iZHAGA

intelligent Luminaire Controller with Zhaga Socket

The interoperable iZHAGA controller controls street luminaires with electronic ballasts with D4i-compliant DALI2 interface.

For this purpose, the luminaire controller with OLC-LonMark® profile uses standardised radio mesh communication in the licence-free 2.4 GHz band.

Data transmission is in accordance with ANSI/CTA 709 and EN 14908. It is possible to operate either as part of a lighting management system using the LonMark® OLC profile or as a stand-alone system with predefined lighting profiles.

Individually OTA (over-the-air) programmable and updatable, the controller takes on all the tasks of a modern lighting management system, thus ensuring a high degree of investment security and contributing significantly to improving the ecological balance through reduced energy consumption and CO_2 emissions.

Typical Applications

- Street lighting and lighting in the vicinity of buildings
- Car parks, bus stops and railway stations
- Industrial facilities and warehouses
- Sports facilities

Product Benefits

- Radio-controlled and automatic lighting control (astronomical/brightness)
- Adaptive, demand-based lighting using internal and external sensors
- Dimming, RGBW control, tunable white, light distribution via DALI2, D4i
- Localisation via GPS/GNSS
- With satellite-synchronised real-time clock and integrated brightness sensor for weather-dependent control
- Monitoring of electrical parameters via DALI2- or D4i-compliant ballasts
- Power consumption: < 2.5 W
- Robust twist-lock contacts for a reliable electrical connection
- Tool-free mounting thanks to standardised Zhaga Book 18 socket
- 2 years warranty

V-1.4 | 10.2025

Interoperable Communication Technology for Smart Cities and Buildings

iciti. intelligent. efficient. controls.

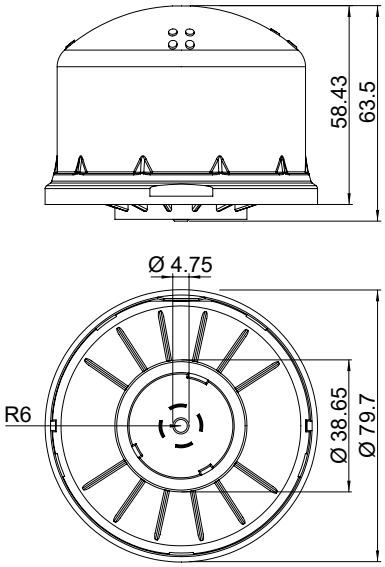
iCiti GmbH
Hellweg 203
33758 Schloss Holte
Germany
info@iciti.de

