

■ **Headquarters**

168 Mingjia Road, Minhang District, Shanghai 201107,
P.R. China
Tel: +86 (0)21 52634688
Fax: +86 (0)21 52634098

■ **U.S. Branch:**
MOONS' INDUSTRIES (AMERICA), INC.

1113 North Prospect Avenue, Itasca, IL 60143 USA
Tel: +1 630 833 5940
Fax: +1 630 833 5946

■ **Japan Branch:**
MOONS' INDUSTRIES JAPAN 株式会社

Room 601, 6F, Shin Yokohama Koushin Building,
2-12-1, Shin-Yokohama, Kohoku-ku, Yokohama,
Kanagawa, 222-0033, Japan
Tel: +81-(0)45-475-5788
Fax: +81-(0)45-475-5787

■ **MOONS' International Trading Company**

4/F, Building 30, 69 Guiping Road, Cao He Jin Hi-Tech
Park, Shanghai 200233, P.R. China
Tel: +86 (0)21 64952755
Fax: +86 (0)21 64951993

■ **Shenzhen Branch Office**

Room 2209, 22/F, Kerry Center, 2008 Renminnan Road,
Luohu District, Shenzhen 518001, P.R. China
Tel: +86 (0)755 25472080
Fax: +86 (0)755 25472081

■ **Wuhan Branch Office**

Room 3001, World Trade Tower, 686 Jiefang Avenue,
Jianghan District, Wuhan 430022, P.R. China
Tel: +86 (0)27 85448742
Fax: +86 (0)27 85448355

■ **Chengdu Branch Office**

Room 1917, Western Tower, 19, 4th Section of South
People Road, Wuhou District, Chengdu 610041,
P.R. China
Tel: +86 (0)28 85268102
Fax: +86 (0)28 85268103

■ **Ningbo Branch Office**

Room 309, Tower B, Taifu Plaza, 565 Jiangjia Road,
Jiangdong District, Ningbo, 315040, P.R. China
Tel: +86 (0) 574 87052739
Fax: +86 (0) 574 87052365

■ **Europe Branch:**
MOONS' INDUSTRIES EUROPE S.R.L.

Via Torri Bianche n.1 20871 Vimercate (MB) Italy
Tel: +39 039 62 60 521
Fax: +39 039 96 31 409

■ **South-East Asia Branch:**
**MOONS' INDUSTRIES (SOUTH-EAST
ASIA) PTE LTD.**

33 Ubi Avenue 3 #08-23 Vertex Singapore 408868
Tel: +65 6634 1198
Fax: +65 6634 1138

■ **Beijing Branch Office**

Room 816, Tower B, China Electronics Plaza,
3 Danling Street, Haidian District, Beijing 100080,
P.R. China
Tel: +86 (0)10 58753312
Fax: +86 (0)10 58752279

■ **Guangzhou Branch Office**

Room 4006, Tower B, China Shine Plaza,
9 Linhe Xi Road, Tianhe District,
Guangzhou 510610, P.R. China
Tel: +86 (0)20 38010153
Fax: +86 (0)20 38103661

■ **Qingdao Branch Office**

Room E, 10th Floor, 73 Wangjiao Mansion,
Hongkong Middle Road, Shinan District,
Qingdao 266071, P.R. China
Tel: +86 (0)532 85879625
Fax: +86 (0)532 85879512

■ **Xi'an Branch Office**

Room 1006, Tower D, Wangzuo International City,
1 Tangyan Road, Xi'an 710065, P.R. China
Tel: +86 (0)29 81870400
Fax: +86 (0)29 81870340

■ **Nanjing Branch Office**

Room 302, Building A, Tengfei Creation Center, 55
Jiangjun Road, Jiangning District,
Nanjing 211100, P.R. China
Tel: +86 (0)25 52785841
Fax: +86 (0)25 52785485

Intelligent Lighting Control and Driver Solutions



<http://www.moonsindustries.com>
E-mail: info@moonsindustries.com

MOONS'
moving in better ways

• All specifications and technical parameters of the products provided in this catalog are for reference only, and 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 and ETL.

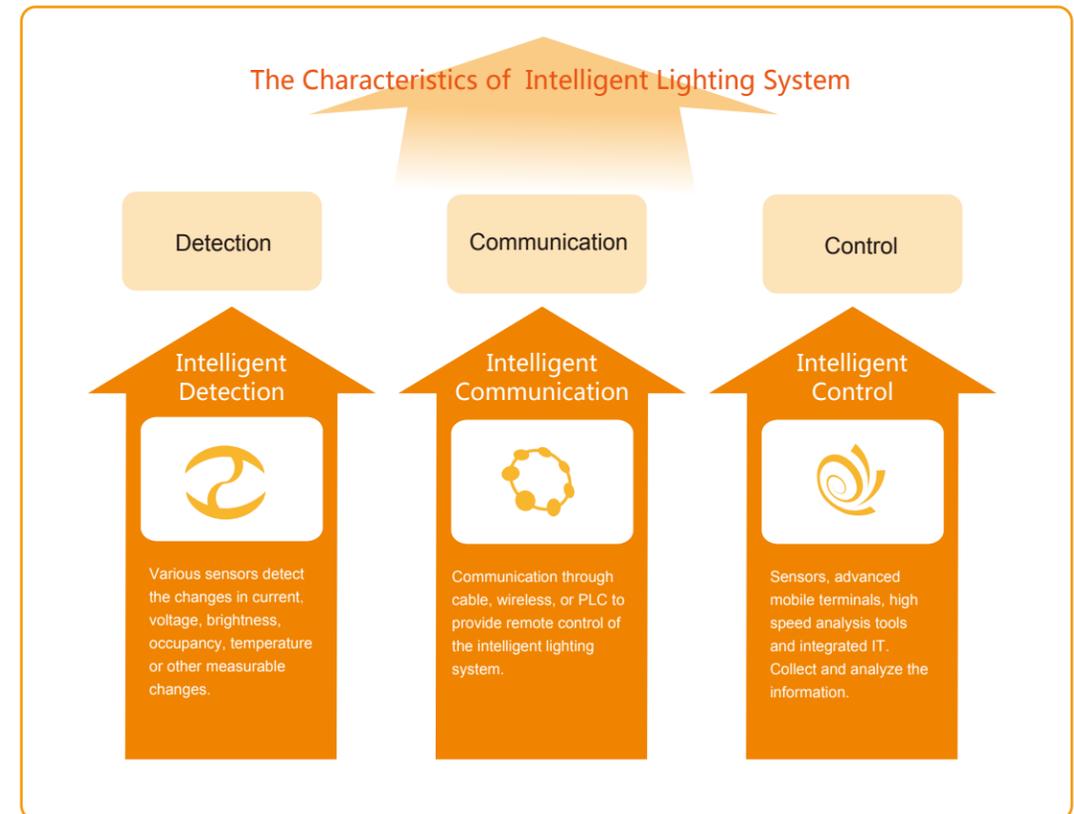
MOONS' intelligent control technologies are widely used in outdoor, roadway & landscape lighting, as well as with indoor building automation systems. MOONS' goal is to provide the "Intelligent Control and Driver Solutions" for our customers.

