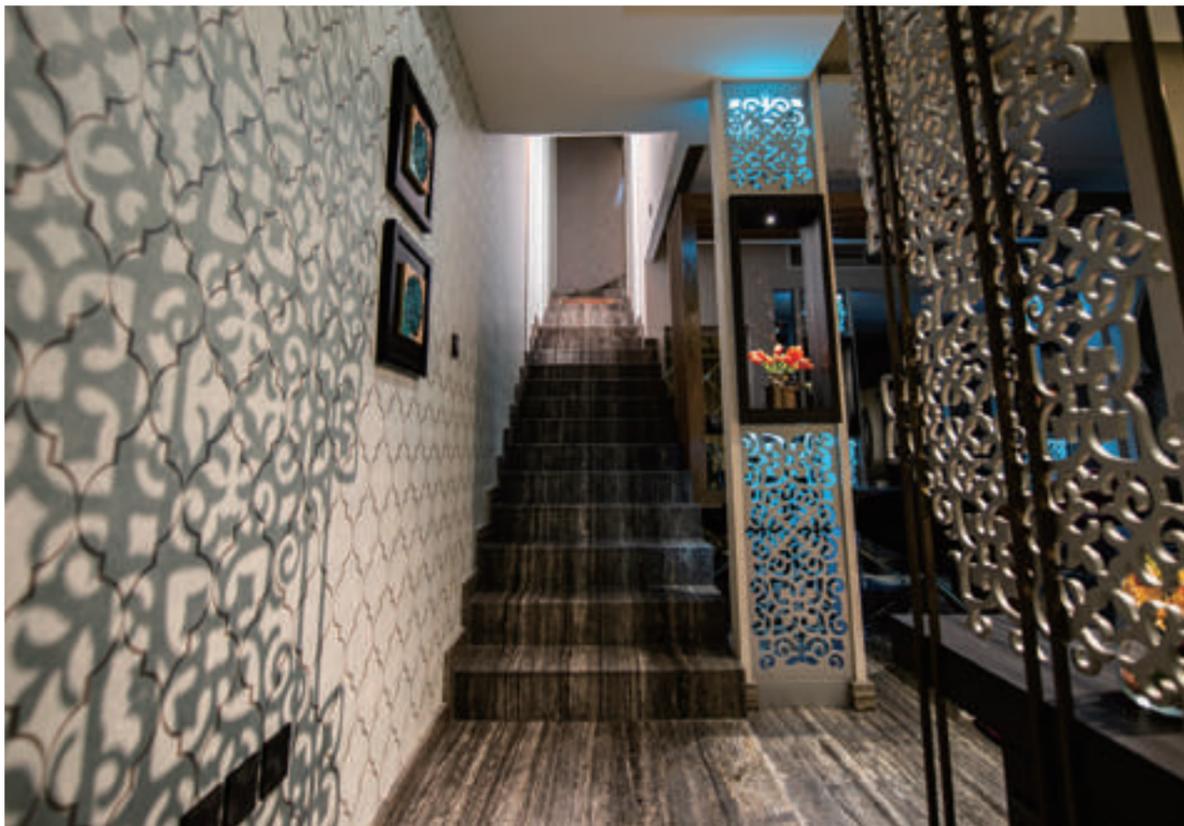


# Future Intelligence

DIE INTELEGENZ  
DER ZUKUNFT



grünes  
LICHT



## Index

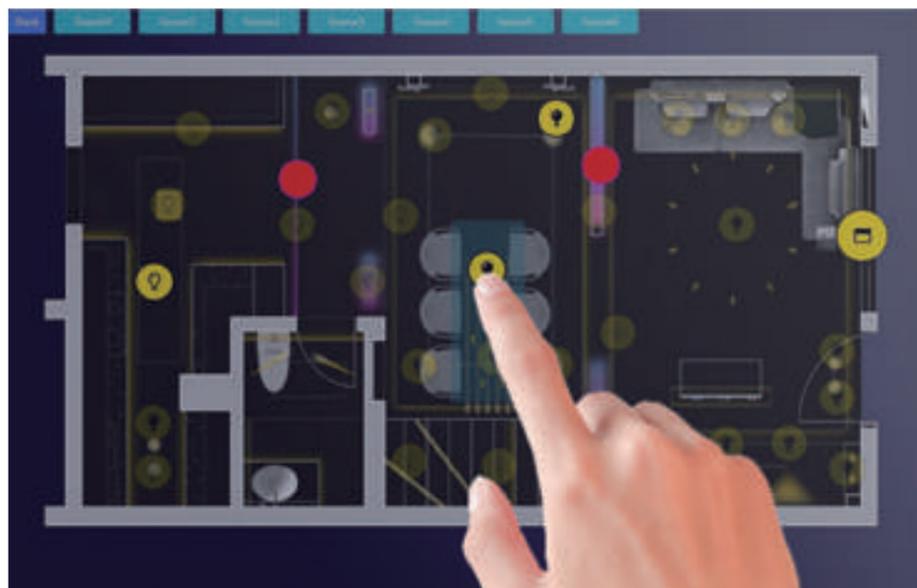
Introduction to Lighting Control System and User Interface	03 - 11
Value of System Integration - Change for Better	12 - 15
Lighting management system	16 - 17
Mood and Scene Setting	18 - 19
Curtains and Blind Control	20 - 21
Fields of application and Service	22 - 29
Structure of the system	30 - 31
Components of the system	32 - 33
Management Panel	34 - 35
Control Buttons and Sensors	36 - 37

## Revolutionary Road in Lighting Technology

The modern life style has made a lot of changes in design and functionality over the recent years. As the world starts to dive deeper into the digital age, it becomes necessary to incorporate technology in ways that will benefit your lifestyle. Taking advantages of the smart/ manageable spaces would make the life much easier and enjoyable. It is valuable to invest in features and systems that are part of the innovative transformation.

Grünes Licht`s newly developed interface and control system transforms home automation to a network of devices connected to an intelligent management server.

# Possibilities are infinite



## Give the Spaces a fresh look

### Preface

We offer complete lighting control solutions for residential and commercial buildings, including artificial light dimming, and curtain control for natural light, Color LED show control, background music, energy management - everything you'd expect - powered by Grünes Licht's Smart Lighting, giving more control and more peace of mind, at home or away.

### Lighting Control Systems

Our system blends intelligence into homes for comfort, health, safety, security and energy conservation.

Designed to suit mobile lifestyle while building a safe environment inside and out of the home. The system seamlessly unifies into one user-friendly application a comprehensive line of fully integrated light sources. From smart dimmers, power strips, bulbs and other lighting sources, user can now take control and run the home lighting, on own schedule even when out of the home.

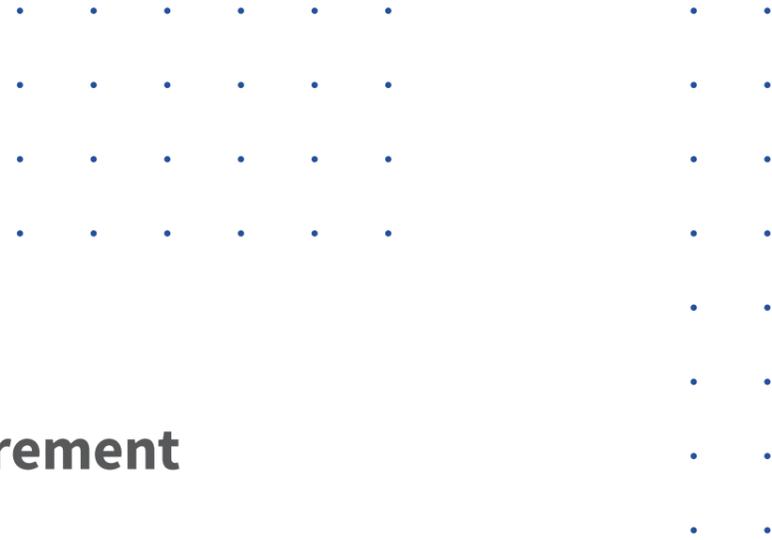


Intelligent Lighting Management



Curtain & Blind Natural light control





## User friendly Interface

## Tailored to serve your requirement



We offer a complete suite of innovative software and hardware architecture to control the lighting equipment in a space. The professional designed graphical interface will integrate the architectural plan into a single user application.