Technical Details

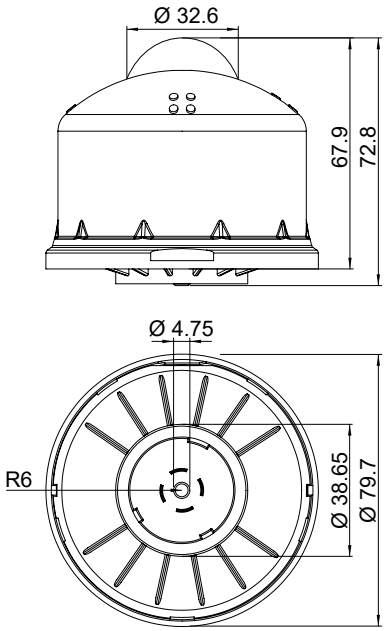
Electronic Luminaire Controller		with PIR sensor
Type	iZHAGA	iZHAGA-S
Ref. No.	200067	200068
Input voltage	24 V DC	
Power consumption	1–2.5 W	t.b.d.
Communication	• RF mesh fullduplex (simultaneous transmission and reception on two channels by means of dynamic selection of up to 80 channels) • Frequency range: 2.4 GHz • Power range: 10 dBm • Modulation: LoRa according to ISO-OSI Layer 1 and 2 • Data transmission: according to LON protocol and ANSI/CTA 709.1/.11 and EN 14908-1/-11 (in preparation) according to ISO-OSI Layer 1 to 6 • Organisation of communication: CDMA/FDMA (Collision/Frequency Detection Multiple Access) • Data rate: 100 kB/s net • Communication types: Unicast, Broadcast, Groupcast • Encrypted data transmission: XTEA, AES, expandable via software update	
Supported frequencies	2400-2480 MHz ISM band	
Software interfaces	Compatible with the LonMark® OLC profile	
Mesh network	Up to 100 hops; latency: < 1 second, constant data rate of 100 kBit/s	
Network organisation	According to ISO-OSI layer model Layer 1 to 3, self-configuring	
Galvanic isolation	Yes	
Control / Dimming	Via DALI2, D4i-compliant (IEC 62386)	
DALI	DALI2, D4i-compliant Multi-manager capable, supply of DALI devices (sensors and ballasts) up to max. 30 mA total consumption Support for sensors such as brightness or movement according to DALI2	
Control output electronic operating device	Short-circuit proof, DALI2 interface	
Light sensor	Integrated, 0-120 k lux	
PIR sensor	—	Pyroelectric infrared sensor for motion detection
External sensors	Connection of any wired DALI2, D4i-compliant sensors for e.g. motion and presence detection, luminance	
GPS/GNSS receiver	Integrated	
Antennas	Integrated	
Firmware update / parameter configuration	OTA (over-the-air) via radio	
Capture of measured data	Voltage, current, power factor, power, energy, temperature only by means of DALI2-D4i compatible ballast	
Connection	Via ZHAGA socket (Book 18)	
Operating temperature range tc	-25 to +80 °C	-25 to +60 °C
Storage temperature range	-25 to +85 °C	-25 to +70 °C
Humidity	5 to 95% non-condensing	15 to 75% non-condensing
Degree of protection	IP66, UV resistant cap	
Impact resistance	IK09 (vertical) / IK07 (lateral)	
Compliant standards	CE, RoHS 2011/65/EU, Radio Equipment Directive (RED) 2014/53/EU, EN 301489-1/3, EN 61547, EN 55015, EN 300328, EN 60950	
Casing material	Cap: PC, Socket: PBT UV-f1 certified plastic materials (UL 94 5-VA) for outdoor use	
Dimensions (ØxH)	Ø 80 x 58,43 mm	Ø 80 x 67.9 mm
Weight	120 g	140 g
Custom tariff number	8543 7090	
Certification	CE	

Dimensions (mm)

