zenosmart | ZENOPIX smart solutions

Lighting Control Systems

LoRaWAN, NB-IoT and RF-Mesh Lighting Control

LoRaWAN | NB-IoT | RF-Mesh | DALI-2 | D4i | TALQ

zenosmart

Zenosmart offers innovative solutions for rapidly growing and intensifying cities, ranging from autonomous lighting control and energy monitoring to infrastructure management through environmental sensors and control modules.

It is estimated that by 2030, approximately 70% of the world's population will prefer urban living.

Cities generate more than 60% of global carbon dioxide emissions.

Street lighting accounts for approximately 40% of a city's total electricity consumption.

Cities consume approximately 78% of the world's energy.

As the increasing population threatens the sustainability of cities, issues such as energy, traffic, safety, and waste management pose major challenges for local governments. Zenosmart's smart city solutions offer a remedy to these challenges through digital technologies like IoT and artificial intelligence. Thanks to innovative solutions such as smart lighting control systems, energy is used efficiently, costs are reduced, and cities are made safer and more aesthetic.

Zenosmart is Powered by Artificial Intelligence!

Cities are no longer just growing; they are also becoming smarter. At the heart of this transformation lies artificial intelligence. Working alongside technologies such as big data, sensors, and the Internet of Things (IoT), artificial intelligence makes cities more livable, efficient, and sustainable. By analyzing real-time data, AI accelerates decision-making processes and prevents resource waste.

By enabling automation in areas such as lighting, water systems, transportation, and public services, Zenosmart not only reduces costs but also saves energy and time. In addition, AI adapts cities to changing conditions, helping them become resilient in the face of population growth, climate change, and crises. AI-powered smart cities support not only technological progress but also social development, offering a safer, cleaner, and more accessible life. In short, the smart city vision is turning into reality with artificial intelligence.

LCNM

NEMA ANSI C136.41 5 or 7-Pin Street Lighting Control Device

This device is designed to withstand outdoor conditions and seamlessly integrates with existing lighting systems and third-party solutions. We prioritize cost-effective system integration through open communication protocols, an open-source JavaScript payload decoder, and our dedicated Zenosmart Connect application.

NEMA ANSI C136.41 5 or 7-Pin Street Lighting Control Device

The control unit facilitates communication over LoRaWAN® and NB-IoT networks. It supports DALI, DALI-2, D4i, and 0–10 V analog interfaces for street lamp control. Its modern design ensures compatibility with industrial LED fixtures. Additionally, an optional GPS module is available to simplify map positioning and provide precise time synchronization.

The NEMA ANSI C136.41 5-Pin or 7-Pin Street Light Control Device is a high-tech wireless remote control unit specifically designed for LED street lights with ANSI C136.41 compliant connectors. Its simple plug-and-play installation provides quick and easy integration across various street lighting modules.

Measured and Monitored Parameters

- Lamp Burn Time
- Ambient Light
- Controller Temperature
- D4i Energy Records for Each Driver: Internal measurements include current (A), voltage (V), power (W), energy (Wh), WB, W Fund, power factor (PF), lamp burn time, voltage sag, and voltage swell
- Driver Faults
- Lamp Tilt Movement and Collision detection
- GPS Location (optional)
- Task time synchronization via GPS

Controller Features

- Managing Up to 4 DALI / DALI-2 Drivers Independently or via 0–10 V Analog Control
- Power Measurement: Via DALI Driver or internal circuitry.
- Reported D4i Energy Records for Each Driver (Only for D4i drivers)
- Versatile, Astronomical Calendar-Based Dimming
- Time-Based Dimming Profiles
- Automatic Device Time Synchronization
- Light Intensity Sensor
- Remote Control and Configuration
- Multicast Control and Configuration
- Internal Overcurrent Protection Circuit with Auto-Reset
- Configurable via Zenosmart Application (iOS and Android)
- GPS Positioning (optional)
- Simple Twist-Lock Installation
- Autonomous and Adaptive Operation (Configure Once, Run Continuously)
- Real-Time Control and Feedback
- RTC (Real-Time Clock) to Maintain Time After Power Outages
- Internal Tilt Sensor
- Surge Protection
- Digital Input (LSI) for External Events: (Motion sensor, switch, photocell, etc.)
- Fully Documented Open Communication Protocol

Technical Data

NEMA ANSI C136.41 5-Pin or 7-Pin Street Light Control Device

Supply	
Power Supply	100–240 VAC, 0.2 A – (Rated load up to 15 A)
Maximum power consumption	3 W (Maximum)
Overvoltage protection	Internal overvoltage protection circuit
Overcurrent protection	Internal overcurrent protection circuit with automatic reset feature

Communication	LoRaWAN®	NB–IoT
Network interface	LoRaWAN® 1.0.4 Class C	3GPP LTE Release 14 Cat–NB1 and Cat–NB2 compliant
RF Frequency	868 / 915 / 923 MHz	Cat–NB1/NB2: B3, B8, B20 1710–1880, 880–960, 791–862MHz
Receiver sensitivity	–137 dBm @ 125 kHz BW SF12	–108 dBm sensitivity for low band (Cat–M1), –107 dBm for mid band
Transmitter power	Up to +22 dBm depending on the region	Up to +23 dBm
Network security	Encrypted communication based on AES–128 security keys	APN / VPN support
GPS	GPS/GLONASS/BeiDou/QZSS	GPS/GLONASS/BeiDou/QZSS
Firmware update (OTA)	Bluetooth and LoRaWAN®	
Bluetooth	Fast configuration and firmware update	

Interfaces	
DALI control and power supply	Controls up to 4 DALI ballasts with an internal 15 VDC power supply
Analog output	0–10 V or 1–10 V analog output
Logical signal input (LSI)	1 × 0–24 V logical signal input; configurable for alarm, dimming levels (analog/digital), etc.

Sensors	
Light sensor	Integrated; configurable threshold
Tilt sensor	2-axis tilt sensor

LoRaWAN I NB-IoT I DALI-2 I D4i I TALQ

Technical Data

NEMA ANSI C136.41 5-Pin or 7-Pin Street Light Control Device

Lamp control	
Brightness adjustment range	0–100% (linear or logarithmic depending on the controller settings)
Control interface	DALI2 / DiiA (IEC 62386) / D4i / 0–10 V / 1–10 V Analog

Measurement	
Internal parameters (for non-D4i drivers)	A, V, W, Wh, WB, Wfund, PF, lamp burn time, voltage sag and swell
D4i reported parameters	V, W, Wh, PF, lamp burn time, and others (depending on controller specifications)
Measurement accuracy	±0.5% for internal measurement circuit

Output switch	Mechanical contact relay	Solid-state relay (SSR)	Switchless
Switching type	5A (100,000 operations)	2A (with zero-crossing detection)	No switching output option

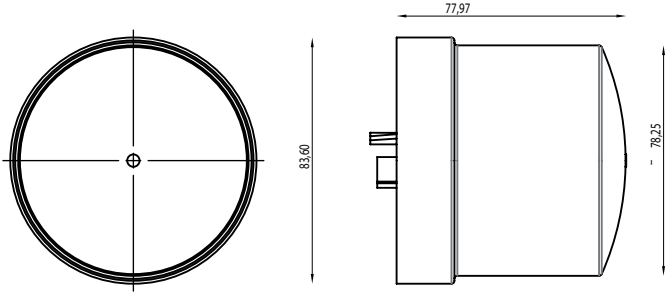
Timing	
Real-time clock (RTC)	Yes, supercapacitor backup (up to 15 days)

