TECHNICAL BROCHURE

2016

TVILIGHT
EMPOWERING INTELLIGENCE

Upgrade Your City

Westerhaven 13
9718 AW Groningen
The Netherlands
www.tvilight.com

ABOUT TVILIGHT

Tvilight is an innovative high-tech company specializing in wireless lighting controls and connected lighting management software for outdoor applications. Our mission is to improve the lives of citizens globally and contribute to the creation of sustainable and connected cities.

We do this through developing state-of-the-art outdoor lighting control systems. Our patented sensor-based presence detection technology enables dynamic on-demand lighting, and our management software provides full remote management of the entire lighting infrastructure in real-time.

We drive the adoption of networked lighting, helping our customers save energy, reduce installation complexity, and minimize infrastructure maintenance costs. We promote third-party compatibility and open standards, delivering highly reliable wireless networks that serve as a perfect foundation for Smart City and the Internet of Things.

MAKE YOUR FIRST STEP TO A SMART CITY

“ In Smart Cities, digital technologies translate into better public services for citizens, better use of resources, and less impact on the environment.” (European Commission on Smart City, 2015)

Today, municipalities and infrastructure operators already use advanced technology to manage critical public services such as electricity supply, transportation, waste management, and public lighting. In the future cities and technology will become even more interconnected, resulting in a wider adoption of intelligent management systems.

Street lights are every municipality’s most valuable asset because they form a city-wide foundation upon which a wireless intelligent network can be implemented. Street lights are your first step to a Smart City.

Tvilight intelligent lighting solutions help cities transform their existing infrastructure into an open wireless platform. With Tvilight, you will be able to benefit from countless Smart City/IoT applications to manage traffic, environment, and assets better.

REMOTE MANAGEMENT AND CONTROL

Data acquisition and analysis

CityManager, our web-based software for remote management of street lighting, provides a real-time overview of the entire lighting infrastructure (both on individual and group level). By using CityManager, you can remotely monitor and control the street lights, which results in optimized energy use, better public safety, as well as reduced maintenance and operation costs.

Intuitive user interface

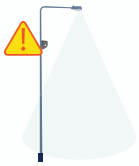
Gain in-depth insights into every single aspect of your lighting system. Smart analytics and simple charts will help you make the right decision about your lighting infrastructure.

Accurate real-time data

Generation of analytics per an individual light point or their groups. Available data includes: notifications about lighting-related faults, number of triggers per light point, generated energy savings, heatmaps, and more.

Automatic failure reports

Lighting-related system faults are identified, and automatic failure reports are sent in real-time. This results in optimized maintenance, better planning, reduced costs and extended lamp life.



Map-based visualizations

Outdoor lights are represented in a graphic interface on Google Maps, coordinated with GPS technology, which enables you to locate, monitor and control individual light points with ease.

Power metering*

Dedicated hardware provides precise energy metering, which is converted into detailed energy usage and savings reports.

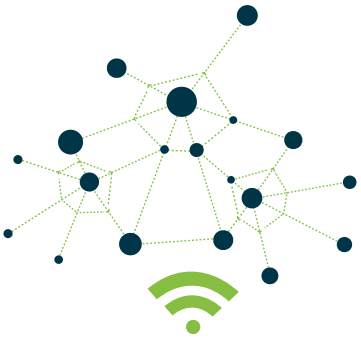
Location-based options*

Support of context-specific lighting levels that reflect local conditions such as sunset/sunrise time, peak/off-peak hours, weather changes, special events, and emergency situations.

*This feature is in development

Continuous support

CityManager receives periodic security and feature upgrades. We do this to ensure optimum functionality and system performance



Wireless Sensor Network

Fully wireless communication

Tvilight offers a robust wireless communication solution that is suited for high-demand environments. The 2.4 GHz wireless self-configuring, self-healing networks use a broadband signal for optimal results in both outdoor and tunnel-like environments. The 2.4 GHz wireless networks are very stable and secure.
We support the following technologies for the Gateway-to-Server connection

- 2G/3G. Used in most projects. Requires a SIM-card (provided either by Tvilight with worldwide coverage or by the customer himself with a 1GB monthly data subscription)
- Wi-Fi
- Ethernet

Figure: the infographic below provides an overview of our **wireless sensor network**

