WAGO Lighting Management

The Lighting Control Solution –
Stay in Control of Your System

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The potential for saving energy are particularly high in industrial environments, because shift and night operation as well as lack of daylight increases the use of artificial lighting tremendously. These means that investments in lighting management are amortized within a very short period of time.
Here, you can learn how to control your system with WAGO Lighting Management to save time and money.


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LIGHTING MANAGEMENT – IS THAT EVEN NECESSARY?

Yes, because every lighting system is over-dimensioned on day one so it will also provide the minimum lighting demanded on day X (maintenance factor). However, without control, potential savings simply vanish. It is therefore quite clear that light not only influences our feelings of comfort, but it also affects the bottom line. A cost analysis should also include operating costs (energy, maintenance and service costs), which greatly exceed initial investment costs for building automation. From a user's point of view, no one would want to go without some type of regulation or control – being limited to switching lights on and off is so last century. State-of-the-art systems can be controlled and serviced independently without great effort; for example converting the hall equipment and changing the lighting conditions. Moreover integrating the lighting equipment into a master system is very practical for doing things like adapting your lighting to your production times. Naturally the most important thing is and remains guaranteeing sufficient lighting at the workplace to ensure safe working surroundings.

Good Reasons for Lighting Management

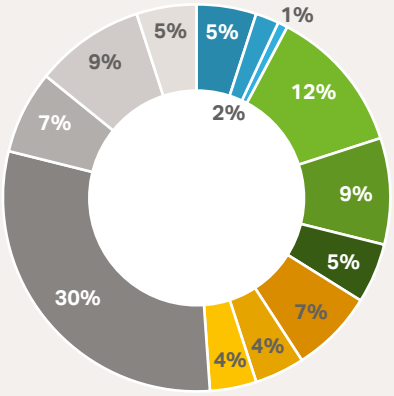
Ergonomic Reasons:
- Increase safety
- Offer orientation
- Ease utilization
- Enhance well-being
- Improve comfort

Psychological Effects:
- Spark attention
- Strengthen motivation
- Boost mood

Economic Aspects:
- Save energy
- Reduce costs
- Decrease work required for operation and service; simplify handing via browser
- Intelligently interlink services
- Increase building value

WAGO offers a particularly user-friendly system for operating and servicing your lighting system – stay in control of your equipment!

Potential Energy Savings in Building



In which areas have energy-saving measures led to the greatest energy efficiency increase in your company (n = 1047)?

(Source: Study by the EEP, University of Stuttgart)

Therefore, politicians are increasing the regulation of lighting efficiency. In Germany, the Energy Saving Ordinance (EnEV) implements the various EU directives regarding building efficiency. It considers energy consumption values for heating, ventilation, cooling, hot water supply, and naturally, lighting. Certification points such as DGNB, which also evaluate the criteria of sustainable construction, include in their assessment important lighting management factors, such as building-related life cycle costs, flexibility and conversion capability as well as convenience features, such as visual comfort. In addition to energy consumption goals, legal requirements, costs, lighting quality and user convenience all have parts to play in the decision. A simple yes-no question transforms into a complex field of topics.

Subject World	Criteria Group	Criterion Number	Criterion	Impact Factor	Percentage of Total Rating
Economic Quality (ECO)	Life cycle costs (ECO 10)	ECO1.1	Building-related life cycle costs	3	11.3 %
	Value development (ECO20)	ECO2.1	Flexibility and conversion capability	2	7.5 %
	Value development (ECO20)	ECO2.2	Commercial viability	1	3.8 %
Socio-Cultural and Functional Quality	Health, comfort and sustainability (SOC10)	SOC1.4	Visual comfort	1	2.5 %
	Health, comfort and sustainability (SOC10)	SOC1.6	Quality of sojourn, indoors/outdoors	2	5 %
	Health, comfort and sustainability (SOC10)	SOC1.7	Safe	1	2.5 %
Technical Quality	Quality of technical execution	TEC1.4	Adaptability of technical system	2	5 %
Process Quality	Quality of planning (PRO10)	PRO1.5	Prerequisites for optimum utilization and management	2	1 %
	Quality and construction	PRO2.3	Proper commissioning	3	1.4 %

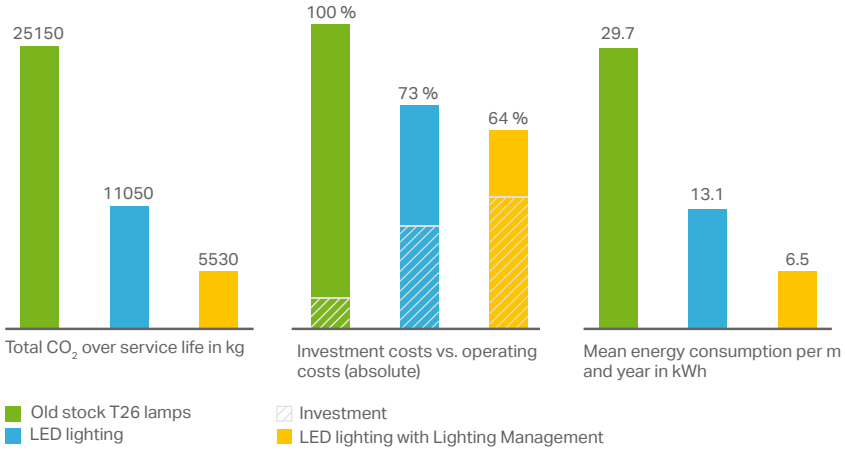
Weighting of criteria according to DGNB Hall Construction: New Construction of Industrial Facilities, Type 1, Version 2015.