Professional Supplier of Lighting Intelligent Control and Driver Solutions

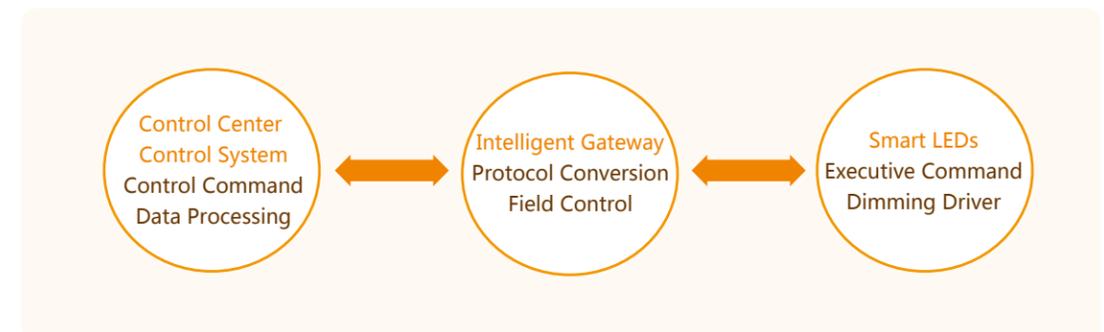


Intelligent Lighting

Core Concepts of the Intelligent Lighting System

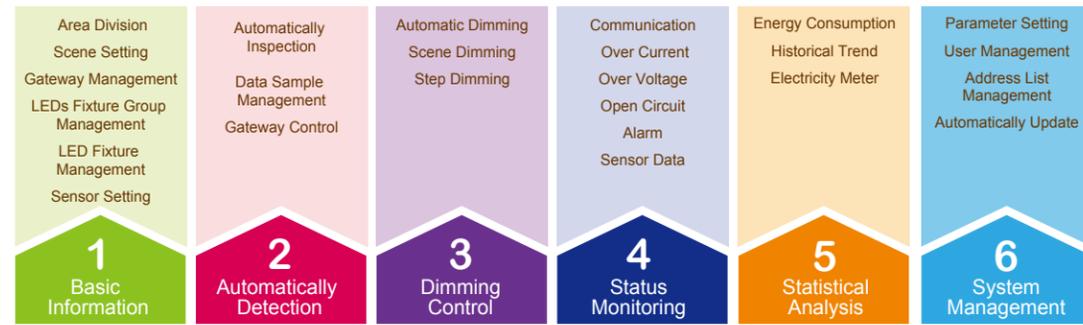


Intelligent Lighting Control System Structure:



Intelligent Monitoring Software

Overall Architecture



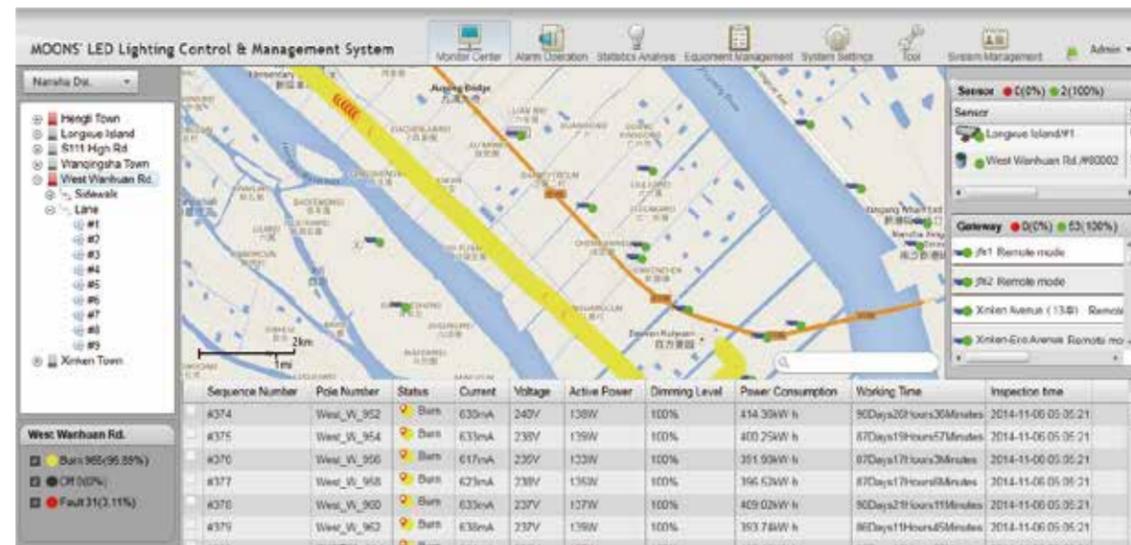
Default Scenario

	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

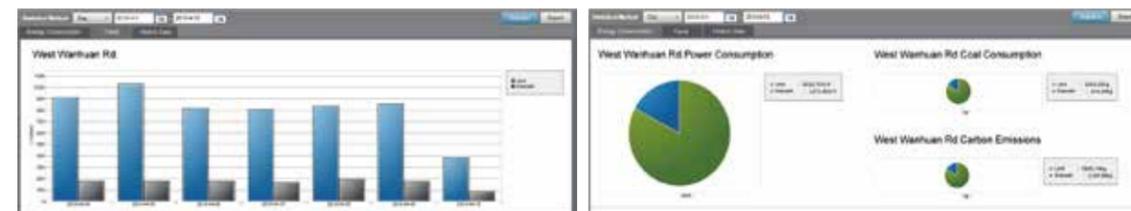
User Defined

Fire Alarm
.....
.....
.....
.....
.....
.....