INDEPENDENT TECHNOLOGY

Third-party compatibility of Tvilight software and hardware

Standards-based technology

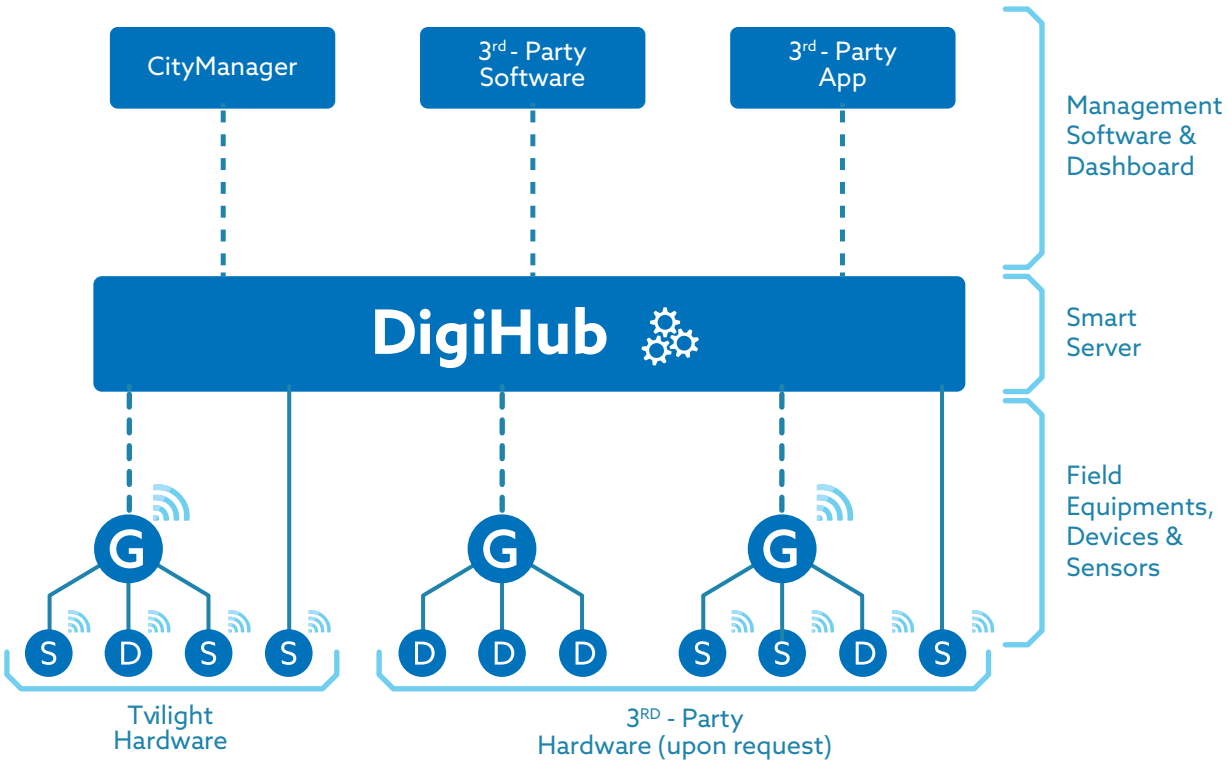
We believe that the use of free, publicly available standards promotes the development of new technologies. It supports a vendor-neutral ecosystem, enables interoperability, and provides the end-user with the freedom to choose among solution providers. Our vision is that the customer should be able to choose from the best products available on the market, instead of being restricted to a single provider (the lock-in strategy).

We comply with the ASTRIN Lighting Interoperability Standard (ALiS, version 1.2). We also take part in the TALQ standardization forum, and actively contribute to the industry dialogue on standardization.

Why use the standards-based technology?

- To ensure quality of performance and functionality among different vendors
- To avoid vendor lock-in and ensure the future viability of the system
- To allow the use of existing management software for outdoor lighting control

Figure: **DigiHub Open-Architecture** for 3rd Party Compatibility



Universal lamp compatibility

For maximum applicability, our outdoor lighting controllers (OLCs) are compatible with all lamp types that allow intelligent controlling (dimming). More precisely, we support the two main industry standards for lamp control: DALI (preferred) and 1-10 V.

The advantage of using DALI is the simplicity of installation, based on non-polar wiring. DALI also eliminates wiring installation errors that may occur due to existing differences in wiring color codes in different regions or countries.

Furthermore, our web-based CityManager software can retrieve all DALI information, which can be used for preventive maintenance and asset management.