Environmental	
Ingress protection	IP66 (IEC 60529)
Operating temperature	–20°C + ... + 60 °C

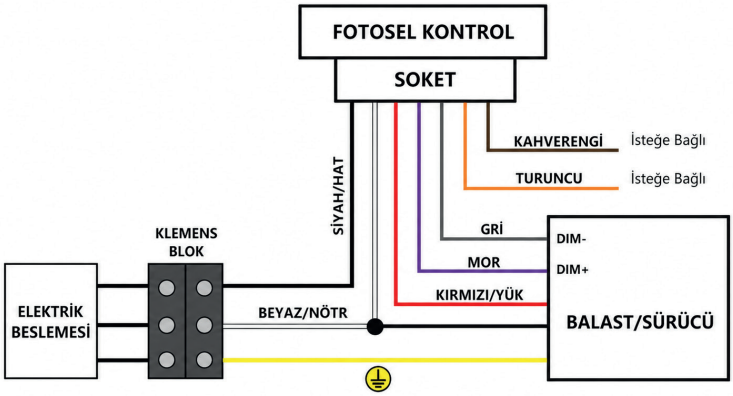
Mechanical	
Standard	ANSI C136.412013
Pins and positions	5 or 7 pins and 3 pin power contacts; 2 or 4 pin dimming and signal contacts
Weight and dimensions	150 g and 76 mm × 70 mm (height × diameter)
Base and dome material	High-temperature resistant polybutylene terephthalate and UV-resistant, impact-resistant polycarbonate

Compatibility	
Standards	EN 61347l, EN 61347211, EN 300 220, EN 62368, EN 301 489, EN 62479, EN 50581
Certificates	CE

Mechanical Dimensions



Wiring Connection Guide



All dimensions are in millimeters (mm).

ORDER CODE	LCNM	L	X	X	X	5	A
Contact type							
LoRaWAN		**L**					
Nb-IoT		**N**					
RF-Mesh		**M**					
GPS option							
Not available			**X**				
Available			**G**				
Relay option							
Not available				**X**			
Solid state relay				**S**			
Mechanical contact relay				**M**			
Energy Measurement							
Not available					**X**		
Available					**E**		
Pin Options							
5 Pin						**5**	
7 Pin						**7**	
Frequency							
EU 868							**A**
AU 915							**B**
US 915							**C**
AS 923							**D**

For quick configuration, Bluetooth and OTAA, DALI-2 / DiiA (IEC 62386) / D4i, 0-10V analog, tilt and light sensors are included by default on the devices.

LCCB

Custom Enclosure Lighting Control Device

The Zenosmart LCCB Control Device is a state-of-the-art wireless remote control unit specifically designed for road and street lighting, park and garden lighting, as well as indoor and outdoor building lighting. Its compact enclosure allows for easy installation on any fixture or pole, offering maximum mounting flexibility.

Custom Enclosure Lighting Control Device

You can easily connect this to your fixtures thanks to its 5-pin IP67 socket. This device is highly durable for both indoor and outdoor environments. With LoRaWAN® and NB-IoT options, it ensures seamless integration with your existing lighting system and third-party solutions. We offer open communication protocols, an open-source JavaScript codec, and our dedicated Zenosmart Connect application for easy system optimization.

The control device can connect to your system via LoRaWAN® and NB-IoT networks. Fixtures can be easily controlled through DALI, DALI-2, DALI-D4i, and 0–10 V analog interfaces. An optional comprehensive GPS module is available to provide map data and precise time synchronization.

Measured and Monitored Parameters

- Lamp operating time
- Ambient light
- Controller temperature
- D4i energy records for each driver
- Internal measurements for A, V, W, Wh, WB, W Fund, and PF
- Lamp operating time, voltage sag, and swell
- Lamp/driver faults and control equipment faults
- Controller tilt movement and collision event
- GPS location (optional)

Controller Features

- Manages up to 4 DALI / DALI-2 drivers independently or via 0–10 V analog control
- Power measurement is performed via the DALI driver or through internal circuitry
- D4i energy records are reported for each driver (only for D4i drivers)
- Versatile astronomical calendar-based dimming
- Time-based dimming profiles
- Automatic device time synchronization
- Light intensity sensor
- Remote control and configuration
- Multicast control and configuration
- Internal overcurrent protection circuit with auto-reset
- Configuration via Zenosmart application (iOS and Android)
- GPS positioning (Optional)
- Autonomous and adaptive operation (set and forget)
- Real-time control and feedback
- RTC to maintain time in case of power loss
- Internal tilt sensor
- Surge protection
- Digital input for external events (motion sensor, switch, photocell, etc.)
- Fully documented open communication protocol

Technical Data

Supply	
Power supply	24 VDC veya 100–240 VAC
Maximum power consumption	3 W (Maximum)
Surge protection	Internal surge protection circuit
Overcurrent protection	Internal overcurrent protection circuit with automatic reset

Communication	LoRaWAN®	NB–IoT
Network interface	LoRaWAN® 1.0.4 Class C	GPP LTE Release 14 Cat–NB1 and Cat–NB2 compliant
RF frequency	868 / 915 / 923MHz	Cat–NB1/NB2: B3, B8, B20 1710–1880, 880–960, 791–862MHz
Receiver sensitivity	–137 dBm @ 125 kHz BW SF12	Receiver sensitivity of –108 dBm for low band (Cat–M1) and –107 dBm for mid band
Transmitter power	Up to +22 dBm depending on the region	Up to +23 dBm
Network security	Encrypted communication based on AES-128 bit security keys	APN / VPN
GPS	GPS/GLONASS/BeiDou/QZSS (Optional)	GPS/GLONASS/BeiDou/QZSS
Software update	Bluetooth ve LoRaWAN®	
Bluetooth	Optional	

Interfaces	
DALI control and power supply	Can control up to 4 DALI ballasts with internal 15V power supply
Analog output	0–10V or 1–10V Analog output
Logical signal input (LSI)	2 x 0–24V Logical Signal Input, configurable alerts, dimming levels (analog/digital), etc.