User can regulate, control or alter the Lighting, and more from Grünes Licht`s interface through an interactive application and home server.

Comfort, security, control, flexibility and ease are the essential components for the development and establishment of our „intelligent“ lighting control system.

The system is based on a centralized structure platform. Where the framework provides access to all domestic electrical lighting installers who can monitor and control lighting equipments by using the Grünes Licht web server.

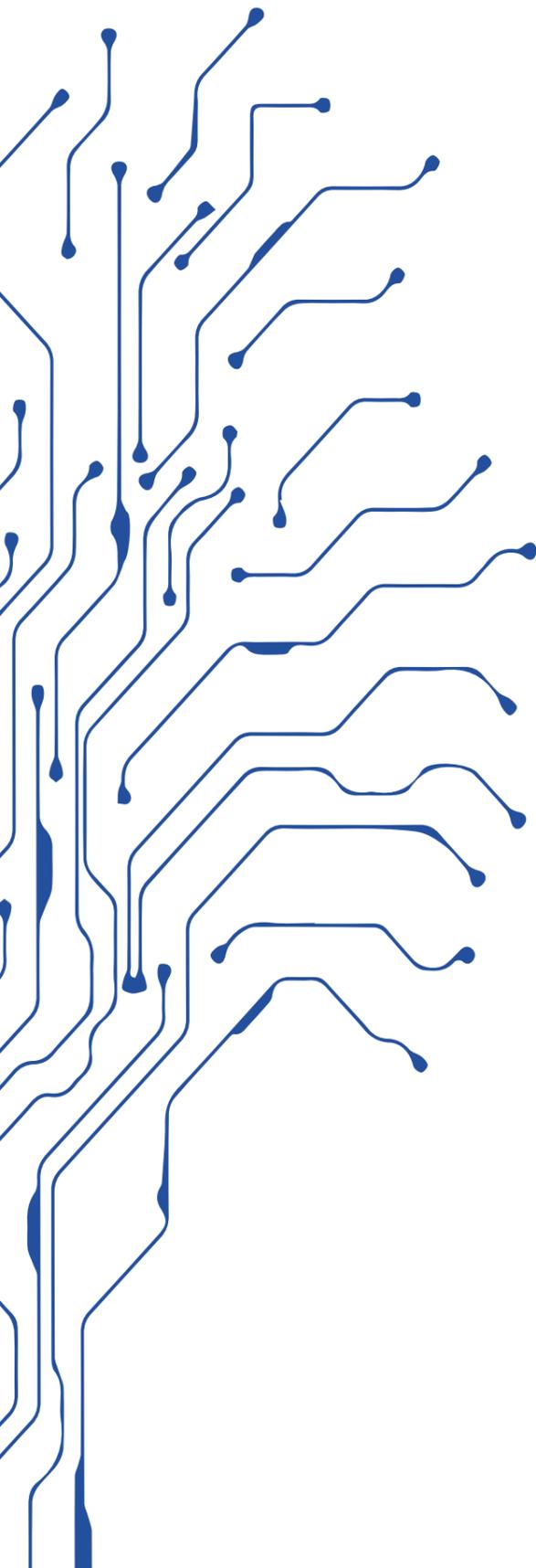
The dedicated web-server is also accessible via any smart-phone, tablet or PC as a web app. The intuitive, user-friendly interface enables remote and on-site control of lights and roller blinds all from a multifunctional home server.

The web app also offers access to the energy data logger, so that you see clearly which devices are ON, their power usage, temperatures etc.

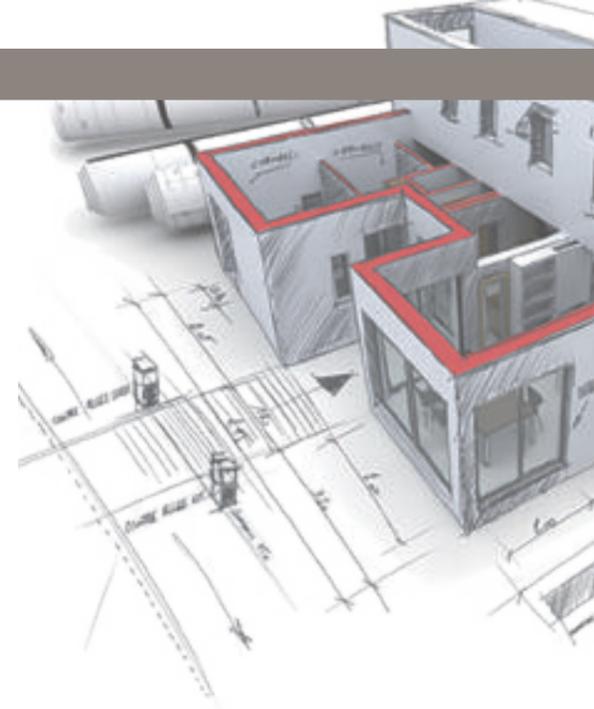


## Combination of luxury and technology with customized style

Homeowners have progressively shifted from opulence and extravagance to elegance and subtle expressions. Controlled atmosphere and ambience of living rooms paves the way to a life where the luxury is redefined.



Its all about  
**Lighting  
management**



**Change for better EXPERIENCE**  
**PORTABLE LIGHTING  
MANAGEMENT**

The objective of the intelligent lighting system is to create and operate appropriate and unique lighting for any place by pre-addressed luminaries. The intelligent system would facilitate the flexibility to adjust light intensity, color temperature, light color and set timing for individual or grouped luminaries.

**Lighting protocols & communication standards**

Smart Lighting Solution supports interfaces for 3rd party systems and standardized communication protocols to integrate with additional sensors & actuators.

**Smart maintenance**

Intelligent Solution allows smart maintenance by enabling devices to be over-viewed with no physical observation.

**Portable control**

Intelligent lighting solution allows portable and remote control operations over a secure and reliable distance using wireless communication and remote operations.

**Flexible in configuration and easy expansion**

Intelligent lighting solution can be integrated with existing or retrofit luminaries, and can be easily expanded in the future.

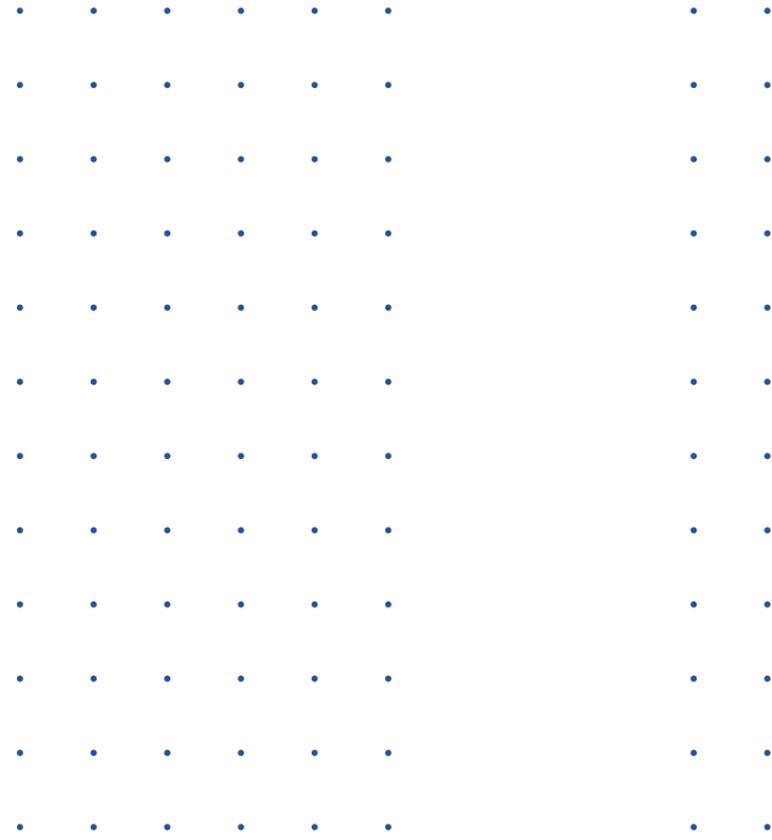
## • Flexibility

Intelligent control system can be applied to any type of spaces such as office, home, hospital, retail or hotel, providing better clarity, intensity, color, etc., in any space and according to the requirement of each users.

