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Intelligent Lighting Control Solutions



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MOONS'
moving in better ways

• All specifications and technical parameters of the products provided in this catalog are for reference only, we are subject to change without notice.
For details, please contact our sales team.

About us

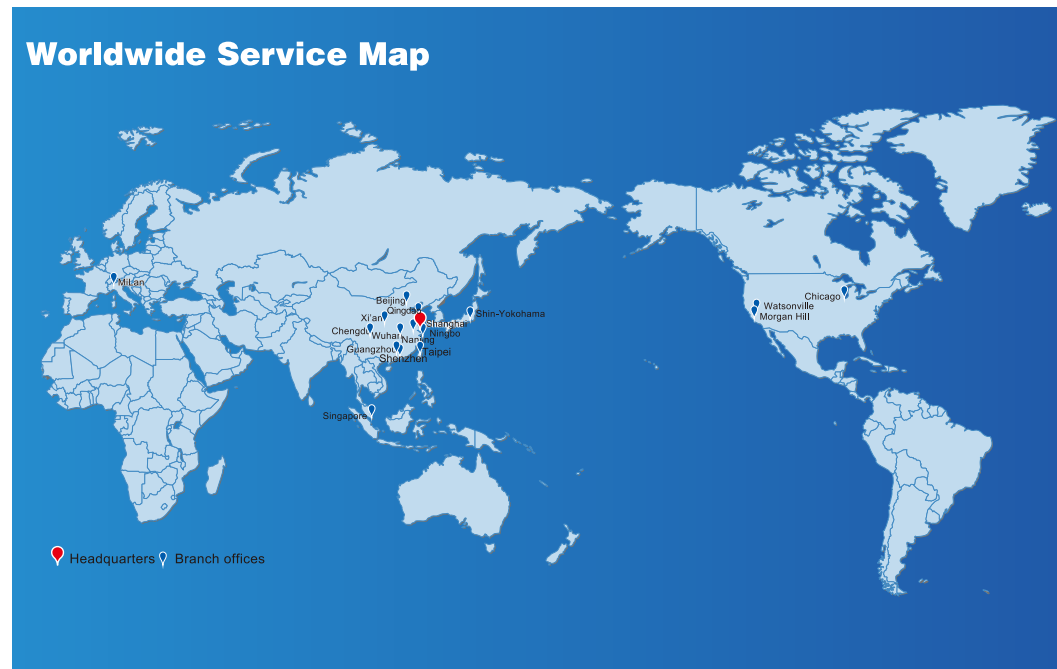


MOONS'

Shanghai MOONS' was founded in February, 1994 with registered capital exceeding 10 million U.S. dollars and with the total investment exceeding 25 million U.S. dollars. Our business campus covers an area of over 50,000 square meters with a work force of over 2,000 employees with the majority being technical and sales professionals. MOONS' currently has nine branches within China; Beijing, Shenzhen, Guangzhou, Nanjing, Ningbo, Qingdao, Xi'an, Wuhan and Chengdu. Internationally, MOONS' has established a global sales network with subsidiaries in North America, Europe, East Asia and Southeast Asia.

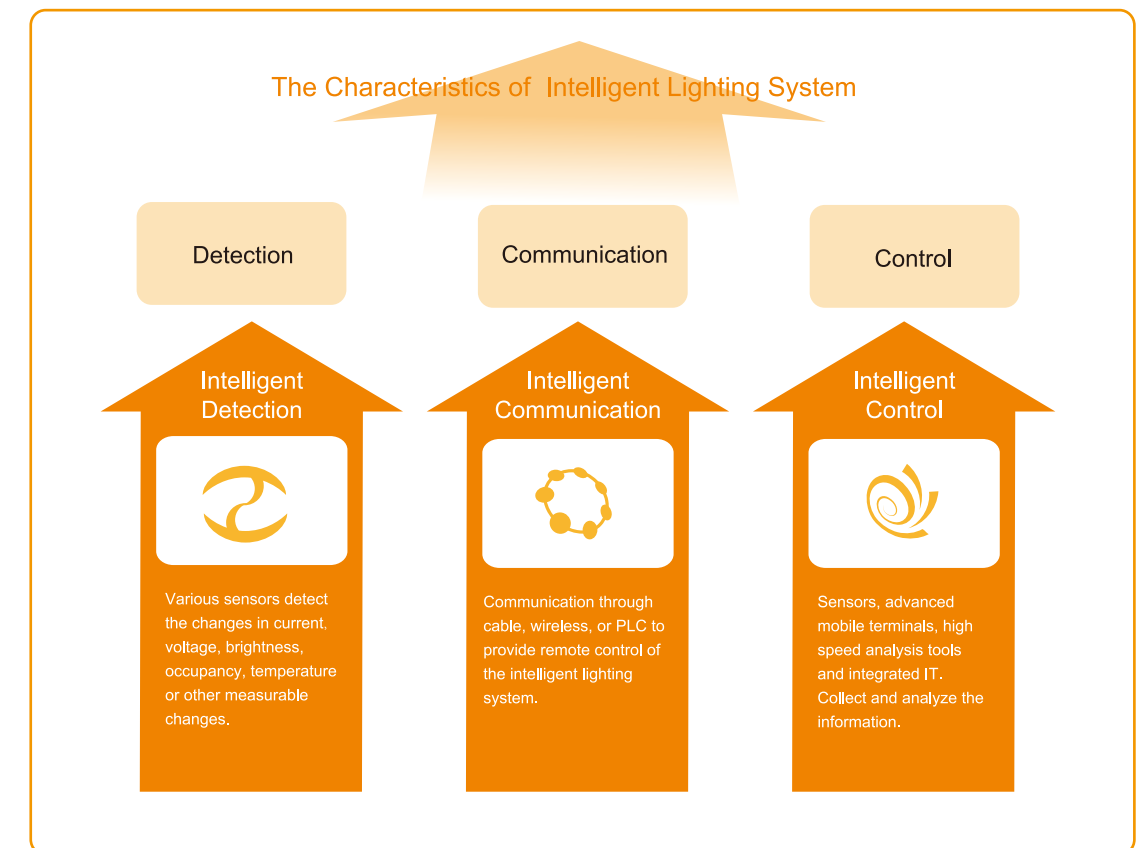
Shanghai MOONS' Automation Control Co., Ltd. is a professional Hi-Tech manufacturing organization producing Intelligent Control Systems, System Integration Technology, Drivers, and Communication Devices. Our quality systems and processes are ISO 9001, ISO 14001, BS OHSAS 18001 certified and met the most stringent software qualification and system integration requirements. The majority of our products have been listed and/or approved by CCC, UL, CUL, TÜV, CB, CE, PSE or ETL.

MOONS' intelligent control technologies are widely used in outdoor, roadway & landscape lighting, as well as with indoor building automation systems. MOONS' goal is to provide the "Intelligent Control and Driver Solutions" for our customers.