STAY IN CONTROL OF YOUR SYSTEM

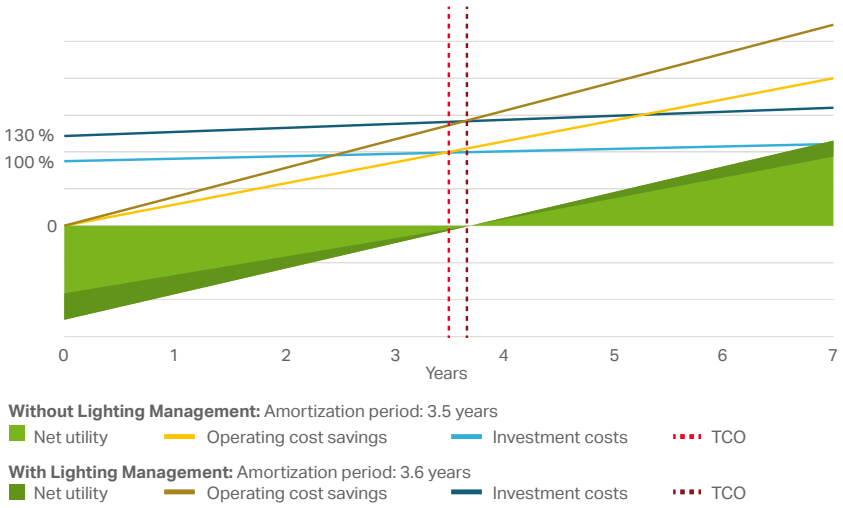
Monitoring and Service for Continuous Functionality

WAGO Lighting Management is the optimum solution for new systems as well as for retrofitting. Regardless of whether small plant halls or large logistics systems, our scalability offers precisely the right concept to meet your requirements. Reduce lifecycle costs through efficient lighting management!
Many helpful features allow autonomous, independent operation of your lighting system, for example, wizard-based configuration provides support for commissioning on your own. Do you want to convert certain areas in your plant? No problem! Your plant personnel can simply reassign the virtual rooms with the Web GUI. Moreover, an integrated time management feature allows you to adapt your lighting system to the hourly time schedules for your production. The comprehensive diagnostic features including maintenance charts, alarm tables, status displays and recording of operating time provide additional support in planning service work.
You can also record the energy data for the lighting very simply to comply with the Energy Services Act (EDL-G).
Above all, it is important that the focus of this solution remain on the user – at the bottom line a large selection of functions and interface options serve to make life easier.

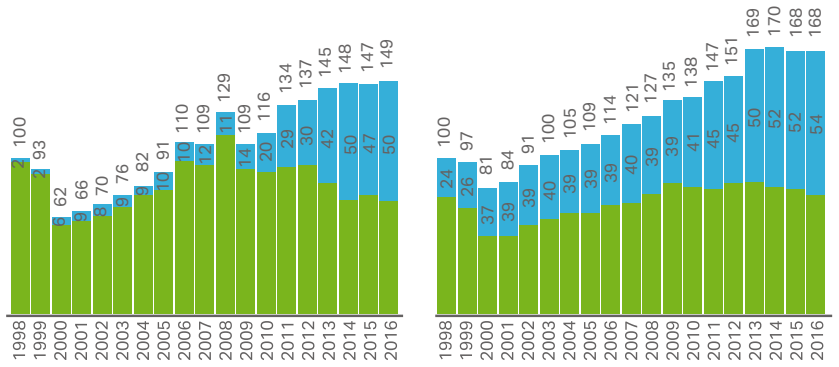
Energy Consumption and Costs for a Warehouse with 24 Hour Operation



Cost/Earnings Curve for a Warehouse with 24 Hour Operation



Development of Electricity Prices (Index 1998=100)



Source: VEA, BDEW; date: 01/2016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OUR CONCEPT

The Solution for Efficient Lighting Management in Production Facilities, Warehouses and Office Buildings

Modern lighting management offers more than merely reducing energy consumption and costs, it simplifies economizing and resource conservation while maintaining user comfort and flexibility.

Our Concept
WAGO Lighting Management is a proven concept based on predefined hardware and preconfigured software, which greatly simplifies planning, commissioning and operation. The basic idea: WAGO Lighting Management is based on the different lighting requirements in warehouses and production facilities.
For example, a production facility is divided into virtual rooms in which the light can be flexibly adapted. Each virtual room receives signals from sensors and actuators in order to automatically set the appropriate light intensity. By using the virtual rooms, conversions and room remodeling can be implemented quickly and simply via Web configuration.

Operation
WAGO Lighting Management features a Web interface that allows you to easily create and edit virtual rooms. Do you need to illuminate a production line, hallway or a storage area? No problem – simply create three different rooms with the required functions. Parameter values can be stored on a backup server via FTP. The values can be forwarded to a higher-level building control system or to a production control center via Modbus TCP/IP.

The foundation is an intelligent lighting control system, which ensures the correct light is available in the right amount at the right time by using daylight sensors, presence sensors and thoughtfully programmed lighting scenarios.


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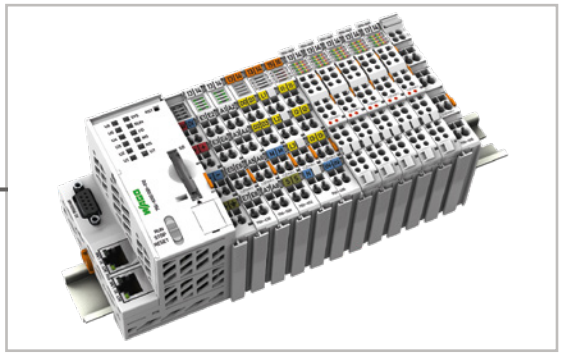
WAGO Lighting Management significantly reduces the overall costs of new installations and conversions. WAGO Lighting Management provides the perfect combination of high-quality hardware and intuitive custom software! Reduce lifecycle costs with quick and simple commissioning, good diagnostic and service capabilities and simple adaptation of lighting situation to varying requirements.

Works photo, WAGO



Advantages of WAGO Lighting Management:

- Reduce lifecycle costs through efficient lighting management
- Scalable to any system requirement
- Commissioning via self-explanatory, wizard-based configuration
- Simple, programming-free conversion
- Connect to higher-level management and control systems within industrial or technical building environments

Do you need to illuminate a large area?
No problem! Our Lighting Management application allows you to illuminate nearly 3000 m² depending on the type of lamp. For larger areas, it is easy to link a number of controllers with one another.

