Modern light management
INNOVATIVE
BUILDING AUTOMATION
In 1975, Mr. F. Brück founded the family company B.E.G. Brück GmbH having it’s headquarter in Lindlar near cologne. The basis to today’s products was the development and production of emergency lights, which were equipped with group supplies already in the late 70ies. This was our first step to building automation.

Right from the beginning, innovation was very important: B.E.G. was one of the first companies in Germany to produce motion detectors and automatic lights.

The fast development of building automation and the increasing demand for intelligent control devices inspired us to keep on with developing and producing energy efficient products.

Today, the broad product range comprises motion and presence detectors, automatic lights, bus system components, floodlights, photoelectric switches, time switches, emergency lights and smoke detectors. B.E.G. has branches and agencies in many countries.
An easy way to save energy

The field of building automation offers high energy saving potentials – in private homes and in industrial applications. A reasonable and presence-depending switching of the light, for example, reduces the energy consumption significantly.

The power consumption for the lighting depends on many factors, e.g. the switch-on time. In the case of a presence-depending automatic lighting control, the daylight can be taken into consideration, too, and hence the power consumption can be reduced. In a typical office in Central Europe the daylight can provide up to 80% of the required light in the summer months. The necessary amount of artificial light is therefore only 20%.

B.E.G. offers intelligent lighting control without unnecessary switch-on times of the lighting.
### Exemplary calculations * for saving

**High-bay warehouse**

<table>
<thead>
<tr>
<th></th>
<th>Without lighting control</th>
<th>With lighting control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connected load</td>
<td>8.580 W</td>
<td>8.580 W</td>
</tr>
<tr>
<td>Average daily lighting duration</td>
<td>16 h</td>
<td>4 h</td>
</tr>
<tr>
<td>Annual lighting duration</td>
<td>250 days 4.000 h</td>
<td>250 days 1.000 h</td>
</tr>
<tr>
<td>Consumption</td>
<td>34.320 kWh</td>
<td>8.580 kWh</td>
</tr>
<tr>
<td>Costs per kWh</td>
<td>0,17 p</td>
<td>0,17 p</td>
</tr>
<tr>
<td>Annual electricity costs</td>
<td>£ 5.836</td>
<td>£ 1.459</td>
</tr>
</tbody>
</table>

**Classroom**

<table>
<thead>
<tr>
<th></th>
<th>Without lighting control</th>
<th>With lighting control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connected load</td>
<td>600 W</td>
<td>600 W</td>
</tr>
<tr>
<td>Average daily lighting duration</td>
<td>8 h</td>
<td>4 h</td>
</tr>
<tr>
<td>Annual lighting duration</td>
<td>180 days 1.440 h</td>
<td>180 days 720 h</td>
</tr>
<tr>
<td>Consumption</td>
<td>864 kWh</td>
<td>432 kWh</td>
</tr>
<tr>
<td>Costs per kWh</td>
<td>0,17 p</td>
<td>0,17 p</td>
</tr>
<tr>
<td>Annual electricity costs</td>
<td>£ 146,918</td>
<td>£ 73,459</td>
</tr>
</tbody>
</table>

**Open plan office**

<table>
<thead>
<tr>
<th></th>
<th>Without lighting control</th>
<th>With lighting control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connected load</td>
<td>3.375 W</td>
<td>3.375 W</td>
</tr>
<tr>
<td>Average daily lighting duration</td>
<td>10 h</td>
<td>7 h</td>
</tr>
<tr>
<td>Annual lighting duration</td>
<td>250 days 2500 h</td>
<td>250 days 1750 h</td>
</tr>
<tr>
<td>Consumption</td>
<td>8.437,5 kWh</td>
<td>5.907 kWh</td>
</tr>
<tr>
<td>Costs per kWh</td>
<td>0,17 p</td>
<td>0,17 p</td>
</tr>
<tr>
<td>Annual electricity costs</td>
<td>£ 1.434,75</td>
<td>£ 1004,32</td>
</tr>
</tbody>
</table>