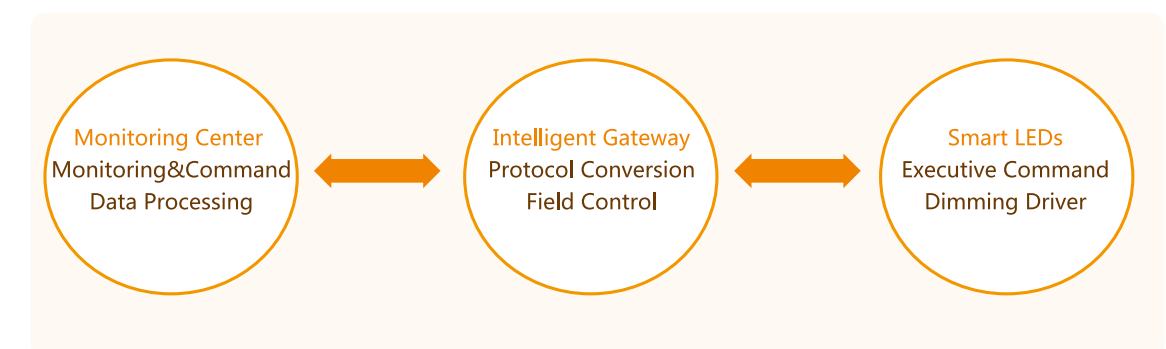


Intelligent Lighting

Core Concepts of the Intelligent Lighting System

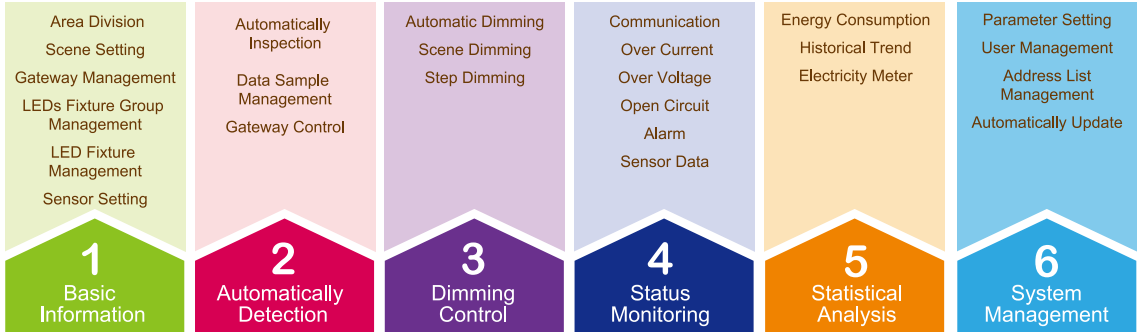


Intelligent Lighting Control System Structure



Intelligent Monitoring Software

Overall Architecture



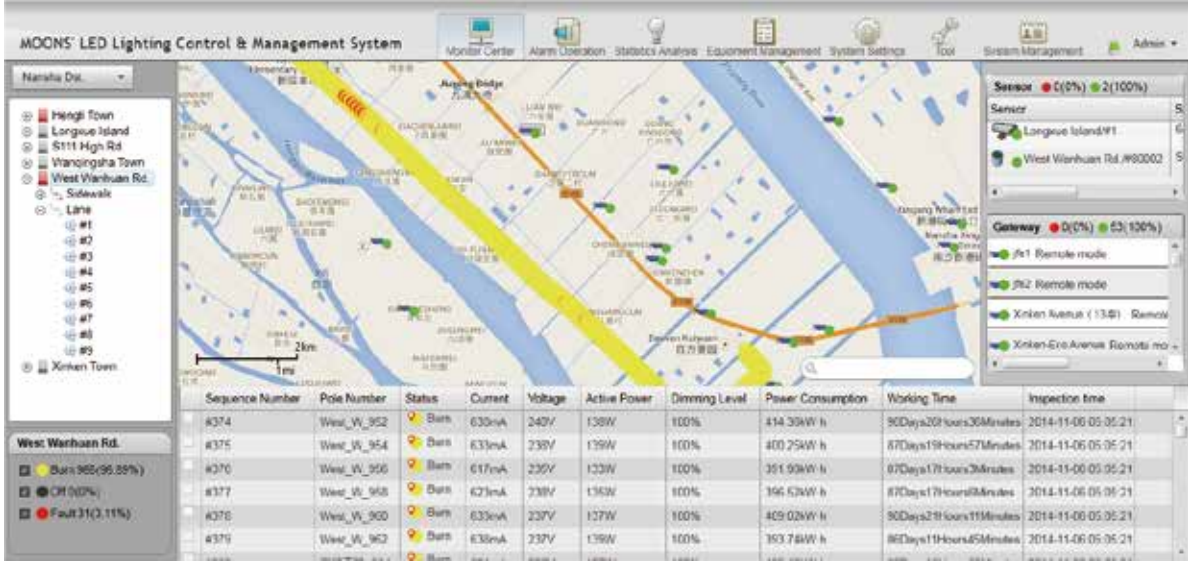
Default Scenario

	High Traffic Volume	Normal Traffic Volume	Low Traffic Volume
	sunny	sunny	sunny
	cloudy	cloudy	cloudy
	overcast	overcast	overcast
	gray	gray	gray
	night	night	night
	midnight	midnight	midnight

User Defined

Fire Alarm
.....
.....
.....
.....
.....
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Visual Condition Monitoring



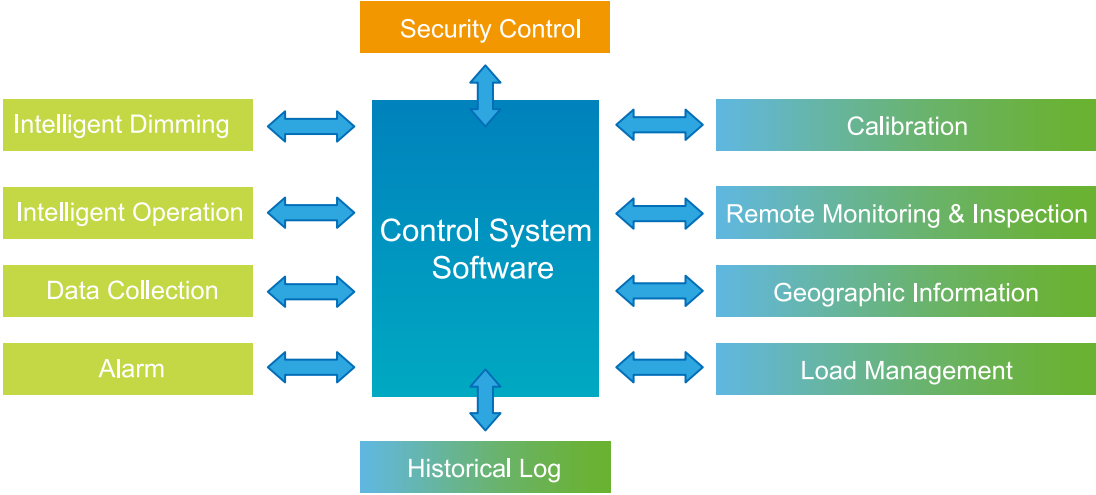
Power Consumption(kW.h)



Alarming



Functions



Interpretation of Functional Words

Intelligent Dimming	The switching and dimming function can be applied to the fixtures in the whole field. Both the manual control and timing control can be applied to any fixture or swarm fixtures as well.
Intelligent Operation	The system can operate automatically including timing mission and dimming according to the operation plan. The system still can operate automatically, even if the host was shut down.
Data Collection	1.Collecting the parameters of fixture. For instance: voltage, current, power, etc. 2.Collecting the data of sensors. For instance: PM2.5, CO, humidity, illuminance, vehicle flow, etc.
Alarm Processing	The host computer will receive the alarm information if the fault condition(e.g. fixture breakdown, steal and abnormal operating situation) occurs.
Security Control	Security control system has an ability to set the login password, observe situation, control the authorization in order to prevent the safety of the control system from someone who hasn't gained authorization operating.
Informing Function	Gaining the record data that including operating data, operating situation, energy consumption, etc.
Automatic Calibration	The system clock keeps the synchronization with server clock in order to maintain precise timing.
Remote Monitoring & Inspection	Achieving the monitoring and instant inspection function via Internet.
GIS	The situation of all fixtures in the field can be embodied via map, sketch map and mode map intuitively. The situation of fixtures can be inspected and controlled through map as well.
Load Management	According to the situation of electric load, adjusting the output of luminance and controlling the load level in order to ensure the safety of the electric power grid and traffic.
Free Organization	Define and organize the distribution of the fixtures according to the requirement of the user.

Solution Type

1 Wireless Solution

Wireless is a standard protocol based on IEEE802.15.4, and is suitable for short distance and low power communications.

Features of Wireless:

- 1.Low power
- 2.Low cost
- 3.Short distance
- 4.Short time delay
- 5.High network capacity
- 6.High security
- 7.ISM band
- 8.High extensibility

Applications:

- 1.Family and Architecture: temperature control for cooling systems; lighting system controls; automatic control of the interior curtains; control of gas systems; remote control of household appliances.
- 2.Industry: monitors, sensors and automation control.
- 3.Commercial: intelligent labels.
- 4.Public Areas: smoke & gas detectors
- 5.Biological: collection soil and climate information.
- 6.Medical: medical sensor and emergency warning beeper.



Landscape Lighting



Street Lighting



Tunnel Lighting



Indoor Lighting



Biological Lighting



Medical Lighting

2 Tunnel Lighting (Cable) Solution

RS485 is a field bus and it is popular because it is simple, reliable and low cost. The standard only defines the electrical characteristics and data format, the protocol can be modified by end users.

The communication is encrypted and safe and RS485 solution is suitable for all kinds of urban roads, tunnels, landscape, parking lots and so on.

3 PLC (Power Line Carrier) Solution

Power line carrier is a unique communication protocol that utilizes the power line to transfer high speed analog and digital signals. This communications protocol does not require any additional cables. All communications is done over existing power lines.