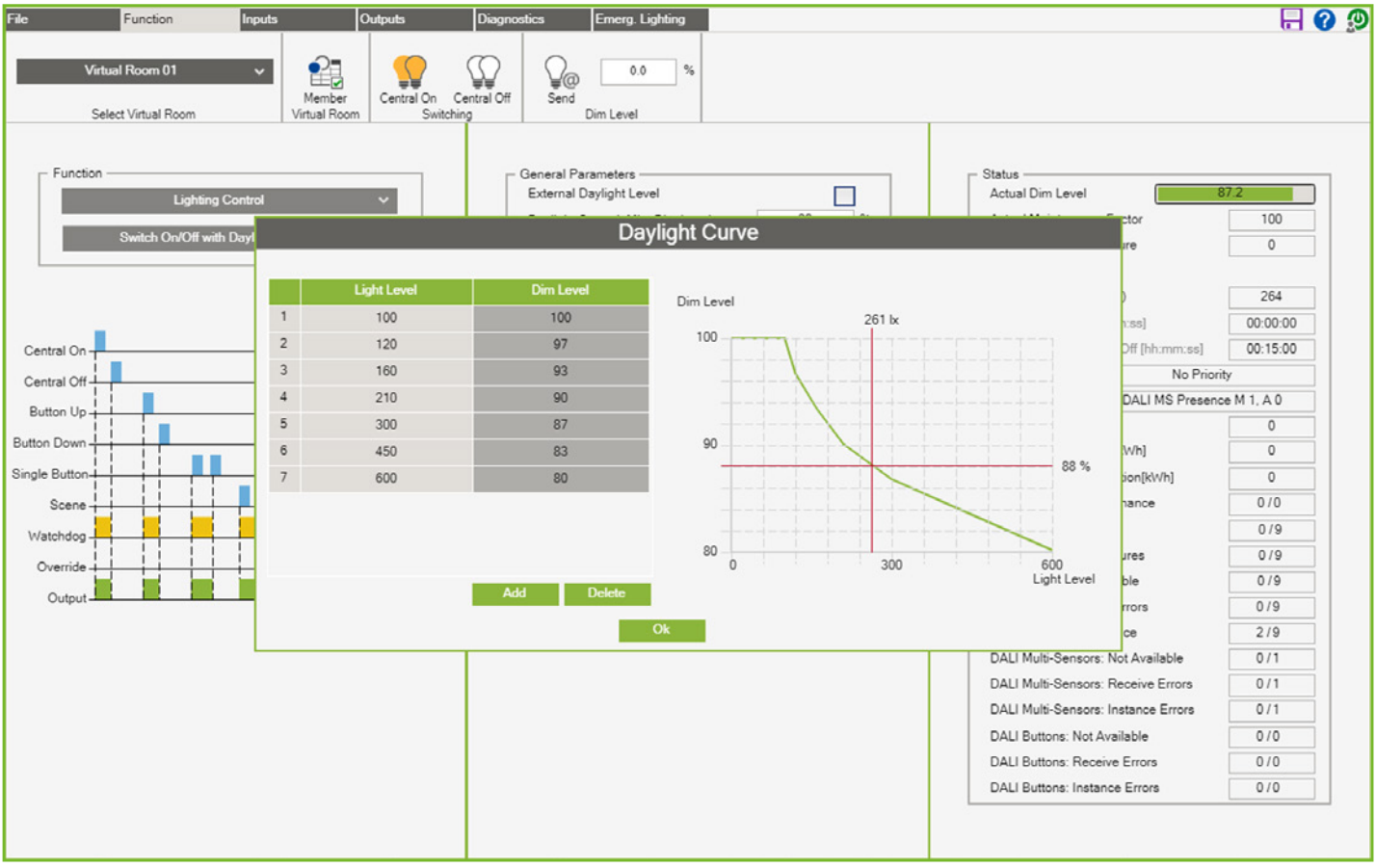
FUNCTIONS

Clever Lighting Management Today

WAGO Lighting Management supports the optimal lighting control in a building. Browser-based software makes it easy to replace default parameters with custom settings any time adaptations are required. Connections to higher-level management and control systems in industrial or technical building environments are also supported. Moreover: Simple connection to master controls or building control systems via Modbus TCP/UDP protocol.

Clear Input Screen:
Screen masks with default settings are pre-populated for basic parameters and operating states are displayed.

- Setpoint value specification
- Maximum and minimum control limits
- Actuator and sensor configuration
- Operating status indication



	Light Level	Dim Level
1	100	100
2	120	97
3	160	93
4	210	90
5	300	87
6	450	83
7	600	80

Screenshot – Example: Daylight Control

Function Overview:

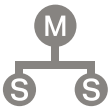
Switching
- Power on/off (with and without watchdog)
- Latching relays
- Staircase feature
- Automatic light (motion detector)
- Twilight control

Dimming
- Automatic dimming
- Dimming with presence sensors

Lighting Control
- Constant light control
- Human-centric lighting (HCL)
- Daylight control:
  - Switching function
  - Staircase function
  - Advanced functions

Simple project documentation by mouse click

Time Functions
- Weekly
- Vacation
- Special switching programs
- Holidays



Slave Function
- Cross-communication between diffusers
- External virtual room
- External dimming value

Safety Lighting
- Single battery
- Central battery

- Precise energy consumption measurement
- Calculation of energy consumption for virtual room (VR)
- Measurement of total power; calculation per virtual room

Software Scope Overview:

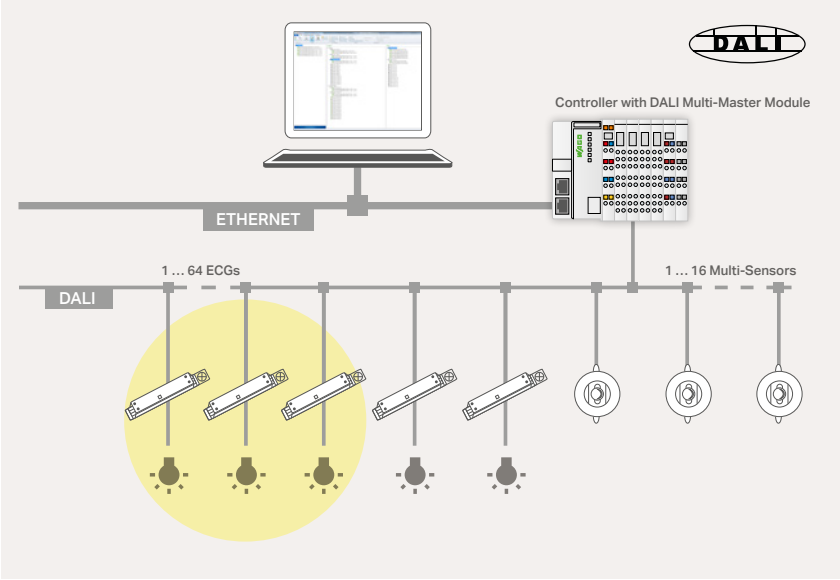
Maximum Number	Description
16/64	DALI-2 Sensors/DALI-2 Instances per DALI Multi-Master Module
16	DALI Multi-Sensors per DALI Multi-Master Module
16	DALI Push-Button Couplers per DALI Multi-Master Module
64	DALI ECG per DALI Multi-Master Module (Notice: Short addresses can not be switched when there are 64 ECGs.)
64	EnOcean Rockers (2-channel)
64	Digital Inputs
32	Digital Outputs
64	Modbus® push-buttons
16	Clients for cross communication to other WAGO Lighting Management controllers for transfer of input signals
19	Server instances for cross communication to other WAGO Lighting Management controllers for provision of input signals
19	Server instances for cross communication to other WAGO Lighting Management controllers for provision of output signals (function, external dimming value for virtual room)
20	Timer programs
60	KNX switching/dimming/scene objects
60	KNX status objects (1 bit/1 byte)
12	HCL curves

