

DALI At A Glance

For Lighting
Designers and
Specifiers



Alliance

The DALI Family

Building a Scalable and Future-Ready Lighting System



DALI® is the language of lighting control

State-of-the-art - Global - Digital - Standardised - Specialised for lighting - Data-rich

Product Certification Programs

Compliance with IEC standards - Supporting cross-vendor interoperability



Lighting control in
wired networks



Luminaire-level lighting control



Lighting control in
wireless and IP networks

All using the DALI protocol

What is DALI?

DALI, or Digital Addressable Lighting Interface, is a groundbreaking protocol that facilitates seamless bi-directional communication between components in a lighting control system. For over thirty years, DALI has been a trusted global standard in digital lighting control, known for its reliability, flexibility, and interoperability. With features like bi-directional communication and real-time feedback, DALI enables precise and intelligent control of modern lighting systems.

How DALI Works

DALI is a digital communication network that enables seamless interaction between all components of a lighting system. Wired implementations use a simple two-wire bus to connect luminaires, sensors, and controllers for both control and feedback. This makes it possible to control individual lights, groups, or pre-set scenes with precision, while real-time diagnostics help maintain reliable system performance.

One of DALI's strengths is its simplicity. Flexible wiring options make it easy to install in almost any layout, and each device is uniquely addressable, allowing for changes to lighting configurations without the need for rewiring. When combined with its ability to integrate seamlessly into smart systems, DALI becomes an essential tool for creating adaptable, efficient, and future-ready lighting designs.

The DALI Alliance

Have you ever wondered how different lighting devices can work together so smoothly? The DALI Alliance, an international consortium of lighting companies, makes this possible. By supporting and promoting the DALI protocol, they ensure that devices from various manufacturers can seamlessly integrate secured by rigorous certification processes. This 'no vendor lock' approach allows lighting designers and specifiers to innovate freely without being confined to a single manufacturer.

The DALI Family

Building a Scalable and Future-Ready Lighting System

State-of-the-Art Digital Lighting Control

Standardised under IEC 62386 and certified by the DALI Alliance, DALI provides cutting-edge, intelligent lighting control that is both sophisticated and responsive.

DALI-2



The DALI-2 certification program enables an extensive range of features and greater interoperability. With its bi-directional communication capability, DALI allows for precise and repeatable lighting control and with real-time feedback, significantly boosting the efficiency and performance of lighting systems.

D4i and DALI+: Extending the DALI Ecosystem

As the DALI protocol evolves to meet the growing demands of modern lighting control, two key advancements have emerged: D4i and DALI+. These innovations extend the capabilities of DALI, enabling it to seamlessly integrate into cutting-edge smart buildings and IoT ecosystems.

D4i



D4i builds on the DALI-2 standard by simplifying the selection of products for intra-luminaire systems, such as those used in indoor or outdoor luminaires. Introduced in 2019, D4i-certified drivers include standardised data and power requirements, enabling features such as luminaire-level diagnostics, energy reporting, and operational data.

These capabilities align seamlessly with IoT ecosystems, supporting integration into smart buildings while maintaining backward compatibility with existing DALI systems. As all D4i products are also DALI-2 products, D4i makes additional data and power requirements mandatory, facilitating smarter, data-rich lighting solutions.

DALI+



DALI+ represents the latest advancement in the DALI protocol, extending its capabilities into wireless and IP-based networks while complementing the existing DALI-2 standard. Launched in 2024, DALI+ with Thread enables lighting designers to integrate the flexibility and precision of DALI into cutting-edge smart buildings and IoT ecosystems.

This evolution enhances interoperability across both wired and wireless systems, offering greater design possibilities while maintaining compliance with the globally recognised IEC 62386 standard. DALI+ works alongside DALI-2, bridging the gap between traditional and future-ready technologies and setting a new benchmark for lighting control.

A Future-Oriented Approach

The DALI protocol, based on the globally standardised IEC 62386 standard, provides a future-proof platform for modern lighting systems. The DALI Alliance's dedication to continuous improvement ensures that both the alliance and the DALI standard remain at the forefront of technological advancements, ready to meet the evolving demands of the lighting industry.

Flexibility in Lighting Control

How DALI Serves Diverse Needs

Adaptability to Dynamic Spaces

DALI's remarkable flexibility makes it the perfect choice for a wide range of applications, including office buildings, retail spaces, healthcare facilities, and educational institutions. Imagine being able to reconfigure your lighting scheme effortlessly without the need for extensive rewiring. With DALI, you can easily adapt your space to evolving requirements. Its versatility also extends to logistics areas, outdoor traffic zones, and street lighting.

Creating and modifying lighting scenes and groups with DALI is straightforward, ensuring optimal setups for any application. For instance, in a luxury department store, a DALI system with sensors can dynamically adjust lighting based on ambient light and occupancy, delivering superior lighting conditions and enhanced energy efficiency.