Applications of PLC:

- 1.Intelligent family
- 2.Intelligent public service (remote meter reading, remote street light monitoring)
- 3.Intelligent industry (data collection)

4 Wireless Data Acquisition Module

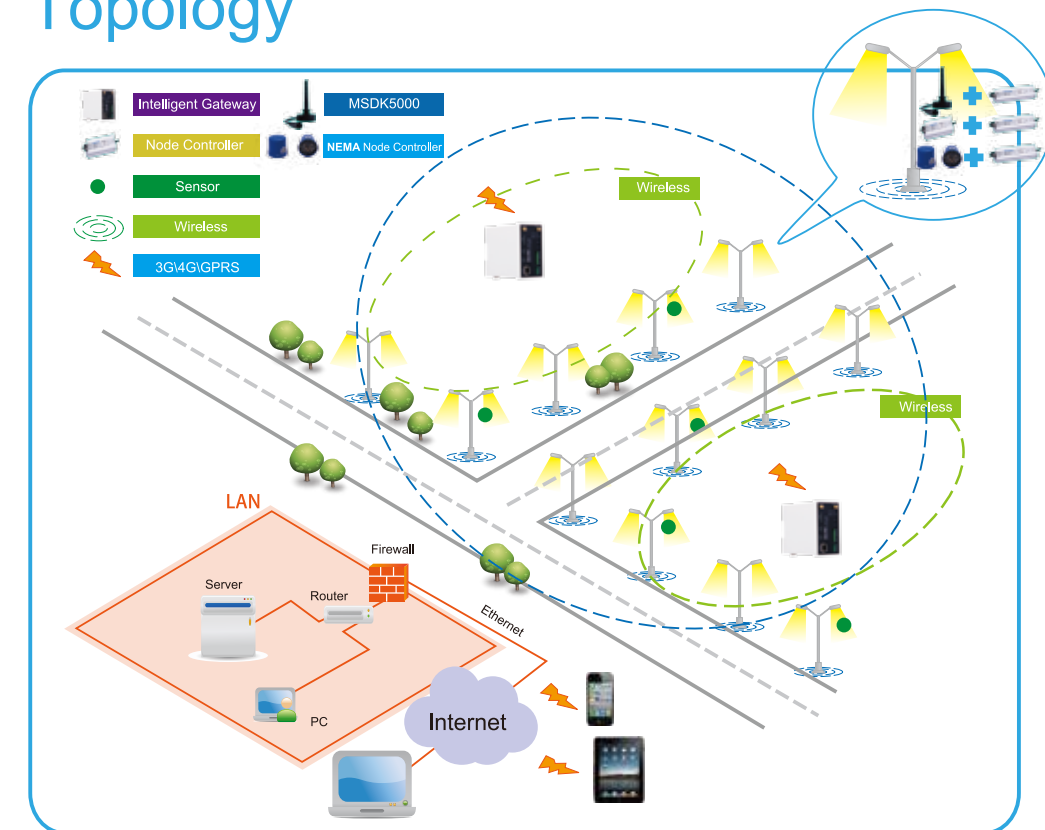
Wireless Data Acquisition Module of MOONS' is designed for connecting various sensors with 0~5V, 4~20mA or I2C interface.

Wireless Solution

MOONS' public lighting intelligent monitoring system is suitable for all kinds of urban roads, tunnels, landscape, parking lots, coalpits, etc. The system is mainly composed of intelligent gateway, node controller, intelligent monitor and control management system software, lighting protocol and different sensors. Each wireless intelligent gateway can manage 200 wireless node controllers at most. In order to apply to roadway, it uses chain and tree wireless network topology to support 20 hops at most.

Lighting protocol is divided into two parts: the protocol of the master controller to gateway, namely, intelligent lighting control system application layer communication protocol; the protocol of the intelligent gateway to node controller, namely, MOONS' protocol. Lighting protocol supports the firmware upgrade to reduce the difficulty of the breakdown maintenance. Intelligent lighting control system application layer communication protocol is fully for the practical requirement of public lighting. MOONS' protocol is independent to the physical layer, and it can be used on the PLC, 2.4G wireless or RS485.

Topology



Note: The public lighting intelligent monitoring system supports different kinds of external sensors, such as Occupancy/Vacancy, PM2.5, CO, Humidity&Temperature, Daylight Harvesting, vehicle flow rate, and etc.

Project Major Requirements List

Requirements	Instructions
Computer	Configuration requirements depend on the size of the project.
Software	Windows Server2003、Windows Server2008 (32-bit/64-bit) SQL Server 2005 and above
Intelligent Gateway (Wireless)	Protocol conversion, local control (optional with 3G communication function, removing remote networking)
Integrated Driver (Wireless)	Instruction execution, driving lamps (power is optional)
Luminaire	Tunnel lamp, street lamp, solar street lamp.

Wireless Intelligent Gateway (Ethernet) (MSKT1100-ZIG)



Features

- Uplink supports Ethernet channel, and follows the TCP/IP protocol (RJ45 interface).
- Downlink supports 2.4GHz wireless communication protocol in accordance with IEEE802.15.4, the maximum communication distance is 1000M (visual range), the communication rate is 250kbps.
- An additional RS485 bus channel can be used to connect watt-hour meter, illuminance sensor, flow rate sensor, and etc.
- Supports the communication mode of unicast, multicast, broadcast and scene dimming; the control mode includes remote control, local control and time control dimming.
- Failure protection mechanism: when the gateway is out of communication with monitoring center for 5 minutes, it will change to the time control dimming mode automatically and base on the previous day's work record, until the communication restored.
- Built-in RTC, with backup battery, the clock can continue working for 30 days after the battery exhausted its power.
- Built-in TF card slot, supports FLASH space expansion (up to 2 GB) to record historical data.
- Power supply: 100 ~ 240VAC, three phase four wire; 50/60Hz.
- Recommended to use in roadway lighting.

Wireless Intelligent Gateway (MSKT1300)



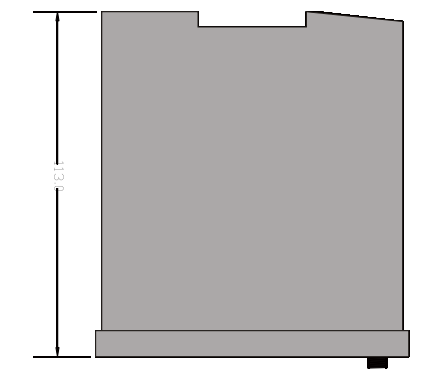
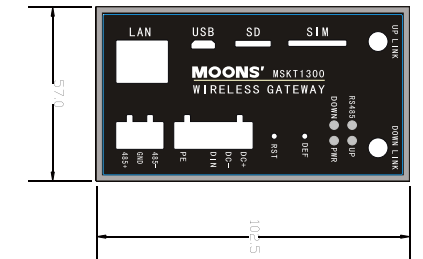
Features

- Uplink supports Ethernet channel, and follows the TCP/IP protocol (RJ45 interface).
- Downlink supports 4 channel 0-10V analog dimming interface.
- An additional RS485 bus channel can be used to connect watt-hour meter, illuminance sensor, flow rate sensor, and other devices.
- The input voltage is 24VDC, can be used with a variety of 24VDC industrial power supply.
- Built-in 64MB MDDR (can be expanded to 256MB).
- Built-in 256MB NAND Flash (can be expanded as needed).
- Built-in TF card interface, can be expanded Flash space (max to 2GB).

Technical Specifications			
AC Input	Voltage	100~240V, tri-phase	
	Frequency	50/60Hz	
	Power Dissipation	≤10W	
	Measuring Current	≤5A	
2.4G Radio Frequency	Transmission Power	20dBm	
	Receiving Sensitivity	-100dBm	
	Transmission Rate	250kbps	
	Frequency Range	2400~2485MHz	
Cellular Network	Standard	GPRS/3G/4G	
	100M Transmission Voltage	-1.05V~+1.05V	
Ethernet	10M Transmission Voltage	-2.8V~+2.8V	
	Transmission Rate	10/100Mbps	
RS485	Voltage	-5.5V~+5.5V	
	Transmission Rate	≤115200bps	
Electric Relay	Switching Voltage	≤250VAC	
	Load Current	≤5A	
0~10V	Input Voltage	0~10.5V	
	Input Current	≥10 μA	
4~20mA	Input Voltage	≤10V	
	Input Current	≤20mA	
Stability	Operating Temperature	-25°C~55°C	
	Storage Temperature	-30°C~85°C	
	Operating Humidity	10~90%, non-condensing	
	Atmospheric Pressure	63~108kPa, Alt.≤4000m	
	Vibration	1G	
	IP	IP51	
Others	Warranty	3 years	
	Data Storage	10 years	
	Dimensions	290*180*98 mm	
	Weight	2.05 kg	
Safety	Standards	IEC61347-2-11	
	Insulation Resistance	AC input to others ≥100MΩ	
EMC	Standards	Isolation Voltage	AC input to DC 2kVAC
		EN61000-4-2 IV;	
		EN61000-4-3 III;	
		EN61000-4-4 IV;	
		EN61000-4-5 IV;	
		EN61000-4-6 III;	
		EN61000-4-8 III;	
EN55015			