Sensors	
Light sensor	Integrated, configurable threshold value
Tilt sensor	2-axis tilt sensor

LoRaWAN I NB-IoT I DALI-2 I D4i I TALQ

Technical Data

Lamp Control	
Dimming range	0%–100% (linear or logarithmic depending on the controller settings)
Control interface	DALI–2 / DiiA (IEC 62386) / D4i / 0–10 V / 1–10 V Analog

Measurement	
Internal parameters	A, V, W, Wh, WB, W Fund and PF, lamp burn time, voltage dips and swells (Non-D4i Drivers)
D4i reported parameters	V, W, Wh and PF, lamp burn time and many other parameters (For D4i drivers only)
Measurement accuracy	0.5% internal measurement circuit

Output Switch	Mechanical contact relay	Solid State Relay (SSR)	Non-switching
Switching type	5A (100,000 Operations)	2A (With Zero Cross Detection)	No switched output

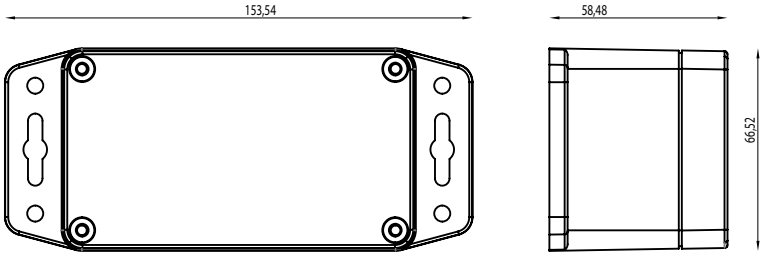
Scheduling	
Real-time clock (RTC)	Yes, supercapacitor backup (up to 15 days)

Environmental	
Ingress Protection	IP66 (IEC 60529)
Operating Temperature	–20 °C ... + 60 °C

Mechanical	
Weight	150 gr
Dimensions	154 x 65 x 59 mm (6.06 x 2.56 x 2.32 inches)
Housing Material	ABS

Compatibility	
Standards	EN 61347–1, EN 61347–2–11, EN 300220, EN 62368, EN3 01489, EN 62479, EN 50581
Certificates	CE

Mechanical Dimensions



Wiring Guide

The Zenosmart LCCB Control Device is offered with various connection options. These options include direct PCB soldering with IP67 cable glands and 5-pin IP67 connector sets. For more information, please contact our sales or customer service team.

5-Pin IP67 Socket

Tubular Connector

All dimensions are in millimeters (mm).

ORDER CODE	LCCB	L	1	X	X	1	X	A
Contact type								
LoRaWAN		**L**						
Nb-IoT		**N**						
RF-Mesh		**M**						
Supply voltage type								
110-220VAC			**1**					
24VDC			**2**					
GPS option								
Not available				**X**				
Available				**G**				
Relay option								
Not available					**X**			
Solid state relay					**S**			
Mechanical contact relay					**M**			
Connection type								
IP67 Standard conduit glands (without cable)						**1**		
IP67 Standard conduit glands, 30 cm 5-pin open-ended cable.						**2**		
IP67 5-Pin Connector (Male & Female)						**3**		
Energy Measurement								
Not available							**X**	
Available							**E**	
Frequency								
EU 868								**A**
AU 915								**B**
US 915								**C**
AS 923								**D**

For quick configuration, Bluetooth and OTAA, DALI-2 / DiiA (IEC 62386) / D4i, 0-10 analog, tilt and light sensors are included by default on the devices.

LCZG

Zhaga Street Lighting Control Device

The Zhaga Street Lighting Control Device is an advanced wireless remote control unit designed for LED street luminaires equipped with a Zhaga® Book 18 compliant connector. Its plug-and-play installation simplifies deployment across different street lighting modules.

Zhaga® 40

Zhaga® 80

This device is durable enough for outdoor environments and integrates seamlessly with existing lighting systems and third-party solutions. Cost-effective system integration is prioritized through open communication protocols, an open-source JavaScript data decoder, and our proprietary Zenosmart Connect application.

The control device communicates over LoRaWAN® and NB-IoT networks. It supports DALI, DALI-2, D4i, and 0–10 V analog interfaces for street lighting control. Its sleek and modern design harmonizes with slim LED luminaires. Additionally, an optional GPS module is available to facilitate map positioning and ensure precise time synchronization.

Measured and Monitored Parameters

- Lamp operating time
- Ambient light
- Control device temperature
- D4i energy records for each driver
- Lamp/driver failures
- Control gear failures
- Control device tilt angle and crash/collision events
- GPS location (optional)

Control Device Specifications

- Independent control of up to 4 DALI / DALI-2 drivers
- Power measurement via the DALI driver
- Reporting of D4i energy records for each driver
- Versatile, astronomical calendar-based dimming
- Time-based dimming profiles
- Automatic device time synchronization
- Ambient light intensity sensor
- Remote control and configuration
- Multicast control and configuration
- Configuration via the Zenosmart application (iOS & Android)
- GPS location (optional)
- Simple push-and-twist lock installation
- Autonomous and adaptive operation (configure once, run indefinitely)
- Real-time control and feedback
- RTC (Real-Time Clock) maintaining time after power failure
- Internal tilt sensor
- Surge protection
- Digital input for external events (motion sensor, switch, photocell, etc.)
- Fully documented open communication protocol

Technical Data

Supply	
Power supply	24 V DC or 100–240 V AC
Peak power consumption	3 W (maximum)
Overvoltage protection	Internal overvoltage protection circuit
Current protection	Internal overcurrent protection circuit, with automatic reset

Communication	LoRaWAN®	NB–IoT
Network Interface	LoRaWAN® 1.0.4 Class C	3GPP LTE Release 14 Cat–NB1 and Cat–NB2 compliant
RF Frequency	868 / 915 / 923 MHz	B3, B8, B20 (1710–1880, 880–960, 791–862 MHz)
Receiver Sensitivity	–137 dBm @ 125kHz BW SF12	–108 dBm sensitivity for low band (Cat–M1), –107 dBm for mid band
Transmitter Power	Up to +22 dBm, depending on the region	Up to +23 dBm
Network security	Encrypted communication based on security keys (AES 128-bit)	APN / VPN Support
GPS	GPS/GLONASS/BeiDou/QZSS (Optional)	GPS/GLONASS/BeiDou/QZSS
Firmware update (OTA)	Bluetooth and LoRaWAN®	
Bluetooth	Optional	

Optional	
DALI control and power supply	Controls up to 4 DALI ballasts with a built-in 15V power supply
Analog output	0–10 V or 1–10 V Analog output
Logical signal input (LSI)	2 x 0–24V Logical signal input, configurable alerts, dimming levels (analog/digital), etc.

Sensors	
Light sensor	Integrated, configurable threshold value
Tilt sensor	2-axis tilt sensor

LoRaWAN I NB-IoT I DALI-2 I D4i I TALQ

Technical Data

Lamp Control	
Dimming range	%0–%100 (kontrol cihazı ayarlarına bağlı olarak lineer veya logaritmik)
Control interface	DALI–2 / DiiA (IEC 62386) / D4i / 0–10 V / 1–10 V Analog

Measurement	
Parameters reported by D4i	V, W, Wh and PF, lamp operating time and many other parameters (Only for D4i drivers)

Scheduling	
Real-Time Clock (RTC)	Yes, supercapacitor backup (up to 15 days)

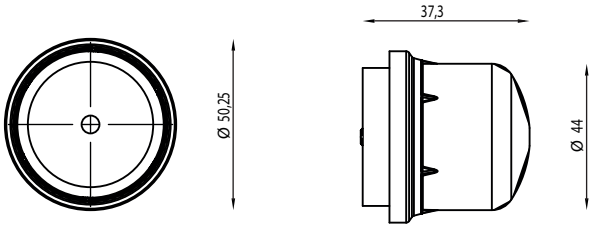
Environmental	
Ingress protection (IP)	IP67 (IEC 60529)
Operating temperature	–20°C ... +60°C

Mechanical	
Weight	150 gr
Dimensions	154 x 65 x 59 mm (6.06 x 2.56 x 2.32 inches)
Housing material	ABS

