For SCENE, use the bottom left button when selecting Dimming Scene. Also when using the Group and SCENE at same time, the bottom right display should be ON.

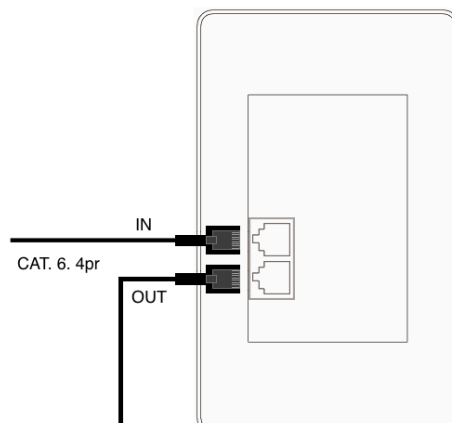
## Specification

- Input Power : AC/DC24V (from LCP)
- Operating Condition : -10~60 °C, 0~95%.
- Current Consumption :15mA.
- Dimming Status Display : 10EA LED Display.
- Switch Button : 4EA.
- Program Setting Button : 4EA.
- Communication Cable & Connector : CAT.6.4pr & RJ45 Jack.
- Mounting Size : Standard 1 GANG SWITCH BOX.
- 4 Circuits Type - 1 GANG (50x100mm).
- Color : Black & White.

## Dimension of Layout



## Connection Diagram





# LIGHTING CONTROLS

IGS TS-8

IGS Touch Switch-8 w/Setting of I.G.S

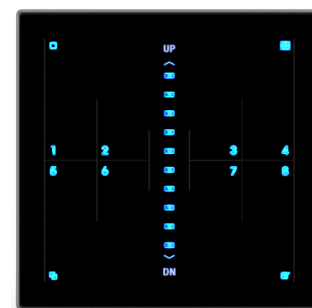
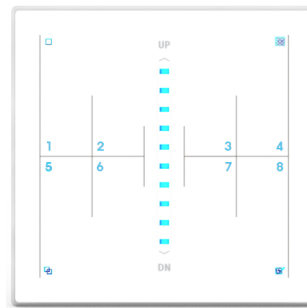
RLCM

## Overview

The IGS Touch Switch is used as Switch and Program Setting Device from RLCM System.

This switch has 8EA switch buttons & 4EA program setting buttons. The LED that displays the Dimming Status in the middle of the switch is indicated by the UP / DN button.

The Dimming Status of the current switch button can be displayed in 10 steps. The Dimming Status can be displayed in 10% increments between 0 ~ 100%.



## Feature

- 8 switch buttons, 4 setting buttons, 10 levels of LED display and Dimming UP/DOWN button.
- Manual Dimming Operation for Individual & Group.
- The Dimming Status is divided into 10 levels and displayed by LED.
- Signal Transmission Distance : 500 Meter.
- Address Setting : 01~99.
- If you have 1EA Switch and 1EA Control Module, they can automatically recognized each other for address and settings. Only 1EA of Switch Button is able to control 1EA of Relay.
- Use the I(Relay or Dimming), G (Group), S (Scene) and M (Mixing) buttons of the Program Setup function to set individual, group and scene settings for the switches for each control module.
- The part where the corresponding program setting LED display is On is the mode that is operated in the current switch.

## Application

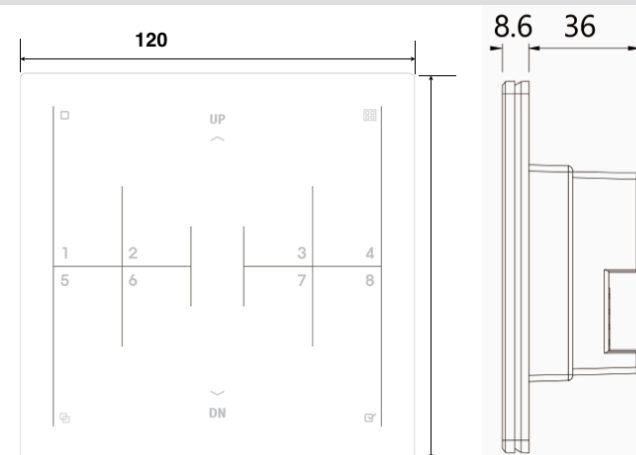
This IGS Touch Switch automatically recognizes mutual devices when only one control module is connected. For example, #1 Switch is connected with #1 Relay and #2 Switch is connected with #2 Relay. And if there are several control modules connected to one IGS Touch Switch, set the program by operating the top button of the switch. For example, with 4eRM powered on, the other control module is powered off, and the #1 and #2 relays are powered on, Press the #1 Switch Button for 5 seconds. Then, #1 and #2 Relays are Grouped and set to the #1 Switch Button for setting with the sounds. Also, use the Switch while the LED display of the group button is ON.