Technical Specifications		
Power	Input	DC:10-30V
	Consumption	10~30W
0-10V dimming interface	Voltage	0~10.5V
	Current	0~250mA
Ethernet	100M Transmission Voltage	-1.05V~+1.05V
	10M Transmission Voltage	-2.8V~+2.8V
RS485	Transmission Rate	10/100Mbps
	Voltage	-5.5V~+5.5V
Stability	Transmission Rate	≤115200bps
	Operating Temperature	-25°C~55°C
	Storage Temperature	-25°C~60°C
Others	Operating Humidity	10~95%, non-condensing
	Vibration	1G
Safety	IP	IP20
	Dimensions	288*140*61 mm
EMC	Weight	180kg
	Standards	Isolation Voltage: 1.5kVac, 5mA, 1min
Safety	Insulation Resistance	≥100MΩ (normal); 2MΩ (damp and heat)
		IEC61000-4-2 Level4
EMC	Standards	IEC61000-4-4 Level3
		IEC61000-4-5 Level2
		CLASS B (EN55022)
		CLASS B (EN55022)
		FCC PART15 Class B / EN55015



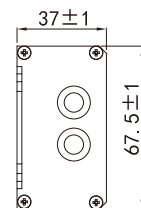
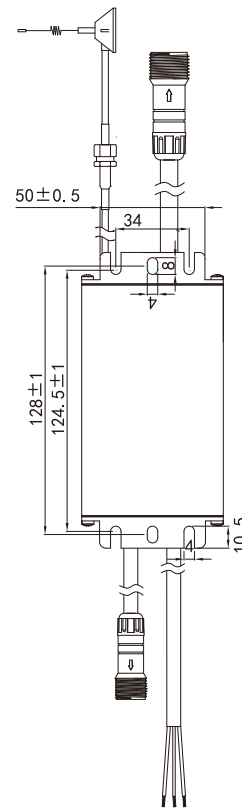
Wireless Node Controller (MSDK1231)



Features

- Designed for outdoor use however can also be used with lamps, wall brackets, and post lamps in interior applications.
- Supports 2.4GHz wireless communication protocol in accordance with IEEE802.15.4 to send and receive data.
- Communication distance is more than 500M (visual range), communication rate is 250kbps.
- Monitors, controls and switches the drivers within 480VA
- Wide input voltage, power supply 100 ~ 277Vac, 50/60Hz
- 0-10V dimming; 1% for each level; totally 100 levels
- Follows MOONS' protocol to communicate with intelligent gateway
- Monitors the input voltage, current, power, power factor and temperature in the lamps
- Alarms for over load, without load, over temperature (send the data to host computer to alarm)
- Statistics, storage, and output the cumulative power and working time
- Communication failure protection mechanism: When the node controller is out of communication with the gateway for 10 minutes, it will keep constant lighting (factory settings is 100% brightness)
- Control failure protection mechanism: Even if the MCU fails, the constant light operation is maintained.

Technical Specifications		
AC Input	Voltage	100~277VAC
	Frequency	50/60Hz
	Current	≤2.05A
	Power Dissipation	≤1.5W
AC Output	Current	2A
	Power	480VA
Radio Frequency	Transmission Power	18dBm
	Receiving Sensitivity	-100dBm
	Transmission Rate	250kbps
	Frequency Range	2400~2485MHz
Dimming	Voltage	0~10.5VDC
	Current	0~10mA
	Accuracy	-3~+3%
Meter	Voltage	0~277VAC
	Current	0~2.05A
	Accuracy	-5~+5%
Stability	Operating Temperature	-40~70°C
	Enclosure Temperature	≤80°C
	Humidity	10~90%,non-condensing
	Atmospheric Pressure	63~108kPa,Alt.≤4000m
	Storage Temperature	-40~85°C
	Vibration	2G
	IP	IP67
Others	MTBF	≥30000h @25°C
	Data Write	10 ¹⁴ times
	Dimension	141*67.5*37mm
Safety	Standards	IEC61347-2-1 IEC61347-2-11
	Insulation Resistance	AC input to others≥100MΩ
EMC	Isolation Voltage	AC input to dimming 3kVac
	Standards	GB17626-2 IV;
		GB17626-3 III;
		GB17626-4 IV;
		GB17626-5 IV;
		GB17626-6 III;
GB17626-8 III;		
GB4824 (2.4~2.5GHz)		



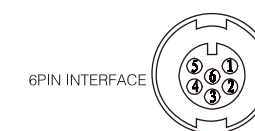
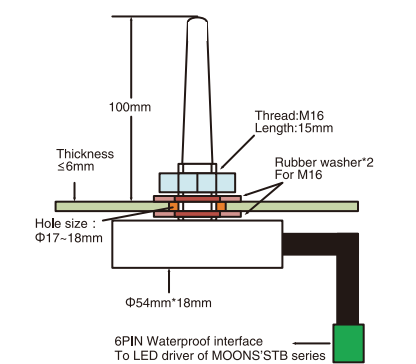
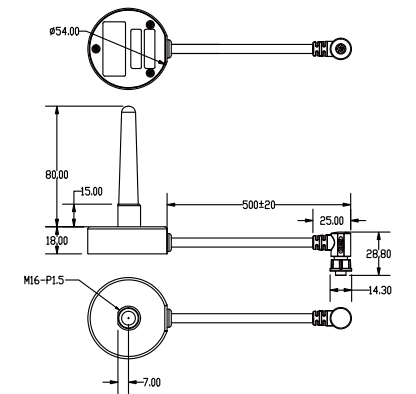
Wireless Node Controller (MSDK5000)



Features

- Designed for outdoor installation, can be retrofitted into existing fixtures.
- Uses 2.4 GHz intelligent gateway to communicate, send and receive data;
- Wireless transmission distance is greater than 500m (visual range),the communication rate of 250 KBPS.
- Connects to the LED driver of MOONS' STB series
- 5V PWM for Dimming
- Communicates with intelligent gateway, and follows MOONS' protocol
- Monitors the DC voltage, current, power, temperature
- Communication failure protection mechanism: When the node controller is out of communication with the gateway for 10 minutes, it will maintain constant light output.
- Control failure protection mechanism: even if the MCU fails, the constant light operation is maintained.

Technical Specifications		
AC Input	Voltage	4.5-5.5V
	Current	300mA max
Radio Frequency	Transmission Power	18dBm
	Receiving Sensitivity	-100dBm
	Transmission Rate	250kbps
PWM	Frequency Range	2400~2485MHz
	PWM Percentage	1±0.1 KHz
Turn-off Voltage	H Condition	4.5-5.4V
	L Condition	0-0.1V
Meter	Voltage	0-2.4V
	Current	0-2.4V
	Accuracy	-5%~5%
Stability	Operating Temperature	-40~70 °C
	Enclosure Temperature	≤80 °C
	Storage Temperature	-40~85 °C
	Relative Humidity	10~90%,non-condensing
	Storage Humidity	5~95%,non-condensing
	Atmospheric Pressure	63~108kPa,Alt.≤4000m
	Vibration	10G
Others	MTBF	≥30000h @25 °C
	Weight	90±5g
EMC	Standards	EN61000-4-2 IV;
		EN61000-4-3 II;
		EN61000-4-4 III;
		EN61000-4-6 II;
		EN61000-4-8 III;



Pin	Name	Description
1	GND	DC Ground
2	5V IN	DC Supply
3	Is	Current Feedback
4	PWM	PWM Output
5	Vs	Voltage Feedback
6	Off	Off

*Some of the STB drivers do not support switch off.

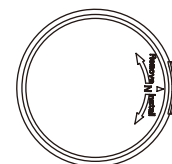
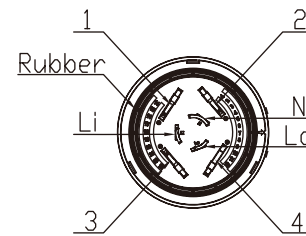
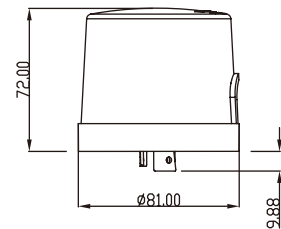
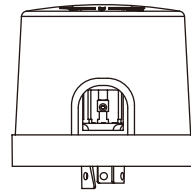
Wireless Node Controller with NEMA Interface (MSDK6149)



Features

- Installation interface: follow the ANSI C136.41.u standard.
- Supports 2.4GHz wireless communication protocol in accordance with IEEE802.15.4 to send and receive data.
- Communication distance is more than 500M (visual range), communication rate is 250kbps.
- Dimming interface: support 2 0-10V or DALI channel.
- Can detect the real time consumption, voltage and current, follow the ANSIC12.1 standard, $\pm 2\%$ accuracy.
- It has a IP53 cover, and could be IP65 after installation.
- Follow FCC PART15 and UL773 standard.
- Support GPS automatic positioning, accuracy: $\leq \pm 10m$ (optional).
- Support automatic dimming, follow the ANSI C136.10 standard(optional).