## • Optimize Energy savings

Intelligent lighting provision saves power by obtaining optimal light levels and correcting light intensity based on available natural daylight. It also gives greater comfort to eye by achieving ideal light level for health.

When you are out of the place the lights turn off automatically, either by time, or by presence.



## • Comfort

For most of people, home is the unique place on earth. the place where to relax, rest, and sleep after a hard day's work. It's the place where to spend time and make memories with family and even friends. It's our place of comfort.

Create glamour to the luxurious space, set a desired ambiance, control and operate the devices or appliances, play the preferred music, modify the temperature of the space. Schedule all this and take control from your hand even if you're out of your house.

## • Hang on with the latest technology

Grünes Licht` is committed to provide its global customers with a simple, convenient and customer-centric user experience and providing high-tech and high-quality products. We are responsible to provide our clients with comprehensive support for the delivery of innovative technologies and outstanding solutions.

## • Cost Reduction

Intelligent system will lead the user to optimum power consumption. The interface has designed to improve the energy-efficiency of the entire space.

The installation cost can be reduced drastically while the end user can get locally available electrical professionals to install the Grünes Licht's unique framework.



01.



# Smart Lighting Management



## Never enter a dark house again.

Enjoy entering the house with desired mood, color temperature and light level, while hearing the favourite music from every corner, everything pre-set or scheduled.

Connected lighting is one of the first devices which the most homeowners invest in. The ability to tap a button to control all your lights, whether at home or away, is powerful and interesting tool.

Personalize the lights to turn on or off at certain times of the day, adjust them with the seasons, or have them automatically alternate while you're out of town. For instance; When the door opens, turn on the entry light. Or, when it's sunrise, turn off the outdoor lights.

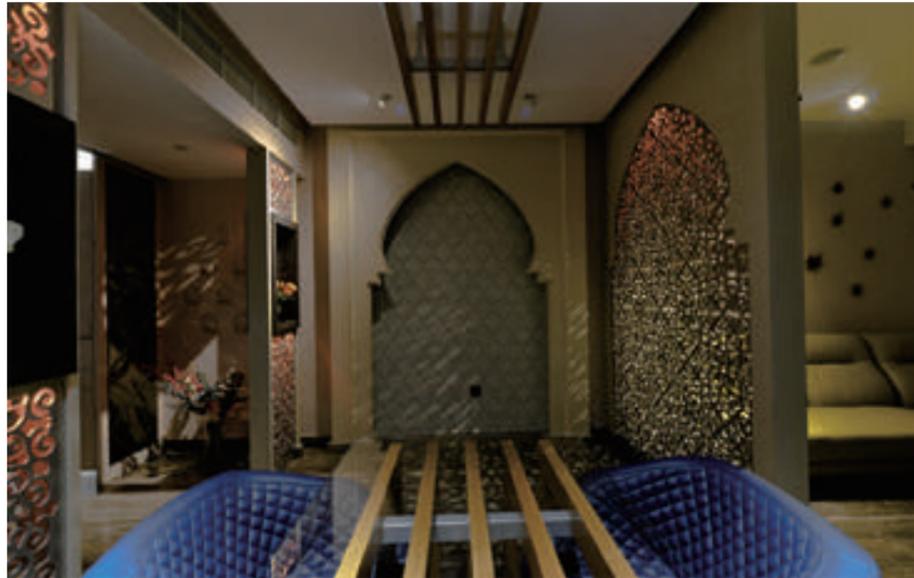
All of these lights can be controlled via physical switch, sensors, or of course by a graphical user interface (an app).

# Mood Setting

In a high-quality studio-type room with a good view, lighting plans are implemented by taking into account the influence of external light and behavioural uses, such as „bright daylight hours“, „fantastic twilight“, and „when relaxing at night“. The beautiful memory-type scenes provide luxurious space and time.

- **Scene 1**

Enable indirect lighting of ceilings and walls during the day when sunlight enters the room. With „sense of brightness“ utilising the daylight that actively moves between outdoor to indoor, and Indirect lighting that is effective for relaxation creates a glamour in the room.



- **Scene 2**

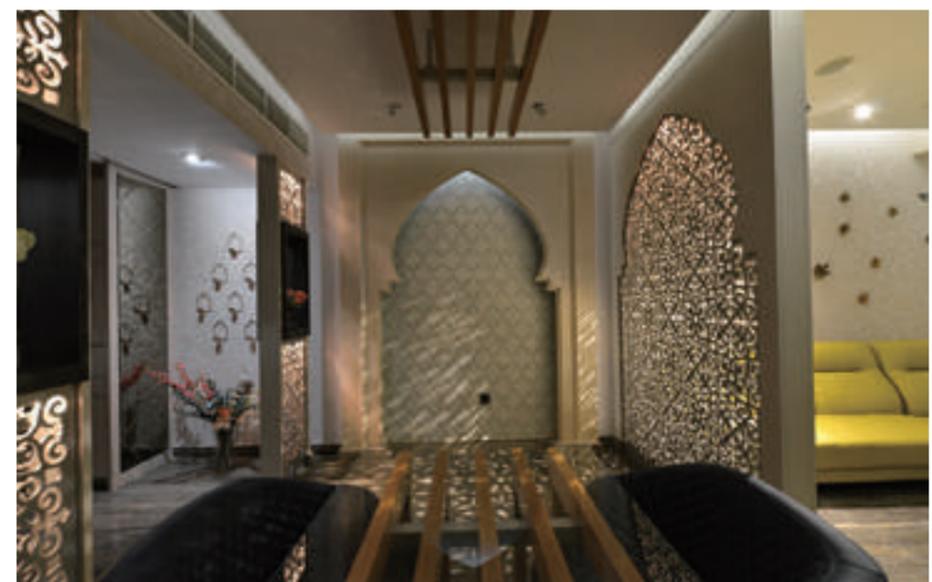
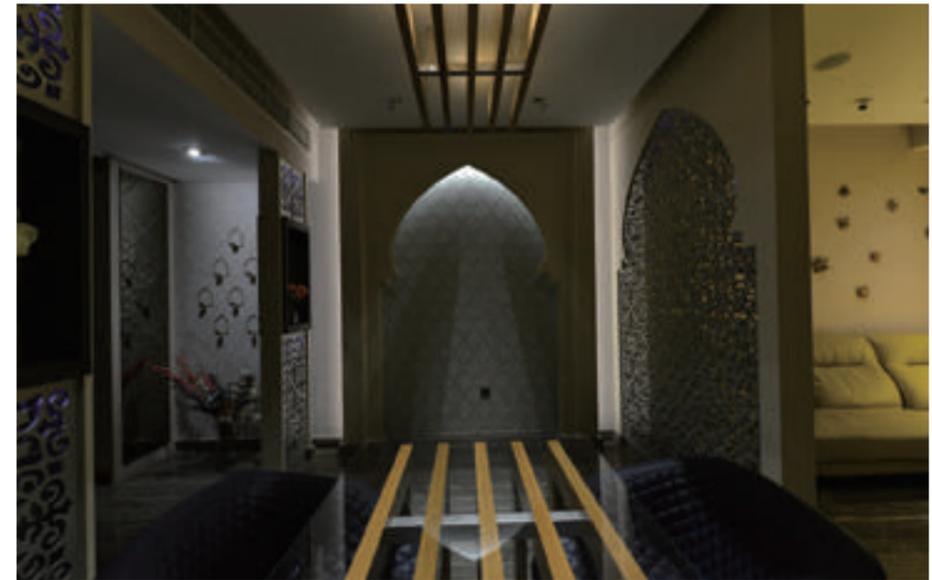
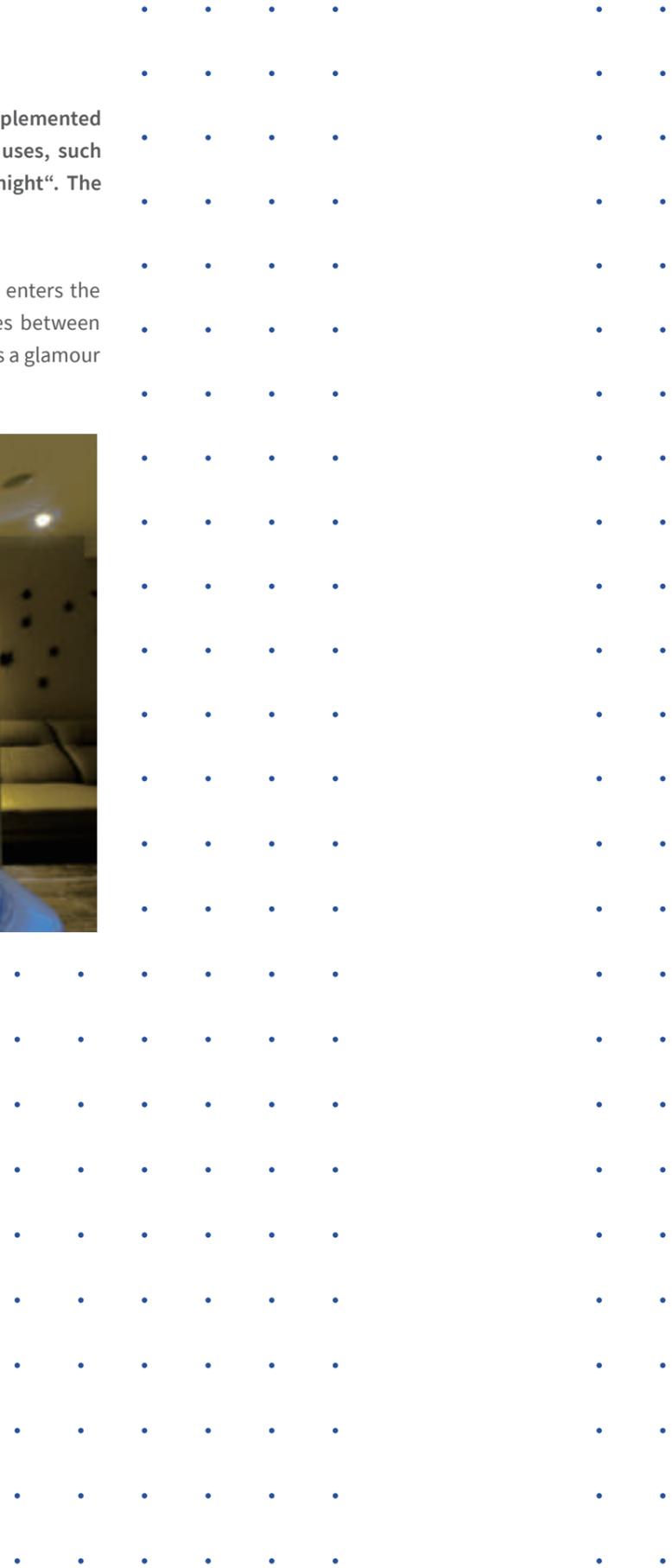
During the fantastic twilight hours when the atmosphere brightness change moment to moment, the outdoor deck lights and indirect foot lighting turns on, indoor lights gradually brightens and spreads. This constitutes an elegant scene where you can enjoy directing and changing scenery.