For setting, use the upper left button when selecting individual relays. For group, use the upper right button when selecting group relays. For SCENE, use the bottom left button when selecting Dimming Scene. Also when using the Group and SCENE at same time, the bottom right display should be ON.

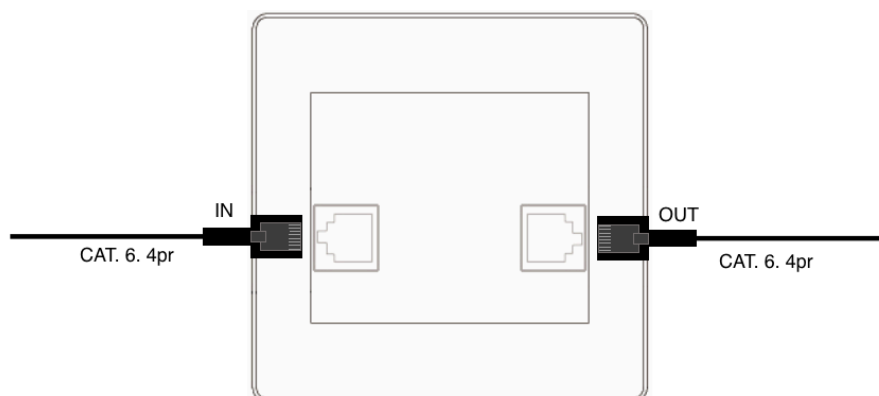
## Specification

- Input Power : AC/DC24V (from LCP)
- Operating Condition : -10~60 °C, 0~95%.
- Current Consumption : 15mA.
- Dimming Status Display : 10EA LED Display.
- Switch Button : 8EA.
- Program Setting Button : 4EA.
- Communication Cable & Connector : CAT.6.4pr & RJ45 Jack.
- Mounting Size : Standard 2 GANG SWITCH BOX.
- 8 Circuits Type - 2 GANG (100x100mm).
- Color : Black & White.

## Dimension of Layout



## Connection Diagram





## Overview

The EPWR Power Supply is used as the power supply for each switch and control module in the RLCM system.  
Up to 32 Devices can be connected to one RPWR.



## Feature

- The Free Voltage is supplied within the AC 90 - 235V.
- It supplies to power to each Relay Module by converting into DC24 supplied by AC Power.
- One single Power Supply Device is suitable to connect up to 32 control modules and switches.
- When operating the Relay Module, 200mA of current is consumed for each Relay Module.

## Operation

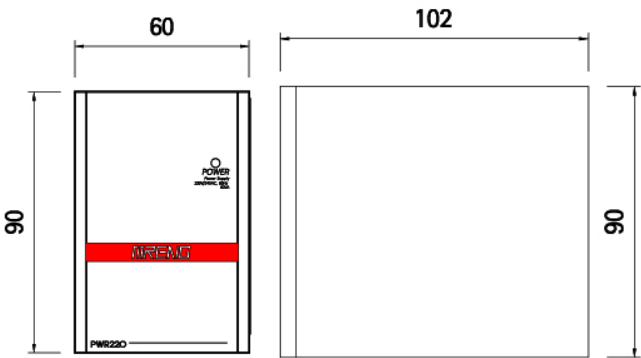
The secondary power performs the role for supplying the power to each Relay Module with DC24V by supplied the power of High-Voltage of 220V (90 - 235V). When power is supplied, the LED lamp of front side maintains ON status.

