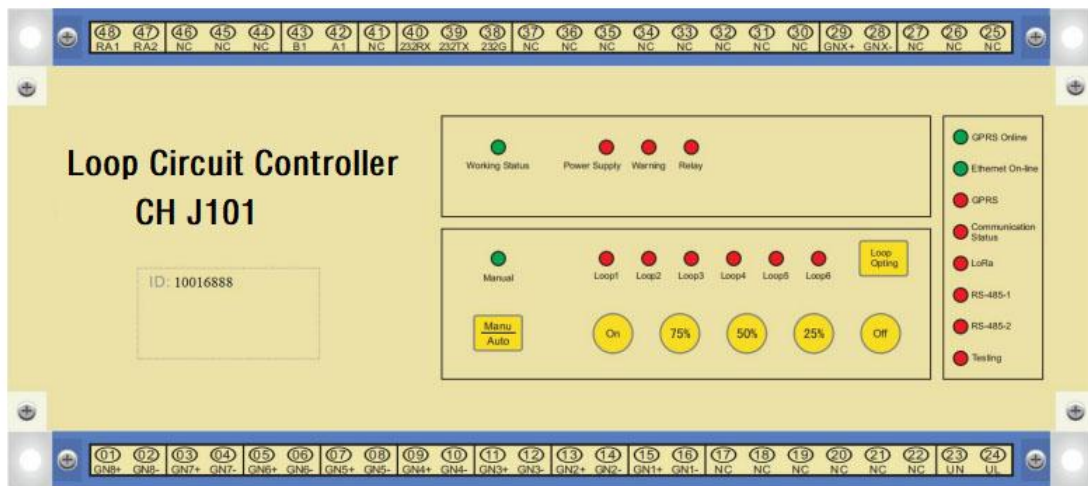


# Intelligent Lighting Loop Circuit Controller

## User Manual



VERSION: CH-J101 C/D

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## I: Specification

CH-J101 Smart Lighting Management Centralized Controller is independently developed by our company, which is widely used in the Smart City Street Lighting Projects, Super-highway's Tunnels and the industrial lighting such as big scale factory and warehouse Lighting System., control lighting fixtures through the man-machine interface, data acquisition and Monitoring of lamps.

Although the Traditional lighting fixtures have widely used in the street lighting, tunnel and high buildings, but there are still a lots of problem exit there: Lifetime, Light Attenuation, Bad Factory Environments etc. which will lead to damage the lamps, moreover, dead plate controlling method, Lighting Scene, the fault points and failure lamps only be found by when the worker inspection there, it can not provide a reliable working data to the controllers on time. For these reasons, we offer this muti-functions smart lighting Centralized Controller: Electric Energy/Data acquisition, Fault Detect, Data Process, Remote Copying Control, Loop Power Control, Dimming, Auto-Running, Temperature Collecting, Sensor Data Acquisition etc.

The device has multiple interfaces, in addition to reserved Industrial Bus RS-485, RS-232, it is also equipped with Industrial Touch Screen Interactive Interface, Ethernet Communication Interface, GPRS Communication Interface, Lighting Control Interface (Power Line Carrier or LoRa Communication Channel) Communication Interface to the Loop Controller and Communication Interface with Sensors (such as Illuminance Sensors). The communication performance of the main communication interface is as follows: the communication distance of the RS-485 Industrial Bus can reach 2 km without Repeater, and the actual measurement in the tunnel can reach 1km. ; A 7-level gateway can be set in the scene, and the maximum distance can reach 7km according to 1km of the gateway of each level, and the capacity of the equipment in the gateway is up to 255 units; LoRa Communication Interface, the communication distance can reach 2km without Repeater, the measured distance can reach 1km, and the communication distance can reach 10km in the case of repeater. PLC communication interface, the communication distance can reach 400m without repeater, and with repeater In this case, the communication distance can be up to 4km.