FUNCTIONS

DALI, EnOcean and KNX as Standard Feature

DALI

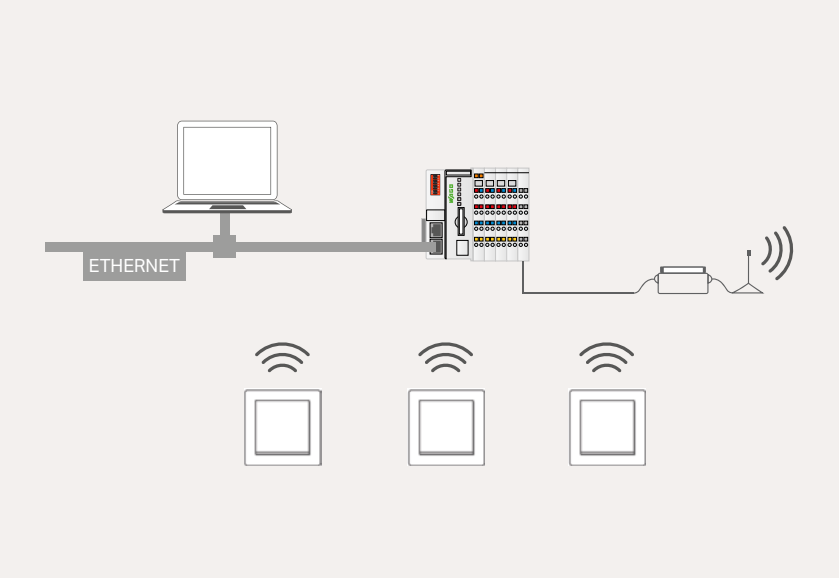
Digital Addressable Lighting Interface (DALI) is a technical standard for controlling lighting devices (e.g., electronic control gears). DALI features digital communication and streamlined installation. It meets lighting requirements, such as switching, dimming, light grouping or status information feedback.
With the new DALI-2 standard, now sensors are also supported on the DALI bus.



DALI System Layout

EnOcean Radio Technology

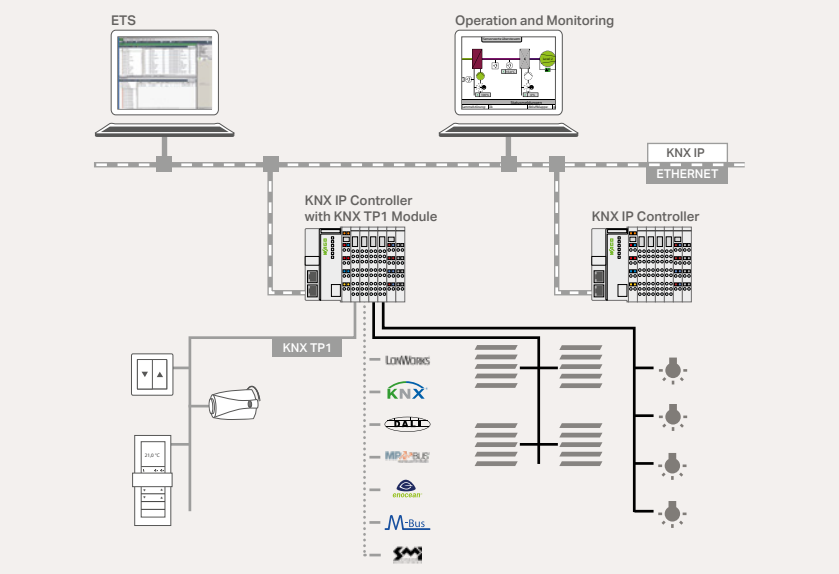
Battery-free EnOcean technology transmits short telegrams and requires very little energy to send radio signals. Transmitters use electrodynamic/ thermoelectric (energy converters) or photovoltaic (solar cells) energy-harvesting technologies. Characteristic features include long range up to 30 m indoors and 50 m in production halls), high transmission reliability (short telegrams) and multiple telegram transmission.



EnOcean System Layout

KNX

KNX is a uniform, manufacturer-independent communication protocol for intelligently networking state-of-the-art home and building system technologies. KNX is used to plan and control energy-efficient solutions for more functionality and convenience while simultaneously reducing energy costs.



If you need more information on the subject of DALI, EnOcean or KNX, see our attachment or go to:
www.wago.com/dali
wago.com/enocean
wago.com/knx