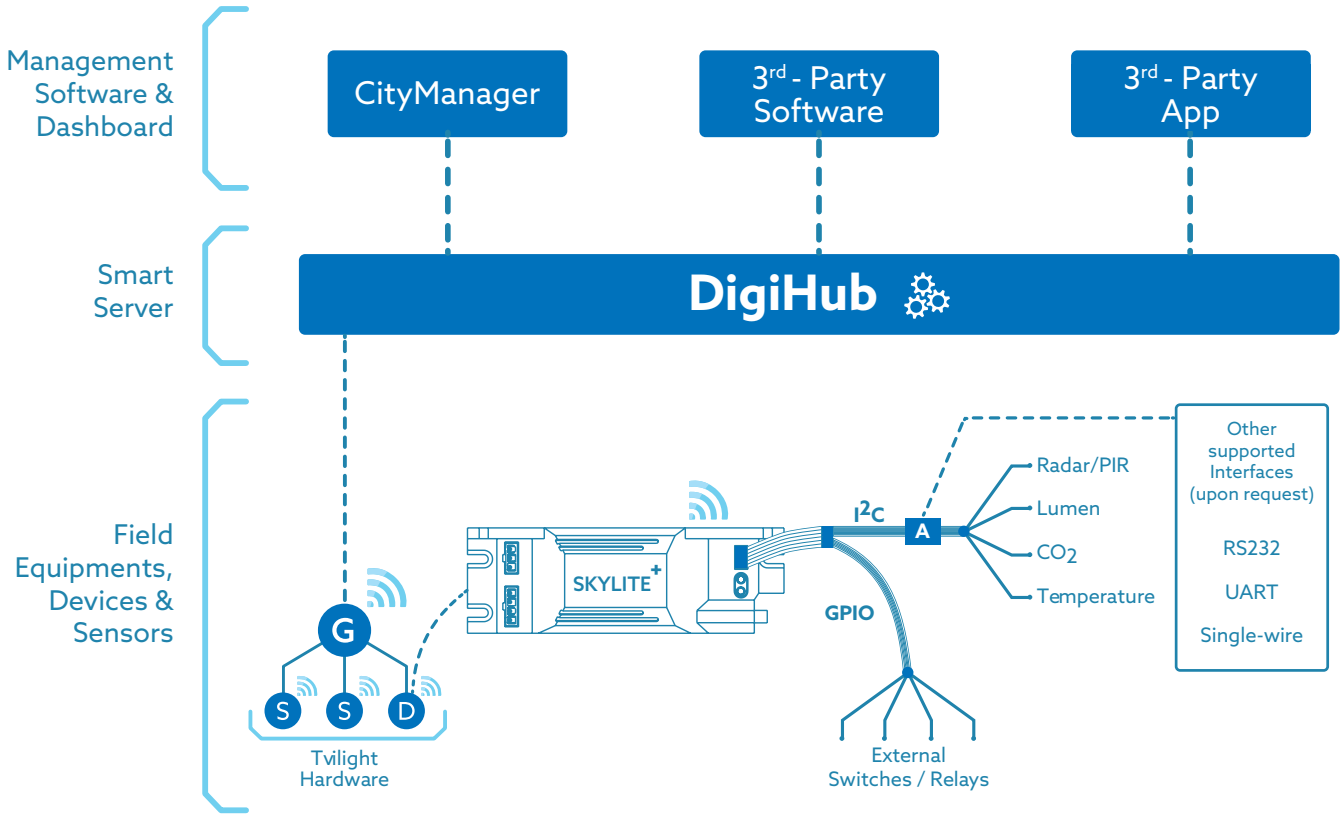
Integration of third-party hardware & software

Tvilight Smart City platform allows the integration of third-party hardware and software, thanks to a unique system architecture. The software can be easily integrated via application programming interfaces (APIs), whereas hardware can be integrated via a GPIO (general purpose input/output) or an I^2C interface.

GPIO interfaces are most commonly used for on/off switches, relays and threshold triggering. The I^2C interfaces are used when data is exchanged between components, e.g. sensors for measuring environmental pollution or noise.

The uniqueness of Tvilight system architecture lies in our DigiHub, a platform that enables simple, standardized communication between all integrated hardware and software. The (OLC's) or other hardware components can therefore be easily connected to software applications.

Figure: SKYLITE+ offers **Platform to Connect** various **External Sensors**



PUBLIC AND TECHNICAL SAFETY

Safety is an all-encompassing concept that is deeply ingrained into everything we do. Tvilight intelligent lighting solutions allow for better public safety in the nighttime, ensuring personal safety for each occupant. However, technical and communication security is of paramount importance as well, which is reflected in our attention to cyber security and user data protection.