### Specification

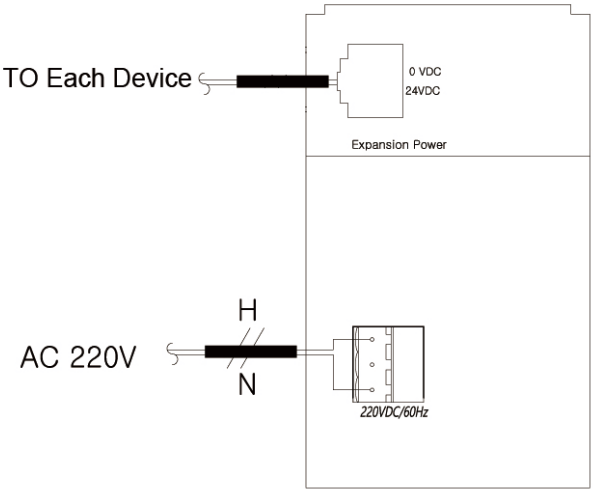
- Input Power : AC 90- 235V, 60Hz
- Output Power : DC24V
- Power Consumption : 40W
- Ambient Temp. 0 - 55°C
- When operating Relay Module : 200mA(0.7Watt), when not: 100mA(0.24Watt)
- Connect up to 10EA of Relay Module



### Dimension



### Connection Diagram







# LIGHTING CONTROLS

4eRM - L2

4 Relay Control Module

RLCM

## Overview

From RLCM System, the 4eRM is a Relay Control Module with 4EA of internal Relays which are 16 Ampere Latching Relays. In addition, the maximum of 32EA of Relay Control Modules can be connected to RLCM Network.

Each Relay Module has 01-99 address switch, which is connected to IGS Touch Switch to set the function for individual and group control.



## Feature

- 4 EA of 16 Ampere Latching Relays are built-in.
- LED Status Display to indicate the status of each Relay.
- In case of Relay Fail, LED Flick function.
- Data Line connected with LAN Cable CAT.6. 4pr (RJ45).
- Max Communication Distance : 500 M.
- Use of Inrush Current 100 Amp Compatible Relay (TV-8 Standard Applied).
- Max 32 EA of Relay Modules can be connected.
- Hard wiring lines are hidden inside of case cover to make nice design.

## Application

In RLCM, when switch and one 4eRM are connected, they are automatically recognized, and they are automatically set to operate as #1 Switch for #1 Relay and #2 Switch for #2 Relay.

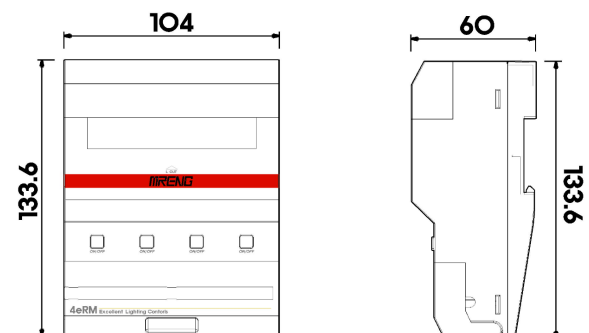
For Group Setting, when several relay modules are connected to one Switch, powered ON the several relay modules and Select and press the Group Button from the switch for 5 seconds and choose the corresponding relays that are turned On for group.

Simple setting methods are described in detail in the manual so that anyone can easily set them up.

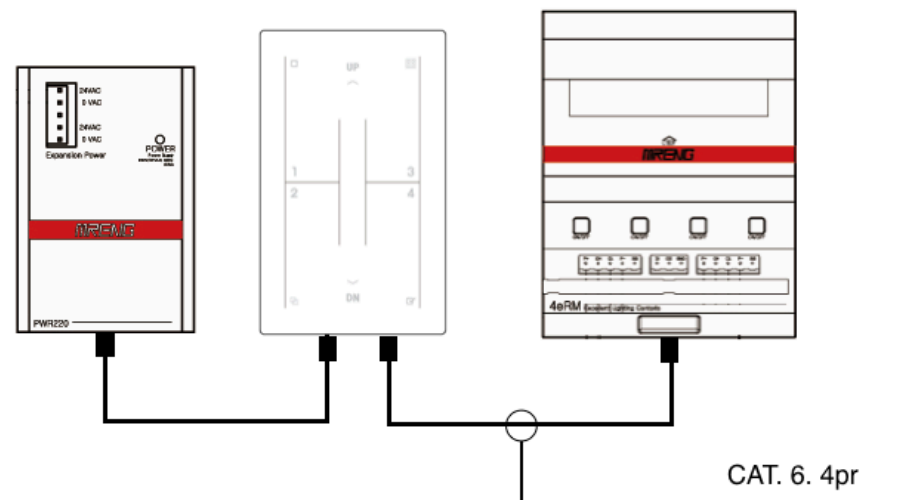
### Specification

- 4ea - LED Status Indicators
- 4ea - 16 Latching Relay(TV-8 Inrush Current 100A)
- Communication Cable & Connector : CAT.6.4pr & RJ45 Jack
- Address Setting : 1-99
- 32Bit Stand Alone Processor
- 2ea - Digital Input
- Operation Condition : -10 ~ 60°C
- AC/DC24V, 50/60Hz, 7VA