Technical Specifications		
AC Input	Voltage	100~277VAC
	Frequency	50/60Hz
	Current	$\leq 5A$
	Power Dissipation	$\leq 2W$
Power Metering	Voltage	0~300Vac
	Current	0~5A
	Accuracy	$\pm 1\%$
Dimming Output	Voltage	0~11Vdc
	Current	0~5mA
	Accuracy	$\pm 1\%$
2.4G Radio Frequency	Transmission Power	20dBm
	Receiving Sensitivity	-98.8dBm
	Transmission Rate	>250Kbps
	Frequency Range	2400~2483MHz
Optical signal	Spectral range	350~970nm
GPS signal	Receiving sensitivity	-160dBm
	Operating Temperature	-40~+70 C
	Storage Temperature	-40~+85 C
Stability	Operating Humidity	10%~95%, non-condensing
	Vibration	10G
	IP	IP53 (Not installed) ;IP65(Intalled)
	Flame retardant	UL94-V0
	EMC	Standards
Others	Dimensions	81 (D) * 72 (H) mm
	Weight	100g

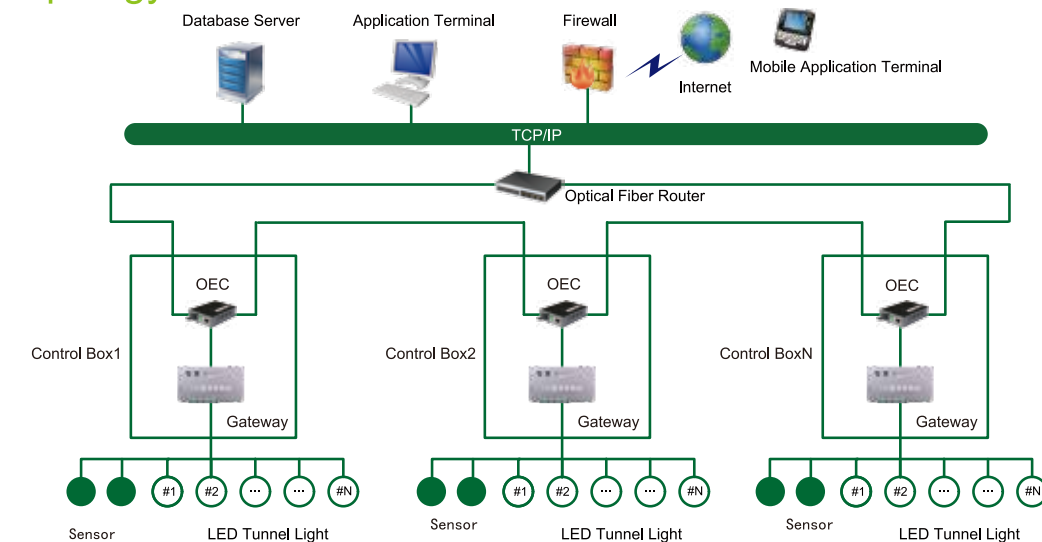


Tunnel Lighting (cable) Solution

MOONS' public lighting intelligent monitoring system is suitable for all kinds of urban roads, tunnels, landscape, parking lots, coalpits, etc. The system is mainly composed of intelligent gateway, node controller, intelligent monitor and control management system software, lighting protocol and different sensors. Each RS485 intelligent gateway can manage 660 RS485 node controllers (4 channels) at most.

Lighting protocol is divided into two parts: the protocol of the master controller to gateway, namely, intelligent lighting control system application layer communication protocol; the protocol of the intelligent gateway to node controller, namely, MOONS' protocol. Lighting protocol supports the firmware upgrade to reduce the difficulty of the breakdown maintenance. Intelligent lighting control system application layer communication protocol is fully for the practical requirement of public lighting. MOONS' protocol is independent to the physical layer, and it can be used on the PLC, 2.4G wireless or RS485.

Topology



Note: The public lighting intelligent monitoring system supports different kinds of external sensors, such as Occupancy/Vacancy, PM2.5, CO, Humidity&Temperature, Daylight Harvesting, vehicle flow rate, and etc.

Project Major Requirements List

Requirements	Instructions
Computer	Configuration requirements depend on the size of the project.
Software	Windows Server2003、Windows Server2008 (32-bit/64-bit) SQL Server 2005 and above
Optical Fiber Router	Remote communication with control center
OEC	Arranging the optical fiber ring network in the control field
Optical Fiber	Arranging the optical fiber Ethernet
Intelligent Gateway (RS485)	Protocol conversion, local control (optional with 3G communication function, removing remote networking) Protocol conversion, local control (optional with 3G communication function, removing remote networking)
Shield Twisted Pair	More than $\phi 1.5mm^2$
Integrated Driver (RS485)	Instruction execution, driving lamps (power is optional)
Luminaire	Tunnel lamp

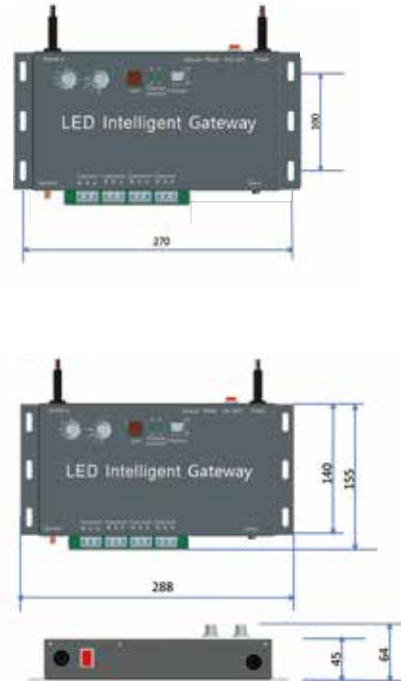
RS485 Intelligent Gateway (Ethernet) (MSKT1000-485)



Features

- Uplink supports Ethernet channel, and follows the TCP/IP protocol (RJ45 interface).
- Downlink supports 4 channel RS485 bus, 165 nodes (max) for each RS485 channel (150 nodes recommended). The communication distance of single bus is 800 meters, the communication rate is 19200 bps.
- An additional RS485 bus channel can be used to connect watt-hour meter, illuminance sensor, flow rate sensor, and other devices.
- Supports the communication mode of unicast, multicast, broadcast and scene dimming; the control mode includes remote control, local control and time control dimming.
- Failure protection mechanism: when the gateway is out of communication with monitoring center for 5 minutes, it will change to the time control dimming mode automatically and base on the previous day's work record, until the communication restored.
- Built-in RTC, with backup battery, the clock can continue working for 30 days after the battery exhausted its power.
- Built-in TF card slot, supports FLASH space expansion (up to 2 GB) to record historical data.
- Power supply: 100 ~ 240VAC; 50/60Hz.

Technical Specifications		
AC Input	Voltage	100~240V, single phase
	Frequency	50/60Hz
RS485	Voltage	-5.5V~+5.5V
	Transmission Rate	≤19200bps
	Transmission Range	800m @9600bps
Ethernet	100M Transmission Voltage	-1.05V~+1.05V
	10M Transmission Voltage	-2.8V~+2.8V
	Transmission Rate	10/100Mbps
Stability	Operating Temperature	-25°C~55°C
	Operating Humidity	10~90%, non-condensing
	Atmospheric Pressure	63~108kPa, Alt. ≤4000m
	Storage Temperature	-30°C~85°C
	Storage Humidity	5~95%, non-condensing
	Vibration	1G
Others	MTBF	≥30000h @25°C
	Data Storage	10 years
	Back-up Battery	≥30 days
	Dimensions	288*140*45 mm
Safety	Weight	1.38 kg
	Standards	IEC61347-2-1 IEC61347-2-11
	Insulation Resistance	AC input to others ≥ 100MΩ
EMC	Isolation Voltage	AC input to DC 2kVAC
	Standards	EN61000-4-2 IV;
		EN61000-4-3 III;
		EN61000-4-4 IV;
		EN61000-4-5 IV;
		EN61000-4-6 III;
		EN61000-4-8 III;
EN55015		



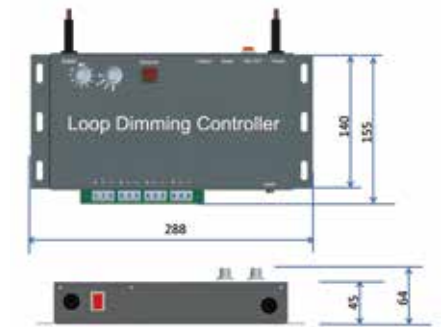
Loop Dimming Controller (Ethernet) (MSKT1000-AN)



Features

- Uplink supports Ethernet channel, and follows the TCP/IP protocol (RJ45 interface).
- Downlink supports 4 channel 0-10V analog dimming interface.
- An additional RS485 bus channel can be used to connect watt-hour meter, illuminance sensor, flow rate sensor, and other devices.
- The input voltage is 24VDC, can be used with a variety of 24VDC industrial power.
- Built-in 64MB MDDR (can be expanded to 256MB).
- Built-in 256MB NAND Flash (can be expanded as needed).
- Built-in TF card interface, can be expanded Flash space (max to 2GB).

