

# PLC + LoRa Hybrid System

Model No. : SLC812

## I: Specification

RF -- Wireless Communication Technology.

PLC -- Power Line Communication, Existing Cable (Free Wiring)

PLC signal can not be transmitted if the system is only work with Single Lamp Controller, when the Transformer is Isolated or the equipment is divided, and this will lead to Transmission interruption. When Chose the wireless communication, can not be controlled well if the Signal is Interference and signal attenuation and distance restriction. Because of the shortage of on them, our Engineer team develop a Hybrid System--both of PLC and RF solution, fully accommodate 2 modes, automatic switching and identification.

The PLC cannot pass the transformer, which is a Limitation , but can be transmitted by RF to the transformer. At the same time, where the wireless cannot pass, the PLC can transmit the signal as long as the power line does not span the transformer. Both of them are combined with each other to control continuously, anti-interference, stability and transmission with high speed, they can work in complex and different environments. Two of them fully automatic identification and intelligent control, dual modes simultaneous open dual channels operation mode, dual modes non-stop cycle monitoring work, automatically coordinated to the best control effect.

Every country is vast in territory, the geographical location is complex and changeable, the latitude and longitude are different, the signal strength and the interference are also different. Any kind of control system has its shortage by a single mode controlling, including the PLC, Wifi and Zibee, etc., such as: Lack of anti-interference, serious signal interference, strong electromagnetic interference and so on, especially in the remote areas, tunnels, mountain areas, and field lighting, Single control easy to appear many problems. At the same time, in the maintenance of stability control is the lack of promotion, in the face of this situation, our R & D engineers through continuous testing and simulation debugging, finally developed a compatibility controller: PLC + RF Controller.

## II: Product Analysis

### 1. PLC Advantage:

1). The greatest advantage of power line carrier technology is its resistance to frequency selective fading or narrow band interference. In a single power line carrier system, a single

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fading or interference can cause the entire communication net to failure, but in a multi-carrier system only a small part of the carrier is subject to interference. Error correcting codes can be used to correct errors in these sub-channels.

2). It can effectively resist the interference between signal waveforms, and is suitable for high-speed data transmission in multipath environment and fading channel. When the channel because of multipath transmission and frequency selective fading, only fall in band depressions in the sub carrier and its carrying information is affected, other sub carriers without damage, Therefore, the total BER performance of the system is much better.

3). Through joint coding of each sub carrier, it has a strong ability to resist fading. If the fading is not particularly serious, there is no need to add the time domain equalizer. The system performance is improved by joint coding each channel.

4). IFFT/FFT based OFDM implementation method can be selected.

5). The channel utilization is very high, which is especially important in the wireless environment with limited spectrum resources. When the carrier number is large, the system spectrum utilization rate approaching 2Baud/HZ.

## 2. PLC Technology Shortage:

Can not cross the transformer.

**Hybrid Modes—RF + PLC technology research and development, to make up for the PLC shortage, dual-mode dual channel combination, make PLC advantages to work More Perfectly.**

## III. Functions

### 1. OFDM multi carrier communication

With carrier communication performance, the use of ad hoc network technology, multi carrier communication, point to point communication distance of up to 2000M, each light controller can be used as a carrier node

### 2. RF wireless communication

With RF wireless communication performance, strong anti-interference ability, communication stability, open space Wireless communications range up to 1 km, and wireless signals have the ability to move through walls

### 3. Control Function

According to the schedule (can set 6 schedule), the scene automatically run dimming settings, or manual dimming, dimming range 0%~100%

### 4. Measurement sampling function

It has the function of collecting electrical parameters, including collecting real-time voltage, real-time current, real-time active power value, and measuring level 5

### 5. Malfunction reporting function

Have the fault judge function, including judge the lamp malfunction, the power failure, and report the fault information in real time

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IV: Product Parameter

1. Electrical parameters

Item		Calibration value
Working Voltage		AC 220V±20%
Frequency		50Hz
Static power dissipation		<3W
Relay Capacity		8A
Relay Life		>100,000 times
Relay Impulse Current		>70A
Dielectric Voltage withstand	L/N-PE	1.5KV
	L/N-485/DIM	3.75KV
Power Surge (L-N L-PE N-PE)		±4KV
Static Electricity		±8KV
Wireless Communication Distance		Open Area 1 km
Measurement Level		5
Dimming Output Drive		20mA
Dimming		1-10V (1-5V/10V PWM etc.)
Lamp Power		<400W(2A、220V) or 200W(1A、110V)

2. PLC—Power Line Communication Parameter

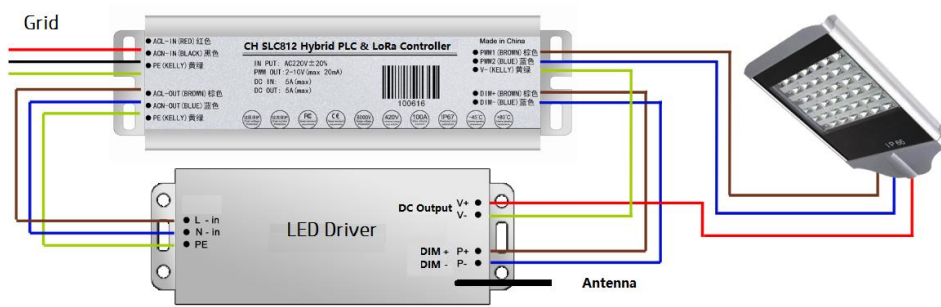
Item	Calibration value
Modulation Mode	97 Subcarrier OFDM
Carrier Center Freq	315 kHz
Max. Carrier Bandwidth	50 kHz
Max. Communication rate	Channel rate 20 kbps
Max.Carrier Transmit Level	Comply with DT/L698 related technical specifications
Receiving sensitivity	< 0.1mV
Two-Directions Communication	Real Two-Directions communication based on CSMA/CA
Coupling Mode	Single phase mutual inductance coupling

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3. Environmental parameters

Item	Calibration value
Normal Working Temp	-25℃～+60℃
Limit Operating Temp range	-40℃～+80℃
Storage, Transportation Temp Range	-45℃～+80℃
Storage Operating Humidity Range	≤85%

V: Wiring Diagram



VI: Warning

- Forbidden ONE unit: “Single Lamp Controller” to connect Multi-drivers, Max. Power range: < 400W(220V), or < 200W(110V). When Multi-Drivers Parallel Connecting, the internal capacitance is equivalent to a large capacitor, the reverse discharge of the capacitor will affect the switching life of the relay when the power is switched on.
- Intelligent Lighting Controller should be installed in solid, refractory, difficult to shake objects, to ensure the installation and use of reliable.
- Intelligent Lighting Controller should be connected correctly and reliably, avoid wiring mistake or bad cause short circuit and fire.
- Because of Different LED drivers dimming curve parameter is difference, we only ensure that the controller dimming output signal is linear, do not guarantee the use of power supply when the illuminance changed to linear. We can provide the service of testing and

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calibrating the light curve if we need to change the illuminance of lamps to linear, but we need the lamps and the environment provided by our customers.

5. our standard products provide 0-10V dimmer output, because the LED driver dimming port in the 0-1V (0%-10%) may appear lamps flicker, so the devices in our 0-1V (0%-10%) among all the output 1V (10%); relay off, dimming output 20%.

## VII: Photo