iZHAGA

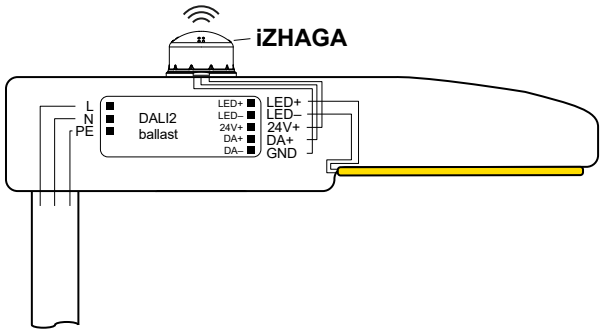


iZHAGA-S
With integrated PIR sensor

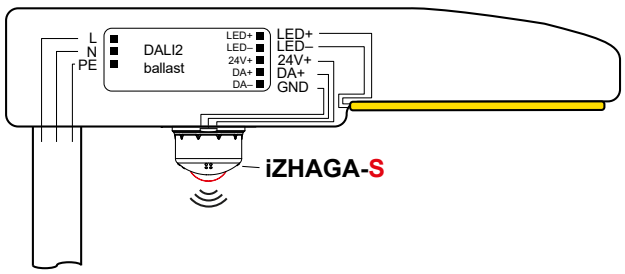


Circuit Diagrams

iZHAGA



iZHAGA-S
With integrated PIR sensor



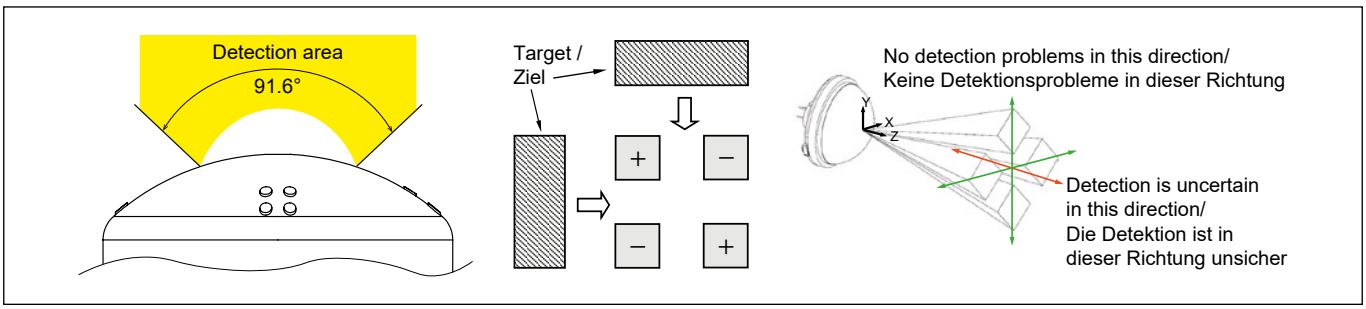
PIR Sensor for iZHAGA-S

The PIR sensor used is a pyroelectric infrared sensor that detects fluctuations in infrared radiation (model no.: EKMC 1611111 from Panasonic).

Electronic Luminaire Controller	**with PIR Sensor**
Type	iZHAGA-S
Ref. No.	200068
Capturing performance (measured at ambient temperature 25 °C)	
Detection area, polarised	• Up to 15 m (at a temperature difference of 8 °C) • Up to 10 m (at a temperature difference of 4 °C) • The detection range is dependent on the temperature difference between the target and the • environment.
Movement speed	1 m/s
Object size	700x250 mm
Area	vertical: 45° / horizontal: 92°
Detection zones	176
Air pressure	86–106 kPa
Detection of heat sources other than the human body	• If small animals enter the detection area. • When a heat source, e.g. sunlight, incandescent lamps, car headlights, etc., or a strong beam of light hits the sensor, whether inside or outside the detection zone. • Sudden temperature changes inside or in the vicinity of the detection area.
Difficulty in detecting the heat source	• Glass, acrylic or similar materials located between the target object and the sensor may not allow correct transmission of the infrared rays. • No movement or rapid movement of the heat source within the detection area.
Extension of the detection area	If there are significant differences between the ambient temperature and the human body temperature, the detection area can be extended beyond the configured detection area.
Dimensions (ØxH)	Ø 32.6 x H 12.2 mm (outside the Zhaga cap)

Detection Area

The detection range is polarised. If a target enters the + and – detection areas at the same time, the signals will each be cancelled and detection could become impossible at maximum detection range.