Technical Specifications		
Working Power Supply	Voltage	DC: 10~30V
	Power Dissipation	10~30W
0-10V Dimming Interface	Dimming Voltage	0~10.5V
	Dimming Current	0~250mA
Ethernet	100M Transmission Voltage	-1.05V~+1.05V
	10M Transmission Voltage	-2.8V~+2.8V
	Transmission Rate	10/100Mbps
RS485	Voltage	-5.5V~+5.5V
	Transmission Rate	≤115200bps
Stability	Operating Temperature	-25~+55 C
	Storage Temperature	-25~+60 C
	Relative Humidity	10%~90%, non-condensing
	Vibration	1G
Others	IP	IP20
	Dimensions	288*140*61 mm
Safety	Weight	1.8Kg
	Isolation Voltage	1.5kVac,5mA,1min
	Insulation Resistance	≥100MΩ (normal condition) 2MΩ (hot and humid condition)
EMC	Isolation Voltage	1500V
	Electrostatic discharge immunity	IEC61000-4-2 Level4
	Electrical fast transient burst immunity	IEC61000-4-4 Level3
	Surge immunity test	IEC61000-4-5 Level2
	Conducted emissions	CLASS B(EN55022)
Radiated emissions	CLASS B(EN55022)	



P Power Line Carrier (PLC) Solution

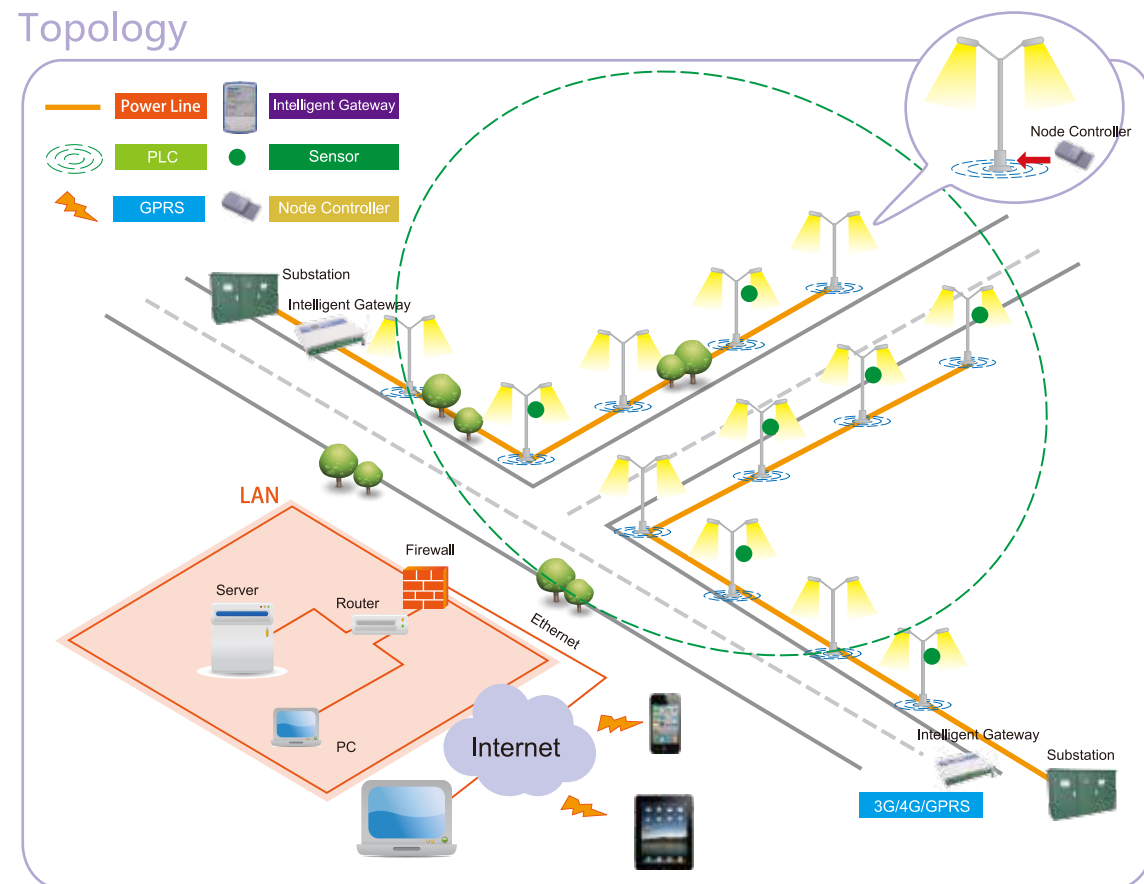
MOONS' public lighting intelligent monitoring system is suitable for all kinds of urban roads, tunnels, landscape, parking lots, coalpits, etc. The system is mainly composed of intelligent gateway, node controller, intelligent monitor and control management system software, lighting protocol and different sensors.

PLC intelligent gateway can be installed into distribution box. It can control the PLC node controllers connected on the same power line and make response to the monitoring center via Ethernet or GPRS Interface.

Lighting protocol is divided into two parts: the protocol of the master controller to gateway, namely, intelligent lighting control system application layer communication protocol; the protocol of the intelligent gateway to node controller, namely, MOONS' protocol. Lighting protocol supports the firmware upgrade to reduce the difficulty of the breakdown maintenance.

Intelligent lighting control system application layer communication protocol is fully for the practical requirement of public lighting. MOONS' protocol is independent to the physical layer, and it can be used on the PLC, 2.4G wireless or RS485.

Topology

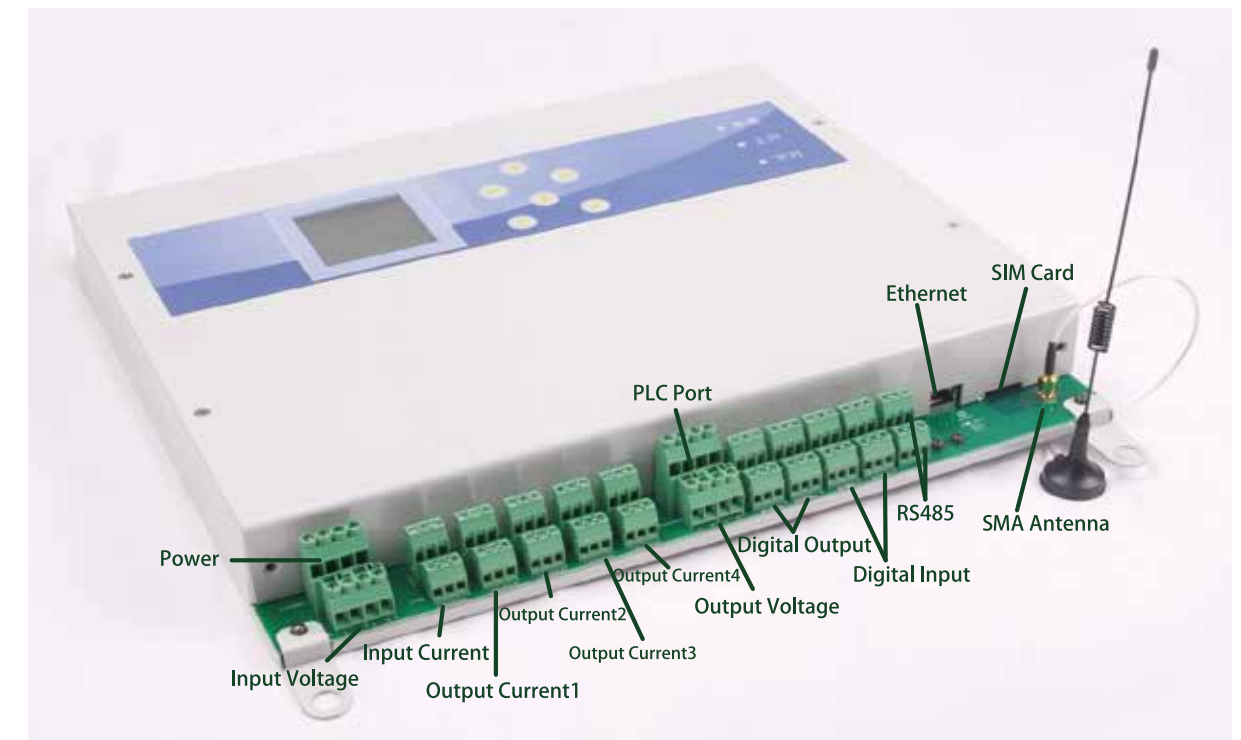


Note: The public lighting intelligent monitoring system supports different kinds of external sensors, such as Occupancy/Vacancy, PM2.5, CO, Humidity&Temperature, Daylight Harvesting, vehicle flow rate, and etc.