## II: Electrical Parameter

Input characteristics					
Parameter	Min.	Nor.	Max.	Remarks	
Rated Input Voltage	176V <sub>ac</sub>	220Vac	264Vac	Phase Voltage	
Frequency	47.5Hz	50 Hz	52.5Hz		
A Series static power consumption		4.6W		220Vac/50Hz, Include 4G Modular	
B Series static power consumption		1.6 W			
C Series static power consumption(8 Loops)		4.5 W			
D Series static power consumption(8 Loops)		4.5W			
Output characteristics					
Parameter	Min.	Normal	Max.	Remarks	
C series	Number of Dimming Port Output Loop	1	6	8	
	Output Voltage of Dim Port	0V <sub>dc</sub>	10V <sub>dc</sub>	10.5V <sub>dc</sub>	
	Output Current per loop of Dim Port	0mA		120mA	Fault judge value 110mA
	Current absorbed by each loop of Dim Port	0mA		120mA	Fault judge value 110mA
D series	RS-485 Communication channel qty.	1	6	8	
	Number of nodes per RS-485 channel	1		254	Controller Qty.
	RS-485 A/B Terminal Withstand voltage			220Vac	Anti-misconnection
Other characteristics					
Parameter	Min.	Normal	Max.	Remarks	
Insulation withstand voltage		3.75KV		Analog or Bus port power supply	
Surge (L-N)		±4KV		Power Suppl1.2/50-8/20us Combination waves)	
Surge (A-B)		Differential Mode 2KV		RS485 (10/700us-5/320us Combination waves)	
Environment Requirement					
Parameter	Min.	Normal	Max.	Remarks	
Normal Working Tempt.	-25°C	25°C	60°C		
Extremely Working Tempt.	-40°C		65°C		
Storage & Shipping Tempt.	-40°C		65°C		
Storage & Working Humidity			85%		

### III: Key Features

#### 1. Functions

 <b>Local Control</b> <ul style="list-style-type: none"><li>Control &amp; Manage by Buttons</li><li>Control by connected Touch Screen</li></ul>	 <b>Status Collect</b> <ul style="list-style-type: none"><li>Module Status Collect</li><li>Terminal Device Status Collect</li></ul>
 <b>Remote Control</b> <ul style="list-style-type: none"><li>Remote Server, Work Station</li><li>Remote Sensor</li></ul>	 <b>Electrical Parameter Collect</b> <ul style="list-style-type: none"><li>Energy Meter Data</li><li>Terminal Device</li></ul>
 <b>Automatic-Control</b> <ul style="list-style-type: none"><li>Sunset, Sunrise</li><li>Schedule</li></ul>	 <b>Electric Energy Collect</b> <ul style="list-style-type: none"><li>Power Consumption Collect</li></ul>
 <b>Real Time Clock</b> <ul style="list-style-type: none"><li>Provide accurate time</li><li>Remote Automatic Timing</li></ul>	 <b>Faulty Report</b> <ul style="list-style-type: none"><li>Device itself fail</li><li>Terminal faulty collect &amp; report</li></ul>
 <b>LED Display</b> <ul style="list-style-type: none"><li>Indicate Device and Modular Status</li><li>Indicate the communication Situation</li></ul>	 <b>Uplink Channel</b> <ul style="list-style-type: none"><li>4G, Ethernet, Industry Bus Ports</li></ul>
 <b>Device Management</b> <ul style="list-style-type: none"><li>Terminal Device Add/Delete/Query</li><li>Terminal Device online Monitor</li></ul>	 <b>Output Signal</b> <ul style="list-style-type: none"><li>Optional Bus, HPL, PL, LoRa, Digital, Analog, PWM downlink</li></ul>

#### 2. Remarks

##### 1). Data Collection

Remote or Local Acquisition of Loop Controllers and Lamps Operating Status and Parameters.

##### 2). Electrical Parameter Acquisition (Optional)

###### A. Collection of Electricity Consumption

The device has a Built-in Three-Phase Energy Collection Module, which can collect the Energy Measurement Value of the Internal Module and Report it.

The Device can Collect the Energy Measurement Value of the Loop Controller and the Energy Meter and Report it.