Safe Circle of Light

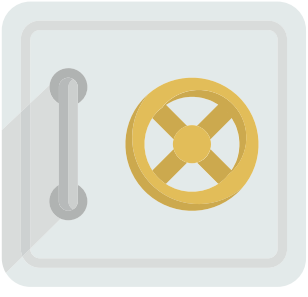
Turning off the street lights completely during the night is undesired and in most cases not allowed, as it would compromise public safety and go against municipal guidelines. Instead, you should choose an intelligent lighting solution that enables dynamic on-demand dimming. As soon as sensors detect human presence, the lights brighten up to a pre-defined level. Whether it is a pedestrian, a cyclist or a driver, they will be embraced in a safe, warm circle of light. By adopting Tvilight intelligent lighting solutions, you are able to prevent the overwhelming waste of electricity that occurs when the lights burn for nobody, without decreasing the citizens' comfort.

Safe streets and safe cities

On-demand dynamic dimming also helps you to keep track of occupancy levels and related security issues. It works like this: when you observe a sudden change in lighting levels in particular areas, you become aware of human presence there. It might alert companies to unauthorized activity taking place at their outdoor facilities, or it might simply let you know that you are not the only one on the street. Furthermore, better street lighting helps security cameras capture images of higher quality, which adds to the security benefits of our system.

Secure Data Connection

We take customer data protection seriously. That is why all Tvilight data connections are highly secure. Furthermore, our in-built multilevel back-up system ensures that the lights will never completely turn off, even in an unlikely case of system failure.



Secure Data Connection

Unit-to-unit communication. Tvilight outdoor lighting controllers (OLCs) communicate with each other through a very stable 2.4 GHz wireless network that is self-configuring and self-healing. In an unlikely case of an OLC failure, the specific lamp automatically switches back to 100% brightness. Other OLCs in the network are not affected.

Gateway-server communication. The Tvilight Gateway is connected to the server through a Secure WebSocket (WWS Protocol RFC 6455). To guarantee integrity, we also use the OAuth 2.0 alongside the Secure Sockets Layer. This way, the Gateway communication remains secure, even when a non-encrypted connection is used. In an unlikely case of Gateway failure, all lights automatically switch on to 100% brightness.

Server-CityManager connection. CityManager uses REST API. The OAuth 2.0 protocol is used for the communication between CityManager and API. The HTTPS ensures the further security of the connection. In an unlikely case of server failure or loss of connection, the Gateway and the OLCs keep operating in the defined dimming profile with no change. Remote management of light would not be possible during this period.

Tvilight servers are hosted at TCN Data Hotels in the Netherlands. Achieving 99,9999% availability as of 2001, TCN is a renowned player in the data center market. TCN designs, builds and operates trusted 100% neutral data centers, providing the fundament of mission-critical environments. Critical components, including connections to the power grid, are at least N+1 redundant. Furthermore, the data hotel is self-sufficient: in case main power supply fails, the entire energy supply can be provided by UPS and emergency power systems. Security is given top priority, so outsiders are kept out and authorized users have controlled access inside. Physical security is on duty 24/7/365 days of the year and is supported by smart CCTV systems, electronic access systems, and a smart facilities management system.

The table below provides an overview of our security infrastructure:

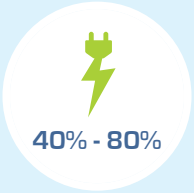
Security group	Security application	Security measures
Physical environment	Access control	• High-security data center
	Redundancy	• Multiserver environment with automatic roll-over
Connectivity layer	API	• Account and access control
	3rd party integration	• Connected devices and applications require pre-authorisation
Software	Point-to-point encryption	• AES 256 encryption & VPN • Resistant to man-in-the-middle attacks
Hardware	Devices	• 3-level back-up system in case of system failure (ensures that lights never turn off during the night) • Surge protector in case of voltage spikes
	Between devices	• AES 128 message encryption • Multidevice failure resistant mesh network • Jammer-resistant signalling

FINANCIAL BENEFITS

By installing Tvilight intelligent lighting solutions, you benefit financially, thanks to energy savings and reduced energy costs.

Energy savings of up to 80%

- By using dynamic lighting, it is possible to generate energy savings of 40-80%, depending on the usage environment
- In industrial terrains, energy savings can reach 70-80%
- In dense urban environments, the Tvilight solution has the potential to generate energy savings of 40-50% (in this case, actual savings depend on the traffic intensity)



Maintenance costs savings up to 50%

- Automatic failure reporting
- No need for expensive visual inspections
- Extended lamp lifetime
- Excellent preventive maintenance

Generally, a two-year warranty is provided on all Tvilight hardware.
A five-year extended warranty is available upon request.