Project Major Requirements List

Requirements	Instructions
Computer	Configuration requirements depend on the size of the project.
Software	Windows Server2003、Windows Server2008 (32-bit/64-bit) SQL Server 2005 and above
Intelligent Gateway (PLC)	Protocol conversion, local control (optional with 3G communication function, removing remote networking)
Integrated Driver (PLC)	Instruction execution, driving lamps (power is optional)
Dimming Driver + Node Controller (PLC)	Instruction execution, driving lamps (selling and installing respectively, suitable for renovation project)
Luminaire	Road lamp

RTU (Remote Terminal Unit)



As a field measuring and control unit of the supervisory control and data acquisition system, remote terminal unit (RTU) for streetlight is a multifunctional device which involves data acquisition and processing, field controlling and remote communication etc. It can execute the function such as turn on/off and energy saving according to the control center configure, and monitoring the loop status at the same time.

The built-in concentrator module has turn on/off, dimming, inspection, and etc. for node controller, to achieve energy saving.

Structure Feature

- Stainless steel housing, high mechanic strength, has good heat resistance and corrosion resistance.
- The control panel use the ultraviolet-proof material; Panel use the gold plated film; LCD screen use the 160*160 lattice industry screen; Can switch more than 800,000 times.
- The flame retardant of the input/output interface is UL94-V0.

Hardware Feature

- High ARM9 controller, use 32 RISC operate with 512Mb DDRSDRAM, 2Gb Nand Flash storage, 1GB SD card storage unit; Operate system is the cut version of Linux and it's operate stably.
- Multiple interface, including I2C, SPI, UART, USB, Ethernet.
- Built-in real time clock, watchdog and spare battery.

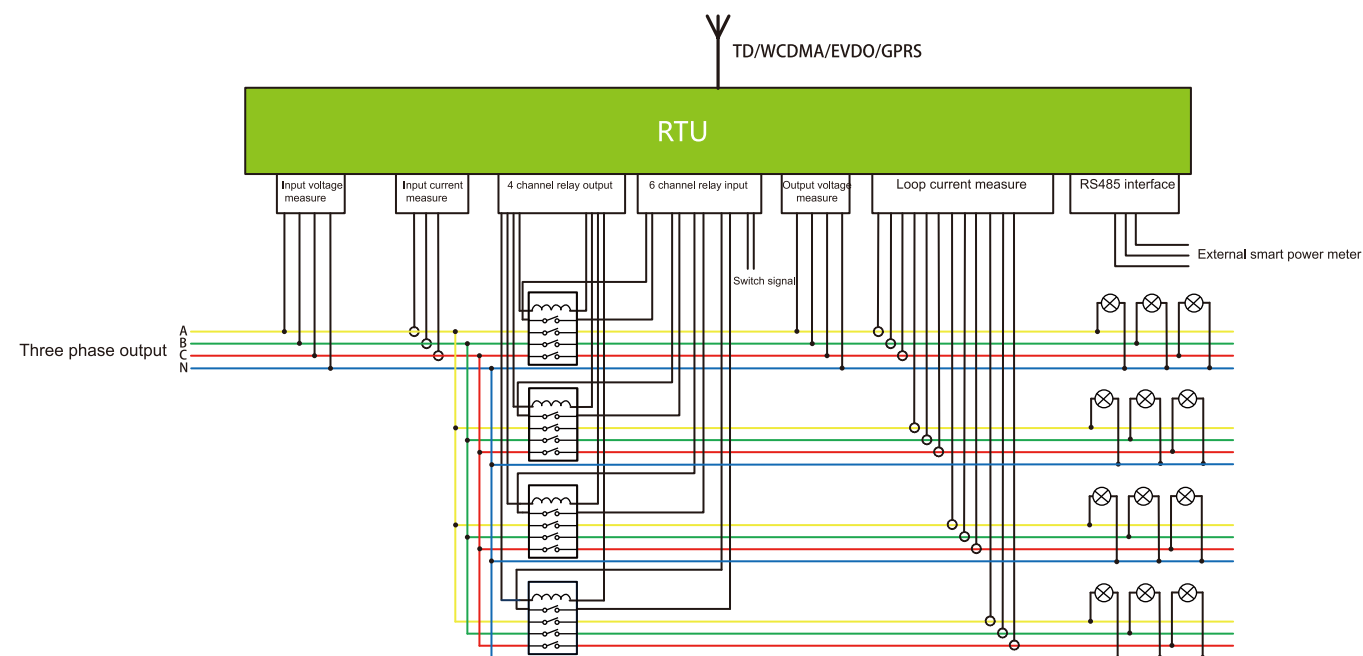
Technical Specifications		
AC Input	Voltage	90~420VAC, tri-phase
	Frequency	50/60Hz
	Power Dissipation	≤10W
	Measuring Current	≤5A
PLC	Measuring Voltage	≤600VAC
	Transmission Power	3W
	Transmission Rate	5.5kbps
Cellular Network	Carrier Frequency Range	132KHz
	Standard	TD/WCDMA/EVDO/GPRS
Ethernet	100M Transmission Voltage	-1.05~+1.05V
	10M Transmission Voltage	-2.8V~+2.8V
RS485	Transmission Rate	10/100Mbps
	Voltage	-5.5V~+5.5V
Electric Relay	Transmission Rate	≤115200bps
	Switching Voltage	≤250VAC
0~10V	Load Current	≤5A
	Input Voltage	0~10.5V
4~20mA	Input Current	≥10μA
	Input Voltage	≤10V
Stability	Input Current	≤20mA
	Operating Temperature	-25~55 C
	Storage Temperature	-40~85 C
	Relative Humidity	10~90%, non-condensing
Others	Atmospheric Pressure	63~108kPa, Alt. ≤4000m
	Vibration	1G
	Warranty	3 Years
Safety	Data Storage	10 Years
	Dimensions	400*350*56mm
	Weight	5.45kg
EMC	Standards	IEC61347-2-11
	Insulation Resistance	AC input to others ≥100MΩ
EMC	Isolation Voltage	AC input to DC 3kVac
	Standards	EN61000-4-2 IV;
		EN61000-4-3 III;
		EN61000-4-4 IV;
		EN61000-4-5 IV;
EN61000-4-6 III;		
EN61000-4-8 III;		

RTU (Remote Terminal Unit)


Function

- Uplink support Ethernet, wireless (TDSCDMA, WCDMA, EVDO, GPRS, LTE); Downlink support PLC.
- Support local/remote update firmware.
- Control 4 loop output and transfer the data (input/output voltage, input/output current relay status, etc.) to monitor center.
- Node controller monitor function: follow the lighting strategy from control center, to monitor the turn on/off, single dimming, group dimming, scene dimming; and query the status of voltage, current, consumption, power factor, false and etc.
- Power failure protection: the system would automatic switch the spare battery when the power failure, so it can saves the data and sends the alarm to monitor center.
- Support multiple control: remote, automatic, schedule, local.
- Support analog output sensor: 1 channel 0-5V analog signal acquire, 1channel 4-20mA analog signal acquire.
- Support RS485 communication.

RTU(Remote Terminal Unit) Wiring Draw



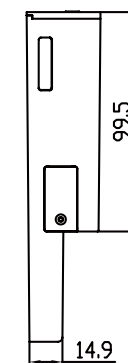
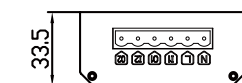
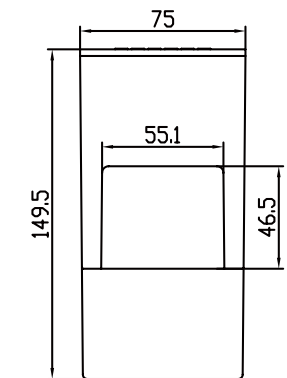
2 Channel PLC Node Controller (MSDK-201-PLC)



Features

- Communicate with PLC monitoring device by power line carrier, can receive and send data.
- Follow the EIA-709.1, EIA709.2 international standards.
- Built-in 2 relay, can separate control 2 Sodium lamp or LED lamp, the relay is 5A/250Vac.
- Wide input voltage, the range is 100~277Vac.
- It can acquire input voltage, current, power, factor, save data and send back to intelligent gateway.
- Alarm function: overload, no-load, overvoltage, and overload protection.
- Complete PLC protocol.
- Complete failure protection system to ensure the lamps normal when the control device fail.