- **Scene 3**

After dusk, the scene is centred on the bed area and living area. Spot light from the ceiling and dispersion by indirect lighting and the calmness of colourful lights spreads in the room.

- **Scene 4**

During bedtime the lights placed at low level and foot lights are turned on providing minimum illumination. This scene allows user to walk around the room without disturbing the sleeping environment.





## 02.

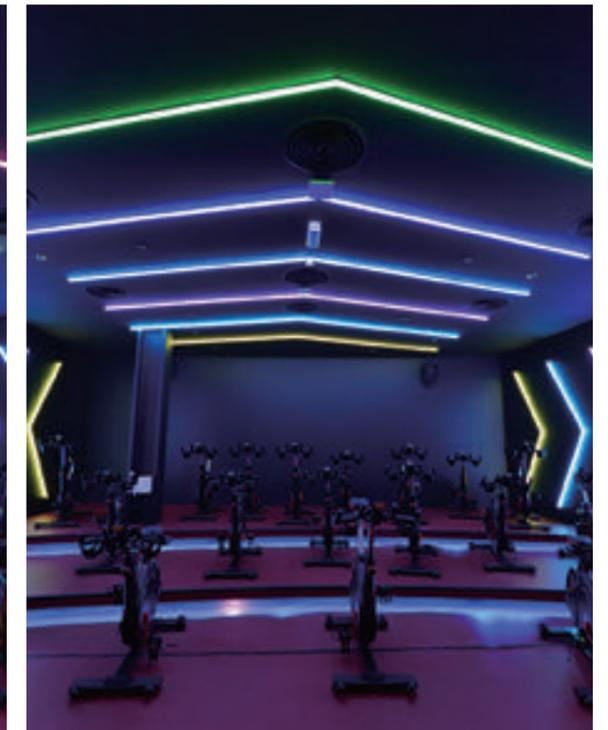
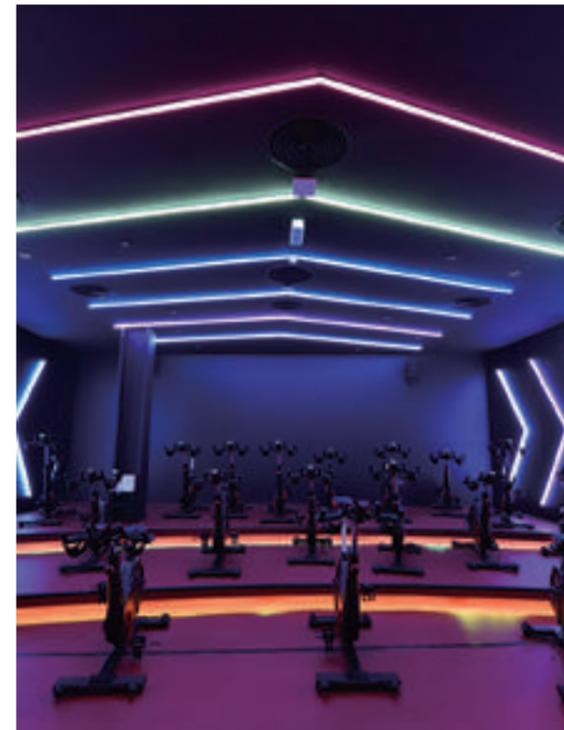
### Curtains & Blinds

Open the window blinds on a bright morning or close the curtains for a quick afternoon nap, right from the comfort of your beds.

Create the perfect ambience, by controlling your blinds. Be in control of the visual and thermal comfort of your rooms, effortlessly.

Motorized Curtains, blinds and shades allow you to tilt, open and close your Motorized Curtains, blinds and shades with just the push of a button or with a tap of your Mobile phone.

- Homes
- Hotels
- Offices
- Retail spaces
- Restaurants
- Sport Centres
- Museums
- Cinemas
- Healthcare





CURTAIN CONTROLLER  
BY WIRELESS MOTOR

LIGHTS DIMMING  
SCENES SELECTION BY  
DALI BUTTONS CONTROLLER

LINEAR LIGHT DALI CONTROLLED  
AT OPTIMAL BRIGHTNESS  
ABOVE WORKING TABLE

DALI LIGHT LEVEL SENSOR  
FOR DAYLIGHT HARVESTING

LINEAR LIGHT AT ZERO LEVEL  
IN NON WORKING AREAS  
FOR ENERGY SAVING

TRACK & SPOT LIGHT  
FOR FOCUSED ILLUMINATION

# Training

## Support service

Our core business competencies with the fusion of technology is excellence in support service.

Our support will be a key part of user's experience with the product which includes Design and supervising support, training, maintenance, and after sales service support.