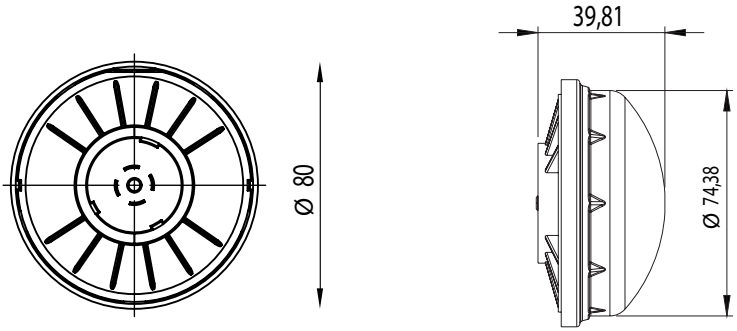
Compatibility	
Standards	EN 61347–1, EN 61347–2–11, EN 300220, EN 62368, EN 301489, EN 62479, EN 50581
Certifications	CE

Mechanical Dimensions

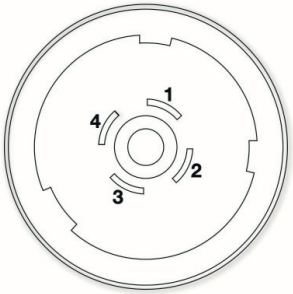
Zhaga 40



Zhaga 80



Wiring Guide



PIN	Description	Type
1	24VDC	DC Power Output
2	GND	DC Power Output
3	NC (No Connection)	Unused
4	0-10V	Dim+ Input

Note: This is the front socket pinout and the connected side is the lighting control device (error-protected socket).

All dimensions are in millimeters (mm).

Zhaga 40

ORDER CODE	LCZG4	X	A
Contact type			
LoRaWAN		**L**	
RF-Mesh		**M**	
Frequency			
EU 868			**A**
AU 915			**B**
US 915			**C**
AS 923			**D**

Bluetooth and OTAA, DALI-2 / DiiA (IEC 62386) / D4i, 0-10V analog, tilt and light sensors are included in the devices by default for quick configuration.

Zhaga 80

ORDER CODE	LCZG8	L	X	A
Contact type				
LoRaWAN		**L**		
Nb-IoT		**N**		
RF-Mesh		**M**		
GPS option				
Not available			**X**	
Available			**G**	
Frequency				
EU 868				**A**
AU 915				**B**
US 915				**C**
AS 923				**D**

Bluetooth and OTAA, DALI-2 / DiiA (IEC 62386) / D4i, 0-10V analog, tilt and light sensors are included in the devices by default for quick configuration.

ZNGTI

Zenogate LoRaWAN® Indoor Gateway

Serving as a central node of the LoRa network, the gateway collects data from various sensor nodes and transmits it to the cloud platform via a 4G connection, Ethernet, or Wi-Fi. Equipped with a high-performance processor and an industrial-grade LoRa chipset, the device offers reliable and efficient operation in large-scale deployments.

The Zenosmart LoRaWAN® Gateway utilizes the LoRaWAN® protocol and is designed for low-power, long-range environmental monitoring applications. It is suitable for use in fields such as precision agriculture, urban infrastructure, and facilities management.

Applications

- Smart agriculture
- Smart factory
- Smart metering
- Smart building and industrial control
- Environmental monitoring
- Other wireless sensing applications
- Logistics and supply chain management

Gateway Features

- Provides seamless integration with popular LoRaWAN® network servers, such as The Things Stack, ChirpStack, Actility, and AWS
- Monitors ambient radio noise levels and delivers clear visual data for optimal installation
- Features a built-in network server with MQTT(S) and HTTP(S) APIs for easy system integration
- Enables integration of LoRaWAN® data into BMS and PLC systems via Modbus protocols
- Includes an embedded SDK to facilitate secondary development by the user (based on customer requests)
- Supports 8 simultaneous reception (RX) channels and 1 transmission (TX) channel
- Features a quad-core processor paired with high-capacity memory for industrial-grade operations
- Powered by the WM1302 or SX1302 chipset, optimized to process high data volumes with low power consumption
- Supports eight configurable channels operating in half or full-duplex mode
- Ensures reliable data transmission with redundant connectivity options, including Ethernet, 4G cellular, and Wi-Fi
- Supports secure communication with various VPN protocols, including OpenVPN
- Facilitates centralized remote device management via DeviceHub and the Zenosmart Platform

Key Advantages and Application Areas

Cortex-A8 processor, Linux system – stable and reliable

Supports LoRaWAN® protocol

Offers various cloud services and data API interfaces

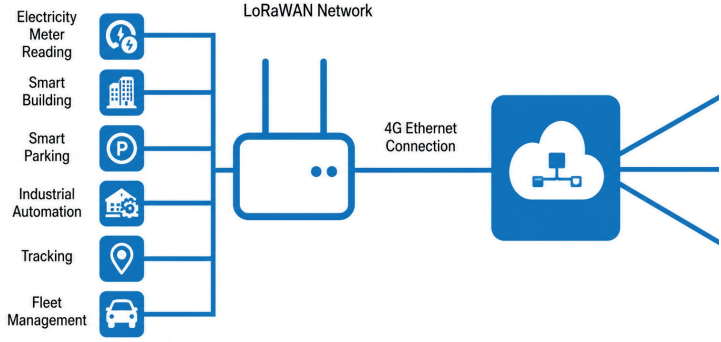
Cortex-A8 processor, Linux system – stable and reliable

Supports LoRaWAN® protocol

Offers various cloud services and data API interfaces

Operating temperature is between –40 °C and +70 °C

LoRaWAN End Node to CMS Signal Flow



Technical Data

Gateway RF Models	
RF Model	**Region**
LoRa–G–470–E/4G	Asia (China)
LoRa–G–868–E/4G	Europe, Africa, Asia (India etc.)
LoRa–G–915–E/4G	North America, South America, Oceania, Asia (Japan, Korea, Thailand etc.)

Gateway Model	Indoor
CPU	Quad-Core Cortex-A72 (ARM v8) 64-bit SoC @ 1.5 GHz
RAM	DDR3 2 / 4 GB
Memory	16 GB / 32 GB eMMC
Ethernet	1Gbps FE (RJ–45)
WiFi	2.4 GHz IEEE 802.11ac Wireless Connection
LTE Bands (Europe/Asia-Pacific)	B3/B7/B20/GSM900/GSM1800
LTE Bands (AT&T, T-Mobile)	B2/B4/B12
LTE Bands (Verizon)	B4/B13
LTE Speed Category	Cat.1 LTE
SIM Slot	1 (Mini SIM / 2FF)
Antenna	1 × LoRa Antenna, 1 × 4G Antenna, 1 × Wi-Fi Antenna
Grounding	1 screw hole is reserved for GND
Power Consumption	Maximum Power 15 W
Power Supply	Power Supply AC 220 V / 0.06 A
IP Protection Class	IP67/IP20
Antenna Connector	2 × RP-SMA Female, 2 × SMA Female
Connection Capacity	Up to 255 Devices
UV Resistance	Anti-Aging (Against Rain/Sun Exposure)
Housing Material (Enclosure Material)	Aluminum / ABS (Plastic)
Operating Temperature	–40 °C to +70 °C
Operating Humidity	0–100% RH (Non-condensing)
Mounting Method	Wall or Pole Mounting
Device Weight	1500/700 g

LoRa RF Parameters			
Channel Plan	470–510 MHz	863–870 MHz	470~510 MHz
Power Output	25 dBm	27 dBm	25 dBm
Sensitivity	-140.5 dBm	-139.5 dBm	140.5 dBm (SF12BW125)
Channel	(SF12BW125)		
Range	Up to 15 km		

ORDER CODE	ZNGTI	X	A
LTE Option			
Available		**L**	
Not Available		**X**	
Frequency			
EU868			**A**
AU915			**B**
US915			**C**
AS923			**D**

ZNGTO

Zenogate LoRaWAN® Outdoor Gateway

Serving as the central node of the LoRa network, the gateway collects data from various sensor nodes and transmits them to the cloud platform via 4G connection or Ethernet. Equipped with a high-performance processor and an industrial-grade LoRa chipset, the device offers reliable and efficient operation in large-scale deployments. Its IP67-rated enclosure guarantees durability, making it suitable for harsh outdoor industrial conditions.