###### B. Electrical Parameter Acquisition

The Built-in Three-Phase Energy Collection Module can collect the Voltage, Current, Active Power and Power Factor of the internal Module and Report it.

The Device can collect the Voltage, Current, Active Power and Power Factor of the Loop Controller, the Energy Meter and the Intelligent Lighting management Terminal, and Report it.

### **3). Faulty Report**

The Fault of the Device itself Occurs(AC Contactor Fault, Clock Fault, Communication Fault, etc.), and the Fault Information is automatically reported to the Server.

Collect the Information: such as Loop Controllers Fault and Light Controllers Fault, etc. (AC Contactor Faults, Clock Faults, Communication Faults, Lamp Faults, Temperature Faults, etc.)

### **4). Data Communication Channels**

#### **A. PLC - Power Line Communication**

Power Line Communication (PLC) is a communication technology that enables sending data over existing power cables. This means that, with just power cables running to an electronic device (for example) one can both power it up and at the same time control/retrieve data from it in a half-duplex manner.

#### **B. LoRa Communication**

Through LoRa Wireless Communication Channel, the Data Exchange and Control Command Reception between the Device and the Man-Machine Interface Device are realized. The Technical advantages are as follows:

- a) Adopting the latest International IoT(Internet of Things) LoRa Communication Technology, combined with AES128 Communication Encryption Technology and Self-Organizing Network Technology, the Communication Distance, Reliability and Security are greatly improved.
- b) The Point-to-Point Communication Distance can reach 3,000m, and the measured average in the Power Plant is 1,000m.
- c) In the case of Repeater, measured 13,000m can be normal communication.

#### **C. RS-485 Communication**

Through RS-485 Communication Channel, the Data Exchange and Control Command reception between the Device and the Man-Machine Interface Device are realized. The Technical Advantages are as follows:

- a) . The device capacity in the gateway is 255.
- b)
- b). Strong Anti-Interference, Differential Mode Communication, and Software Fault Tolerance, no need to use Dedicated RS-485 Communication Line, reduce engineering cost under the premise of Ensuring Reliability

#### **D. Loop Controlling**

Built-in 1 ~ 8 Loop circuits Dimming Module, which can control the lighting fixtures with analog interfaces (such as 0-10V, 1-10V, 0-5V, PWM, etc.), to achieve loop circuit lamps management, dimming, loop circuit electrical parameters collection and fault reporting.

## 5). Extended Function (Optional)

### 1). Linkage

The Device can be linked with Equipment such as Cameras and Conveyer Belt; For example, when the Camera is activated, the Brightness of the Corresponding Lighting Area is Raised lighting the whole area, to Restore the Original Illumination when the Camera Stop Shooting; Another example, when the Conveyor Belt start transmission, its corresponding lighting area is adjusted the brightness, illuminates the area, and restores the minimum safe illuminance when Stop Transmission.

### 2). Dimming Loop Extension

The Control Loop can be concatenated to realize the application of Multiple Requirements.