Training is designed and arranged by qualified team of engineers to meet your specific needs. User can get help in education of the system. Training can be done at our facility (no distractions / hands on exercises), or we can bring our team to user's own facility.



# We design to your Comfort

At Grünes Licht, as we continue serving our high profile clients, we designed a software that helps our high profile clients to be in line with latest technology devices and interfaces to control and manage their living and work spaces as per their desire.

Our system along with the technical expertise of our team, we design and provide a luxurious and unique space which our client deserve.

We are dedicated to help our clients find new ways to enhance lives of people, the communities where we work and live and the planet which our future generations depend.

We work together with highly trained system designers and installers who share our vision and passion for excellence, combine their expertise with our advanced solutions and offers comfort and convenience to everyone.

We revolutionised the home automation by introducing Intelligent lighting control system. We innovate more with new products consistently to meet the technology requirements. You can expect the great ideas to keep on coming.

We train and certify our authorised dealers to install the advanced intelligent system that will work in homes, businesses and major hotels all over the world. You can be confident that we will be a great addition to your home.

```
8  Dali::Dali()
9  {
10     applyWorkAround1Mhz = 0;
11     bt.begin(9600);
12 }
13
14 void Dali::setTxPin(uint8_t pin)
15 {
16     TxPin = pin;
17     pinMode(TxPin, OUTPUT);
18     digitalWrite(TxPin, HIGH);
19 }
20
21 void Dali::setRxAnalogPin(uint8_t pin)
22 {
23     RxAnalogPin = pin;
24 }
25
26 void Dali::workAround1MhzTinyCore(uint8_t a)
27 {
28     applyWorkAround1Mhz = a;
29 }
30
31 void Dali::setupAnalogReceive(uint8_t pin)
32 {
33     setRxAnalogPin(pin);
34 }
35
36 void Dali::setupTransmit(uint8_t pin)
37 {
38     setTxPin(pin);
39     speedFactor = 2;
40 #if F_CPU == 1000000UL
41     uint16_t compensationFactor = 88;
42 #elif F_CPU == 2000000UL
43     uint16_t compensationFactor = 32;
44 #else
45     uint16_t compensationFactor = 4;
46 #endif
47 #if (F_CPU == 8000000UL) || (F_CPU == 16000000UL)
48     delay1 = delay2 = (HALF_BIT_INTERVAL >> speedFactor) - 2;
49 #else
50     delay1 = (HALF_BIT_INTERVAL >> speedFactor) - compensationFactor;
51     delay2 = (HALF_BIT_INTERVAL >> speedFactor) - 2;
52     period = delay1 + delay2;
53 #endif
54 #if F_CPU == 1000000UL
```

# Service Oriented Culture

## Project support

Our team serves as a reliable partner for professional advice and support to help you with calculations, planning and design. We will make sure that not only our offers match to your specifications and requirement perfectly, but they also are fit for the future developed systems too.

## Custom tailored Solution

Customer's requirement and expectations are ever rising. Grünes Licht serves to provide custom made software solutions to suite your project with user friendly interface.

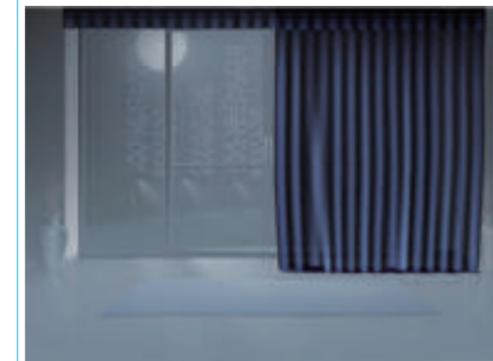
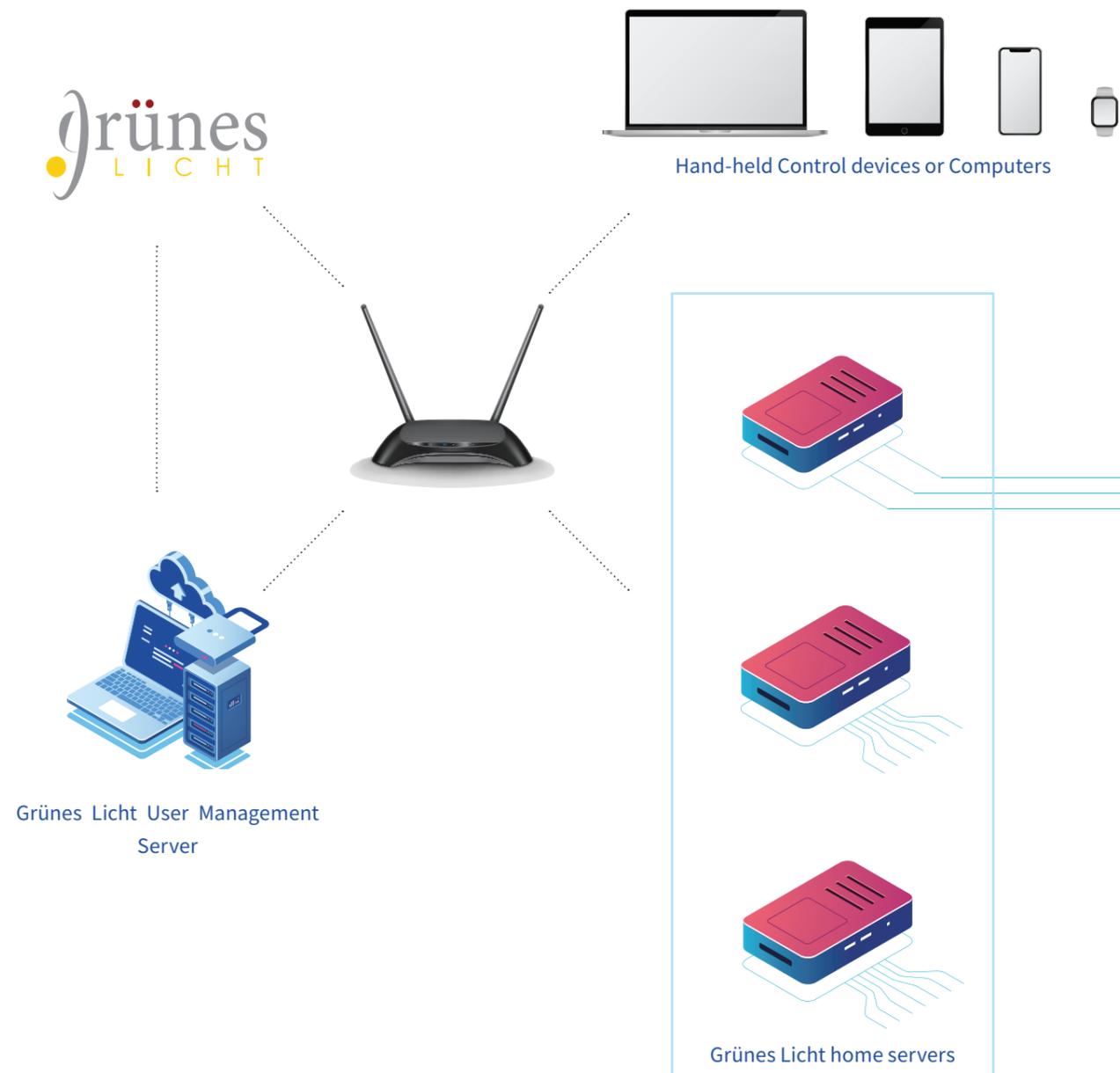
## Web Access

We provide easy and convenient web access to all our control systems to liaise with the special requirements.

## Knowledge and Communication

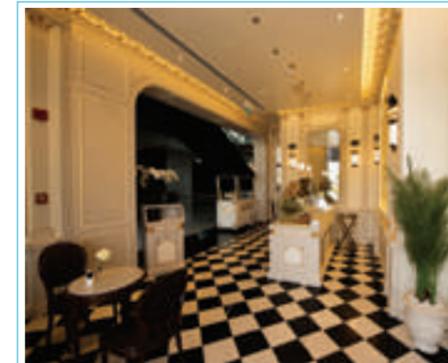
In order to ensure a smooth process and provide the perfect solution, we will communicate and thus support the process with all project participants.

