

NJ-jk01

Smart Street Light Centralized Controller

Product Manual



Version Revision

The revision log accumulates notes for each document update

Number	Document Version	Revisionist	Release Date	Modification instructions
1	V1.0.0	Zhang Huiliu	2023.03.09	Changing the picture temperature problem

Xiamen Nengjia New Energy Technology Co.,

www.xmnengjia.com

Update:20230309

I. Product Functional Characteristic

NJ-JK01 Smart Street Light Concentrator is the key equipment in the smart street light control system. It can control single light and collect power parameters through downlink channel and collect 485 device data at the same time, and its downlink channel can be low-voltage power line carrier and RS-485 serial communication channel; meanwhile, it can exchange data with master station platform or handheld device through uplink GPRS channel or Ethernet, and its uplink channel adopts public communication network, supporting two communication modes: client and server. It complies with the relevant standards of IEC International Electrotechnical Commission.

The centralized controller can support various types of street light distribution boxes, whether with or without energy-saving function. It is equipped with control and monitoring functions for 8 circuits. When realizing the control of the distribution box, the device is linked with the contactor equipment in the distribution box through the standard input and output modules to realize the operation of the street light switch. At the same time, it is able to match the control logic of the original street light control box to realize the control of street lights in the energy-saving control box.

II. Product Diagram and Installation Dimensions



Pictures of centralized controllers



NJ-jk01 size: 288mm*177mm*96mm (L*W*H)

III. Product Functional Characteristics

1.1 Street light timing control

Street light timer control function that through the timer task setting, the concentrator automatically according to the task time, perform the corresponding whole line street light control operation, refers to the closing and pulling applications.

1.2 Street light latitude and longitude control

The street light latitude and longitude control function means that through the latitude and longitude task setting, the concentrator automatically calculates the sunset and sunrise time of the region to control the whole street light, which refers to the application of closing and pulling the gate.

1.3 Street light sensing control

Street light sense control function that through the light sensor control task settings, the use of external light sensor (optional) on the whole street light control operation, refers to the closing and pulling applications.

1.4 Branch control function

Concentrator side can realize 7 branch relays independent pull-closing control, and can realize automatic control of any branch at any time of the day.

1.5 Street light and group control

Single lamp control: you can switch and adjust the brightness of any lamp.

Grouping control: switching and brightness adjustment can be carried out for all the lamps or the street lamps meeting the grouping conditions at the same time.

1.6 Energy-saving control of street lights

Through the task configuration of the energy-saving program, the concentrator can automatically control the street lights under each grouping at regular intervals, adjusting the brightness of the street lights or controlling the switch status, so as to achieve the purpose of system energy saving.

1.7 Door monitoring for street light boxes

The concentrator cooperates with door magnetic switch (optional) and infrared sensor (optional). Realize the street light control box illegal open box door alarm.

1.8 Relay output remote monitoring

The concentrator comes with 7-channel input signal detection, which is used for confirming the output of pull-close signal, confirming the execution effect of the output signal, and prompting the user with abnormal light out and abnormal light on alarms after the abnormality occurs. If the remote monitoring port is insufficient, the input can be expanded by expansion module.

1.9 Power failure alarm

It can realize the alarm when the concentrator loses power and can maintain the concentrator online in the case of power failure.

1.10 Data acquisition and processing

Control box total power supply data: can collect control box input total voltage, current, power, electricity and other parameters.

Single lamp data: voltage, current, power, electricity of each street lamp, supporting real-time collection and historical data collection.

State quantity collection: the terminal collects switch position status and other state information in real time, and actively reports to the backstage when a change of position occurs.

1.11 Power failure data preservation

After the power supply of the concentrator is interrupted, the data and clock are kept for at least one month. When the power supply is restored, the saved data will not be lost and the internal clock will run normally. Concentrator has a built-in battery to ensure that the device can be kept online within 8 hours after a power failure.

1.12 Anti-theft function for street light cables

Concentrator with cable anti-theft device (optional). 24-hour line monitoring of street light power supply lines, cable loss alarm.

1.13 Calibration function

Concentrator remote manual time calibration and automatic time calibration, can also be equipped with GPS accurate positioning time calibration module, can be accurate time to milliseconds, generally used for color lights synchronization control.

1.14 Other functions

Total power supply data of control box: the total voltage, current, power and electricity input to the control box can be collected.