Visual Condition Monitoring



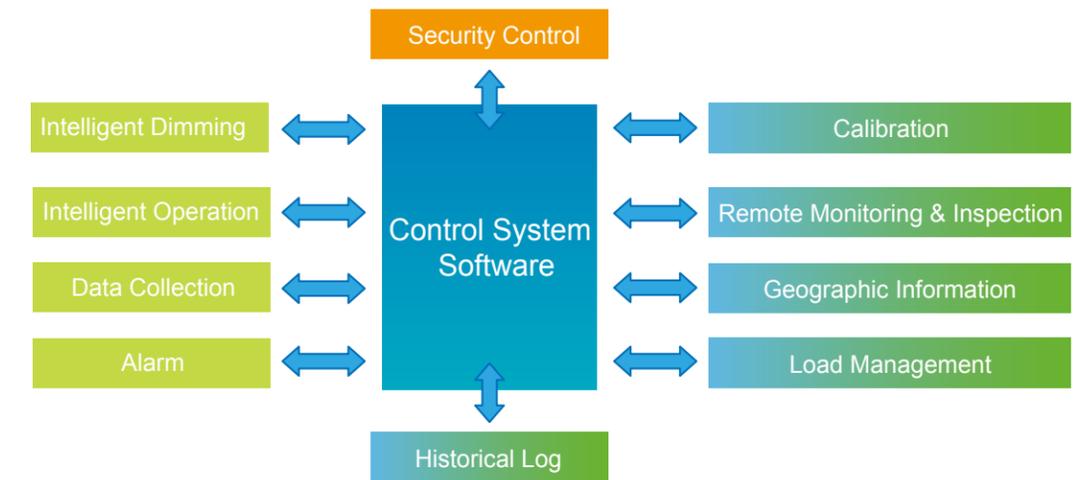
Power Consumption(kW.h)



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.

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 Cable (RS485) 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

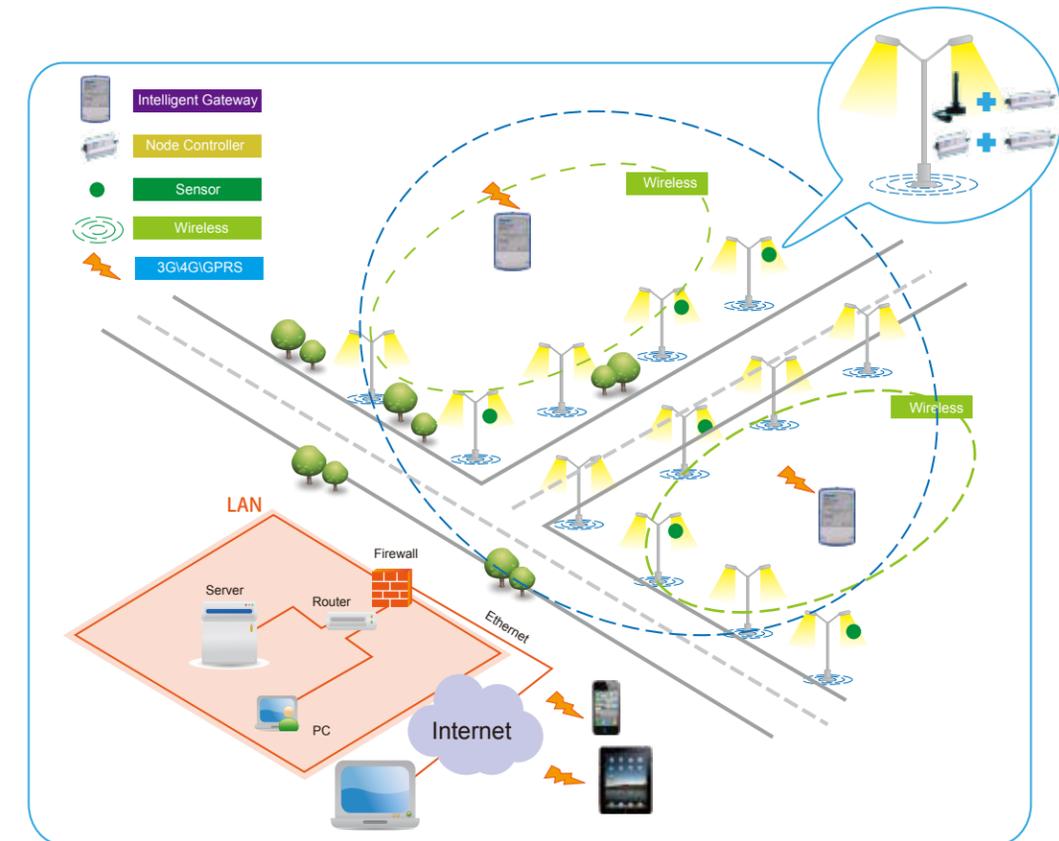
Wireless Data Acquisition Module of MOONS' is designed for connecting various sensors with 0~5V, 4~20mA or I2C interface.

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 use 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, road lamp, solar road 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; 50/60Hz.
- Recommended to use in roadway.

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
Cellular Network	Frequency Range	2400~2485MHz
	Standard	GPRS/3G/4G
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
Electric Relay	Switching Voltage	≤250VAC
	Load Current	≤5A
	Input Voltage	0~10.5V
0~10V	Input Current	≥10 μA
	Input Voltage	≤10V
4~20mA	Input Current	≤20mA
	Operating Temperature	-25°C~55°C
Stability	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
Safety	Weight	2.05 kg
	Standards	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		



Wireless Node Controller (MSDK1231)

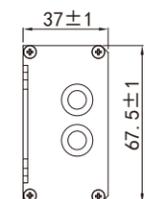
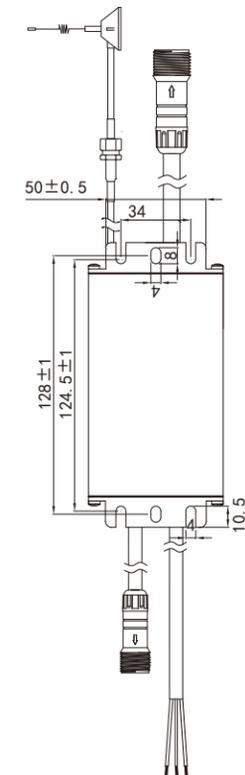