# Structure of Grünes Licht System



**Relay and Wireless Curtain Control**  
Turn your traditional curtain into smart ones. Motorised curtain control allows for easy opening and closing of curtains.

- Smart curtain motor
- Remote control
- Control from app
- Relay control



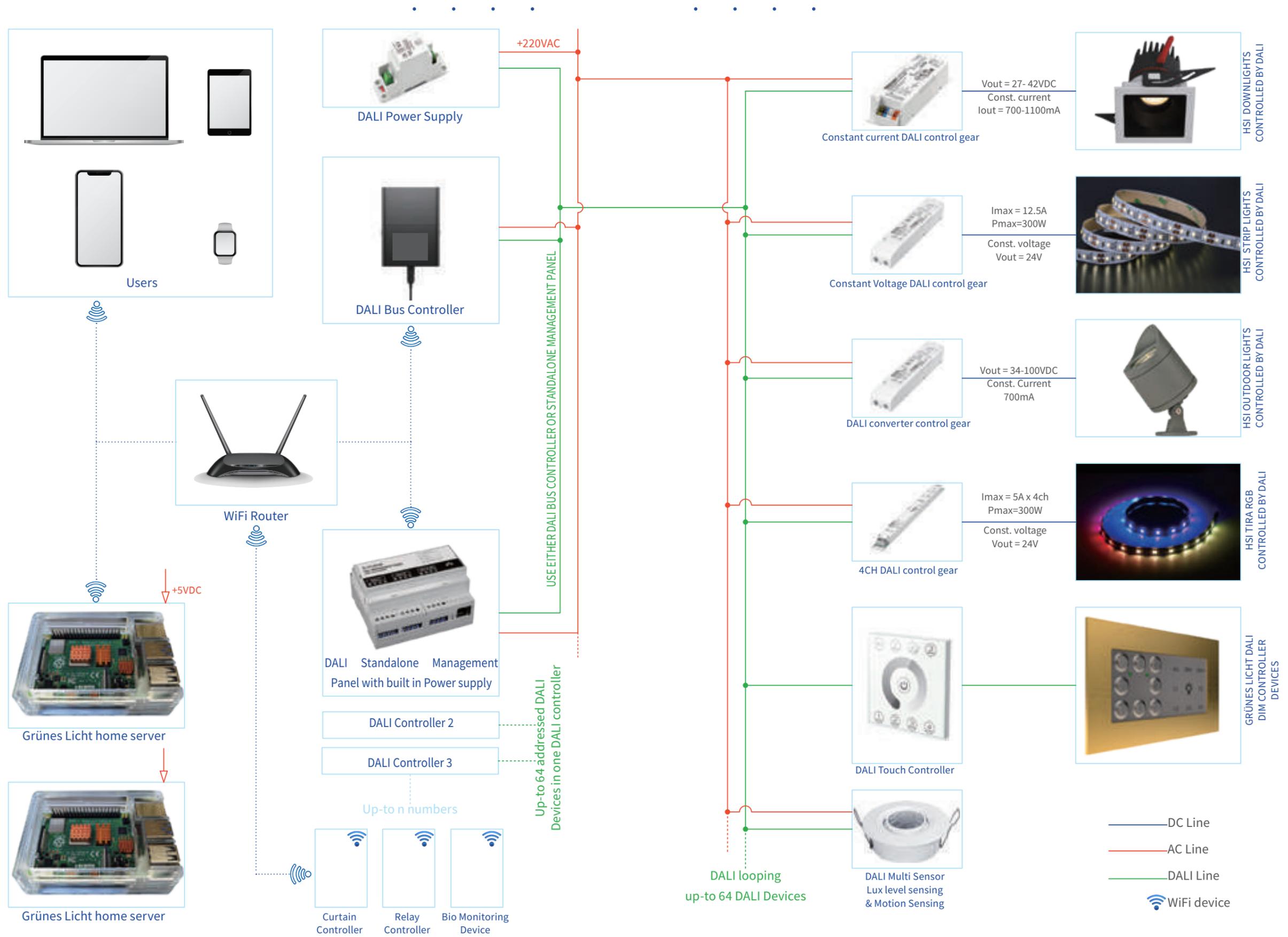
**Lights Control**  
Your space can be more glamorous, proper lighting can give your space more contrast and can improve aesthetics of architecture.

- DALI Dimmable Lights
- Individual Light Control
- Control from app
- Power consumption monitoring
- Auto-off lights
- Daylight harvesting



**Bio Monitoring and Plant Lighting**  
Controlled Irrigation and Monitoring your garden and indoor plants by various sensors helps plants to adapt to changing atmospheric condition.

- Ph level monitoring
- Moisture monitor and control
- Turn on irrigation by Control from app





**BRIEF INTRODUCTION:**  
**GL - HS - 485 - DB**

Communication protocol:  
DALI 1, DALI 2, RS485, USB  
IEC 60929/IEC 62386

Input Voltage: Respectively for model  
220Vac, 24Vdc Internal

Input Current: Respectively for model  
20mA, 300mA

System power :  
<9W

Data transfer rate :  
8bits/10ms DALI  
480mb/s USB 2.0

Power failure retry loop :  
x5 times then go to default

DALI bus : single Bus up to 64 address  
Number of Master in line : max 100

Data Connections:  
Input : USB, RS485  
Output : DALI, WiFi Optional

Recommended wire length:  
<50m

Recommended wire size:  
>0.75sqmm DC  
>1.5sqmm AC

Working temp -10°C ~ +60°C  
Sound rating - Class A  
Humidity - 10% ~ 90% non condensing  
IP Rating : 40

Installation requirements:  
DIN Rail mount

Weight:  
<250g

Protection:  
Short Circuit, Overload, Over heat  
Max operation temperature: < 60 °C \*

Recommended for indoor use only  
Shell material - Polycarbonate

**Color Options**



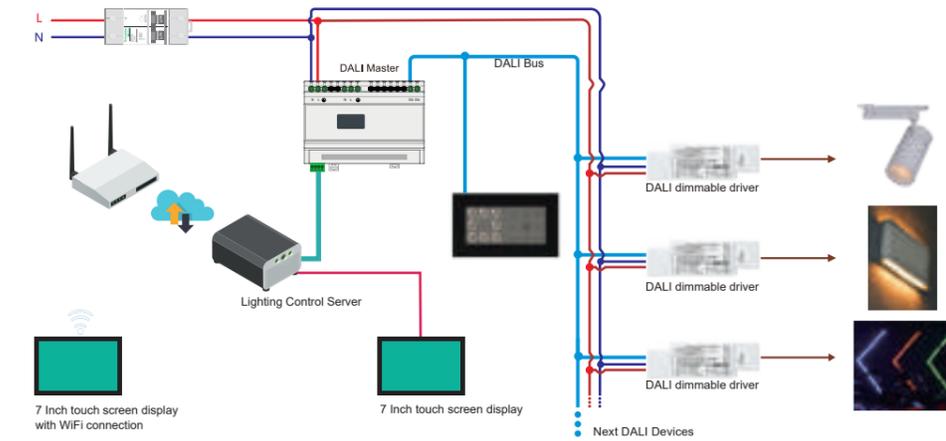
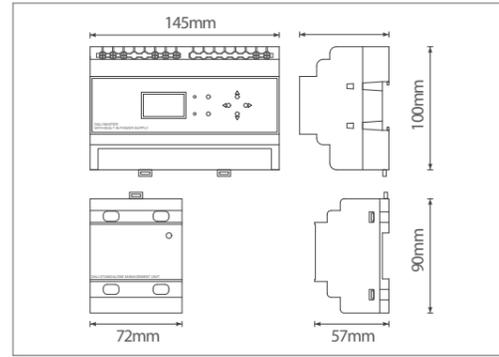
**Compliance**



Subject to technical alternations.