## IV: Indicator Lights & Buttons Spec.

### 1). Indicator Lights

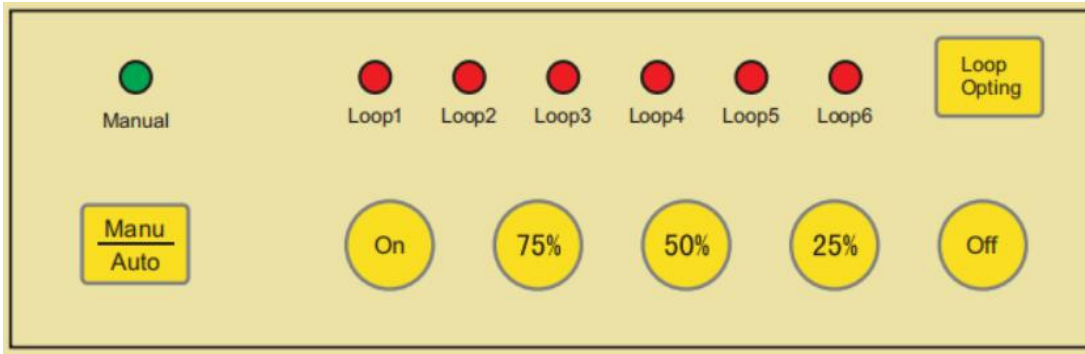
A

Mark	Functions Specifications
Working Status	Device is working, 1 flash/1 sec
Power Supply	Lights up when power on
Warning	Lights up when the device fails
Relay	Digital output indication, light up when the output port is on
Mark	Functions Specifications
Manual	Device is working in manual state, the indicator light is on
Loop 1	In manual state, indicator means selected this Loop to control
Loop 2	In manual state, indicator means selected this Loop to control
Loop 3	In manual state, indicator means selected this Loop to control
Loop 4	In manual state, indicator means selected this Loop to control
Loop 5	In manual state, indicator means selected this Loop to control
Loop 6	In manual state, indicator means selected this Loop to control

B

Mark	Functions Specifications
GPRS Online	1 flash/1sec. means the connection is success; long off means the connection failed
Ethernet	1 flash/1sec. means the connection is success; long off means the connection failed
GPRS	GPRS Communication Indication
Communication Status	Ethernet or RS232 Communication Indication
LoRa	LoRa Communication Indication
RS-485 1	RS-485 1 Communication Indication
RS-485 2	RS-485 2 Communication Indication
Testing	Site Debugging or Interior Testing

## 2) .Button Specification



### ✧ **Manu/Auto**

Under Manual Status, the Dimming Buttons Operations are valid, otherwise it is invalid.

Press "Manu/Auto", to achieve Manual/Auto Status Changing, that is , the Manual State this time, press it again to enter Auto Status

When changing from Manual State to Auto-State, the device will automatically broadcast and issue the command to resume automatic operation.

### ✧ **Loop Option Buttons**

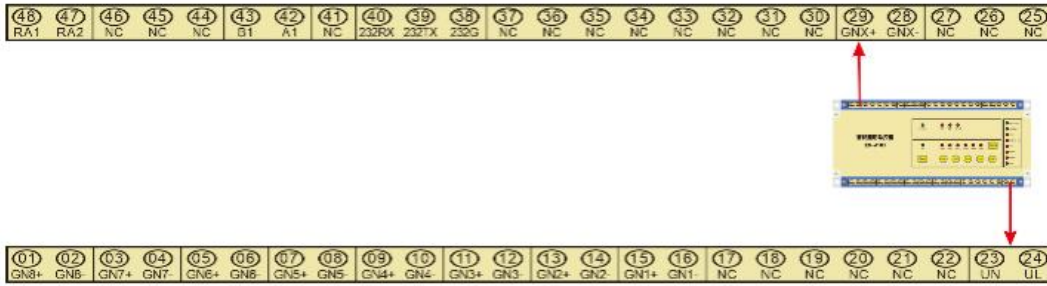
Each time the button is pressed, the "loop" indicator light cycle execution: all lights up -> loop 1 light up -> loop 2 light up -> loop 3 light up -> loop 4 light up-> loop 5 light up -> loop 6 light up -> all lit.

When the loop circuit indicator lights up - can execute the button on the panel ( ON, 75%, 50%, 25%, light Off) command, and the circuit(loop) that is not lit is not controlled.

### ✧ **Control Buttons**

N/M	Mark	Functions Specifications
01	On	Send Switch ON Command to the selected circuit (100% dimming value)
02	75%	Send 75% dim command to the selected loop
03	50%	Send 50% dim command to the selected loop
04	25%	Send 25% dim command to the selected loop
05	Off	Sends a light off command to the selected circuit (0% dimming value)