### Dimension of Layout



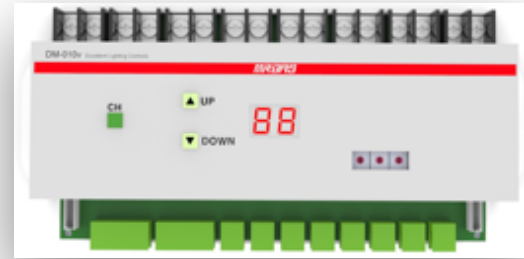
### Connection Diagram





## Overview

The 0-10V Dimming Control Module in RLCM has 8 Dimming Channels, enabling dimming control of 8 light circuits. This Dimming Module has an Address switch, if you set the IGS Touch Switch and Address the same, it can be automatically connected to the switch one-to-one. Group and Scene settings can also be set in IGS Touch Switch and STS-L2 in different ways.



## Feature

- 8 of 16 Ampere Latching Relays
- Equipped with 8 of 0-10V Dimming Modules
- DATA Line connects to LAN Cable CAT.6. 4pr (RJ45)
- Max. Comm. Distance 500M
- Dimming can be control manually in this dimming module
- Up to Maximum of 32 connections to RLCM

## Application

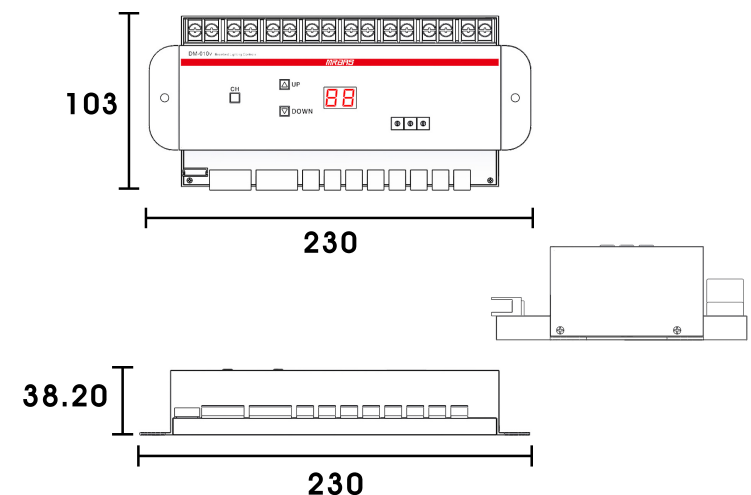
In RLCM, when a switch and one 0-10 Dimming Module are connected, mutual recognition is automatically performed, so that Channel 1 at Switch 1 and Channel 2 at Switch 2 are set automatically.

In addition, when several 0-10 dimming modules are connected to one switch, when the power of the corresponding dimming module is turned ON, select the switch group button and press and hold the corresponding switch for five seconds to set the Channels that are ON. Simple setting methods are described in detail in the manual so that anyone can easily set them up.