The Zenosmart LoRaWAN® Gateway utilizes the LoRaWAN® protocol and is designed for low-power, long-range environmental monitoring applications. It is suitable for use in fields such as precision agriculture, urban infrastructure, and facility management.

Application Areas

- Smart agriculture
- Smart factory
- Smart metering
- Smart building and industrial control
- Environmental monitoring
- Other wireless sensing applications
- Logistics and supply chain management

Gateway Features

- Powered by the SX1302 chipset, optimized for processing high data volumes with low power consumption
- Supports eight configurable channels operating in half-duplex or full-duplex mode
- Rugged IP66 or IP67-rated enclosure for reliable operation in extreme outdoor conditions
- Wall and pole mounting support with flexible installation options
- Redundant connectivity options including Ethernet, 4G cellular, and WiFi for reliable data transmission
- Secure communication support with various VPN protocols, including OpenVPN
- Centralized remote device management via DeviceHub and Zenosmart Platform
- Seamless integration with popular LoRaWAN® network servers such as The Things Stack, ChirpStack, Actility, and AWS
- Monitors ambient radio noise levels and provides visual insights for optimum installation
- Features an integrated network server with MQTT(S) and HTTP(S) APIs for easy system integration
- Enables integration of LoRaWAN® data into BMS and PLC systems via Modbus protocols
- Includes an embedded SDK to facilitate user-side secondary development (upon customer request)
- Supports 8 simultaneous reception (RX) channels and 1 transmission (TX) channel

Key Advantages and Application Areas

Cortex-A8 processor, Linux system – stable and reliable

Supports LoRaWAN® protocol

Offers various cloud services and data API interfaces

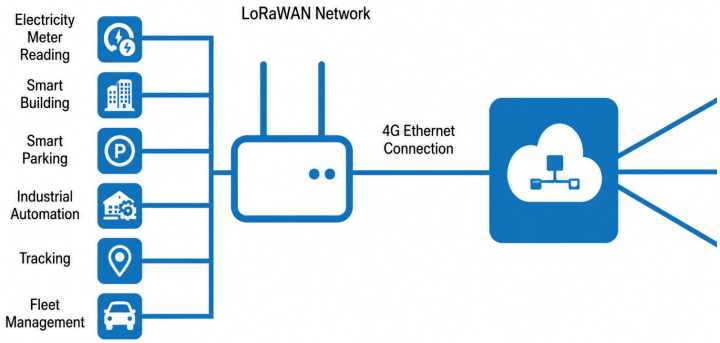
Cortex-A8 processor, Linux system – stable and reliable

Supports LoRaWAN® protocol

Supports LoRaWAN® protocol

Operating temperature: –40°C to +70°C

CMS Signal Flow with LoRaWAN End Node



Technical Specifications

Gateway RF Models	
RF Model	**Region**
LoRa–G–470–E/4G	Asia (China)
LoRa–G–868–E/4G	Europe, Africa, Asia (India etc.)
LoRa–G–915–E/4G	North America, South America, Oceania, Asia (Japan, Korea, Thailand etc.)

LoRa RF Parameters			
Channel Plan	470~510 MHz	863~870 MHz	470~510 MHz
Power Output	25 dBm	27 dBm	25 dBm
Sensitivity	140.5 dBm (SF12BWI25)	139.5 dBm (SF12BWI25)	140.5 dBm (SF12BWI25)
Channel	8 (Half/Full duplex)		
Range	Up to 15 km		

Gateway Model	Model 1
CPU	Quad-Core Cortex-A72 (ARM v8) 64-bit SoC @ 1.5 GHz
RAM	DDR3 2 / 4 GB
Memory	16 GB / 32 GB eMMC
Ethernet	1Gbps FE (RJ–45)
Wi-Fi	2.4 GHz IEEE 802.11ac Wireless Connection
LTE Bands (Europe/APAC)	B3/B7/B20/GSM900/GSM1800
LTE Bands (AT&T, T-Mobile)	B2/B4/B12
LTE Bands (Verizon)	B4/B13
LTE Speed Category	LTE Category 1 (Cat.1)
LTE Speed	Download 10.3 Mb/s, Upload 5.2 Mb/s

Gateway Model	Model 1
SIM Card Slot	1 (Mini SIM 2FF) Slot
Antenna	1× LoRa Antenna, 1× 4G Antenna, 1× Wi-Fi Antenna
Grounding	1 screw hole reserved for Grounding (GND)
Power Consumption	Maximum Power Consumption 15W
Power Supply	Power Supply AC 220V / 0.06A
IP Protection Class	IP67
Antenna Connector	2 × RP-SMA Female, 2 × SMA Female
Connected Device Capacity	Up to 255 Devices
UV Resistance	Anti-Aging (Against Rain/Sun Exposure)
Housing Material	Aluminum
Operating Temperature	-40 °C to +70 °C
Operating Humidity	0–100% RH (Non-condensing)
Installation Method	Wall or Pole Mounting
Device Weight	1500 g

ORDER CODE	ZNGTO	L	2	A
LTE Option				
Available		**L**		
Not available		**X**		
Types of Antennas				
2.8 dbi RPA-SNA Male Connector Antenna			**2**	
5 dBi Fiberglass Antenna 50cm			**5**	
6 dBi Fiberglass Antenna 80cm			**6**	
8 dBi Fiberglass Antenna 120cm			**8**	
Frequency				
EU868				**A**
AU915				**B**
US915				**C**
AS923				**D**

zenosmart

Smart Master

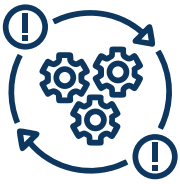
Smart Control Management System

Zenosmart Smart Master is a cost-effective and reliable smart master management system designed to maximize energy savings and build modern smart cities. The system centrally monitors and manages lighting, irrigation, sensor-based monitoring, and waste management.

Smart lighting not only ensures energy efficiency but also enables dynamic, data-driven business models. For instance, streetlights can adapt their color and behavior in real-time to clear pathways for emergency vehicles.

Versatile Management

Manages various urban services, such as smart lighting, smart park and garden irrigation, waste monitoring, and meteorological data collection, through a single system.



Real-Time Fault Detection

Detects faulty fixtures in real-time without the need for a complex and costly communication infrastructure.