Features

- 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
Dimming	Frequency Range	2400~2485MHz
	Voltage	0~10.5VDC
Meter	Current	0~10mA
	Accuracy	-3~+3%
	Voltage	0~277VAC
Stability	Current	0~2.05A
	Accuracy	-5~+5%
	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	
Others	IP	IP67
	MTBF	≥30000h @25°C
	Data write	10 ¹⁴ times
	Dimension	141*67.5*37mm
Safety	Weight	1.0kg
	Standard	IEC61347-2-1
	Insulation Resistance	IEC61347-2-11
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)		

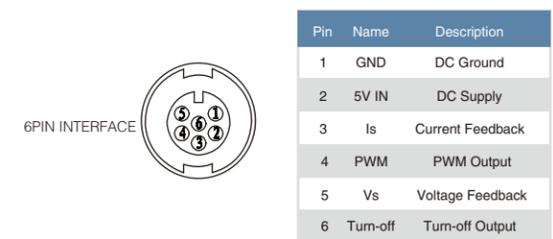
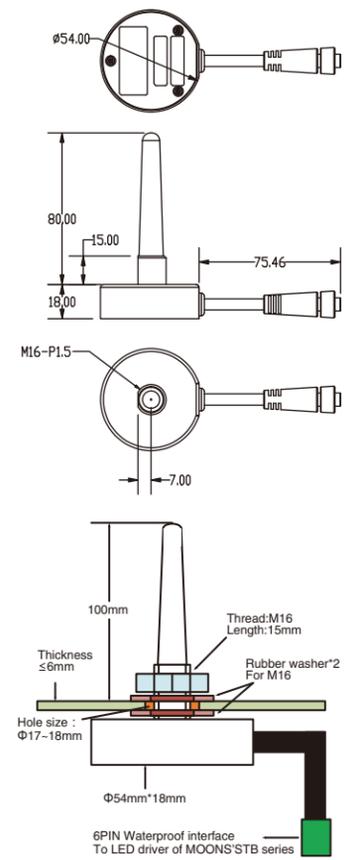


Wireless Node Controller (MSDK5000)



- 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
	Frequency Range	2400~2485MHz
PWM	PWM Frequency	1±0.1 KHz
	PWM Percentage	0-100%
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	IP	IP67
	MTBF	≥30000h @25 °C
EMC	Weight	90±5g
	Standards	EN61000-4-2 IV; EN61000-4-3 II; EN61000-4-4 III; EN61000-4-6 II; EN61000-4-8 III;

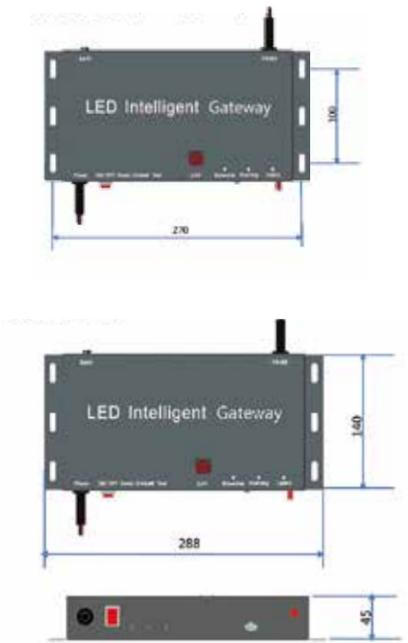


Wireless Intelligent Gateway (Ethernet) (MSKT1005-ZIG)



- Features**
- Uplink supports Ethernet channel, follow 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.
 - For the different needs, support 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 run out of 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.
 - Recommended to use in tunnel.

Technical Specifications		
AC Input	Voltage	100~240V, single phase
	Frequency	50/60Hz
Radio Frequency	Transmission Power	20dBm
	Receiving Sensitivity	-100dBm
	Transmission Rate	250kbps
	Frequency Range	2400~2485MHz
Ethernet	100M Transmission Voltage	-1.05V~+1.05V
	10M Transmission Voltage	-2.8V~+2.8V
Stability	Transmission Rate	10/100Mbps
	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
Safety	Dimensions	288*140*45 mm
	Weight	1.38 kg
EMC	Standards	IEC61347-2-1 IEC61347-2-11
	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



Wireless LED intelligent control system(MSKT1200-ZIG)



Features

- Communicate with wireless single lamp controller via IEEE802.15.4.
- Communicate with control center through 3G/GPRS or Ethernet.
- 2.4GHz communication accord with IEEE802.15.4 standard, which is used to receive the data of wireless single lamp controller and send order.
- Communicate with control center through 3G/GPRS to send or receive data.
- Communicate with control center or local computer via Ethernet (10M/100M) to set configuration, send or receive data.
- The data of intelligent electricity meter, etc can be gained via RS485 bus.
- Can read digital switch quantity.
- Can read simulated current and voltage.

Technical Specifications			
AC Input	Voltage	10-30VDC	
	Power Dissipation	≤10W	
2.4G Radio Frequency	Transmisionng Power	20dBm	
	Receiving Sensitivity	-100dBm	
	Transmission Rate	250kbps	
	Frequency Range	2400~2485MHz	
Cellular Network	Standard	GPRS/3G/4G	
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	
0~10V	Input Voltage	0~10.5V	
	Input Current	≥10μA	
4~20mA	Input Voltage	≤10V	
	Input Current	≤20mA	
Stability	Operating Temperature	-25~55℃	
	Storage Temperature	-30~85℃	
	Operating Humidity	10~90%,non-condensing	
	Atmospheric Pressure	63~108kPa,Alt.≤4000m	
	Vibration	1G	
	IP	IP51	
	Warranty	3Years	
Data Storages	10Years		
Others	Dimensions	290*180*98mm	
EMC	Standards	Weight	2.05kg
		EN61000-4-2 IV;	
		EN61000-4-3 III;	
		EN61000-4-4 IV;	
		EN61000-4-6 III;	
		EN61000-4-8 III;	
CISPR 11.			