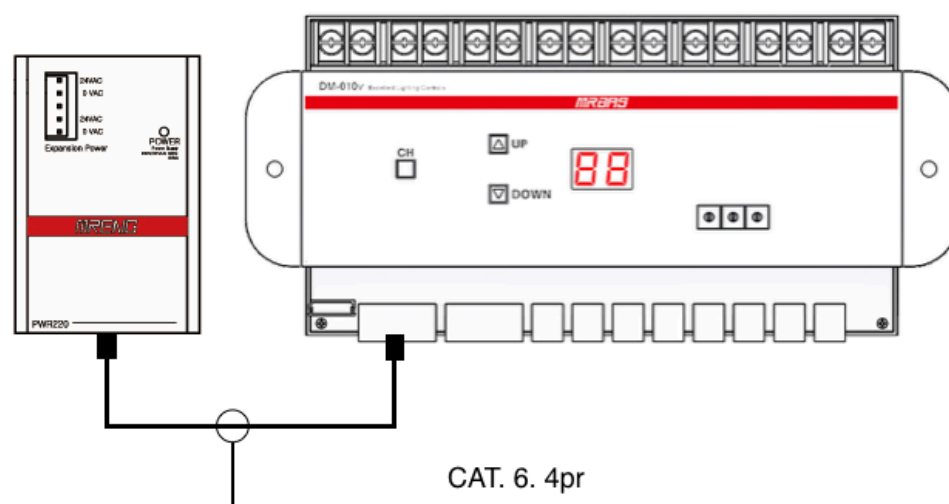
## Specification

- 8EA : 0 -10V Dimming Channel
- 8EA : 16 Ampere Latching Relay
- 0 ~ 254 step Dimming Control
- 16 Group/Scene Control
- Fade time, Fade rate
- Min/Max Control
- Communication Cable & Connector : CAT.6.4pr & RJ45 Jack
- Local Control(up/down/level)
- Address Setting : 1- 99
- 32 Bit Stand Alone Control Processor
- Operation Condition : 0 - 60°C
- AC/DC24V, 50/60Hz
- Weight :

## Dimension of Layout



## Connection Diagram





# LIGHTING CONTROLS

LDM-L2 Series

LED Dimming Module for Level-2

RLCM

## Overview

Up to 32 LDM (LED Dimming Module) in RLCM are connected and installed in each LED lighting, Dimming and On/ Off control of LED lighting. Program settings are made on the IGS Touch Switch or STS. The LDM-L2 Series is classified into various types according to the type of output stage.

## Feature

- Apply to connect to a CAN Communication network.
- Photo adjustment function by 254 steps
- 16 sets of SCENE & Group Setting Function
- DATA Line connects to LAN Cable CAT.6. 4pr (RJ45)
- Max. Comm. Distance 500M.
- Address Setting Method: Select the Random Address by checking the isoline of the site in STS or MR BLE APP.
- LDM has an Address switch that allows to select up to 16 Group. Can set up to 16 Address with this address switch.
- Dimming range : 1% ~ 100%
- Dimming times : Program
- Type of output : Normal type is a module that is directly connected to LED luminaire, and there are modules to give PWM and 0-10v signal to SMPS (LED Driver), respectively.



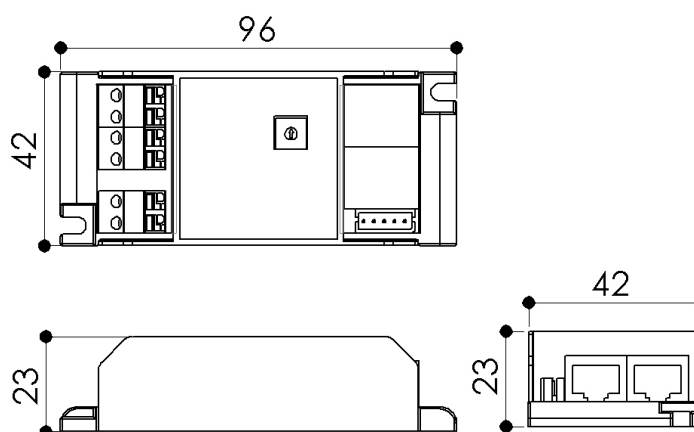
## Operation

- LED lighting can be applied to various types of lighting such as flat panel lighting (downlight), downlight, LED fixture and can be controlled through CAN communication of RLCM.
- Connect LAN Cable CAT.6. 4pr to RJ45 Jack which is prepared for each LDM2-L2.
- Ballast of LED lighting shall use ballast less than 180W when output voltage of constant voltage method is below 60V / 3A.
- The LDM-2 is mounted with screws or magnets next to the ballast at the back of the LED luminaire.
- Able to set the address and program of each LDM through the setting buttons and screen of IGS Touch Switch and STS.