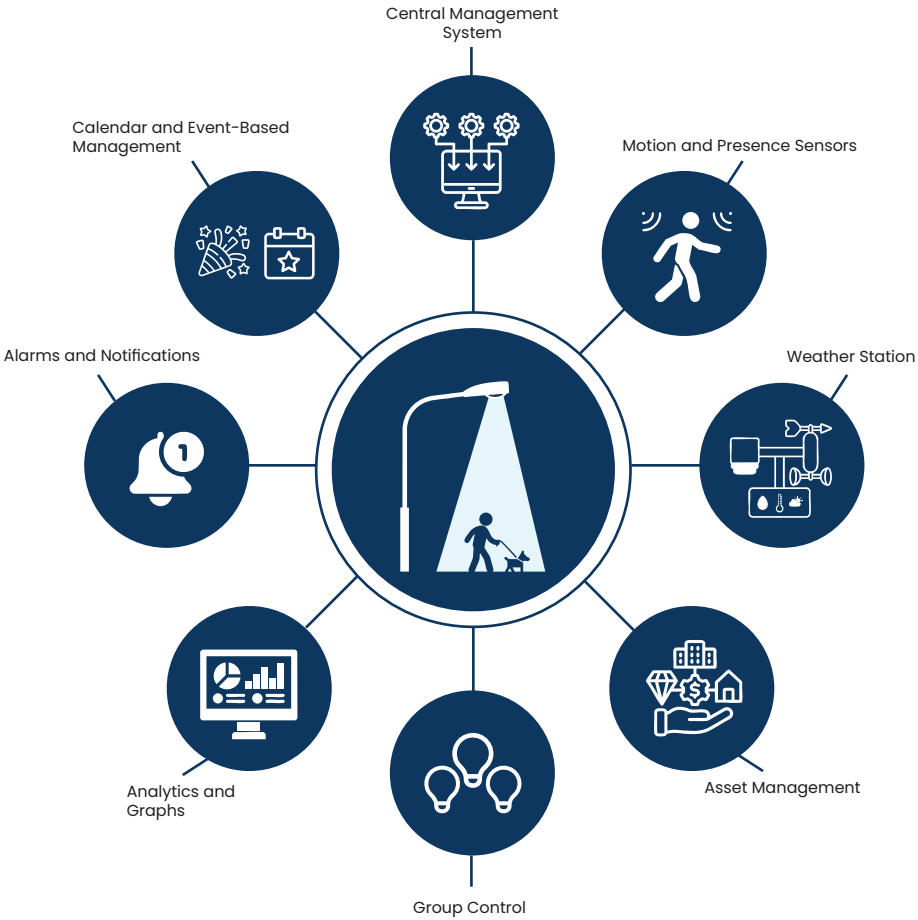
Integration with Existing Systems

Allows existing fixtures to be retrofitted by adding a control device, eliminating the need to completely replace the control system.

Central Control Panel

Allows cities to remotely control, evaluate, and manage lighting across roads, streets, parks, and other public areas through a single monitoring and control panel.

Lighting Under Your Control



TALQ

Zenosmart Smart Master is TALQ Ready compliant and integrates seamlessly with smart city systems.

Simplify Operation and Maintenance

Zenosmart serves as a central access point for both wireless (such as LoRaWAN, LTE, and NB-IoT) and wired lighting control devices. The platform offers connectivity and security services, data analytics, and a user-friendly interface for street lighting project design.

Additionally, it features a simple GIS (Geographic Information System) for the graphical representation of luminaire statuses and possesses seamless integration capabilities with external software systems.

Status Information

Smart Master provides near real-time information about each luminaire or luminaire group. Faults and outages are automatically recorded, and a notification is sent to the authorized person for action.

Reporting

The platform enables the monitoring of lighting performance, status, energy consumption, and savings across different locations and customizable time intervals.

Efficient Management

Daily reports regarding the behavior and performance of the lighting infrastructure can be obtained automatically. The insights from these reports are utilized to improve the efficiency and utilization of the city's lighting.

Workflow Optimization

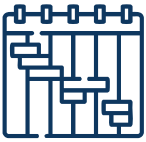
Smart Master further enhances lighting management by integrating with preferred asset management applications. This integration helps better manage repairs and increases the efficiency of all lighting-related workflows.

Event-Based Control

The system can control the lighting based on events such as ambient light, noise, weather, or traffic. Once the event concludes, it reverts to its normal profile.

Central Management System

This central application performs network configuration, monitoring, and management. It analyzes the status of the street lighting infrastructure in near real-time, assists managers, and performs fault detection.



Lighting Planning and Management

It allows operators to program lighting levels according to the city plan. Light levels can be adjusted based on time, conditions (traffic, weather), and advanced calendars.

Group Control

It is a web-based software for the remote management of electrical panels. It simultaneously controls and analyzes lighting fixtures, offering functionalities such as turning the fixtures on and off.

Infrastructure Service Management

It is an asset management platform that assists local system integrators in the daily operations of physical infrastructure (street lamps, cables, poles, etc.).

Notifications

Proactive notifications enable immediate intervention. The system provides the status of each light in real-time, automatically records faults and outages, and informs the right individuals.

Analytics

This is part of the Command Center software and tracks the city's lighting performance, status, energy consumption, and savings. Specific fixture data, such as grid voltage and driver temperature, can be monitored over time.

Calendar-Based Control

It allows for the creation of special lighting programs for weekdays and weekends. Light levels can be increased during special times, such as shopping nights, or decreased during holidays.

Dimming Profiles

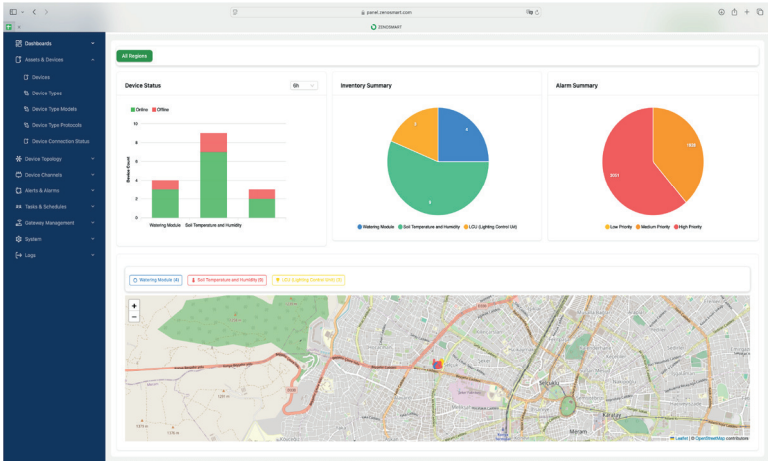
The system's intuitive interface makes it possible to create precise dimming profiles for a single light or groups of lights. On busy streets, light brightness can be increased during peak hours, while in business districts, it can be reduced after hours.

Tiered User Access

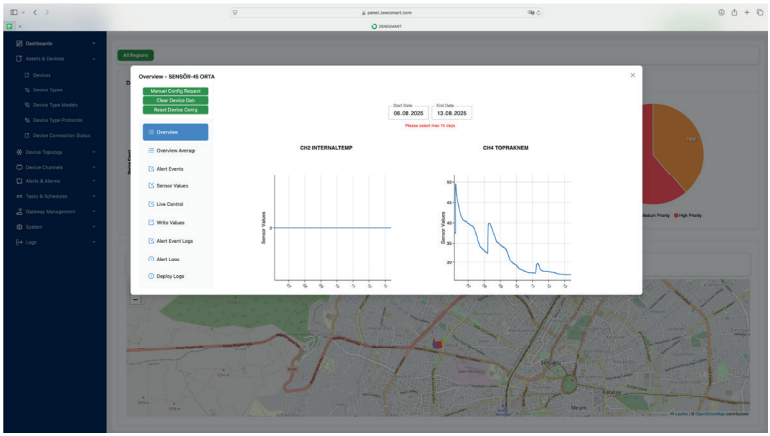
It provides identity and access management for different administrator and user levels. Administrators can create users and groups, and assign access rights based on their roles, such as business managers or maintenance personnel.