RAPID INSTALLATION

Plug & Play Installation

Installing and maintaining wireless communication systems is easy because power grid owners do not need to be involved. This eliminates several regulatory and legal restrictions since no foreign signals are transmitted through the grid. That is why wireless systems are more cost-effective than their analogs based on Power Line Communication.

Our plug-and-play turnkey solutions allow for rapid implementation without any major civil works, special tools/gear, changes to underground cabling or specialized personnel.

GPS data from existing GIS systems can be used for a quick and precise registration of each lighting pole. This is done through either one-time import or by setting up a one-way or two-way data stream, allowing the GIS application to exchange information with the OLCs via an API.

This makes the manual input of data unnecessary which is especially beneficial for large-scale installations.

Installation options

At Tvilight, we are focused on flexibility and simplicity and offer different installation options

Product	IP Classification	Mounting Options
SkyLite (RF)	IP 67 (external use)	• External on lighting pole (different heights) • Inside luminaire (via luminaire manufacturer)
CitySense (integrated sensor + OLC RF)	IP 65	• External on lighting pole Standard mounting height is 5 meters
Gateway	IP 65	• External on lighting pole • Internal in control cabinet, given proper server connection

Detailed technical specifications can be found in the following product data sheets

SKYLITE *V3*

SKL V3 Model A or Model B

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SkyLite V3 is a plug-and-play wireless lighting controller for the monitoring and control of the outdoor lighting fixtures. It creates a smart, energy-efficient and safe environment, and serves as an ideal foundation for a Smart City.

SkyLite supports seamless communication with other Tvilight products, such as CitySense Plus and Tvilight Gateway, and can be managed remotely via Tvilight CityManager.

Remotely programmable lighting schedules allow the users to reduce energy consumption by up to 80% in a safe and comfortable manner. The in-built monitoring tools notify users (via CityManager) about the lighting-related faults such as a lamp or ballast failure. This greatly reduces the need for expensive visual inspections and enables a reduction of operation and maintenance costs.

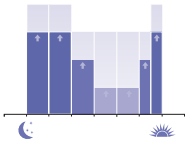
SkyLite units serve as a perfect platform for various Smart City devices and applications (Tvilight or third-party) enabling environmental monitoring, traffic control, asset management, and more.

Designed in the Netherlands Made in Europe

Features

Wireless outdoor lighting control

Remote management and control via CityManager and third-party software



Advanced dimming and adaptive lighting schedules

Energy monitoring

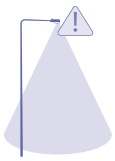
Universal lamp compatibility

Open interfaces for third-party compatibility

Automatic failure and status reports via CityManager

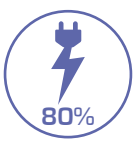
In-built real-time clock with a back-up battery, AstroClock