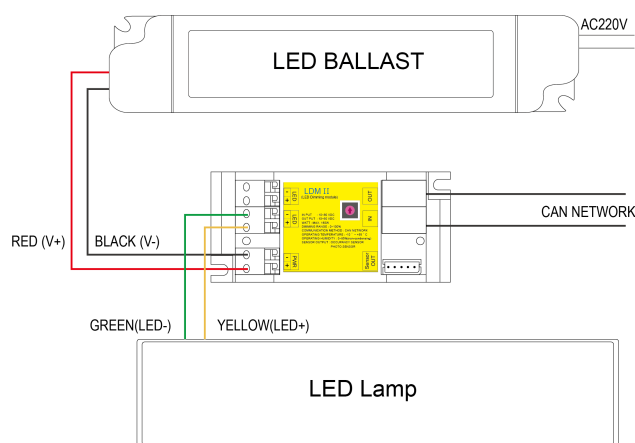
## Specification

- LED Min.10W - Max. 180W Type
- Environment Condition: -10℃ ~ 55℃, 0~95% RH
- Input Power : DC 10~60V Voltage
- Power consumption : 12 ~ 50W
- Communication Method : CAN Communication
- Max. Comm. distance : 500M
- Communication Cable & Connector : CAT.6.4pr & RJ45 Jack
- Output Power(POut) : Max. 180W
- Output Voltage(VOut) : 12 - 60VDC(LDM-L2-n only)
- Outout Current(IOut) : Max.3,000mA(LDM-L2-n only)
- Dimming Range : 1 - 100%
- LDM-pwm and LDM-010 are PWM and 0-10v Signal only for SMPS, respectively

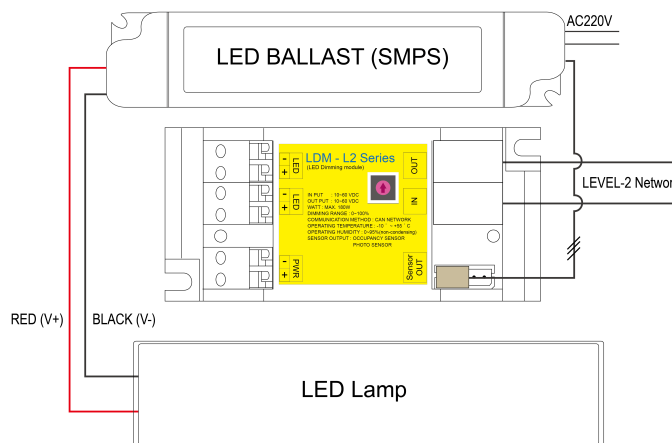
## Dimension of Layout



## Connection Diagram



LDM-L2-n Type

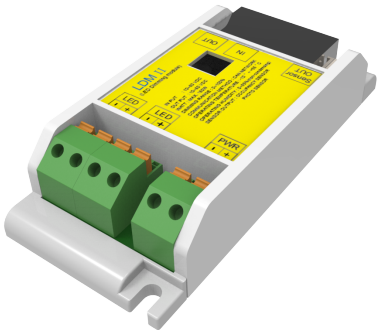


LDM-L2- pwm or o-10v Type

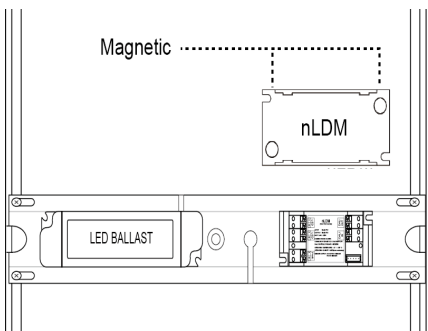
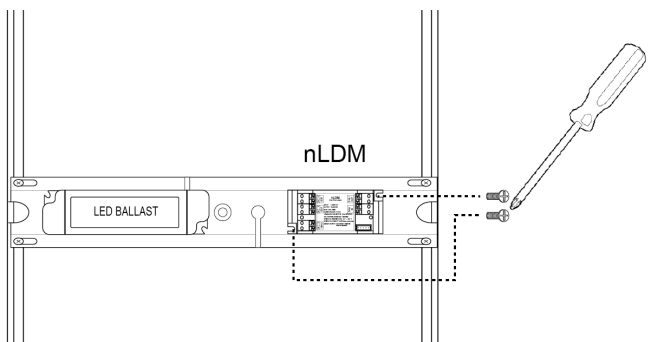


### Application

- Up to Maximum of 32 LDM-2 can be connected on one RLCM, allowing Individual/ Group/ Scene control
- 16 GROUP can be set
- 16 SCENE can be set
- Fade Time can be set
- Fade Rate can be set
- Min/Max. Level can be set
- Controllable by Occupancy sensor
- Controllable by Photo sensor

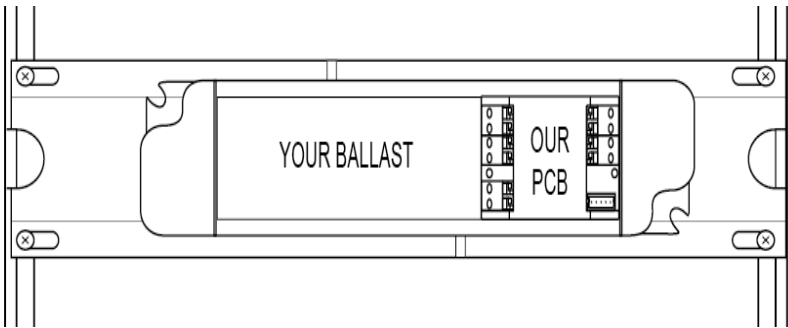


### Installation Guide



### Semi-finished from available

- It is available in PCB form so that our LDM-2 can be used as an integrated ballast.
- Using semi-finished product of LDM-2, use inside the ballast.
- See the illustration on the side.