Functions

Operation	Stand-alone without Mesh	Stand-alone with Mesh	With Edge Controller	With Edge-Controller and SCADA system
Functions	Single light point with iZHAGA controller	Multiple light points with iZHAGA controller	Multiple light points with iZHAGA controller and edge controller	Multiple light points with iZHAGA controller, edge controller and SCADA software
Runtime calendar	Part of the controller	Part of the controller	Part of the edge controller	Part of the edge controller
Programmable calendar for events	—	—	Yes	Yes
Light sensor	Yes	Yes	Yes	Yes
Seasonal/location-dependent light control	Yes	Yes	Yes	Yes
Integrated motion detector	Only for iZHAGA-S	Only for iZHAGA-S	Only for iZHAGA-S	Only for iZHAGA-S
External sensor	Yes; via DALI2	Yes; via DALI2	Yes; via DALI2	Yes; via DALI2
Direction-dependent, moving light with street luminaires on one side of the carriageway	—	Yes, automated	Yes, automated	Yes, automated
Direction-dependent, moving light with street luminaires on both sides of the carriageway	—	Yes, if controllers are set up manually before installation (binding)	Yes, if controllers are set up manually before installation (binding)	Yes, if controllers are set up manually before installation (binding)
Parameterisation via RF (Over-the-Air)	Yes	Yes	Yes	Yes
Networking	—	Yes	Yes	Yes
Grouping	—	Yes	Yes	Yes
Maintenance factor / LED degradation over service life	Yes	Yes	Yes	Yes
Dimming levels for night-time dimming	1 step integrated; multi-step on request	1 step integrated; multi-step on request	Any dimming levels parameterisable	Any dimming levels parameterisable
Fading	Yes; with predefined time	Yes; with predefined time	—	—
Support of RGBW	—	—	Yes (10 DALI short addresses)	Yes (10 DALI short addresses)
Measurement data via DALI2	Storage of the current value in the controller and readout via OTA	Storage of the current value in the controller and readout via OTA	Measurement data mapped to the OLC profile depending on the DALI2 LED driver used; storage of values over a longer period of time in the edge controller	Measurement data mapped to the OLC profile depending on the DALI2 LED driver used; storage of values over a longer period in the edge controller and visualization via SCADA software

Note: certain functions are only possible with permanent power supply to the street lighting.

Digital control of lighting

- Control light (switch on/off and dim)
  - by means of a runtime calendar
  - by means of a programmable calendar (in the light management system)
  - by means of light sensor incl. adjustability of a hysteresis threshold for unpredictable weather phenomena
  - by means of GPS location (seasonal)
  - Dimming with freely selectable dimming levels (in the management system) or by means of a predefined dimming level (in stand-alone operation)
- Separate switching of the light at dangerous or architectural points, e.g. pedestrian crossing, monuments,...
- Replacement for audio frequency/long wave ripple control technology (e.g. in combination with Switch Cabinet Controller)

Additional function of the iZHAGA-S

- Motion-controlled light via PIR sensor
  The movement is detected and switches the luminaire on.

Further lighting control functions

For example, running lights with directional lighting for tunnels or light control depending on traffic volume (e.g. traffic jam warning) in preparation.
Note: No additional components required

Measurement data collection
Measurement data acquisition is carried out via the connected DALI2 luminaire driver (see DALI2/D4i specification). The iZHAGA controller only records the runtime.

Maintenance factor function
A constant luminous flux can be achieved with the lighting controls slowly increasing power to counteract the lumen depreciation over the service life of the lamp. This avoids the need to over specify the luminous output to allow for lumen depreciation and thereby optimizes energy consumption.

Communication infrastructure for smart city applications
Using an open protocol, the existing street lighting infrastructure becomes an intelligent communication platform for further smart city applications.

The technology used is fully interoperable at the protocol and communication level due to the standardised protocol according to EN 14908-1. The transmission channel based on radio is standardised according to EN 14908-11 and is in preparation.

iZHAGA luminaire controllers create a reliable communication structure to which further smart city applications can be added.

iZHAGA allows the lighting to be controlled while maintaining power at the pole which is a prerequisite for adding additional applications.

Possible fields of application with additional sensors can be:
- Environmental technology (real-time measurement)
  - Fine dust
  - Nitrogen oxides
  - CO_2
  - Ozone
- Weather data (real-time measurement)
  - Temperature
  - Humidity
  - Air pressure
  - Precipitation
  - Wind
  - Road ice detection
- Noise measurement
- Parking management
  - Detection and display of free/occupied parking spaces
  - Display on information boards
- Waste management (only possible in management mode)
  - Reporting of fill level to central location via e-mail or SMS
- Traffic management
  - Traffic counting (type and quantity)
  - Provision of data for traffic control
  - Pre-processed image data transmission for traffic measurement, blind spot assistant via signal light display
- Charging electric vehicles
  - Single-phase or multi-phase charging of electric vehicles with alternating current incl. energy consumption measurement
  - Different access options to the charging point (ad-hoc charging, app, RFID card)
  - Free/occupied message via street light and transmission to information systems
- Actuator data (e.g. information boards)