## V: Terminal Interfaces Specification



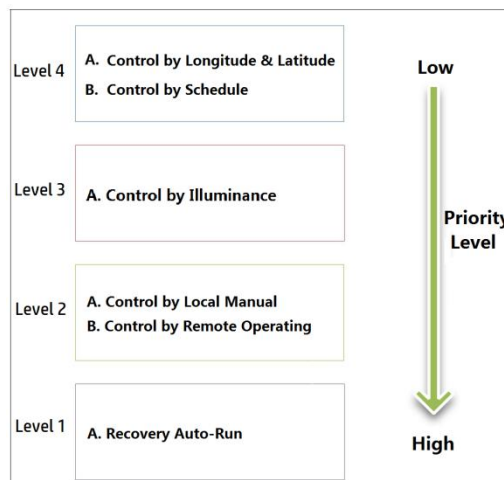
Port N/M	Mark	Functions Specifications	Port N/M	Mark	Functions Specifications
1	GN8+	No.8 Dimming Output Port +/A Port	25	NC	Unused
2	GN8-	No.8 Dimming Output Port -/B Port	26	AI-	Current Collect -Port
3	GN7+	No.7 Dimming Output Port +/A Port	27	AI+	Current Collect +Port
4	GN7-	No.7 Dimming Output Port -/B Port	28	GNX-	Data Collect -Port
5	GN6+	No.6 Dimming Output Port +/A Port	29	GNX+	Data Collect +Port
6	GN6-	No.6 Dimming Output Port -/B Port	30	DO4	Digital Ouput Port 4
7	GN5+	No.5 Dimming Output Port +/A Port	31	DO3	Digital Ouput Port 3
8	GN5-	No.5 Dimming Output Port -/B Port	32	DO2	Digital Ouput Port 2
9	GN4+	No.4 Dimming Output Port +/A Port	33	DO1	Digital Ouput Port 1
10	GN4-	No.4 Dimming Output Port -/B Port	34	COMd	Digital Output Common Port
11	GN3+	No.3 Dimming Output Port +/A Port	35	COMk	Digital Input Common Port
12	GN3-	No.3 Dimming Output Port -/B Port	36	K2	Digital Input Port - OUT
13	GN2+	No.2 Dimming Output Port +/A Port	37	K1	Digital Input Port - IN
14	GN2-	No.2 Dimming Output Port -/B Port	38	232G	RS232 Debug Output Port - GND (Touch Screen Port)
15	GN1+	No.1 Dimming Output Port +/A Port	39	232TX	RS232 Debug Output Port - Sender (Touch Screen Port)
16	GN1-	No.1 Dimming Output Port -/B Port	40	232RX	RS232 Debug Output Port- Receiver (Touch Screen Port)
17	NC	Unused	41	NC	Unused
18	NC	Unused	42	A1	RS485 Bus Port A (sensor comm port)
19	NC	Unused	43	B1	RS485 Bus Port B (sensor comm port)
20	NC	Unused	44	NC	Unused
21	NC/UC	Unused / PLC Communication Port	45	NC	Unused
22	NC/UB	Unused / PLC Communication Port	46	NC	Unused
23	NC/UA	Power Supply Live/ PLC COMM Port	47	NC	Unused
24	UN	Power Supply Neutral/ PLC COMM Port	48	NC	Unused

## V: Priority Controlling Level

### 1). Control Priority Level

High priority or Same Level can change the state of low priority or same level, while low priority can not change the state of high priority.

The control mode corresponds to the following priorities.





## 2). Priority Level 1 - Recovery Auto-Run Operating (Highest Priority Level)

At this time, the state of priority Level 4 is executed regardless of the control state in which it was previously operated(the specific operation is performed according to the setting value at the time of installation).

- a) The server or client remotely issues "Recovery Auto-Run" command.
- b) Press the "Manual/Auto - Run" Button on the device panel

## 3). Priority Level 2- Local Manual Control

Change the illuminance of the lamp through the control button on the device panel; at this time, the control commands of priority 3 and priority 4 will not be executed if the manual command is executed.

## 4). Priority Level 2- Remote Operation Control

Remotely issue the control Commands through the Server or the Client; at this time, the Lighting that executes the Manual Command, the Priority Level 3 and Priority Level 4 control status will not be executed.