### Product List

Product Name	Model Number	Key Specification	Output Capacity for LED Load		
			10~20W	21~60W	61~180W
LED Dimming Module with Output Circuit	LDM-L2-n	Input : DC10 ~60V, Output :DC12~60V, Dimming Range : 1~100%, CAN Comm.	LDM-L2-n-20	LDM-l2-n-60	LDM-L2-n-180
LED Dimming Module with PWM signal	LDM-L2-pwm	Input : DC10 ~60V, Output :pwm signal, Dimming Range : 1~100%, CAN Comm.	LDM-L2-pwm	LDM-L2-pwm	LDM-L2-pwm
LED Dimming Module with 0-10v signal	LDM-L2-010	Input : DC10 ~60V, Output :0-10v signal, Dimming Range : 1~100%, CAN Comm.	LDM-L2-010	LDM-L2-010	LDM-L2-010





# LIGHTING CONTROLS

OCC-L2  
PH-L2

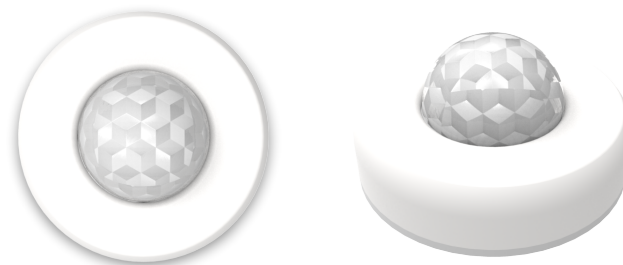
Occupancy Sensor  
Photo Sensor

RLCM

## Overview

This Occupancy Sensor is connected to LDM II-L2 and interlocks with other control modules as well as LDM. Sensor detection range is within 5M radius. The delay time of the sensor and the selection of Enable and Disable are set in STS.

In addition, this Photo Sensor is connected to LDM II-L2 and interlocks with other control modules as well as LDM. Sensor detection range is 0-753LUX (0-70FC). Selection of sensor Enable and Disable is set by STS which is setting equipment.



## Feature

- RLCM's CAN Network is connected via LDM-2 to perform the functions of each sensor.
- Each sensor can also control LDM2 individually
- The delay time and Enable/ Disable of each sensor are set in STS or MR BLE APP.

## Application

Photo Sensor and Occupancy Sensor are used in the same housing. Each sensor must be connected and used via an LDM2 module. Control each LDM2 or control several other control modules. The setting of this sensor is set in STS or MR BLE APP of RLCM.

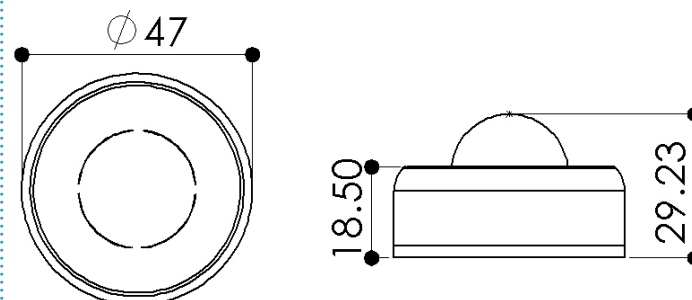
### Specification

Operating Environment :  
• Temp : 0°C to +40°C, Humidity : Max.90% RH

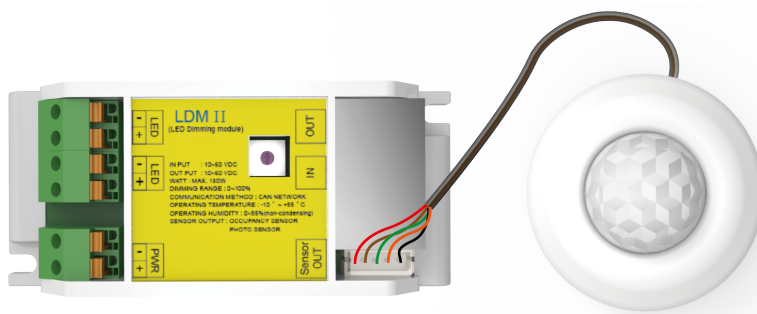
Sensor Detection Range :  
• Occupancy : Max. 5M  
• Photo Sensor Range : 0 -753LUX(0-70FC)  
• Microwave Sensor Range : Max. 10M