Interface and Control

A lighting system based on the DALI standard can offer intuitive control panels and user-friendly apps, making it easy for end-users to adjust lighting settings. This simplicity of control ensures that anyone can operate the system efficiently, enhancing the overall user experience.

Robust Performance and Reliability

DALI-2 and D4i products are known for their robustness and reliability of communication, performing consistently in various environments and under different conditions. This reliability ensures that the lighting system remains functional and efficient, regardless of external factors.

Comprehensive Diagnostics and Monitoring

D4i and many DALI-2 products include advanced diagnostics and monitoring capabilities, providing detailed data on the performance and status of each lighting component. This comprehensive approach to diagnostics facilitates long-term maintenance and system health, ensuring that potential issues are identified and addressed proactively.

Integration with Smart Building Technologies

DALI systems can be integrated with smart building management systems via appropriate gateways or interfaces. This integration enables a cohesive approach to managing various building functions, including HVAC, security, and lighting.



Ease of Installation and Scalability

Benefits for New Projects

Simplified Wiring

Installing DALI systems is easy, thanks to a simple two-wire system that reduces complexity and costs. A key advantage is that no special wiring is required—DALI can be installed using standard mains wiring. Another standout feature is the non-polarity-sensitive wiring, which significantly reduces the risk of installation errors. This combination streamlines the installation process and eliminates common wiring mistakes.

Flexible Wiring Topologies

DALI supports various wiring topologies, including daisy-chain, star, or a combination of both. This flexibility allows installers to tailor the wiring layout to the project's specific needs, whether it's a small, straightforward setup or a large, complex installation.

Enhanced Scalability

Need to upgrade? DALI makes it simple to expand your lighting system as your needs grow. A single DALI line supports up to 64 luminaires, but the system can easily scale up by linking multiple subnets into one unified lighting control system. With this flexibility, DALI can manage lighting across entire buildings or even larger facilities, controlling thousands of luminaires if needed.

At the core of this system are application controllers, which connect and manage the DALI network to ensure smooth operation. DALI also integrates seamlessly with Building Management Systems (BMS), enabling centralised control and smarter building operations.

DALI's proven scalability has been demonstrated in large-scale projects like Zayed International Airport, where it manages thousands of luminaires across a vast, complex facility. For more detailed insights, refer to the case studies on page 8.

Cost-Effective and Efficient

Combining simple wiring, reduced installation errors, and flexible topologies makes DALI a cost-effective and efficient choice. DALI systems not only save on initial setup costs but also offer long-term benefits by simplifying future expansions and modifications.



Enhanced Energy Efficiency

Saving Costs with DALI

DALI systems significantly improve energy efficiency through features like daylight harvesting, occupancy sensing, and dimming capabilities. These innovations reduce energy consumption and extend the lifespan of lighting fixtures, optimising their lifetime and saving both energy and money. Additionally, the precise control offered by DALI ensures that lighting is used only when needed, further contributing to energy savings, cost efficiency, and long-term sustainability.

Sustainability and Circularity: How DALI Plays a Part

DALI supports sustainability goals by promoting energy-efficient operations and facilitating maintenance and upgrades, extending the lifespan of lighting systems. With DALI's real-time diagnostics and data reporting capabilities, proactive maintenance becomes a reality, reducing waste and ensuring optimal performance.

Consider a busy international airport terminal, where continuous and efficient lighting is crucial for safety and operations. Leveraging diagnostic data from D4i LED drivers, maintenance teams can quickly identify and replace failing lamps, preventing areas of the terminal from going dim and ensuring passenger convenience and security.

Evolving and adapting for the future

Reduced energy usage

Extended luminaire lifetimes

Established and widely used

Future-proof systems



Improved Lighting Quality and Comfort

The Impact of Precise Control

Customisation for Diverse Environments

The ability to create customised lighting scenes and groups means DALI systems can cater to the specific needs of different spaces. In a fitness centre, bright, energising light can motivate users during workouts, while in a romantic restaurant, soft and gentle illumination can create a perfect ambience for a cosy dinner. This adaptability ensures that lighting is always suited to the intended mood and function of the space, enhancing user experience and satisfaction.

Well-Being and Human-Centric Lighting

DALI technology enables Human-Centric lighting (HCL) by supporting non-visual aspects of lighting, such as circadian rhythms. Its advanced colour control capabilities allow precise adjustments to light intensity and colour temperature, enabling the simulation of natural daylight progression to support healthy sleep-wake cycles.

In healthcare, DALI facilitates dynamic lighting that creates calming environments in recovery rooms and provides glare-free, high-precision illumination in operating theatres. By seamlessly supporting both intensity and colour control, DALI ensures adaptability to evolving lighting needs, positioning itself as a future-ready solution for innovative and well-being focused lighting.