**Corridor**

<table>
<thead>
<tr>
<th></th>
<th>Without lighting control</th>
<th>With lighting control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connected load</td>
<td>600 W</td>
<td>600 W</td>
</tr>
<tr>
<td>Average daily lighting duration</td>
<td>10 h</td>
<td>5 h</td>
</tr>
<tr>
<td>Annual lighting duration</td>
<td>250 days 2.500 h</td>
<td>250 days 1.250 h</td>
</tr>
<tr>
<td>Consumption</td>
<td>810 kWh</td>
<td>405 kWh</td>
</tr>
<tr>
<td>Costs per kWh</td>
<td>0,17 p</td>
<td>0,17 p</td>
</tr>
<tr>
<td>Annual electricity costs</td>
<td>£ 137,74</td>
<td>£ 68,86</td>
</tr>
</tbody>
</table>

*Results can vary according to type of use and amount of daylight available.*

### An ordinary day in the office:

At eight o’clock in the morning, the employee steps into his office. The occupancy detector detects movement, evaluates the light level and switches on the artificial light in addition to daylight. In the course of the day, the employee leaves his office several times, for example for lunch break or a meeting. During these times, the artificial light is switched off completely after expiry of the follow-up time. While the employee stays in his office, the occupancy detector dims the artificial light according to the existing natural light, i.e. at noon the amount of artificial light is lesser than in the morning or evening. When the natural light is sufficient, the lighting can even be switched off despite of detected movements. When the work is finished for the day and no more movement is detected, the light is switched off automatically and therefore cannot stay on unnecessarily overnight. Hence, a lot of energy can be saved during the day.
DALISYS® – the modular concept for projects of any size

Multisensors, push-button modules, user terminals and increasingly now smartphone apps – all these control and application devices have one thing in common: they send operating commands triggered by a user or the environment, i.e. time-critical commands, directly or indirectly to the artificial lighting. In order to properly ensure that all telegrams can be processed, although these may reach their destination almost simultaneously, the multi-master principle was developed with Part 103 of IEC 62386 (part of the DALI2 standard). Products which meet this standard at B.E.G. are known as DALISYS®.

“Multi-master capable” means that telegram collisions are prevented by the system, so no telegram can be lost. If for example one multi-master (e.g. DALI multisensor) sends a “light off” command to its group, the other multi-master (e.g. DALI push-button module) assigned to the same group registers this. It then handles the command in its own application logic as if it had sent it itself. The result is “distributed intelligence”.

![Diagram showing single room solution, multiroom solution, and building solution]
As well as addressability and the multi-master principle, the B.E.G. system’s decentralised control and scalability, from single rooms to control of an entire building via the DALI bus, is a major advantage. The B.E.G. DALISYS® portfolio, like a KNX system, includes individual DALI components which can be combined with each other according to the requirements and size of the building. These components also offer a range of options for system access, such as programming via USB, Ethernet, LAN or Bluetooth (interface depends on required solution). This means the planner gains improved efficiency in the planning process and the installer reduces costs in the installation process.

**Advantages**

- Modular, networkable system, scalable as required
- High level of safety in operation due to field-level automation
- Power supply to control devices is via the DALI bus
- DALI wiring is independent of group formation
- Premium functions, which are typically realisable via BACnet or KNX
- Broad range of multi sensors (also for outdoor use)
DALISYS® Single room solution

Only a few components are required to realise a user-friendly automation which can be controlled quick and easily via Bluetooth using any Smartphone.
Automatic regulation

Multisensors are the “eyes” of the system. They detect movement and measure the brightness in the room. They enable the system to react perfectly according to the situation.

Illumination

The DALI lights in the room are switched on if movement is detected and the amount of natural light is not sufficient. The set value brightness is compared with the measured light level and only the difference is added as artificial light.

Climatisation

Further to the light, also the climatisation can be activated depending on presence. As soon as the multisensor detects movement, CVC devices are activated.

Manual overriding

Of course it is possible to manually override the automatic control, either by using the B.E.G. Bluetooth app or the push-button.

Installation example

- One DALI line
- Auto-addressing
- Max. length 300m
- Max. 25 lighting devices
- 6 control devices

Commissioning, maintenance, remote control (scenes) via smartphone and Bluetooth interface.
DALISYS® Multi-room solution

The system is structured by groups over several rooms. A good synchronisation of the groups can create a harmonious regulation.
Linking

Up to 64 participants can be connected to one DALI power supply. The wiring is not important for the creation of groups. The connected participants can be grouped in up to sixteen groups, which can be synchronised.