## 5). Priority Level 3- Illumination Control

Controls the Brightness values of all Fixtures according to preset rules by the received illuminance value.

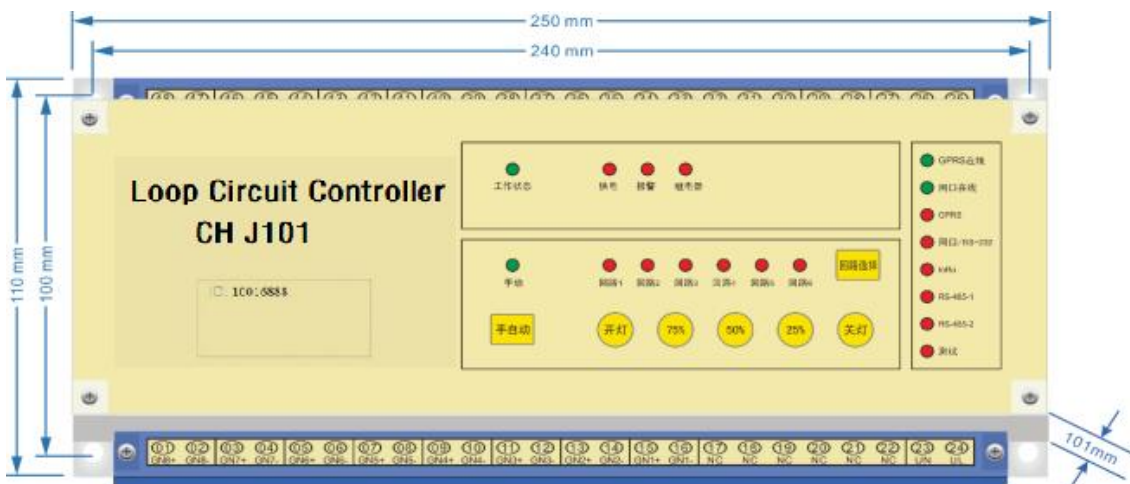
## 6). Priority Level 4 - Latitude &Longitude Control

By setting the Latitude and Longitude values, the Sunrise and Sunset times are calculated, Disconnect the Loop at the sunrise time, Closed the Loop at the sunset time . The On-Off time can be fine-tuned by the Sunrise and Sunset offset time, and the range of fine-tuned for 30 minutes.

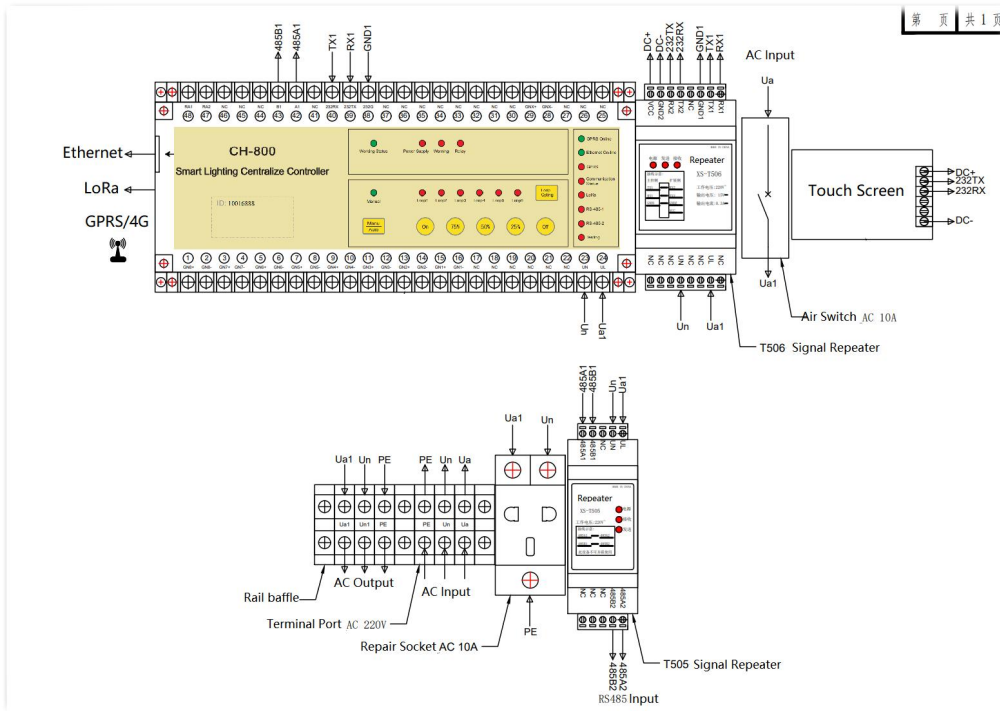
## 7). Priority Level 4 - Schedule Control