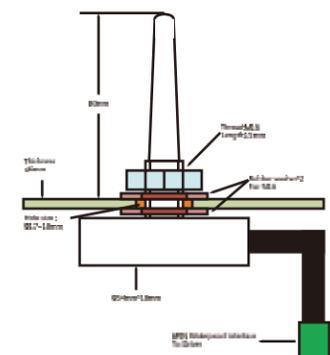
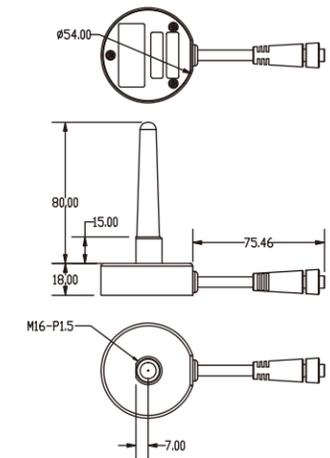
Wireless Integrated Antenna (MSDK5110) Solar Energy Version



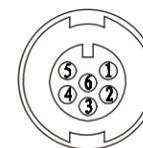
Features

- Communicate with the wireless intelligent gateway via IEEE802.15.4
- Communicate with the driver of solar energy LED fixture through UART port.
- Sample the information of fixture situation and battery.
- Send the control order of fixture.
- 6PIN ports.
- Air interface (2.4~2.5GHZ, ≤4dbi antenna).

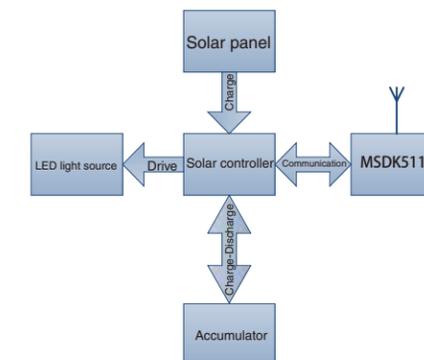
Technical Specifications			
AC Input	Voltage	10-30V	
	Current	150mA max@10V	
2.4GRadio Frequency	Transmission Power	18dBm	
	Receiving Sensitivity	-100dBm	
	Transmission Rate	250kbps	
	Frequency Range	2400~2485MHz	
UART	UART Voltage	3.0-3.6V	
	UART Transmission Rate	9600bps	
Stability	Operating Temperature	-40~70℃	
	Enclosure Temperature	≤80℃	
	Storage Temperature	-40~85℃	
	Relative Humidity	10~90%,non-condensing	
	Storage Humidity	5~95%,non-condensing	
	Atmospheric Pressure	63~108kPa,Alt.≤4000m	
	Vibration	10G	
Others	IP	IP67	
EMC	Standards	MTBF	≥30000h @25℃
		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;	



6PIN INTERFACE



Pin	Name	Description
1	VCC	DC Supply
2	NC	
3	NC	
4	RXD	Receive Data
5	TXD	Transmit Data
6	GND	DC Ground

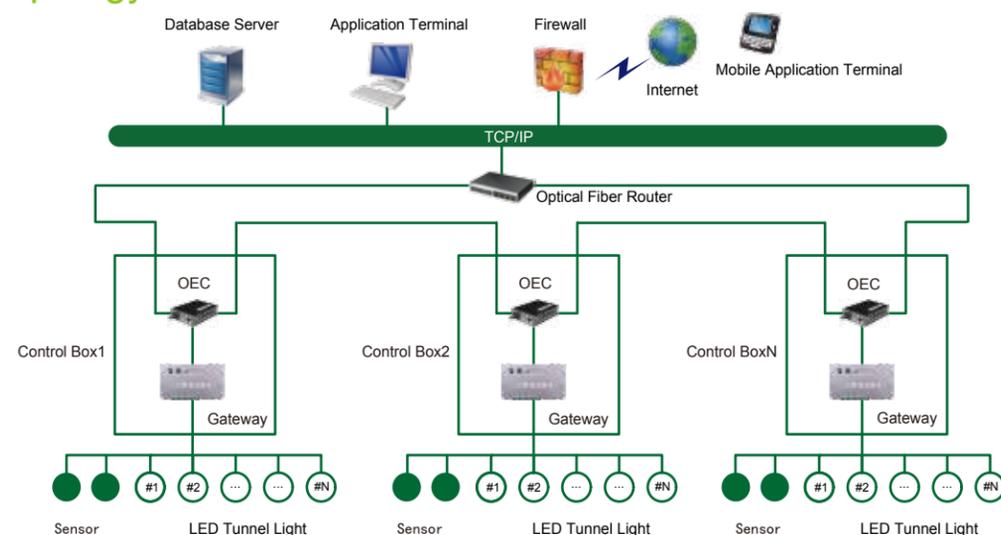


Cable (RS485) Solution

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 $\phi 1.5\text{mm}^2$
Integrated Driver (RS485)	Instruction execution, driving lamps (power is optional)
Luminaire	Tunnel lamp

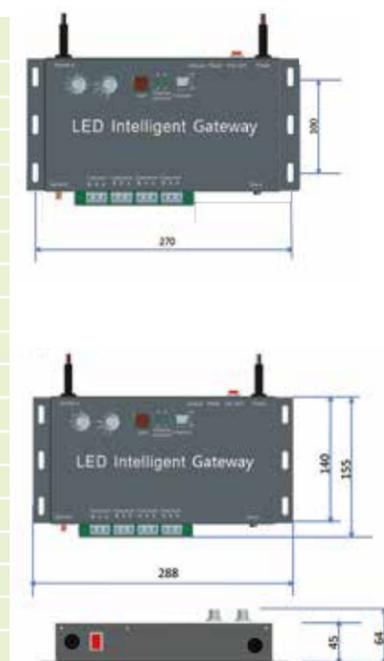
RS485 Intelligent Gateway (Ethernet) (MSKT1000-485)



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	$\leq 19200\text{bps}$
	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. $\leq 4000\text{m}$
	Storage Temperature	-30°C~85°C
	Storage Humidity	5~95%, non-condensing
	Vibration	1G
	MTBF	$\geq 30000\text{h}$ @25°C
Others	Data Storage	10 years
	Back-up Battery	≥ 30 days
	Dimensions	288*140*45 mm
	Weight	1.38 kg
Safety	Standards	IEC61347-2-1 IEC61347-2-11
	Insulation Resistance	AC input to others $\geq 100\text{M}\Omega$
	Isolation Voltage	AC input to DC 2kVAC
EMC	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