Programming

Commissioning and management of the system is carried out via the B.E.G. DALISYS® PC Tool.

Savings

No more unnecessary power consumption in stand-by mode: the cut-off function is realised via relay. When the electronic ballasts are dimmed to 0%, they are completely separated from the power supply.

Guided Light

The Guided Light function offers the possibility to synchronise room and corridor lighting, for example.

Installation example

Multi-room solution

- One single DALI line
- Auto-addressing
- Max. length 300m

- Max. 64 components
- 16 groups
- 8 regulation zones

Commissioning and maintenance via USB
DALISYS® Building solution

400 interconnected DALI lines can be set up over a local network (LAN/Ethernet) and enable the intelligent automation of a whole building.
Safety

The whole locally controlled lights including emergency lights can be managed centrally. Therefore, maintenance processes can be streamlined.

Guided Light PLUS

The Guided Light Plus function enables a synchronisation of lighting control triggered by motion detection not only across groups, but also across DALI lines. This means no more restrictions on person-driven lighting control.

Independance

Thanks to the DALISYS® router, management of the whole system is possible via LAN/Ethernet. Furthermore, the router offers additional functions such as a time-based control, floor plan visualisation or e-mail notification.

Installation example

Building solution

A “B.E.G. Mesh”, consisting of up to 100 DALI routers

Max.
- 100 x 4 DALI lines
- 400 x 64 components
- 400 x 16 groups
- 400 x 8 regulation zones

Commissioning, maintenance, monitoring, time-based control, reports, emergency light management via LAN/Ethernet
**Guided Light-Function**

A special DALISYS® function is “Guided Light”, an innovative form of guidance. Guided Light accompanies users through the building like a pool of light. The sensors co-operate across groups and even lines to fully activate the lighting in the area where the user is located. Surrounding areas are dimmed to a preset orientation lighting value. This means the user will never see a dark room.

In a multi-room solution, the external trigger events must be configured for every B.E.G. multisensor in order to set up the Guided Light function. For an example, we will take a stairway with nine groups. The information for each group is stored so that the main light is activated when there is movement in the directly-adjacent group. When there is movement in the next-but-one group, the orientation lighting is activated. When movement is no longer detected, the follow-up time is activated. The groups switch first from main light to orientation light and then from orientation light to completely off.

The stairway is entered at the lowest floor. Immediately, groups 1 and 2 activate their main lights, and group 3 activates its orientation lighting. While the stairway is being used, the main light is always on for the floor where the user is, and for the floors directly above and below. Two floors above and below, the orientation lighting is also on. After the user has left the stairway at the fourth floor, the groups switch off in sequence.
Two-channel regulation

DALISYS® multisensors can control two channels. So for example, two lighting areas can be set up in one room, one on the wall side, and one on the window side. If this function is used, an additional DALI group is used for the second channel. This group number cannot be selected, but follows on from the group number given for the main group. For example, if Group 1 is assigned during group allocation, then Group 2 is automatically set up for the second channel if two-channel mode is used. Take care that this group is not used by another multisensor.

For the second channel, an offset value is stored. This is always a negative percentage of the light value for the main group. This means that in regulation mode with daylight falling into the room, the lights of the second group are dimmer than the lights of the main group by this percentage. The second channel is regulated together with the first channel. The lights on the window side are then regulated to a lower light output than those on the wall side. Due to the need for dimming, the function is only available in regulation mode.
Scene control

Scenes can be configured and retrieved as required via the relevant applications (depends on solution). For each individual DALI lighting device, a dimming value (0-100%) is assigned for the desired scenes.

Floor plan visualisation

In the DALISYS® building solution, a visualisation can be produced if required, to match the floor plan of the building. So at a glance you can get an overview of where the lighting is on or off.

Virtual control panel

In the DALISYS® building solution, it is possible to manage users who can control lighting for specific rooms via smartphone/tablet or PC.

Email error reporting

Maintenance of the lighting installation is simplicity itself when the system displays errors directly. The system manager receives an email error notification showing that a light is defective, for example.