Plug-and-play installation



Fail-proof: three-level back-up system

Benefits



Up to 80% Energy savings

Up to 50% maintenance cost reduction

Reduce light pollution and CO_2 emissions

Wireless platform for Smart City

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TECHNICAL SPECIFICATIONS

SKL V3 Model A or Model B

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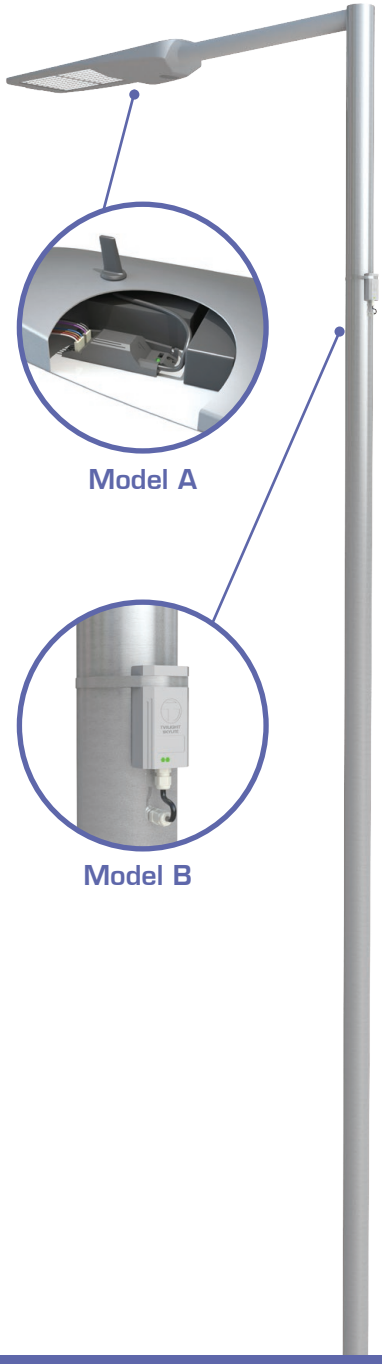
Product	In-built wireless communication, lighting control, and external sensor interface Model B: 5.5 m pre-connected power cable for ease of installation
Input voltage	230 VAC (Model A PR151083 - Model B PR161195) or 115 VAC (Model A PR151115 - Model B PR161196), 50/60 Hz (normal power grid)
Power consumption	<2W
DALI Loads	Max.2
Dimming control	1-10 V or DALI (isolated for safety)
Surge protection	110 joules (6 Ka), 12 kV combination wave
Controller	ARM Cortex-M3 CPU
Electrical protection	Class II: overload, short circuit, and overtemperature protection
Electrical safety	Galvanic isolation between high-voltage and low-voltage terminals
Operating conditions	-20 °C to +70 °C ambient, 20% to 90%, Rh non-condensing
Product mounting	Model A inside the luminaire, Model B: on the pole
Housing	IP20 (Model A) , IP65 (Model B)
Antenna	External antenna
Dimensions	120 mm x 55 mm x 29 mm (Model A), 160 mm x 110 mm x 60 mm (Model B)
Product compatibility	Direct wireless communication with SkyLite and Gateway, communication with CityManager—through Gateway Compatibility with conventional (PLL, HID, HPS) and new (LED) luminaires
External sensor integration	I²C interface to connect third-party external sensors
Additional control	GPIO interface
Wireless communication	2.4 GHz IEEE 802.15.4 self-forming, self-healing wireless network +10 dBm max. transmit power, -98 dBm max. receiver sensitivity Up to 1 km open field range Up to 250 kbps microcontroller RF data rate 32-bit microcontroller, 64 kB Flash and 16 kB RAM
Network security	128 AES Multi-layer security with end-to-end encryption
Over-the-air update	Configurations and software can be updated remotely, ensuring an up-to-date network infrastructure
Device to Gateway ratio	200:1
Remote monitoring	Via CityManager or similar third-party management software. CityManager enables remote management, monitoring, control, and configuration of lamps on individual and group level.
Safety mode	Auto-safe: in a case of Gateway failure, all lamps go back to the highest pre-programmed level of brightness. In a case of the controller failure, the lamp goes back to the 100% brightness.
Certification	RoHS, CE, EN301489-1/3, EN61547, EN55015, EN300328, EN60950, EN550121-5 RF transceiver compliant with US (FCC), Canadian (IC), European (ETSI), and Japanese (Telec) standards
Manufacturing	ISO 9001:2008, Made in Europe
AstroClock	Battery-backed real-time clock; AstroClock feature Able to switch on/off the lamps at sunset/sunrise and adjust them seasonally (Summer-Winter time). Eliminates the need for conventional photocell



Model A

Model B

Keywords: Wireless SLC, OLC RF (Street / Outdoor Lighting Controller Radio Frequency)

CITYSENSE *PLUS*

(CS-PRAI) 230 VAC (PR150868) or 115 VAC (PR151116)

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CitySense Plus is a revolutionary integrated wireless motion sensor for the presence-based monitoring and control of outdoor lighting. The product is compatible with both conventional and new luminaires (such as LED).

CitySense Plus delivers on-demand dynamic lighting, making the lights adjust their brightness based on the presence of pedestrians, bicycles, and cars. As a result, the lights automatically dim down during the off-peak hours when there is nobody in the vicinity. Upon detection of the human presence, all lights in the surrounding area return to the brightness levels previously defined by the user. Dynamic lighting reduces energy consumption by up to 80% without compromising public safety and citizen comfort.

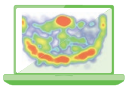
The in-built monitoring tools notify users (via CityManager) about the lighting-related faults such as a lamp or ballast failure. This greatly reduces the need for expensive visual inspections and enables a reduction of operation and maintenance costs.