Software remote upgrade: the terminal can realize online software upgrade through remote communication channel. sim card management: it can automatically read and write the sim card number, which is convenient for the maintenance of the terminal; it can also count the communication flow with the master station.

Sim card management: Sim card number can be read automatically to facilitate the maintenance of the terminal; and it can count the communication flow with the master station.

2、Concentrator configuration

name	Centralized Controller					
versions	relay control	RS485	DC12V	Box Inspection	Door network communication	port USB Debugging
Concentrator Configuration	7-way	1-way	1-way	1way	support	support
	support	support	support	Supports 8-way expansion	Supports 16-way expansion	Maintenance, automatic mode switching to ensure safety

3、Electrical Performance

3.1 Carrier frequency

Power line carrier: 1.66MHz

3.2 Power supply

Three-phase four-wire power supply: A (2), B (5), C (8), N (10) or single-phase power supply when the fire wire to A (2);

Supply voltage: it can work normally within the rated voltage (220/380V) $\pm 15\%$;

Normal operating frequency: 50HZ deviation 6% $\sim +2\%$;

Power consumption of the whole machine: apparent power $\leq 15\text{VA}$, active power $\leq 10\text{W}$.

3.3 Environmental conditions:

Outdoor: temperature of $-40\text{ }^{\circ}\text{C} \sim +70\text{ }^{\circ}\text{C}$; relative humidity of 10% ~ 100%

3.4 Mechanical properties

Can withstand the mechanical vibration in normal operation and the impact of conventional transportation conditions, the equipment does not occur damage and loose parts off.

3.5 Electromagnetic compatibility (EMC)

Electrostatic discharge: 8KV;

High frequency electromagnetic field: 10V/m;

Electrical fast transient pulse group: 4KV;

Surge voltage: 4KV;

3.6 Other electrical properties

Internal clock accuracy: 0.5s/d;

Data retention validity: 30 years

IV. Scope of application

Smart street light centralized controller is applicable to the following scope:

- City street light system: Smart street light centralized controller can be applied to the street light system in the city, including the street light control of all kinds of roads, such as main roads, secondary roads, community roads and so on.
- Lighting in public places: Smart street light centralized controllers can also be used for lighting control in public places, such as parks, squares, parking lots and other places for lighting management.
- Commercial area lighting: street lighting in commercial areas can also be centrally managed by smart street light centralized controllers to improve the lighting effect and energy utilization efficiency.
- Industrial Park Lighting: Street lighting in industrial parks requires a large area lighting layout, and smart street light centralized controllers can realize centralized control and monitoring of street lights in the park.
- Highway Lighting: Smart street light centralized controller can be applied to the lighting system of highway to realize the control and management of street lights on road sections, tunnels, bridges and other sections.
- Smart street light centralized controllers can be applied to various sizes and types of street light lighting systems, providing centralized control, remote monitoring, energy consumption management and other functions to achieve more efficient, smart and energy-saving street light lighting management.

V. Product technical characteristics

- 1.Communication modular design: smart street light centralized controller adopts communication modular design, which can be replaced on the spot without cumbersome settings and is easy to use.
- 2.Compliance with industry standards: the product complies with most industry standards, has good electromagnetic compatibility and anti-interference ability, stable and reliable performance.
- 3.Industrialized design: Smart street light centralized controller adopts industrialized design with novel and beautiful appearance. The shell material has the characteristics of flame retardant, UV resistance, shock resistance, dustproof, moistureproof, etc., and the protection level reaches IP45.
4. Support for common and own protocols: the device supports the CJJ industry common protocol specification, and can be directed to secondary development according to the requirements of different cities, in order to support all levels of city-specific own protocols.
- 5.Equipment failure does not affect the original facilities: when the smart street light centralized controller itself fails, it will not affect the normal operation of the original street light related facilities, including street lights, centralized controllers, street light distribution box distribution equipment and single light monitoring terminals.
- 6.The annual failure rate of the equipment itself is $\leq 0.1\%$ in 2 years.
7. The annual failure rate of the equipment itself is $\leq 1\%$ within 5 years.

VI. Technical parameters

1. AC Power Supply:

- A. The rated voltage of the AC power supply is AC380V with an allowable deviation range of -20% to +20%;
- B. The frequency of AC power supply is 50/60Hz, and the allowable deviation range is $\pm 10\%$;
- C. Support single-phase and three-phase four-wire AC power input.