RS485 Integrated Driver

Features:

- 1.High efficiency
- 2.Surge protection: Level 4
- 3.IP67 compliant
- 4.Support RS485 dimming function with turn-off function
- 5.OVP, OCP, SCP, OTP
- 6.Compliance to worldwide safety regulations for lighting
- 7.Suitable for dry/damp locations
- 8.5-year warranty



Electrical Specifications

	MU050AxxxAQ_Standby	MU084AxxxAQ_Standby	MU100AxxxAQ_Standby	MU120AxxxAQ_Standby	MU150AxxxAQ_Standby	MU200AxxxAQ_Standby
Dimension (L*W*H)	203 x 63.5 x 40 (mm)	241 x 67.5 x 37 (mm)	241 x 67.5 x 37 (mm)	241 x 67.5 x 37 (mm)	265 x 86 x 43 (mm)	264 x 95 x 46 (mm)
Input Voltage Range	90~305 VAC	90~305 VAC	90~305 VAC	176~264 VAC	90~305 VAC	90~305 VAC
Efficiency	47~63 Hz					
Power Factor	0.99 typ, 100~277VAC input	0.99 typ, 100~277VAC input	0.99 typ, 100~277VAC input	0.96 typ, 200~240VAC input	0.99 typ, 100~277VAC input	0.99 typ, 100~277VAC input
Inrush Current	15A (230VAC input, 25°C, cold start)	50A (230VAC input, 25°C, cold start)	50A (230VAC input, 25°C, cold start)	50A (230VAC input, 25°C, cold start)	65A (230VAC input, 25°C, cold start)	65A (230VAC input, 25°C, cold start)
Input Current	0.35A (220VAC input)	0.65A (220VAC input)	0.65A (220VAC input)	0.9A (220VAC input)	1A (220VAC input)	1.2A (220VAC input)
Maximum Power	50W	84W	100W	120W	150W	200W
Line Regulation	±3%	±1%	±1%	±1%	±1%	±1%
Load Regulation	±3%	±3%	±3%	±3%	±3%	±3%
Leakage Current	0.75mA (277VAC 50Hz)	1mA (277VAC 60Hz)	1mA (277VAC 60Hz)	1mA (264VAC 50Hz)	1mA (277VAC 60Hz)	1mA (277VAC 60Hz)

Environmental Specifications

Operating Temperature	-40°C ~ +70°C
Storage Temperature	-40°C ~ +85°C
Operating Humidity	20~95%RH, non-condensing
Storage Humidity	10~95%RH
Cooling Method	Convection
Isolation Voltage	Input / output 3750 VAC Input/chassis 1500 VAC
MTBF	300,000 hours full load at 25°C ambient, MIL-HDBK-217F(25°C)
Life Time	50,000 hours at 50°C ambient

Safety

CUL	UL8750, UL1012, CSA-C22.2 No. 107.1
CE	EN61347-1, EN61347-2-13

EMC Compliance

Conducted Emissions	FCC Part15 / EN55015
Radiated Emissions	FCC Part15 / EN55015
Harmonic Current Emissions	EN61000-3-2
Voltage Fluctuations and Flicker	EN61000-3-3
Electrostatic Discharge	EN61000-4-2
RFE Field Susceptibility	EN61000-4-3
Electrical Fast Transient	EN61000-4-4
Surge Immunity Test	EN61000-4-5
Conducted Radio Frequency	EN61000-4-6
Power Frequency Magnetic Field Test	EN61000-4-8
Voltage Dips	EN61000-4-11
Electromagnetic Immunity	EN61547

Model Specifications

Part Number	Output Power	Output Current	Output Voltage	Current Accuracy	Efficiency (typical, 220VAC)
MU050A030AQ_RS485	50W	300mA	85~142VDC	± 5%	87%
MU050A035AQ_RS485	50W	350mA	85~142VDC	± 5%	87%
MU050A070AQ_RS485	50W	700mA	44~71VDC	± 5%	87%
MU084A035AQ_RS485	84W	350mA	120~240VDC	± 5%	88%
MU100A030AQ_RS485	100W	300mA	205~343VDC	± 5%	88%
MU100A035AQ_RS485	100W	350mA	143~286VDC	± 5%	88%
MU100A070AQ_RS485	100W	700mA	84~143VDC	± 5%	88%
MU100A097AQ_RS485	100W	970mA	84~105VDC	± 5%	88%
ME120A035AQ_RS485	120W	350mA	171~343VDC	± 5%	88%
MU150A030AQ_RS485	150W	300mA	256~428VDC	± 5%	90%
MU150A070AQ_RS485	150W	700mA	128~214VDC	± 5%	90%
MU150A139AQ_RS485	150W	1390mA	84~105VDC	± 5%	90%
MU200A035AQ_RS485	200W	350mA	343~571VDC	± 5%	92%
MU200A045AQ_RS485	200W	450mA	266~467VDC	± 5%	92%
MU200A055AQ_RS485	200W	550mA	226~309VDC	± 5%	92%
MU200A060AQ_RS485	200W	600mA	226~333VDC	± 5%	92%