Smart Master serves as a suite of web-based software applications providing full remote management for the entire lighting infrastructure at both individual light and group levels. Its open architecture and Open API allow for secure integration with any preferred third-party application.

Zenosmart Dashboard

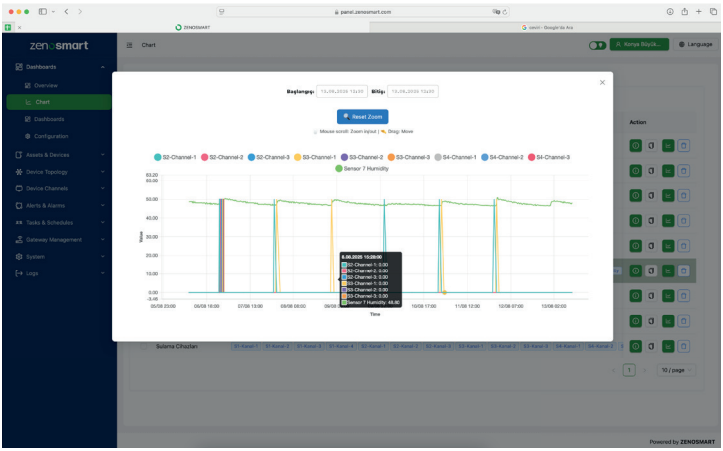


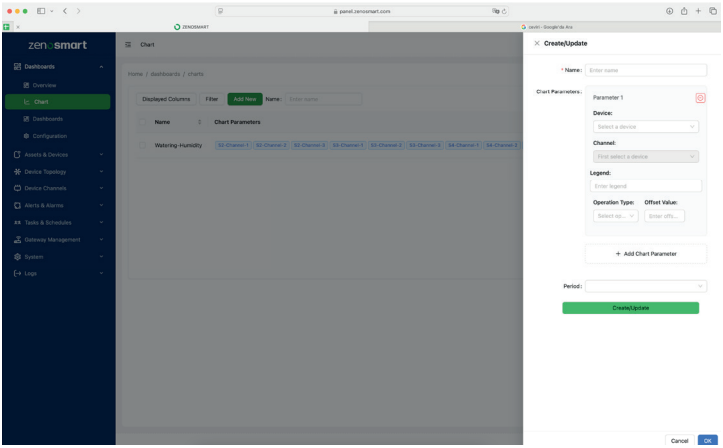
You can monitor and manage devices through the Zenosmart Dashboard using interactive charts and a map-based interface.



The Dashboard is not a separate page; it is displayed directly as the main screen when the application opens.

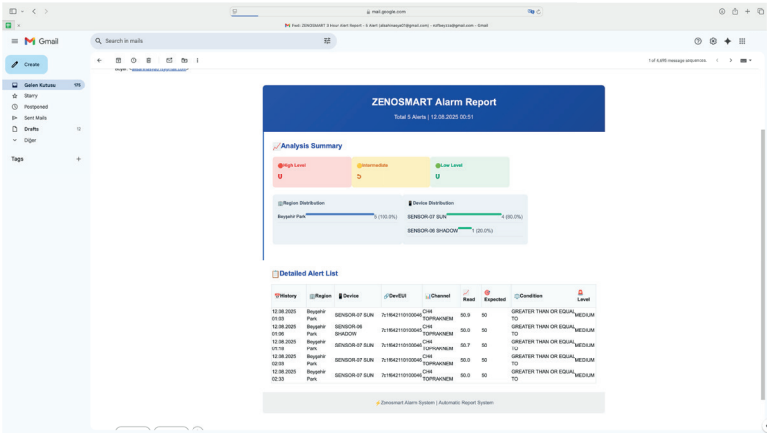
Zenosmart Chart Services

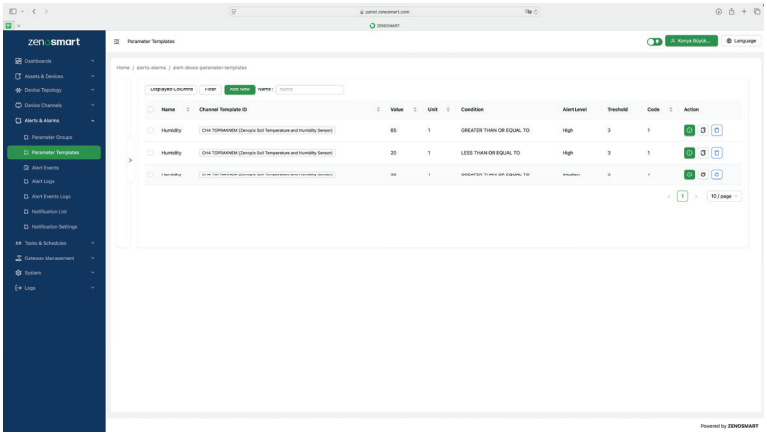




Zenosmart chart services allow you to view data from multiple devices and channels dynamically and interactively on a single screen

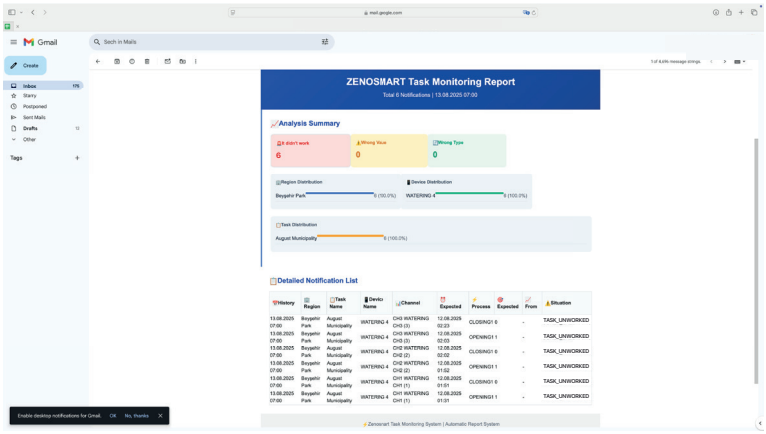
Zenosmart Alert System

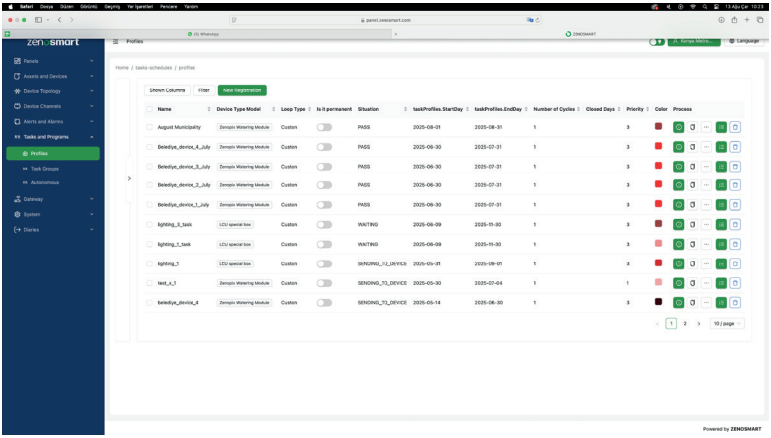




The Zenosmart Alert System allows you to create custom alarm conditions and receive notifications via email when these conditions are triggered.