Control the Brightness Value of the Fixture through the set 6-Segment Schedule.

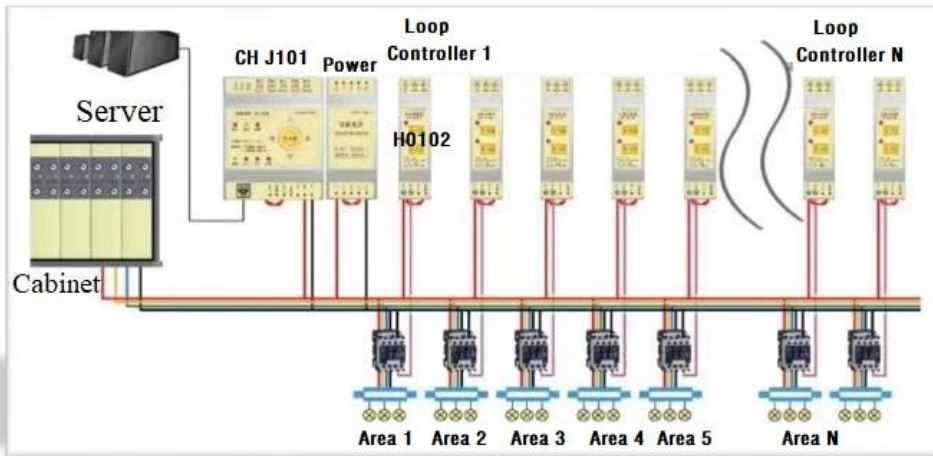
## VI: Dimensions



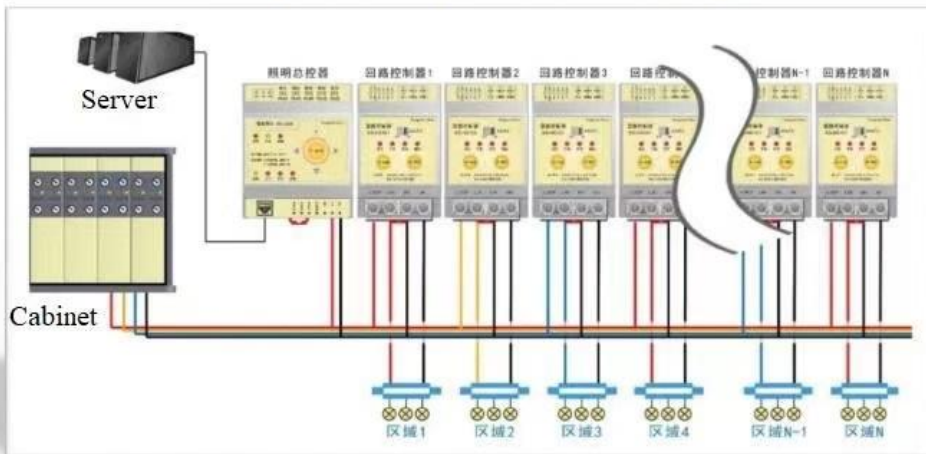
# VII: Wiring Diagram



## 3 Phases Loop Circuit Controlling



## Single Phase Loop Circuit Controlling



# VIII: Intelligent Lighting Cabinets Study