Power Line Carrier(PLC) Solution

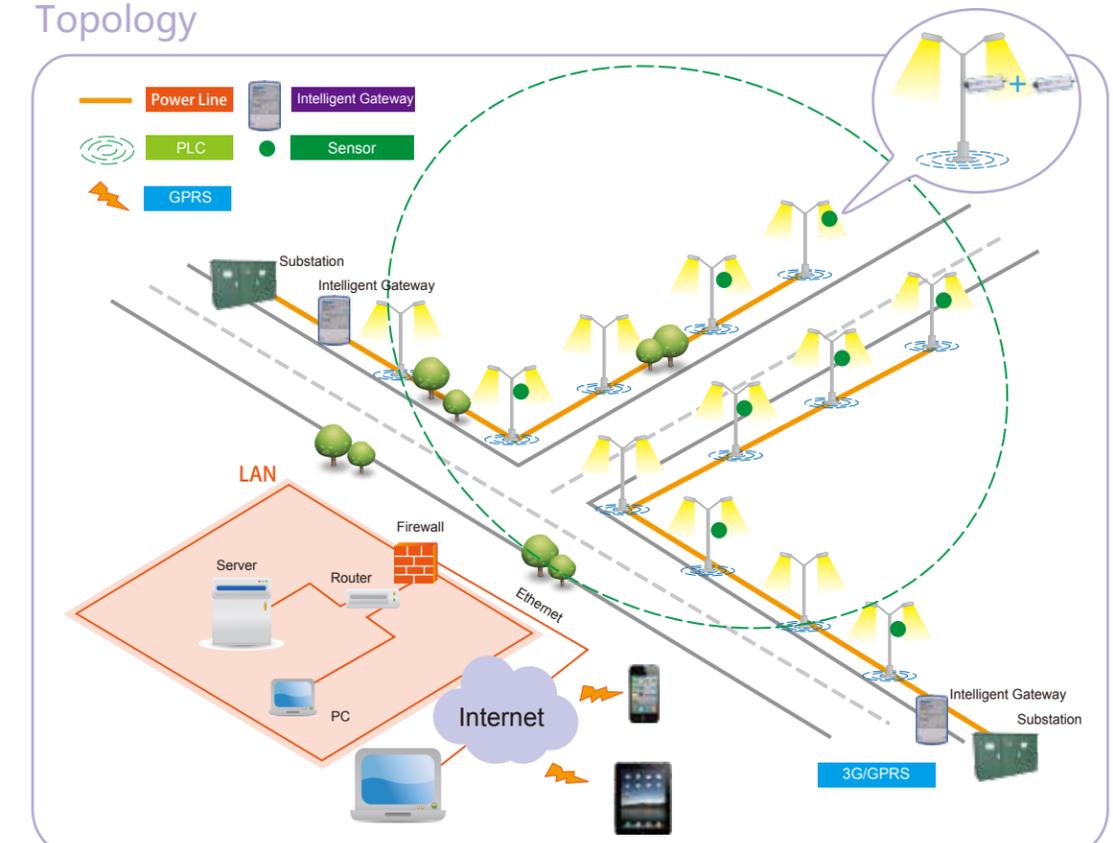
MOONS' public lighting intelligent monitoring system is suitable for all kinds of urban roads, tunnels, landscape, parking lots, coalpits, etc. The system is mainly composed of intelligent gateway, node controller, intelligent monitor and control management system software, lighting protocol and different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

PLC Intelligent Gateway (MSKT_1001_PLG)



Features

- 3 phase 4 wire, 100 ~ 420VAC input voltage
- Uplink supports GPRS/3G or Ethernet, and follows the TCP/IP protocol.
- Downlink supports power line carrier (PLC) protocol in accordance with EIA-709.1, EIA-709.2, EN50065-1.
- 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, it will change to the time control dimming mode automatically, until the communication restored.
- Built-in RTC, with backup battery, the clock can continue working for 30 days after the battery exhausted its power.
- Supports remote and local software upgrade
- Supports RS485 interface
- Supports 2 channels (0-10V, 4~20mA) analog input
- Supports loop circuit switching control for 4 channels,
- Supports 2 channels digital input
- Supports tri-phase electrical energy measurement
- Omniseal flame retardant protective enclosure

Technical Specifications		
AC Input	Voltage	100~420V, tri-phase
	Frequency	50/60Hz
PLC	Transmission Power	3W
	Transmission Rate	5.5kbps
	Frequency	132KHz
Cellular Network	Standard	GPRS/3G/4G
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
	MTBF	≥30000h @25°C
Others	Data Storage	10 years
	Dimensions	289.9*180*98 mm
	Weight	2.05 kg
Safety	Insulation Resistance	AC input to others ≥100MΩ
	Isolation Voltage	AC input to DC 2kVAC
EMC	Standards	EN61000-4-2 IV;
		EN61000-4-4 IV;
		EN61000-4-5 IV;
		EN61000-4-6 III;



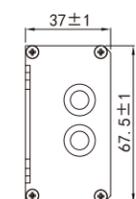
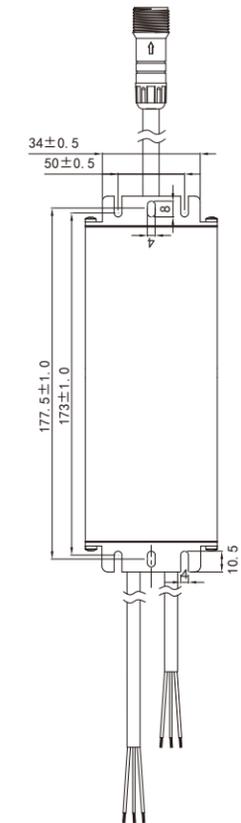
PLC Node Controller (MSDK_102_PLG)



Features

- PLC node controller works in combination with PLC intelligent gateway using power line carrier communication based on EIA-709.1, EIA-709.2, EN50065-1 communication protocol.
- 100 ~ 277VAC power line input voltage range
- Output up to 480VA to a lamp/LED-driver combination, output 0-10V for LED-driver combination, dimming from 0%-100%, step by 1%
- Monitors the working status and alarms the function fault
- 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	≤2.1A
AC Output	Power Dissipation	1.2W~5W
	Current	0~2A
	Power	≤480VA
PLC	Transmission Power	3W
	Transmission Rate	5.5kbps
	Frequency	132KHz
Dimming	Voltage	0~10VDC
	Current	0~5mA
	Accuracy	-3~+3%
Meter	Voltage	0~600VAC
	Current	0~5A
	Accuracy	-5~+5%
Stability	Operating Temperature	-40°C~70°C
	Enclosure Temperature	≤80°C
	Humidity	10~90%,non-condensing
	Atmospheric Pressure	63~108kPa,Alt.≤4000m
	Storage Temperature	-40°C~85°C
	Vibration	2G
	IP	IP67
Others	MTBF	≥30000h @25°C
	Data write	10 ¹⁴ times
	Dimension	190*67.5*37 mm
Safety	Weight	0.802 kg
	Insulation Resistance	AC input to Dimming ≥100MΩ
Safety	Isolation voltage	AC input to Dimming 3kVAC
		Earth to others 1.5kVAC
EMC	Standards	EN61000-4-2 IV;
		EN61000-4-4 IV;
		EN61000-4-5 IV;
		EN61000-4-8 III;



Wireless Data Acquisition Module

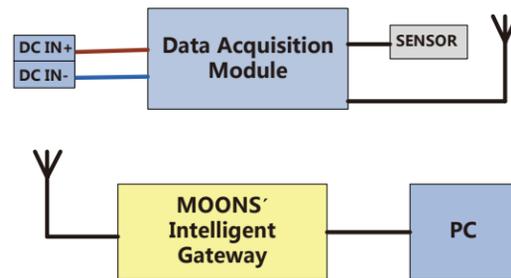
Wireless Data Acquisition Module of MOONS' is designed for connecting various sensors with 0~5V, 4~20mA or I²C interface.