**Description:**

The one-channel DALI outputs on the DIN-DALI makes controlling up to 64 individual DALI drivers easy. The Digital Addressable Lighting Interface (DALI) is a protocol used for the control of lighting. Since it offers driver-level control, lighting loads powered from the same feed can be controlled individually. DALI provides ultimate flexibility by allowing reconfiguring of zones after a system is installed even for retrofit light fixtures without any change in live wiring.



**What is DALI GL-HS-485-DB?**

The innovative design of the DIN-DALI eliminates the need for the external power supplies required by other DALI controllers on the market. Power is delivered via DC-NET, creating a true single-wire installation. DC-NET are capable of powering all 64 DALI controllers. If desired, an external power supply may be used in conjunction with the DIN-DALI. An on-board switch allows the installer to choose the required mode during the setup.

DALI sends messages around, and just like computer networks, those messages are picked up by the drivers via specific addresses and follows the instruction.

**DALI Application**

Different color and luminance patterns can be achieved without applying individual circuits for each lamp. Contrary to analogue controls, power is supplied in the traditional way with a minimum number of circuits. However, all drivers are connected with a two-wire bus that carries both power and standardized control signals on low-voltage wiring to every device on the network. The messaging system complies with an open-source

protocol, so every building automation system can use programs to send commands. Building engineers and lighting designers can utilise programs to transmit commands. Every driver and relay switch on the network gets its unique address stored in the device and can be controlled via software, and from any UI that has the software installed.

**Simplicity of using DALI**

To gain the level of control people need in conference rooms and office floors, user normally have to pull a lot of wiring to make sure all the devices are connected. Using DALI it is not required to make those same types of interconnections. It's a simple two-wire control connection that goes to each fixture to form the control network. DALI allows pre-set lighting scenarios to be created and achieved with the touch of a button or click in a UI or browser.

**Comparing DALI with 0-10V**

DALI is similar to a 0-10V system due to features like low-voltage wiring and daylight harvesting capabilities. But, DALI is much more advanced than 0-10V. Communication in a 0-10V system is unidirectional; the control system tells the LED driver or ballast

what to do, and it adjusts according to the voltage on the control circuit. DALI, on the other hand, provides a two-way method of communication, giving the LED driver or ballast a chance to communicate as well.

**Comparing DALI with Phase Cut**

Phase control is a dimming technique often used for halogen and incandescent lamps. It "clips" part of the sine wave of the alternating current to dim the light. There is no surety that how the LED driver reacts for these alteration of the current giving chance to unexpected flicker. In contrast the digital DALI driver includes a microprocessor that has functions stored for address, intensity settings, fade rate etc. DALI instructions such as GoTo-Scene and SetMin are sent to the driver, utilizing the data stored in this microprocessor memory. Therefore, there is no chance for unexpected flicker especially in low dim range as all the control commands are digital.

**Electrical power connections**

HSI DALI master connections meet high standard of electric safety. It is fully isolated with high quality PC material suitable for installation in Lighting Control Panel.

**DALI Power Supply**

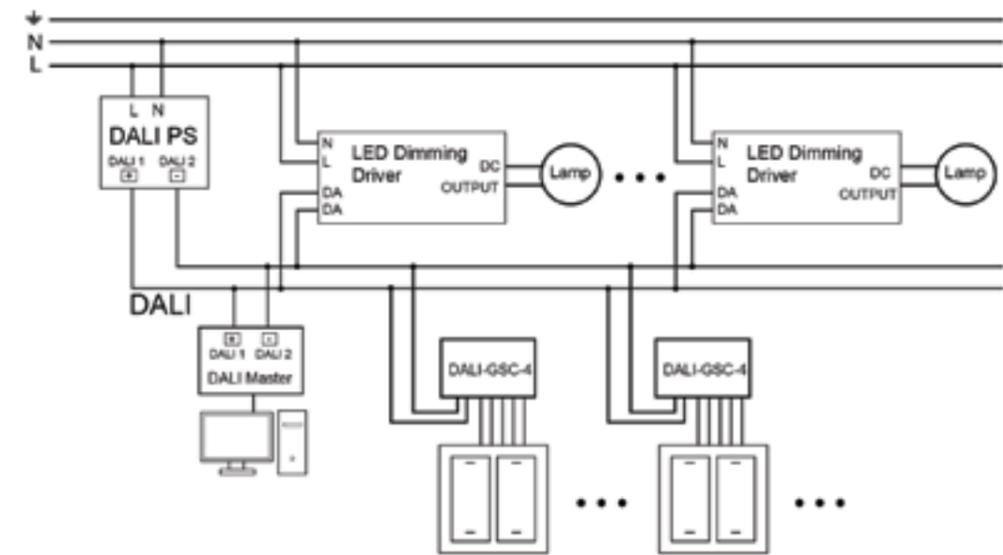
**Product Features**

- Meet DALI Protocol IEC62386
- Output current up to 250mA Max
- Support two installation methods of rail and screw fixing
- Support over current protection
- LED indicator light indicate status



- Individual DALI circuits must not exceed 250mA, the number of drivers and controllers shall not exceed 64
- Usually, the current consumption of each DALI power supply is 2mA, with 64 individual addresses this will consume 128mA. The remaining part is used to supply the DALI controller without built-in power supply (including DALI panel, DALI Group / scene controller)
- The maximum cable length of the DALI signal wires must not exceed 300m, and drop more than 2 V on the signal line voltage. It can be related to material

DALI BUS POWER SUPPLY			
Model	GL - HS - DPS - 130	Product size	111*35*67mm (L*W*H)
Input	220-240VAC 50/60Hz	Mounting	DIN RAIL or SCREW
Output voltage	16±5%	Wire preparation	0.5-1.5mm² recommended
Output current	250mA		
Power	4W	DALI PROTOCOL	IEC 62386
Operating temperature	-20°C to +60°C	Ingress Protection	IP40





**BRIEF INTRODUCTION:**  
**GL - HS - DSP - 01**

Communication protocol:  
DALI 1, DALI 2  
IEC 60929/IEC 62386

Input Voltage: Respectively for model  
220Vac, 16Vdc

Input Current: Respectively for model  
8mA, 300mA

System power :  
<3W

Data transfer rate :  
8bits/10ms

Power failure retry loop :  
x5 times then go to default

Assigned buttons: Respectively for model

Common, Dim +, Dim -  
5 individual ID or  
2 group 3 scenes or  
3 ID 2 scenes or  
any similar combinations

Recommended wire length:  
<50m

Recommended wire size:  
>0.75sqmm

Working temp -10°C ~ +60°C

Sound rating - Class A

Humidity - 10% ~ 90% non condensing

IP Rating : 40

Installation requirements:  
3x6inch (2module) wall socket box

Weight:  
<250g

Protection:  
Short Circuit, Overload, Over heat

Max operation temperature: < 60 °C \*

Recommended for indoor use only

Material - Polycarbonate / Metal

**Color Options**



**Compliance**

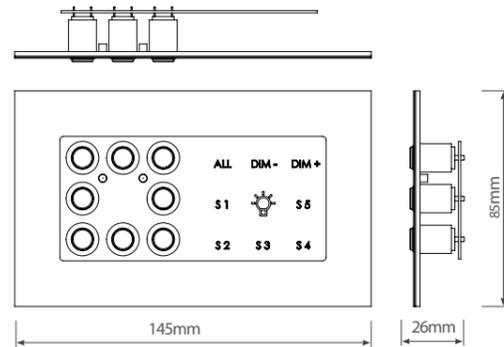


Subject to technical alternations.

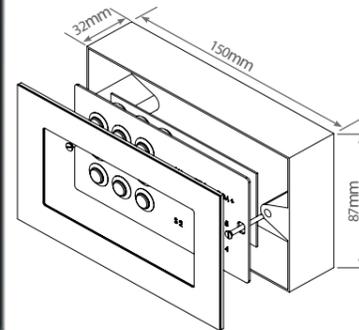
**Description:**

DSP-1 one of our high-end, DALI wall dim panel controller series, with characteristic of fashion-able and beautiful appearance, complete functions, easy operations, sensitive key.

The user can control DALI controller and driver to achieve group and scene control via this panel. It can be widely used in hotels, restaurants, villas, hospitals and offices and other regions.