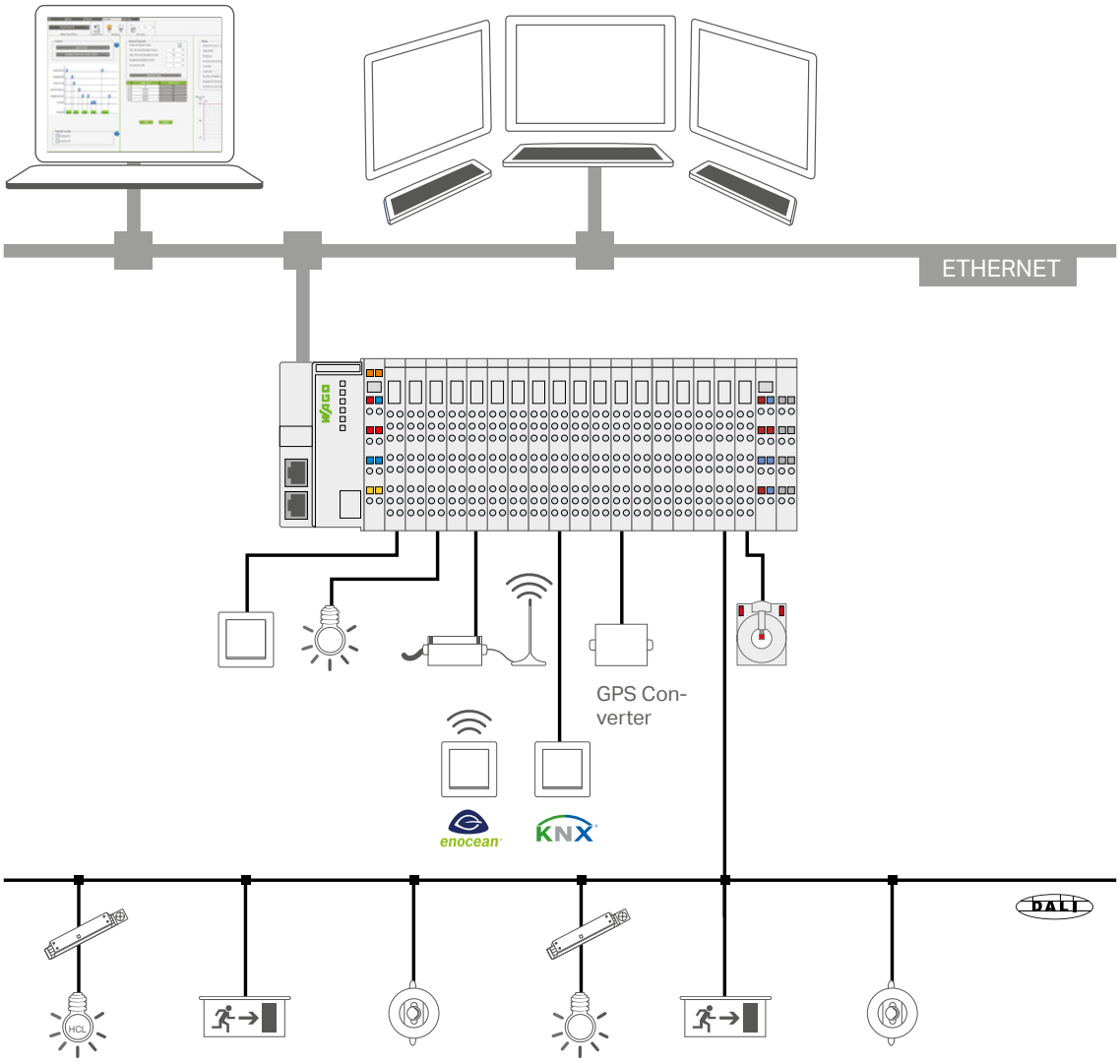
CLEVER LIGHTING

From Planning to Commissioning and Operation

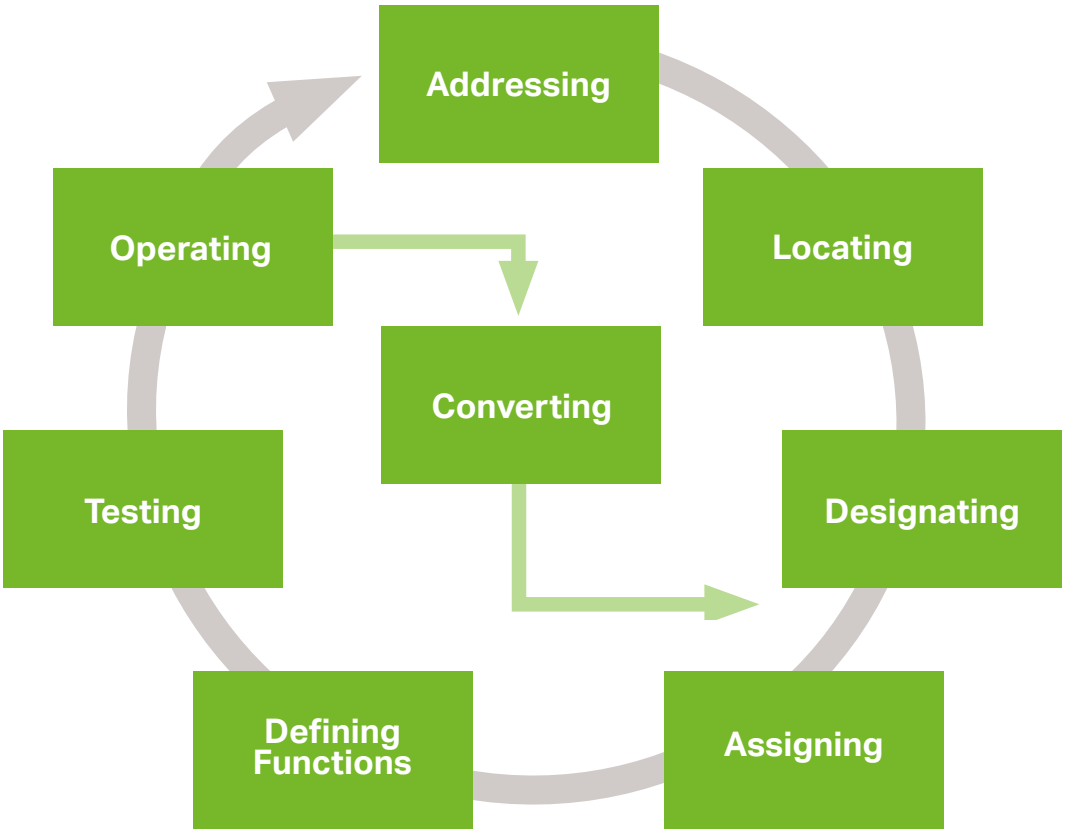
Planning

Government regulations ensure that important sustainability objectives are met. For this reason, it is necessary to observe all current standards when planning a lighting system. For lighting planners, specifications in application standards such as DIN EN 12464-1 are mandatory for indoor workplaces. This requires that artificial light be produced with minimum energy consumption.

The energy certificate required by the Energy Saving Ordinance (EnEV 2014) considers the lighting in the balance of the total building energy requirements. WAGO Lighting Management also helps you achieve the objectives specified for industrial buildings in DGNB, by positively influencing 46% of the assessment criteria.



Lighting Management System Layout



Simple Workflow – Wizard-Based Commissioning

Wizard-Based Commissioning for Simple Workflow:

Addressing:
- DALI and EnOcean devices

Locating:
- Finding and sorting DALI components

Designating:
- Inputs and outputs according to equipment marking system

Assigning:
- Inputs and outputs to rooms

Defining Functions:
- Assigning functions within a room

Testing:
- Checking the configuration

Operating:
- Performing diagnostics and maintenance

Converting:
- Changing assignments or functions

Easy Commissioning:
- Classification of rooms using a Web browser view
- Configuration with standard PC
- Without having to install additional applications programs
- Automatic detection of modules used and associated components (lamps, sensors)
- Automatic documentation during commissioning
- Optional configuration with Microsoft Excel via import/export