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.

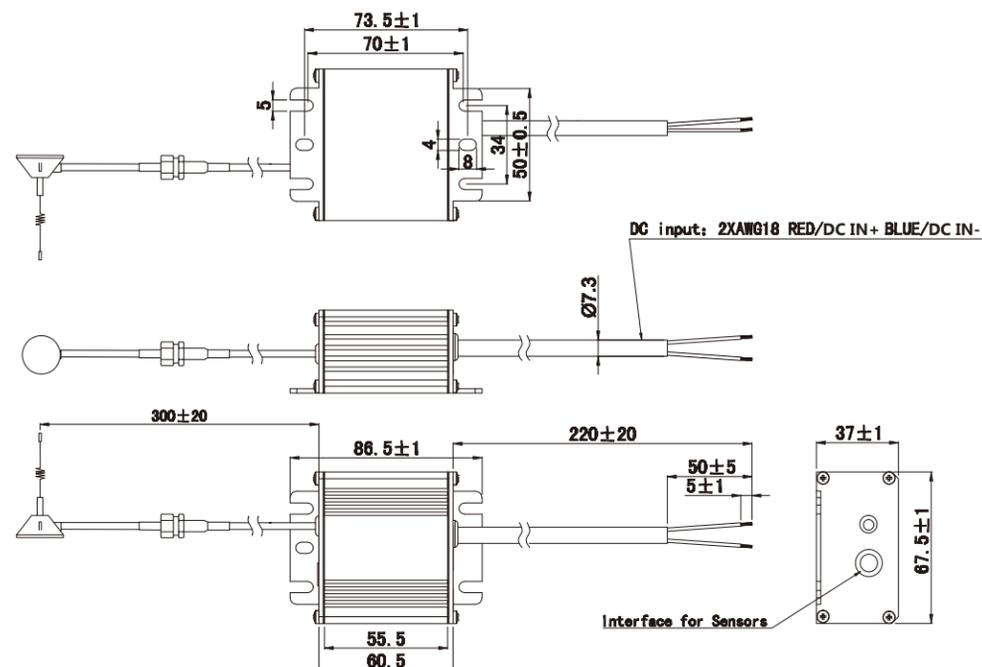
MOONS' data acquisition module is suitable for all kinds of urban roads, tunnels, landscape, parking lots and so on. Our product is low-power, low-cost and convenient to fix and use.

Specifications		
DC Input	Voltage	12 ≤ V _{in} ≤ 24V (±10%)
DC Input	Current	≤ 250mA
DC Input	Power	≤ 2.5W
Interfaces for Sensors	2 chs for Analog Signal	0~5V/4~20mA
	2 chs for Digital Signal	I ² C
	2 chs for Control Signal	PWM/High or Low logic
Accuracy	0~5V	0.01V
	4~20mA	0.1mA
RF	Transmission Power	18dBm
	Reception Sensitivity	-100dBm
	Transmission Rate	250kbps
	Frequency	2400~2485MHz
Stability	Operating Temperature	-20~+60 °C
	Useful Life	3 years
Others	Dimension	86.5*67.5*37(mm)

Typical Application



Mechanical Outline



Wireless PM2.5 Sensor (MSCG1110)

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 (MSCG2110)

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 (MSCG3110)

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 (MSCG4110)

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℃~+50℃

Ultrasonic anemometer(MSCG6110)

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℃~+70℃

Wireless Daylight Harvesting Sensor(MSCG5110)

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℃~+70℃

Vehicle flow Sensor(MSCG7110)

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℃~+65℃

Typical Recommendation

Road new construction sodium lighting solution				Road reconstruction sodium lighting solution			
PLC Solution		Wireless Solution		PLC Solution		Wireless Solution	
RTU remote control MSKT-1002-PLC	PLC node controller MSDK_102_PLC	RTU remote control MSKT1300-ZIG	wireless node controller MSDK1231	PLC gateway MSKT_1001_PLC	PLC node controller MSDK_102_PLC	Wireless gateway MSKT1100-ZIG	wireless node controller MSDK1231
	+ Dual PLC monitor MSDK_201_PLC				+ Dual PLC monitor MSDK_201_PLC		
Road new construction LED lighting solution				Road reconstruction LED lighting solution			
PLC Solution		Wireless Solution		PLC Solution		Wireless solution	
RTU remote control MSKT-1002-PLC	PLC node controller MSDK_102_PLC	RTU remote control MSKT1300-ZIG	wireless node controller MSDK1231	PLC Gateway MSKT_1001_PLC	PLC node controller MSDK_102_PLC	Wireless intelligent gateway MSKT1100-ZIG	wireless node controller MSDK1231
	+ Dual PLC monitor MSDK_201_PLC		+ Wireless integrated antenna MSDK5000		+ Dual PLC monitor MSDK_201_PLC		+ Wireless integrated antenna MSDK5000
Road new construction solar lighting solution				Road reconstruction solar lighting solution			
Wireless Solution				Wireless Solution			
Wireless solar gateway antenna MSKT1200-ZIG	Wireless integrated antenna MSDK5110			Wireless solar gateway MSKT1200-ZIG	Wireless integrated antenna MSDK5110		
Tunnel new construction LED lighting solution				Tunnel reconstruction LED lighting solution			
RS485 Solution		Wireless Solution		RS485 Solution		Wireless Solution	
RS485 intelligent gateway MSKT1000-485	RS485 node controller MSKT100-485	RTU remote control MSKT1300-ZIG	wireless node controller MSDK1231	RS485 intelligent gateway MSKT1000-485	RS485 node controller MSKT100-485	Wireless intelligent gateway MSKT1005-ZIG	wireless node controller MSDK1231
	+ RS485 integrated driver (variety of specifications)		+ Wireless integrated antenna MSDK5000		+ RS485 integrated driver (variety of specifications)		+ Wireless integrated antenna MSDK5000