Customisable Panel area. Denotions can be customised as per user required Logo or Design.



**What is DALI?**

The DALI is a two-way communication system that brings digital communication technology to lighting. An international standard for communication, DALI defines the commands that LED drivers need to recognize. The system allows individual LED drivers to "communicate" with the user, and allows the user to "communicate" back via DALI controllers. It will happen with the help of Digital interface equipped with appropriate software or building management systems. DALI sends messages around, and just like computer networks, those messages are picked up by the drivers via specific addresses and follows the instruction.

**DALI Application**

Different color and luminance patterns can be achieved without applying individual circuits for each lamp. Contrary to analogue controls, power is supplied in the traditional way with a minimum number of circuits. However, all drivers are connected with a two-wire bus that carries both power and standardized control signals on low-voltage wiring to every device on the network. The messaging system complies with an open source

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Phase control is a dimming technique is often used for halogen and incandescent lamps. It "clips" part of the sine wave of the alternating current to dim the light. There is no surety that how the LED driver reacts for these alteration of the current giving chance to unexpected flicker. In contrast the digital DALI driver includes a microprocessor that has functions stored for address, intensity settings, fade rate etc. DALI instructions such as GoTo-Scene and SetMin are sent to the driver, utilizing the data stored in this microprocessor memory. Therefore, there is no chance for unexpected flicker especially in low dim range as all the control commands are digital.

**Electrical power connections**

HSI DALI buttons connections meets high standard of electric safety. The buttons are fully isolated although they operate under low voltage.

**DALI light sensor**

**Product Features**

- Component of the DALI standalone system
- With ambient light dependent control and motion detection
- Simple group assignment via rotary switch
- Multiple Sensors possible in a group
- Can be remote controlled
- Lighting control and motion detection can be deactivated
- Individual adjustment of the parameters with configuration software
- Multi-master compatible: Multiple control modules are possible in a DALI system
- Power supply via DALI line



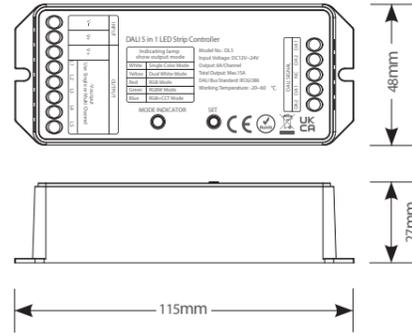
DALI SENSORS			
Model	HS - LS - 64 - DA	Mounting height	5m
Input	DALI	Infrared control range	5m
Input current	6mA from DALI	Control speed	0-7
Power	Max : 20W	Ø of detection range	5m when mounted at H=2.5m
Operating temperature	0°C to +55°C	Light measurement at sensor head	10-650lx
PIR detection angle	90°	Groups	16
Lux sensing angle	70°	Ingress Protection	IP40



**Description:**

DCG-DL5 DALI controller is a 5channel DALI output device that can be assigned with 5 different addresses. It is newly developed DALI dimming controller with the newest DALI standard protocol IEC62386.

This control gear is suitable for use in single color, tune-able or RGB/W strip lights especially to get 5 uniquely dimmable output channels from a single control gear.



**BRIEF INTRODUCTION:**

**GL - HS - DCG - DL5**

- Communication protocol:  
DALI 1, DALI 2  
IEC 60929/IEC 62386

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- Input Voltage: Respectively for model  
12/24VDC

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- Output Current:  
6A/Channel, 15A Max

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- Power output:  
Upto 360W

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- Data transfer rate:  
8bits/10ms

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- Compatibility:  
DALI Dimming Panels

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- Output Functions:  
Common, Dim +, Dim -  
Tune-able color temperature  
RGB  
RGBW  
RGB+Tune-able

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- Recommended wire length:  
<50m

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- Recommended wire size:  
>0.75sqmm

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- Working temp -20°C ~ +60°C

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- Sound rating - Class A

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- Humidity - 10% ~ 90% non condensing

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- IP Rating : 40

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- Weight:  
<250g

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- Protection:  
Short Circuit, Overload, Over heat

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- Max operation temperature: < 60 °C \*

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- Recommended for indoor use only

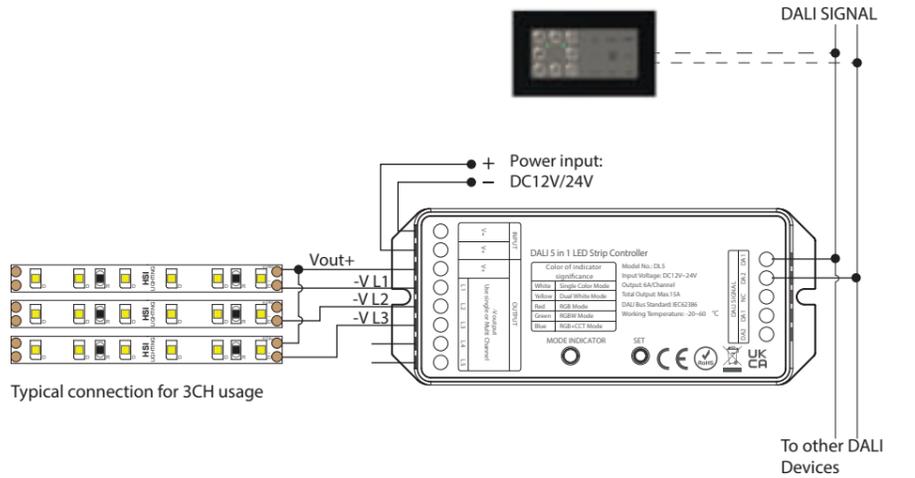
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- Material - Polycarbonate

**Compliance**



Subject to technical alternations.



**What is DALI?**

The DALI is a two-way communication system that brings digital communication technology to lighting. An international standard for communication, DALI defines the commands that LED drivers need to recognize. The system allows individual LED drivers to "communicate" with the user, and allows the user to "communicate" back via DALI controllers. It will happen with the help of Digital interface equipped with appropriate software or building management systems. DALI sends messages around, and just like computer networks, those messages are picked up by the drivers via specific addresses and follows the instruction.

**DALI Application**

Different color and luminance patterns can be achieved without applying individual circuits for each lamp. Contrary to analogue controls, power is supplied in the traditional way with a minimum number of circuits. However, all drivers are connected with a two-wire bus that carries both power and standardized control signals on low-voltage wiring to every device on the network. The messaging system complies with an open source

protocol, so every building automation system can use programs to send commands. Building engineers and lighting designers can utilise programs to transmit commands. Every driver and relay switch on the network gets its unique address stored in the device and can be controlled via software, and from any UI that has the software installed.

**Simplicity of using DALI**

To gain the level of control people need in conference rooms and office floors, user normally have to pull a lot of wiring to make sure all the devices are connected. Using DALI it is not required to make those same types of interconnections. It's a simple two-wire control connection that goes to each fixture to form the control network. DALI allows pre-set lighting scenarios to be created and achieved with the touch of a button or click in a UI or browser.

**Comparing DALI with 0-10V**

DALI is similar to a 0-10V system due to features like low-voltage wiring and daylight harvesting capabilities. But, DALI is much more advanced than 0-10V. Communication in a 0-10V system is unidirectional; the control system tells the LED driver or ballast

what to do, and it adjusts according to the voltage on the control circuit. DALI, on the other hand, provides a two-way method of communication, giving the LED driver or ballast a chance to communicate as well.

**Comparing DALI with Phase Cut**

Phase control is a dimming technique is often used for halogen and incandescent lamps. It "clips" part of the sine wave of the alternating current to dim the light. There is no surety that how the LED driver reacts for these alteration of the current giving chance to unexpected flicker. In contrast the digital DALI driver includes a microprocessor that has functions stored for address, intensity settings, fade rate etc. DALI instructions such as GoTo-Scene and SetMin are sent to the driver, utilizing the data stored in this microprocessor memory. Therefore, there is no chance for unexpected flicker especially in low dim range as all the control commands are digital.

**Electrical power connections**

HSI DALI buttons connections meets high standard of electric safety. The buttons are fully isolated although they operate under low voltage.





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