Real-Time Adjustments and Responsiveness

DALI's bi-directional communication capability allows for real-time adjustments and feedback, ensuring that the lighting system can respond dynamically to changing conditions. This is particularly beneficial in office environments, where lighting can be adjusted throughout the day to match circadian rhythms, improve employee productivity, and reduce glare on screens. Such adaptability enhances comfort and well-being while contributing to energy efficiency by adjusting lighting based on occupancy and natural daylight availability.

Enhanced Learning Environments

In educational institutions, DALI's ability to adjust both lighting intensity and colour temperature based on the time of day and specific activities can significantly enhance concentration and learning outcomes. Bright, well-lit classrooms with cooler tones can stimulate alertness and engagement, while warmer, dimmable lighting can create a relaxed atmosphere for activities like group discussions or video presentations. The flexibility DALI offers, including seamless colour control, ensures that the lighting environment is always optimised for educational success.

Aesthetic Appeal and Ambience

DALI's ability to fine-tune lighting enhances the aesthetic appeal of any space. Whether creating a vibrant environment in a retail space or a serene, welcoming atmosphere in a hospitality setting, DALI ensures that the lighting complements the space's design and function, enhancing the overall user experience.

By leveraging these capabilities, DALI provides an advanced and versatile lighting solution that improves both the quality of light and the comfort of users across a wide range of applications.

Compliance with Building Regulations

How DALI Meets Standards

DALI systems help ensure compliance with various building and energy regulations by providing detailed monitoring, control, dimming, and standby capabilities. The ability to collect and report data on energy usage and lighting performance supports adherence to standards and contributes to achieving green building certifications. By optimising lighting usage and reducing energy consumption, DALI systems can help meet or exceed energy codes and building and lighting standards.

Interoperability and Compatibility: Working with Different Fixtures and Systems

DALI-2, D4i and DALI+ certification helps to ensure that all certified devices are interoperable, regardless of the manufacturer. This simplifies integration with existing systems and future upgrades, making DALI a future-proof choice for lighting control. The DALI-2 certification further enhances interoperability by covering a broader range of devices and ensuring rigorous testing and verification. Control gear (drivers), control devices and other equipment can interact seamlessly, promoting a harmonious system.

Diagnostic and Maintenance Features: Simplifying System Management

DALI-2 includes advanced diagnostics and monitoring capabilities, providing detailed data on the performance and status of each lighting component. This facilitates predictive maintenance, reducing downtime and maintenance costs. LED drivers with diagnostics capabilities can report operational data, such as operating voltage, current, temperature, light source starts, and light source on time. Maintenance teams can use this data to identify potential issues or failures in advance, allowing them to take proactive measures to prevent downtime and reduce maintenance costs.

Future-proofing Lighting Systems

DALI's modular and scalable nature, combined with the DALI Alliance's commitment to backward compatibility and ongoing development (such as DALI+ for wireless and IP-based control), ensures that DALI systems remain relevant and adaptable to future technological advancements and regulatory changes. DALI+ expands lighting control technology by integrating the established DALI protocol with wireless and IP-based networks, ensuring data transmission from control gear, luminaires, and sensors while maintaining the ability to monitor energy consumption, power usage, and diagnostic data in real-time.



- ◆ **Product certification programs**
- ◆ **Based on open, global standards**
- ◆ **Cross-vendor interoperability**
- ◆ **Rigorous testing & independent verification**

Case Studies

Real-world Applications and Success Stories

DALI has been successfully implemented in most lighting environments, demonstrating its versatility and effectiveness. Examples include:

Shanghai LONTRI – Estée Lauder R&D Centre:

Precise lighting control for productivity and energy efficiency.

Delmatic – Battersea Power Station:

Flexible lighting designs enhance the customer experience.

Synapse Wireless – Uline Store C6:

Optimal lighting for safety and efficient operations in an industrial setting.

zencontrol – University of Warwick Faculty of Arts:

Adjustable lighting for learning environments.

Smartscape Queensland Ballet in Brisbane:

Dramatic lighting effects for concerts, shows, and events.

Delmatic – Zayed International Airport, Abu Dhabi:

Controlled lighting in transit hubs for safety and comfort.

These projects and case studies can be found on the [DALI website](#). They illustrate how DALI can meet diverse lighting needs, providing both functional and aesthetic benefits while ensuring energy efficiency and sustainability.

Illuminate Your Knowledge: Dive into the DALI Lighting Designer's Guide

To delve deeper into the benefits and features of DALI, read "Specifying with DALI - A Lighting Designer's Guide." This comprehensive guide offers detailed insights and practical advice to help you fully leverage DALI for your lighting projects. For more information, visit the [DALI website](#).



Alliance



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The DALI Alliance is also known as the
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