Zhaga-D4i standards for smart luminaires
Smart, future-proof LED luminaires with IoT connectivity

**Connected:** Able to participate in the IoT

**Future-proof:** Easily upgraded to keep pace with rapid developments in digital networking technology

**Standardized:** Certified solutions with plug-and-play interoperability

**Beyond lighting:** Supporting sensing and communication applications

**Intelligent:** Able to collect and report a wide variety of data

Beyond lighting: Supporting sensing and communication applications
Overview – market drivers and solution

Market requirement: Smart, future-proof LED luminaires with IoT connectivity

Solution: The **Zhaga-D4i interface standard**

→ A simple way to add sensors and/or wireless communication nodes to luminaires, with plug-and-play interoperability

- Zhaga and DiiA have collaborated to develop a standardized interface between luminaires and sensors and/or communication nodes:
  - Combining complementary specifications for mechanical fit, digital communication and power
  - Offering Zhaga-D4i certification to ensure plug-and-play interoperability
  - Focusing initially on outdoor lighting, with indoor being a work-in-progress
Zhaga-D4i interface for outdoor luminaires

- Zhaga-D4i node (sensor and/or wireless communication node)
- Zhaga receptacle
- Intra-luminaire DALI bus
- Second node
- D4i driver
- Zhaga-D4i luminaire (outdoor)
Features of Zhaga-D4i interface standard

• Easy to add or upgrade sensors and/or communication nodes:
  – Enables future-proof luminaires that can keep pace with rapid developments in digital networking and sensing technology.

• Intra-luminaire DALI-2 bus:
  – Enables bi-directional interaction between sensors and/or communication nodes and LED drivers using the well-established and standardized DALI protocol.

• D4i drivers are smart:
  – Able to report operational and diagnostic data to an external network, and can provide inventory-related information about the luminaires.

• IoT connectivity:
  – With a suitable wireless communication node, the luminaire is able to interact with an external lighting-control network, and to participate in the IoT.
Complementary specifications

D4i specifications from DiiA

- DALI Part 250: Integrated bus power supply
- DALI Part 251: Luminaire data
- DALI Part 252: Energy data
- DALI Part 253: Diagnostics data
- DALI Part 351: Luminaire-mounted control devices
- DALI Part 150: AUX power supply

Book 18 & Book 20 specifications from Zhaga

- Book 18 for outdoor:
  - Mechanical interfaces
  - Electrical pin assignment (Book 18)
  - Electrical connectors (Book 20)
  - References to D4i specs for power & control, and luminaire tests

DALI Part 250: Integrated bus power supply
DALI Part 251: Luminaire data
DALI Part 252: Energy data
DALI Part 253: Diagnostics data
DALI Part 351: Luminaire-mounted control devices
DALI Part 150: AUX power supply
D4i specifications for intra-luminaire DALI

DALI Part 150
(AUX power supply)

DALI Part 250
(integrated bus power)

DALI Parts 251-3
(data for enhanced asset tracking & performance monitoring)

Optional AUX supply*

DALI-2 LED driver with integrated bus power supply and Smart Data

LEDs

Remote lighting-control network

Sensor and/or wireless communication node

Power

Data

Intra-luminaire DALI bus

Sensor node

* AUX can be in the driver, or implemented in a separate product
Zhaga-D4i certification: Overview

• **Zhaga-D4i certification**: A joint program from Zhaga and DiiA
  – Certification for interoperable luminaires and sensors and/or communication nodes

• Based on *complementary specifications* from Zhaga and DiiA
  – Zhaga Books 18 & 20, plus D4i specifications from DiiA

• Product certification enables use of Zhaga and D4i logos
  – For *luminaires, sensors* and *communication nodes*
  – Logo indicates multi-vendor *product interoperability*

• Initial focus on *outdoor lighting* (Book 18), *indoor* solutions now added (Book 20)

• LED drivers are eligible for D4i certification from DiiA
D4i and Zhaga–D4i certification

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1. D4i certification
2. Zhaga certification

1 + 2 both required
Outdoor luminaire with Zhaga receptacles

- Communication node or sensor with Zhaga Book 18 plug
- Zhaga Book 18 receptacle
- Intra-luminaire DALI bus
- AUX supply
- D4i driver
- LEDs

Second Book 18 node (e.g. sensor)
Zhaga-D4i certification for outdoor luminaires

Zhaga-D4i node (sensor and/or wireless communication node)

Zhaga receptacle

Intra-luminaire DALI bus

Second node

D4i driver

Zhaga-D4i luminaire (outdoor)
Zhaga-D4i certification for indoor luminaires

Intra luminaire DALI bus

D4i driver(s)

Zhaga connectors

Zhaga-D4i luminaire

Zhaga-D4i sensing and/or wireless communication module
Zhaga-D4i certification

• Zhaga-D4i certification (Book 18 or Book 20) is available for:
  – Luminaires
  – Control devices (nodes)
• Zhaga-D4i certified products are listed on the Zhaga website

• Zhaga-D4i certification is available to Zhaga members

• For control devices:
  – First step is D4i certification; only available to DiiA members
  – D4i-certified products are listed on the DiiA website

• The Zhaga logo and the D4i logo are separate logos with separate trademarks. Usage is controlled by Zhaga and DiiA, respectively.
Zhaga-D4i certification: Benefits

• Certification gives confidence for interoperability
  – Certification carried out by independent authority
  – Certified products are traceable in public databases
  – Certification logos are trademarked to prevent misuse

• Certification gives business advantages
  – Certified luminaires and components are available from multiple suppliers
  – Certification logos provide an established brand for product marketing

• Certification ensures that luminaires are:
  – Future-proof
  – Will be able to host next-generation Zhaga-D4i nodes
More information

- DiiA specifications – www.dali-alliance.org/specifications/download.html
- D4i overview and FAQs – www.dali-alliance.org/d4i
- D4i certification – www.dali-alliance.org/d4i/certification.html
- Zhaga-D4i – www.dali-alliance.org/zhaga-d4i
- DALI product database – www.dali-alliance.org/products

Contact the DALI Alliance – www.dali-alliance.org/contact
Certification Process: Book 18 Zhaga-D4i Node

**Organisation**

- Associate or regular membership of DiiA is required
- Associate or regular membership of Zhaga is required

**Process**

1. Product self tested or tested by DiiA test house
2. Submit results to DiiA for verification and D4i certification
3. Submit product documentation to Zhaga Test Centre
4. Tested for compliance against Zhaga specifications

**Comment**

1. Product awarded Zhaga-D4i certification and use of Zhaga and D4i logos
Certification Process: Zhaga-D4i Luminaires

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