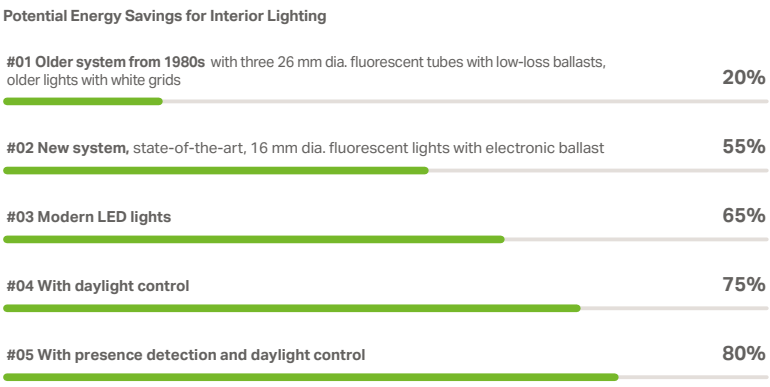
ORDER OVERVIEW AND ACCESSORIES

WAGO Lighting Management is compatible with the following components:

Components	Item No.	Note
Base Unit		
Lighting Management – Controllers	750-8202/000-012	The controllers can communicate with each other.
Lighting Management – Software	Free of charge	Download: wago.com/applicationcontroller
DALI Multi-Master	753-647	In addition to 64 DALI Actuators (ECGs), a DALI Multi-Master supports up to 16 DALI Multi-Sensors (max. 64 sensor addresses); max. 10 DALI Modules per base unit (controller).
End Module	750-600	An end module must be snapped onto the assembly at the end of a fieldbus node.
Power Supply to I/O Node	787-1112	24 VDC power supply (2.5 A) to controllers and additional modules
Power Supply to DALI Multi-Master	787-1007	Power supply to max. 5 DALI Multi-Master Modules
Extension for inputs/buttons		
16-Channel Digital Input; 24 VDC; 3 ms	750-1405	For 1-16 light push-buttons/switch inputs; max. 4 extensions per base package
Extension for Outputs/Actuators		
16-channel digital output; 24 VDC; 0.5 A	750-1504	For 1-16 actuators/lamps/relays/ECG control; max. 2 extensions per base package
Socket with Relay; 1 Make Contact; 24 VDC	788-357	Light switching via relay
Extension for EnOcean Radio		
RS-232/-485 Serial Interface	750-652	Serial interface connects to STC65-RS-485 EVC EnOcean Radio Transmitter/Receiver (for 1-64 rocker switches)
EnOcean Receiver/Transmitter	2852-7101	Receives EnOcean radio signals and transmits them to the I/O node
EnOcean Repeater	2852-7102	Extends the transmission range (for more planning information, visit the EnOcean website)
Radio Transmitter; EnOcean easyfit PTM 250; 2-Channel Lighting Control	758-940/001-000	1-2 or 1-4 signals; range of 30 meters in buildings to the radio receiver
Radio Transmitter; EnOcean easyfit PTM 250; 4-Channel Lighting Control	758-940/003-000	
Extension for External Time Request		
Real-Time Clock Module	750-640	Time synchronization module, if no time server connection is possible
GPS DCF Converter	2852-7901	Converter/external receiver for time synchronization
Extension for Energy Data Measurement		
3-Phase Power Measurement; 690 VAC	750-495/xxx-xxx	
Current and Voltage Connections	2007-8874 2007-8877	Pre-assembled terminal block assemblies for easy connection and short-circuiting of current transformers (for current transformers, see Full Line Catalog, Volume 4)
Extension for KNX Push-Buttons		
KNX Module	753-646	Connects KNX push-buttons to the I/O node
Extension for Sensors		
DALI Multi-Sensor Kit	2851-8201	Brightness measurement and motion sensor: Kit connects to a DALI bus system.
DALI sensor coupler	2851-8202	Sensor coupler connects MULTI-3-CI Sensors to DALI (max. 16 DALI Sensor Couplers per 753-647DALI Multi-Master)
DALI HIGHBAY ADAPTER + HIGH BAY	2852-7207 2852-7201	Brightness measurement and motion sensor for large installation heights (3-13 m)
DALI HIGHBAY ADAPTER + VISION	2852-7207 2852-7202	Motion sensor for large areas, open offices, hallways or warehouses
DALI LS/PD LI	2852-7203	Motion sensor for office lighting (1-5 m)
DALI Sensor Coupler HF LS LI + Radar Sensor HF LS LI	2852-7205 2852-7206 2852-7208	Light and recessed ceiling sensor: combined daylight and motion detection, motion detection via radar
DALI XC	2852-7301	Push-button coupler connects 4 conventional push-buttons to DALI.
DALI Sensor Coupler E	2852-7204	Sensor coupler connects standard sensors to DALI.
DALI-2 sensors from different manufacturers		See DALI compatibility list: https://www.wago.com/de/d/11486.

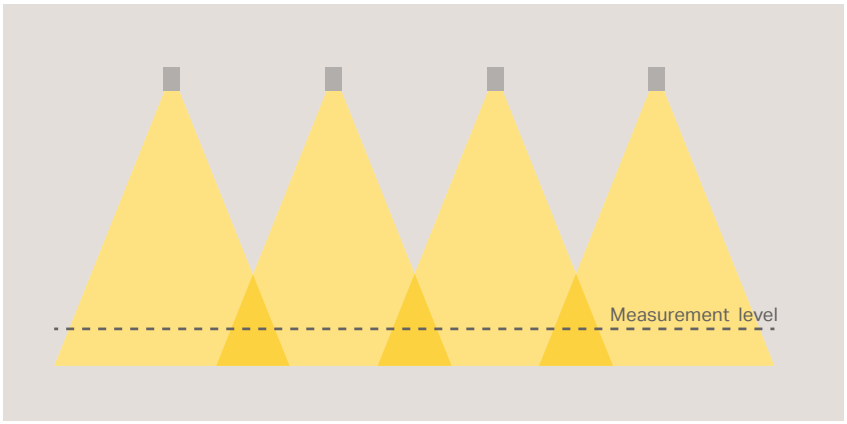
INTERESTING FACTS – GENERAL QUESTIONS

Why do I need to install a controller when using LED lamps?
Because a controller for the lighting provides additional savings.