Zenosmart Task Management





Zenosmart Task Management allows you to assign long-term tasks to your devices and receive notifications via email when these devices stop operating.

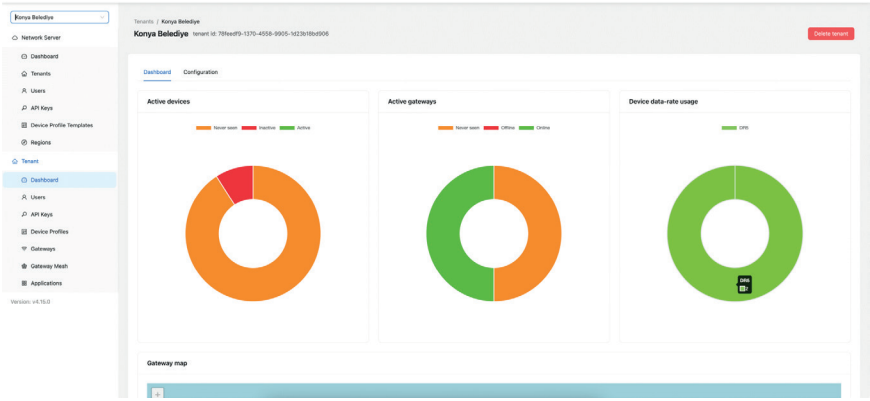
Empower the Future with ZenoSmart LoRaWAN Network Server (LNS)!

The LoRaWAN Network Server (LNS) is the core component of the LoRaWAN architecture that manages data flow, authentication, and security between end devices, gateways, and the application layer. Data collected from hundreds of gateways is securely processed, decrypted, and verified by the LNS before being forwarded to the application layer.

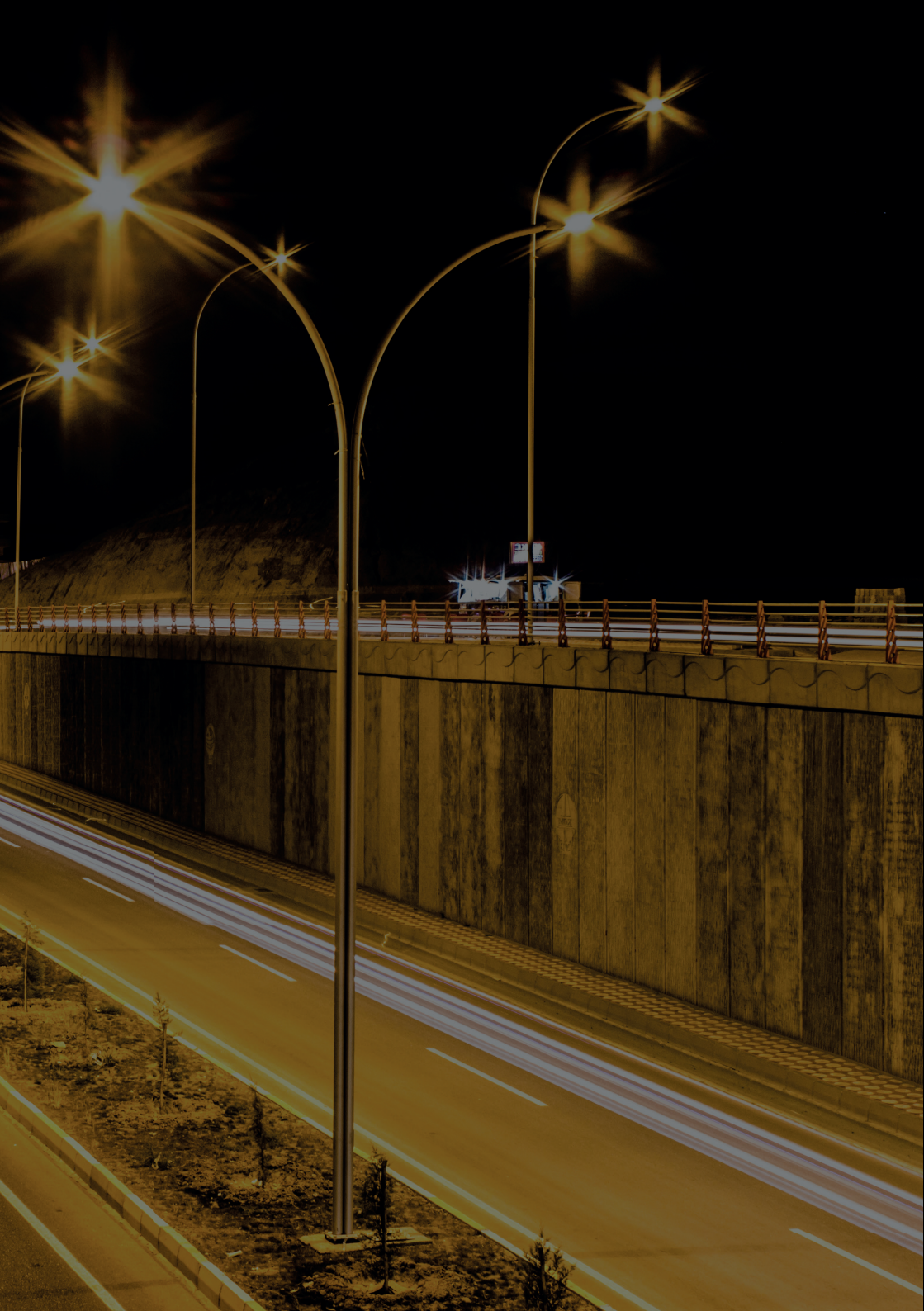
In the Zenosmart infrastructure, this data is presented to users via the ZenoSmart Dashboard in the form of meaningful charts, statistics, and real-time status information. With advanced features such as device authentication, AES128 encryption, Adaptive Data Rate (ADR), downlink command management, and remote firmware updates, the LNS provides a secure, scalable, and centrally managed foundation for smart city, industrial automation, and environmental monitoring solutions.

- **Device Authentication:** Secure authentication of device identities and session key generation
- **Secure Communication:** AES128 encrypted, end-to-end data protection
- **Data Routing:** Reliable uplink and downlink data transmission
- **ADR Optimization:** Energy-efficient data rate and power management
- **Multicast and FUOTA:** Simultaneous commands and remote firmware updates

LoRaWAN Network Server Monitoring Dashboard



The LoRaWAN network server includes a monitoring dashboard that displays the number of active LoRaWAN devices and gateways in the system, as well as total data usage. This dashboard enables real-time monitoring of all network traffic and ensures uninterrupted observation of overall system performance.



zenosmart | ZENOPIX smart solutions

Zenosmart makes life easier by smartly increasing energy efficiency and sustainability with innovative, AI-powered, IoT-based solution

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