Designed in the Netherlands Made in Europe

Features

Revolutionary outdoor motion sensor with an in-built wireless lighting controller

On-demand dynamic lighting thanks to advanced human detection technology



Heatmaps to track occupancy levels and traffic intensity in the area

Plug-and-play installation

Universal lamp compatibility

Energy Monitoring

In-built real-time clock with a back-up battery, AstroClock

Fully controllable through Tvilight CityManager or similar third-party management software

Open interfaces for third-party compatibility

Fail-proof: three-level back-up system

Benefits

Up to 80% energy savings

Up to 50% maintenance cost reduction

Reduce light pollution and CO_2 emissions

Light on demand

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TECHNICAL SPECIFICATIONS

(CS-PRAI) 230 VAC (PR150868) or 115 VAC (PR151116)

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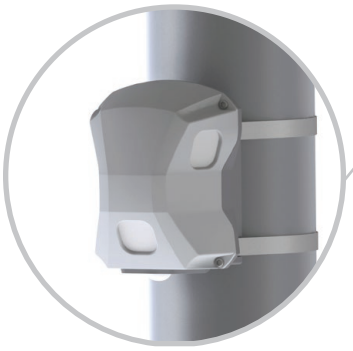
Product	Motion detection sensors, wireless communication, and lighting control integrated into one product for a simple plug-and-play installation. Includes a 5,5 m pre-connected power and control cable.
Motion detection	Detects pedestrians, cyclists, and cars (range: 4-120 km/h) Range: up to 15 m on each side, 9 m in front, 3 m behind Angle: >270 ° (depends on pole diameter) Triggering of 1-10 neighboring lamps upon detection (user-configurable)
Input voltage	230 VAC (PR150868) or 115 VAC (PR151116), 50/60 Hz (normal power grid)
Power consumption	<3W
DALI loads	Max.2
Dimming control	1-10 V or DALI (isolated for safety)
Surge protection	110 joules (6 Ka), 12 kV combination wave
Controller	ARM Cortex-M3 CPU
Electrical protection	Class II: overload, short circuit, and overtemperature protection
Electrical safety	Galvanic isolation between high-voltage and low-voltage terminals
Operating conditions	-20 °C to +70 °C ambient, 20% to 90%, Rh non-condensing
Product mounting	On the pole. Recommended mounting height 5 m above the ground
Housing	IP65, weatherproof and fireproof
Antenna	Integrated Internally
Dimensions	100 mm x 125 mm x 95 mm +/- 10 ° adjustable mounting plate to accommodate for pole tilts
Product compatibility	Direct wireless communication with SkyLite and Gateway, communication with CityManager—through Gateway Compatibility with conventional (PLL, HID, HPS) and new (LED) luminaires



Wireless communication	2.4 GHz IEEE 802.15.4 self-forming, self-healing wireless network +10 dBm max. transmit power, -98 dBm max. receiver sensitivity Up to 1 km open field range Up to 250 kbps microcontroller RF data rate 32-bit microcontroller, 64 kB Flash and 16 kB RAM
Network security	128 AES Multi-layer security with end-to-end encryption
Over-the-air update	Configurations and software can be updated remotely, ensuring an up-to-date network infrastructure
Server communication	via Gateway
Device to Gateway ratio	200:1
Remote monitoring	Via CityManager or similar third-party management software. CityManager enables remote management, monitoring, control, and configuration of lamps on individual and group level.
Safety mode	Auto-safe: in a case of Gateway failure, all lamps go back to the highest pre-programmed level of brightness. In a case of the controller failure, the lamp goes back to the 100% brightness.
Certification	RoHS, CE, EN301489-1/3, EN61547, EN55015, EN300328, EN60950, EN550121-5 RF transceiver compliant with US (FCC), Canadian (IC), European (ETSI), and Japanese (Telec) standards
Manufacturing	ISO 9001:2008, Made in Europe
Lamp switching capacity	2400 VA (Relay),16A max. current
AstroClock	Battery-backed real-time clock; AstroClock feature Able to switch on/off the lamps at sunset/sunrise and adjust them seasonally (Summer-Winter time). Eliminates the need for conventional photocell

Keywords: Wireless iSLC, iOLC Radio Frequency (Intelligent Street /Outdoor Lighting Controller RF), Outdoor Wireless Sensor

GATEWAY
GW-MXX PR140319

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The Tvilight Gateway is a state-of-the-art network interface device which synchronizes Tvilight outdoor lighting controllers and the street lighting management software (Tvilight CityManager or similar third-party software).

The Gateway has an in-built radio module for wireless network configuration, commissioning, and maintenance. It can reliably communicate with a large number of devices spread across large distances. In-built smart monitoring tools notify users about the status of the lamps and the network (via CityManager or other software).