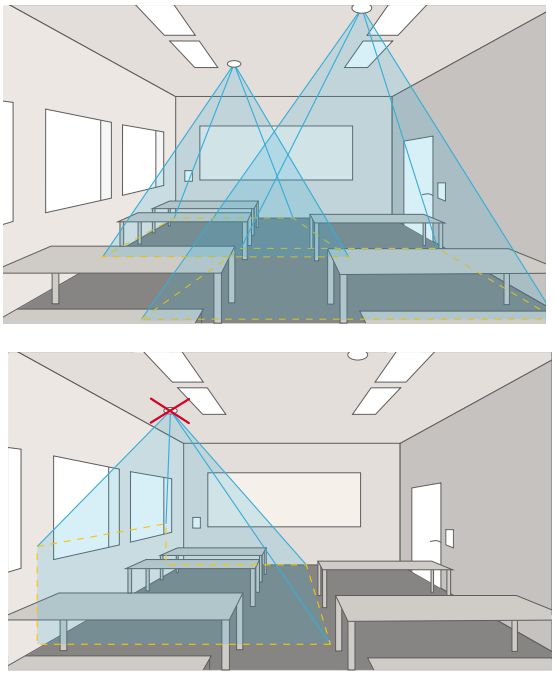
Savings potential for interior lighting: The baseline reference is an older system from the '70s using standard fluorescent tubes, ø 38 mm with conventional ballasts; older lights with soft opal reflector (source: licht.de)

What intervals should be observed when installing lights in a high hall?
The important factor is uniform illumination, which depends on the lamp. In high halls, the cones of light should begin to overlap at a greater height instead of at the assessment level.
It is best to have an expert calculate the lighting requirements and complete the planning based on current standards and regulations, such as the Technical Regulations for Workplaces (ASR).



Hall Illumination

How should sensors be placed?
What needs to be observed?
You should maintain a certain distance from the light so the sensor is not affected by the brightness of the light. It is important to note that the sensor measures the brightness directly at the device.
Tip: Do not attach sensors directly above surfaces with irregular reflection. For example, if a sensor is attached directly above a welding workplace, the irregular brightness will cause the sensor to continuously adapt the brightness, making it dark while welding then increasing the intensity again.



Sensor Positioning in a Room

INTERESTING FACTS – GENERAL QUESTIONS

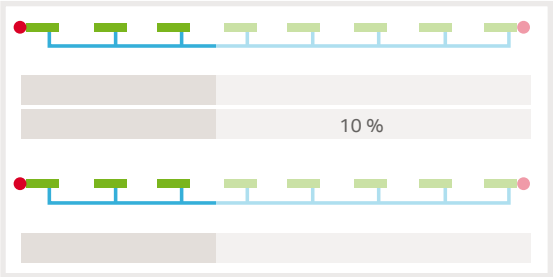
How can the correct brightness value be measured at the workplace?
Special devices are specified in the standards for measuring the light intensity. For example, a sensor can be placed on a table and the brightness measured there, allowing the light to be adjusted to the desired value.

What needs to be observed when illuminating production facilities and warehouses?
Daylight should be utilized to allow work with maximum energy efficiency and save costs for lighting. In this case, it is important to know that 90% of all halls do not have uniform light incidence. For this reason, it is necessary to install a number of sensors.

What needs to be observed with sensors in high bay warehouses?
Ceiling heights of up to 14 meters are typical in high bay warehouses, placing high demands on the technical equipment. It is necessary for the sensors to measure reliably from such heights while detecting motion only in the assigned aisle. The only sensors suitable for such purposes are infrared sensors – usually also called HIGH BAY sensors.
Tip 1: The sensors can be interlinked to monitor even larger areas.
Tip 2: Too many sensors and different types of sensors should be avoided.

What needs to be observed with sensors in warehouses?
Artificial light is frequently used for illumination of storage areas. Often the light burns for the entire work period, even though it is only required for short periods. Presence sensors or intelligent controls switch the light on only when required. Otherwise it is off, or can be dimmed by 10% in a standby mode. For example, if you have an aisle a forklift only drives into occasionally, the lighting is set to 10%, so the driver does not drive into a black hole before the presence sensor detects the vehicle as it turns into the aisle. If you do not have any incidence of extraneous light, motion sensors are perfect for switching the artificial light.
Important: The space must be covered by the sensor's detection zone.

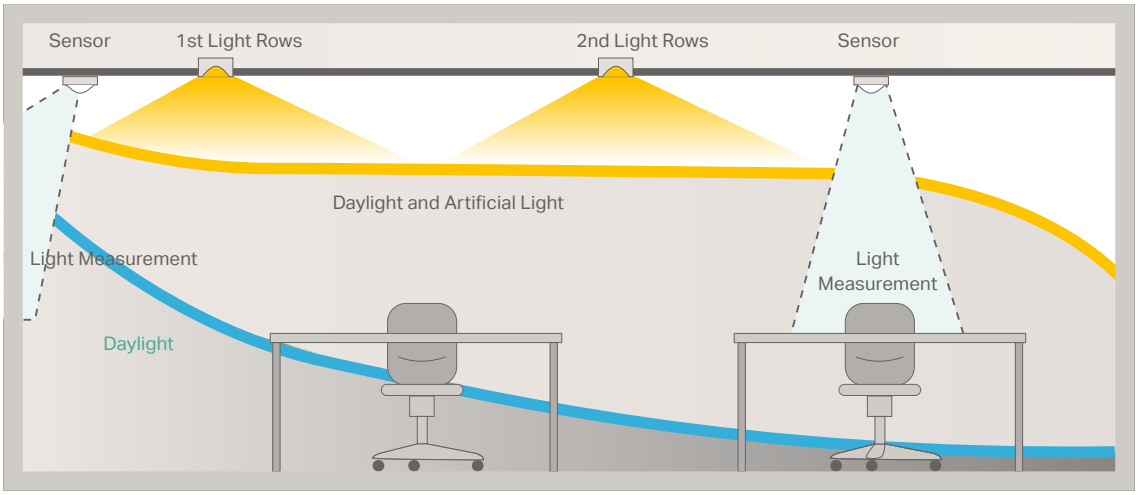
What needs to be observed regarding illumination for night shifts?
If, for example, only 1/3 of the hall needs to be completely illuminated for the work, the Rules for Workplaces (ASR) require the remaining 2/3 of the hall to also be illuminated; here, a value of 10% is also recommended.



Illumination of a Hall Section during the Night Shift

There are conventional sensors and sensors for high ceilings. Which are suitable for which applications?
A normal sensor can be used for ceiling heights up to 4.5 m.
With DALI-2, one HIGH BAY Sensor can realize a height of over 13 m.