Technical Specifications		
AC Input	Input Voltage	100~277VAC
	Frequency	50/60Hz
	Input Current	≤2.1A
AC Output	Output Voltage	100~277VAC
	Output Current	0-2A
	Output Power	≤480VA
PLC	Transmission Power	3W
	Transmission Rate	5.5kbps
	Carrier Frequency Range	132KHz
Coulomb Measuring	Voltage Range	0~600VAC
	Current Range	0~5A
	Accuracy	-5~+5%
Stability	Operating Temperature	-40~70 °C
	Case Temperature	≤80 °C
	Relative Humidity	10~95%, non-condensing
	Atmospheric Pressure	63~108kPa
	Storage Humidity	-40~85 °C
Safety	Vibration	10G
	Insulation Resistance	AC input to others ≥100MΩ
	Isolation Voltage	AC input to DC 3kVac
Others	Dimensions	149.5*75*33.5mm
EMC	Standards	EN61000-4-2 IV
		EN61000-4-4 IV
		EN61000-4-5 IV
		EN61000-4-6 III
		EN61000-4-8 III



W ireless Data Acquisition Module

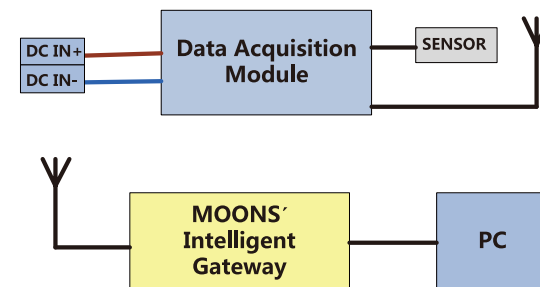
Wireless Data Acquisition Module of MOONS' is designed for connecting various sensors with 0~5V, 4~20mA or I²C interface.

The module can precisely deal with signals from sensors and communicate with gateway through wireless networks of 2.4 GHz which is encrypted by 128 bits to ensure the communication safe and reliable. The communication protocols of the wireless module and gateway and wireless module and sensors are MOONS' protocols.

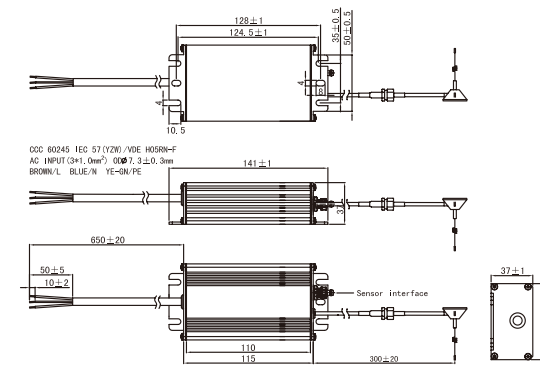
MOONS' data acquisition module is suitable for all kinds of urban roads, tunnels, landscape, parking lots and so on. Our product is low-power, low-cost and convenient to fix and use.

Technical Specifications		
AC Input	Voltage	100 ≤Vin≤277V
	Current	≤ 20mA
	Power Dissipation	≤ 1.5W
DC Output	Voltage	5V or 3.3V
	Current	≤500mA
Voltage Sampling	Range	0~5V
	Resolution	2.5mV
	Accuracy	±3%
Current Sampling	Range	4~20mA
	Resolution	15uA
	Accuracy	±3%
Radio Frequency	Transmission Distance	500m (visual distance)
	Transmission Power	18dBm
	Reception Sensitivity	-100dBm
	Transmission Rate	250kbps
	Frequency	2400~2485MHz
Others	Lifetime	3 years
	Stability	Operating Temperature
Storage Temperature		-40~+85 C
Humidity		10%~95% (non-condensing)
EMC	IP	IP67
	Vibration	≤10G
	Electrostatic discharge immunity	Level 4 (IEC61000-4-2)
	Electrical fast transient burst immunity	Level 4 (IEC61000-4-4)
	Surge immunity	Level 4 (IEC61000-4-5)
	Conducted disturbances induced by RF field immunity	Level 2 (IEC61000-4-6)
	Power frequency magnetic field immunity	Level 3 (IEC61000-4-8)
	Electromagnetic disturbance characteristics RFEMS	Class B (CISPR11) Level 2 (IEC61000-4-3)

Typical Application



Mechanical Outline



Wireless PM2.5 Sensor (MSCG1010)

Wireless PM2.5 sensor of MOONS' is designed to detect PM2.5 concentration in the air. It takes advantage of an optical sensing system including an infrared emitting diode and a phototransistor to detect the air quality. The measurement range includes all the levels of the present Air Quality Standards. Each level has a different color to show on the server software.



Detection Range	25 ~ 500 µg / m ³
Detection Accuracy	±40%
Operating Temperature	- 10 C ~ + 60 C

Wireless Occupancy/Vacancy Sensor(MSCG2010)

Wireless occupancy vacancy sensor of MOONS' is designed to detect whether there is human approaching or not, working with our intelligent gateway to control the LEDs around the sensor. This kind of product can detect the variation of infrared light produced by the moving of human or object which has a temperature difference between itself and the environment.



Detection Distance	≤12m
Detection Range	±51°(Horizontal) ±46°(Vertical)
Operating Temperature	-20 C ~+60 C

Wireless Humidity&Temperature Sensor (MSCG3010)

Wireless Humidity & Temperature Sensor is designed to measure ambient humidity and temperature. The specific values will be shown on the server software. It has a digital interface with our data acquisition module and the protocol between them is of MOONS'. Its measurement range can cover various conditions and requirements with high sensitivity and accuracy.



Humidity Range	0~100%
Humidity Accuracy	±4%
Temperature Range	-40 C ~+70 C
Temperature Accuracy	±1 C
Operating Temperature	-40 C ~+70 C

Wireless Carbon Monoxide Sensor (MSCG4010)


Wireless Carbon Monoxide Sensor is designed to detect Carbon Monoxide concentration in the air. It depends on the chemical reaction which carbon monoxide is involved to produce electrons. The number of electrons is proportional to carbon monoxide concentration. The measurement range can cover from safe condition to dangerous ones. And different ranges will be shown in different colors on our server software to indicate whether it is dangerous or not.



Detection Range	30~200ppm
Detection Accuracy	±10%
Operating Temperature	0 C~+50 C

Vehicle flow Sensor(MSCG7010)


Vehicle flow sensor is a radar equipment. The operating principle is the Doppler effect that is the frequency of the wave sent by the radar will change in the reflected wave from a moving target. The Doppler shift is proportional to the speed of the target. The main characteristic of this sensor is the narrow type radiation area, which ensures the narrow detection area. When the target car comes into the detection area, the radar will send the trigger signal. When the target car that is monitored leaves the detection area, the radar will determine whether the target car has left the detection area or not and then record the relevant data of this car. Using this method can determine the vehicle flow in the detection area. The capture ability of this sensor can achieve about 100% and the operation of this sensor need cooperate with our gateway.



Radar emission Angle	≤5° (Horizontal), ≤7° (Vertical)
Vehicle Speed Range	5~250km/h
Operating Temperature	-40 C~+65 C

Wireless Daylight Harvesting Sensor(MSCG5010)

Wireless Ambient Light Sensor is designed to measure the ambient light intensity. It can cooperate with our intelligent gateway to dim according to the intensity of illumination. The range and accuracy are flexible to satisfy different requirements. The specific values will be shown on the server software.



Detection Range	0~1000 lux
Detection Accuracy	5 lux
Operating Temperature	-40 C~+70 C


Typical Recommendation

Road Sodium Lighting Solution			
PLC Solution		Wireless Solution	
PLC gateway MSKT_1001_PLC	+ Dual PLC monitor MSDK_201_PLC	Wireless gateway MSKT1100-ZIG	Wireless node controller MSDK1231
		Wireless gateway MSKT1300-ZIG	

Road LED Lighting Solution			
PLC Solution		Wireless Solution	
PLC gateway MSKT_1001_PLC	+ Dual PLC monitor MSDK_201_PLC	Wireless gateway MSKT1100-ZIG	Wireless node controller MSDK1231
		Wireless gateway MSKT1300-ZIG	Wireless integrated antenna MSDK5000
			NEMA node controller MSDK6149

Ultrasonic anemometer(MSCG6010)

Ultrasonic anemometer is used to detect wind speed and direction in the current environment. It uses the principle that the speed of sound waves is affected by wind. Using four ultrasonic probes to send and receive ultrasonic waves in the two-dimensional plane circularly to calculate wind speed and direction through measuring the time difference of ultrasonic spreads in the air. The internal heating unit can ensure that the equipment can work in the severe winter. When the sensor operates, it needs the constant voltage driver of MOONS' MU200A024AP and cooperate with the wireless data acquisition module.



Wind speed range	0~60m/s,±0.2m/s (≤10m/s)
Detection Accuracy	<±2% (>10m/s)
Wind direction range	0~360°
Detection Accuracy	±1°
Operating Temperature	-10 C~+70 C

Tunnel LED Lighting Solution					
RS485 Solution		Wireless Solution		0-10V Solution	
RS485intelligent gateway MSKT1000-485	+ RS485 node controller MSKT100-485	Wireless intelligent gateway MSKT1300-ZIG	Wireless node controller MSDK1231	0-10V gateway MSKT1100-AN	+ 0-10V dimming LED driver
	RS485 integrated driver (variety of specifications)		Wireless integrated antenna MSDK5000		