Several Internet connectivity options offer robustness and flexibility to the end-customer. Furthermore, it supports the industry-standard protocols allowing for an easy integration with other systems and networks.

The Gateway encloses advanced industrial components for optimized performance worldwide.

Designed in the Netherlands Made in Europe

Technical Specifications

HARDWARE

Integrated product	In-built power supply, 2.4 GHz wireless network communication, server communication (SIM-card, Ethernet, Wi-Fi). SIM-card provided by Tvilight with worldwide coverage, or by customer himself (requires 1GB monthly data subscription)
Input voltage	Universal 85 – 264 VAC, 50/60 Hz (PR140319)
Power Consumption	<8W (average)
Processor	High-performance industrial grade dual-core ARM Cortex-A9 CPU, 1 GHz
Data storage	4 GB micro SD-card
Real-time clock	Battery-backed RTC
Electrical protection	Class II: overload, short circuit, and overtemperature protection
Electrical safety	Galvanic isolation between high-voltage and low-voltage terminals
Operating conditions	-20 °C to +70 °C, 20% to 90%, Rh non-condensing
Antenna	Integrated internally for 2.4 GHz wireless and Wi-Fi
Connectors	1x Ethernet port (10/100, RJ45) 1x USB 2.0 connector (high speed) 1x micro SD-card slot (max. 32 GB) 1x push insert for a standard SIM-card bay (25 mm x 15 mm) 2-pin power connector 2x uFL antenna connector (2.4 GHz wireless, Wi-Fi) 1x SMA-F antenna connector (2G/3G modem) 16x GPIOs for analog/digital input and output lines (activated on request)
Product mounting options	Pole mounting, wall mounting, or inside the cabinet
Housing	IP65, fireproof (UL94V0) housing
Dimension	230 mm x 130 mm x 90 mm
Manufacturing	ISO 9001: 2008, Made in Europe
Certification	RoHS, CE, EN301489-1/3, EN61547, EN55015, EN300328, EN60950 RF Transceiver compliant with US (FCC), Canadian (IC), European (ETSI), and Japanese (Telec) standards

Keywords: Wireless Gateway, Data Concentrator (DCU), Wireless Segment Controller (SC RF), Network Interface unit, Lighting Monitoring and Management Software

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TECHNICAL SPECIFICATIONS
GATEWAY GW-MXX PR140319

TVILIGHT
EMPOWERING INTELLIGENCE

INTERNET COMMUNICATION

Server communication	2G GSM/ GPRS/ EDGE quad-band, 3G six-band UMTS/ HSPA Additional Ports: Ethernet
Network security	128 AES, WebSocket (with SSL) and VPN Multilayer security with end-to-end encryption Dual protection for messages between devices and Gateway Certificate-based secure WebSocket and VPN connection
Functions	Real-time monitoring of devices and network fault tolerance Several Internet connectivity options (Ethernet, Wi-Fi) and automatic connectivity selection Automatic recovery for mobile connection SNTP time-sync between Gateway and devices Regular logging of the system operation (selectable time interval) Real-time connection between Gateway and DigiHub Remote debugging of Gateway and devices Over-the-air update for Gateway and devices (software and firmware) Local intelligence for reliability and faster response time
Over-the-air update	Configurations and software can be updated remotely, ensuring an up-to-date network infrastructure
Remote monitoring	CityManager (or third-party software) enables remote management, monitoring, control, and configuration of lamps on individual and group level.

WIRELESS COMMUNICATION

Wireless network	2.4 GHz IEEE 802.15.4 Self-forming, self-healing, user-configurable wireless network +10 dBM max. receiver sensitivity Up to 1 km open field range Up to 250 kbps RF data rate
Device to Gateway ratio	200:1
Product compatibility	Plug-and-play compatibility with CitySense, SkyLite, and CityManager

Keywords: Wireless Gateway, Data Concentrator (DCU), Wireless Segment Controller (SC RF), Network Interface unit, Lighting Monitoring and Management Software

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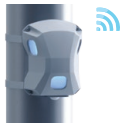
INTELLIGENT LIGHTING ARCHITECTURE

Wireless Lighting Control Network

TVILIGHT
EMPOWERING INTELLIGENCE

FULLY INTELLIGENT

CITYSENSE
INTELLIGENT LIGHTING CONTROL



STANDARD

CITYSENSE + SKYLITE
INTELLIGENT LIGHTING CONTROL

BASIC

SKYLITE
INTELLIGENT LIGHTING CONTROL