What needs to be observed regarding incidence of light from outdoors? How does a control system work using outdoor brightness?
A daylight circuit uses the incident daylight and automatically switches the light to a minimum illumination intensity when activated. Artificial lighting is only switched on, or is lit gradually and continuously intensified, when there is insufficient daylight. If there is enough daylight, the lighting may even be switched off completely. This is accomplished with the aid of a brightness measuring sensor, which relays the value to the control that increases or dims the light. If the presence of daylight varies, excessive switching operations can be avoided by using a time delay. This feature means the lighting does not always have to provide the full power, thus saving energy. It also ensures a constant lighting level at greater room depth (constant light illumination).
Important: The sensor should measure as much natural light as possible and not be placed too close to a light fixture.



Example: Light Incidence from Outdoors

Is there a rule of thumb for the savings potential?
Yes, the indicator LENI (Lighting Energy Numeric Indicator) stands for the actual energy consumption of a lighting system in kWh per square meter and year. The LENI value is determined as described in the specification EN 15193 (Energy performance of buildings – Energy requirements for lighting).

As a matter of principle, the following factors affect the energy savings potential:
- Use of daylight
- Use of presence sensors
- Practical control of lighting
- Annual utilization times
- Illuminated area
- Energy-efficient lights

INTERESTING FACTS – GENERAL QUESTIONS

How must I wire DALI lines?
Supply and control wires can be routed together in the same cable. The wiring can be implemented in series, radially or in a hybrid configuration. Ring circuits should be avoided completely.

How large can the DALI network be?
A maximum of 64 actuators, 16 sensors and/or a maximum of 16 groups per DALI line is permissible.

Can I use a Y(ST)Y cable or other extra low voltage cables for the DALI bus?
Unfortunately not, because this is only an extra low voltage cable and the DALI bus line must be laid out for 230 volts, including the specified dielectric strength. Detailed information is also given in IEC 62386.

Which cable lengths must be observed?
The maximum cable length is determined by the maximum permissible voltage drop in the DALI line; it is defined at a maximum of 2 V. This corresponds to a maximum line length of 300 m, with a 1.5 mm² cable cross section

Which standards do subscribers in a DALI line have to fulfill?
DALI subscribers are subject to IEC 62386.

What are the minimum lighting intensities required?
See Appendix or Technical Regulations for Workplaces (ASR).

What is the burn-in period?
Fluorescent bulbs have a burn-in period of 100 hours.

Is it also necessary to burn in LED lights?
No.

What does a lighting control system cost in comparison to a conventional system? Is there a price based on floor space?
This is a typical question for planning lighting systems. An expert will be happy to complete an amortization calculation for you.

Are subsidies available?
Information on current subsidy programs is available at: www.bafa.de

INTERESTING FACTS – QUESTIONS ABOUT WAGO LIGHTING MANAGEMENT

Which sensors should be used?
Can other sensors be connected?
It is best to use the specified sensors to ensure that the system functions properly. We cannot guarantee that other sensors will function properly.

What interfaces are there to the building control system or other systems?
Data can be transferred to the building control system via Modbus®. Data can also be transferred to other controllers or systems, such as BACnet or KNX, via Modbus®.

How is the WAGO Lighting Management system put into operation?
The system can be commissioned using a Web GUI; no additional software is required.

Who commissions the WAGO Lighting Management system?
It is not necessary to program the lighting management system, making it easy to commission yourself. The WAGO solution provider will be glad to help. We also offer a 1-day course of training.

How high are the costs for commissioning?
The system is laid out so that the purchase price covers all costs for licenses; there are no additional costs for software or licensing. Moreover, the system offers an interface for bulk processing, making commissioning very efficient.

Are there any additional costs for hardware?
No, you purchase a controller and the required number of I/O modules and the lighting management system is ready to use.

Can other I/O modules be added?
If you like, you can add more I/O modules. Simply look in the order overview.

Are tender texts available for the complete system?
Yes, there are. Follow the link:
wago.com/lighting-management.

Is there a model circuit diagram for the control cabinet in form of a WS-CAD or EPLAN document?
Yes, there are. Follow the link:
wago.com/lighting-management.

Who will deliver me a complete system?
Ask our solution providers.

LIGHTING REQUIREMENTS

For Work Environments in Interior Spaces per EN 12464-1

Type of Room, Task or Activity

Traffic Zones and General Areas in Buildings	Em	UGRL	Uo	Ra
Traffic Zones inside Buildings				
Circulation areas and corridors	100	28	0,40	40
Stairs, escalators, travelators	100	25	0,40	40
Elevators, lifts	100	25	0,40	40
Loading ramps, loading bays	100	25	0,40	40
Rest, Sanitation and First Aid Rooms				
Canteens and pantries	200	22	0,40	80
Restrooms	100	22	0,40	80
Exercise rooms	300	22	0,40	80
Coatrooms, washrooms, baths, toilets	200	25	0,40	80
Sanitation rooms	500	19	0,60	80
Infirmaries	500	16	0,60	90
Control Rooms				
Rooms for facility installations, switchgear rooms	200	25	0,40	60
Telex and mailrooms, telephone switchboards	500	19	0,60	80
Storerooms and Cold Stores				
Storage and stockrooms	100	25	0,40	60
Dispatch packing handling areas	300	25	0,60	60
Unmanned gangways	20	-	0,40	40
Manned gangways	150	22	0,40	60
Control station	150	22	0,60	80
High-bay front	200	-	0,40	60

Equation Symbol for Assessment Values

DIN EN 12464-1 defines the following equation terms for technical light evaluation values for general use:

- E_m: Warning value for (mean) light intensity
- E_z: Mean cylindrical luminous intensity
- E_x: Mean vertical luminous intensity
- UGR_L: UGR limiting value for evaluation of glare
- U_o: Uniformity, corresponding to g1
- R_a: Color rendering index

CONTACT

Technical Support
WAGO's technical support staff is ready to assist you with advice and guidance – from selecting the right product, through telephone support during commissioning, all the way up to on-site trouble-shooting. You directly benefit from knowledgeable WAGO experts who dramatically expedite project implementation.

WAGO provides advice and support with:
- Product selection
- Product commissioning
- Troubleshooting
- All technical questions about WAGO products and solutions

As a WAGO customer, you will profit from first-class support:
- Qualified fieldbus specialists
- Troubleshooting
- Spare parts service
- Contact via telephone, on-site or using the form

Project Support
WAGO's technical support offers consultation and project planning services to help devise the best possible solutions for your custom building automation and installation projects. Our experienced team of professionals will gladly help you implement your projects with WAGO products.

Planning and project development:
- Conceptual realization
- Network planning
- Application design
- Component selection
- Quote generation

WAGO helps customers with:
- Advice from experts with years of experience in planning construction projects
- Customizing solutions to ensure the technical and financial success of large projects.
- Technical support while implementing building projects

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Note: For more information,
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