Sensor Setting :  
• Delayed Off Time : Software delay off time setting  
• Sensor Activation : Enable / Disable Selection  
• Min & Max Level Setting : Setting by Software

### Dimension



### Connection Diagram





## Background of Development

Bluetooth communication is a part of the communication method of smartphones and connected devices most commonly used in daily life. Using this BLE communication method, the existing lighting control system and the smartphone are automatically paired so that the lighting control can be controlled and operated on the smartphone app.

The lighting control switch is installed in most offices and spaces, and when the BLE Chip is installed on the switch, when the smartphone is near the switch, it is automatically paired, so that various controls and analysis of the lighting can be performed on the smartphone instead of the switch.

The switch is limited in setting and operating the control zone. You can create more control modes of operation beyond those limits on your smartphone app, so you can use your smartphone as a light control switch instead of a remote control, without having to go to the switch with ease and movement. In addition, the time zone schedule program that is difficult to set in the switch can be set in the smartphone app program and downloaded through the switch, so that a separate computer or software is not required. By learning function that continuously analyzes various patterns, it is possible to set the best lighting scenes and create the best lighting control value for power saving and efficient operation.



## Overview

MR BLE APP is the core component of RLCM.

The APP is automatically paired and connected by RLCM and BLE communication, and individual, group, and scene control is possible instead of a switch.

In addition, the group and scene modes that can be set on the IGS TS switch can be set on this APP, and the time zone schedule program can be set.

## Feature

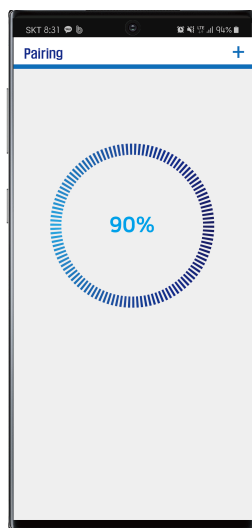
- Applicable on all smartphones for Android phone and iPhone
- Operate as a serverless app
- Communication setting: Connect with RLCM switch by BLE communication.
- Device configuration: RLCM equipment ... 4eRM-L2, DM0-10-L2, LDM-L2 Series, IGS TS-4,8, STS-L2, STS-SCH. Schedule control and data transmission Source: Run Time Analysis

## Application

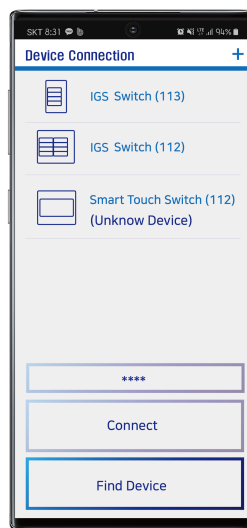
Users who want to install m.r.BLE App program download and use "mr BLE App" from APP program store of each smartphone. The app is installed on a smartphone, and the tenant sets up communication at a short distance with the switch of the RLCM system of MRBAS.

If you go near the switch and set up BLE communication in the setting of the smartphone, the switch and the smartphone are auto paired to establish communication. In this state, open "mr BLE App", recognize the program of each switch, if necessary, modify the set program of the switch and download it again. It works.

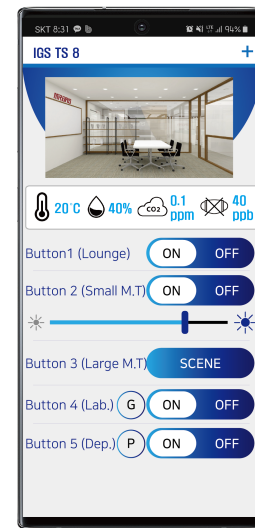
## Smart-Phone Screen Configuration



Auto Pairing



Connection of each device

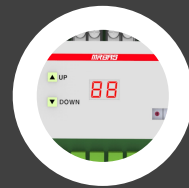


Control for each zone



# MEMO





THE LEADING SUPPLIER OF LIGHTING  
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