2. Environmental conditions:

Name	Parameter content
Temperature	40°C~+70°C
Relative Humidity	10%~100
Atmospheric Pressure	BB2 level, 66~108kPa

3. Hardware Configuration

Name	Parameter content		
CPU	Industrial grade Cortex-M4 core microcontroller 1024Kb Flash, 128Kb RAM		
DRAM	Capacity: 512K×16bit		
Data FLASH	Capacity: 128M×8bit Reliable data retention time: 10 years		
SD Card	Capacity 4G		
LCD Display	55*55 (mm)		
Clock Hold	Clock error ≤ 0.12S/h Terminal data, parameter data retention time: 10 years		
Communication Interface	1 RS232 local communication interface; 1 RS485 interface; 1 SD card interface; 1 10/100M Ethernet interface		
Support wireless communication mode	4G		
Three-phase power data collection Collector Module Parameters	measured quantity	inaccuracies	resolution
	Voltage	±0.5%	0.01V
	Current	±0.5%	0.001A
	Active power	±0.5%	0.001KW
	Reactive power	±0.5%	0.001Var
	Apparent power	±0.5%	0.001VA
	Power factor	±0.5%	0.001
	Frequency	±0.01Hz	0.01Hz
	Active power	±1%	0.01Kwh
	Reactive power	±1%	0.01Kvarh

VII. Product installation instructions

1. Specific installation steps:

- ① Disconnect the power supply.
- ② Secure the concentrator and open the terminal block box.
- ③ Connect the wires according to the above terminal block wiring instructions.
- ④ Measure whether the voltage is normal, whether the terminals are firmly connected, and confirm that there is no error to close the power supply.
- ⑤ Observe whether the terminal LCD is normal or not. Communication signal is full.
- ⑥ GPRS "NET" shows green, blinking once every 1s, communication normal operation light blinking once every 1S, the platform on-line communication is normal. Manual branch control switch to detect whether the control is normal, check whether the corresponding setup data is normal (detailed operating instructions to view the operating instructions).
- ⑦ check is complete, cover the terminal box, clean up the scene!

2. 1220V power supply plus relay output expansion module

3. 2380V supply - AC contactor 220v control

4. 3380V supply - AC contactor 380v control

5. 4380V power supply without output control extension connection

6. Indicator light status

Running indicator light: Normal power-up is always on, and the platform is connected successfully by flashing 1 time every 1 second. Alarm indicator: when an alarm event occurs, this light is on for 6 seconds.

485 communication indicator: external 485 communication status light flashes
active reactive power status light: no status indication for the time being.

Centralized controllers carrier communication module status indication

Power light - module power-up indicator, red. When the light is on, it indicates that the module is powered up;

When the light is off, it indicates that the module is de-energized.

T/R lamp - module data communication indicator, red and green. When the red light flashes, it means the module receives data; when the green light flashes, it means the module sends data.

A lamp - A-phase transmit status indicator, green. B lamp - B-phase transmit status indicator, green. C lamp - C-phase transmit status indicator, green.

GPRS Communication Module Status Indication

Power light - module power-up indicator, red. When the light is on, it indicates that the module is powered up; when the light is off, it indicates that the module is powered down.

NET light - network status indicator, green light when network status is on.

T/R lamp - module data communication indicator, red and green. When the red light blinks, it means the module receives data; when the green light blinks, it means the module sends data.

LINK light - Ethernet status indicator, green color. Indicates that the LINK light is always on after the Ethernet port has successfully established a connection.

DATA light blinks - Ethernet data indicator, red. The DATA light blinks when data is exchanged on the Ethernet port.

7. Transportation and Storage

Terminal transportation and unpacking should not be subjected to violent shocks, should be in accordance with GB/T15464-1995 ("Instrumentation Packaging General Techniques original packaging, preserved in a place where the ambient temperature of $-40\text{ }^{\circ}\text{C} \sim +70\text{ }^{\circ}\text{C}$, the air is not corrosive gases.

8. Warranty period

This product in the user to comply with the requirements set out in the manual, and under the conditions of the manufacturer sealed complete, found not in line with the relevant standards, since the sale of eighteen months free of charge within the maintenance, lifelong technical support.

Attachment:

Concentrator use please see: Concentrator operation and use guide

VIII. Technical support

Computerized web site entrance:
<https://iot1.xmnengjia.com/#/login>

Test account: test001

Password: 123456



NET JOIN IOT

www.xmnengjia.com