Calendar function

A calendar function is available with the DALISYS® router. The user can program time-dependent control and have individual commands carried out depending on day and time. For example, the light output in the evening can be set to 300 lux for energy saving purposes instead of the daytime value of 500 lux. This function also allows you to program a simulated presence.

Emergency lighting management

The DALISYS® router makes possible central monitoring of all emergency lights/emergency exit signs. The “Emergency Light Manager” application shows all the information about installed DALI emergency lights and carries out all the necessary functional and long-term tests. Test cycles can also be set up by the user. In the tests, any errors are displayed, and the automatic documentation of them can be downloaded.
The comfortable access to DALI

B.E.G. assists you in planning, commissioning and realising your DALISYS® project:

- The B.E.G. planning department assists you in planning the perfect equipment for your project and advises you on the DALISYS® functions and possibilities, e.g. the Guided Light function.

- The B.E.G. CAD department creates an interactive 2D floor plan of your project. Therefore, the client is provided with a visualisation of the lights, multisensors and push-buttons.

- B.E.G.’s DALI lighting control unit is a pre-wired enclosure comprising the components for up to four DALI lines. This enables a quick installation.

- B.E.G.’s DALI experts will be at your side with help all the way from the first drawing to commissioning to achieve our common goal: satisfied customers.

We look forward to seeing your project:

Phone: (+44) 0870.850 5412
E-Mail: info@beguk.co.uk

INFO:
Pre-wired DALI lighting control unit DLS4

Various DALISYS® components are pre-mounted and pre-wired by B.E.G. in an enclosure. The installer only has to connect the input and output wires to the DALI bus, network and LAN and the enclosure is ready to use.
The first occupancy detector which controls the light intensity and the light colour time-based and depending on movement.
Light controls our body clock

Human beings control the light – but the light also controls human beings: In 2002, scientists identified a third light receptor in addition to rods (twilight vision) and cones (colour vision). These ganglion cells are photosensitive, but non-visual. They only react on the ambient brightness and regulate biological processes accordingly – for example hormone production and pupillary reflex.

In rooms, a lighting with non-visual effects can support the effects of natural daylight. Especially in our “around-the-clock” societies it can assist in stabilising the biological rhythm of human beings.

Scientists discovered in non-visual ganglion cells the light-sensitive protein Melanopsin. Light is the critical factor for the body clock: in the evening, the pineal gland produces Melatonin. Melatonin makes a person sleepy. In the morning, the Melatonin level sinks. At approximately 3 o’clock in the morning, the stress hormone Cortisol is produced. It stimulates metabolism and brings the body into “day-time operation”. With the first morning light, the production of Melatonin is stopped and the body produces Serotonin, which is a contributor to feelings of well-being and happiness.
Light-Life-Balance

In modern times, most persons stay in rooms with artificial illumination and many people work in shifts or in buildings without windows. Therefore, the influence of daylight with its brightness and vitality and also the influence of the darkness of the night become lesser. This has an impact: the body clock gets confused and the sleep and wake times are less intensive, having a negative influence on the circadian rhythm and thus on health.

A lighting control with non-visual effects can contribute to the well-being: tests show that lighting intensities between 500 and 1500 lux on working desks can be biologically effective. An important role for biologic effectiveness of light has the colour temperature: light having an important blue component activates, light having an important red component soothes.

The B.E.G. PureColour Wellness-detector enables the automatic control of a melanopic lighting taking into account the amount of natural daylight. This improves the quality of the lighting, of the well-being of persons and furthermore, the energy consumption is optimised.
Circadian illumination – The sun of your office

Circadian (circa, meaning “around” (or "approximately"), and diēm, meaning "day" also around the day) illumination imitates the natural day-night-rhythm having a cycle duration of 24 hours. A biologic effective illumination (HCL=Human Centric Lighting) should be adapted to the user’s circadian rhythm. It should support natural active times and resting periods. The PureColour Wellness-detectors bring the vitality of daylight into rooms thanks to their ability to control the non-visual effects of artificial light. They are able to improve the effectivity and well-being of persons.

In the course of the day the biologic effective illumination changes. The colour temperature changes from warm white to daylight white and the illumination intensity from 500 to 1500 lux and therefore adapts to the circadian rhythm of human beings. The dimming of the individual lights is continuous and harmonious so that the change is not directly visible – but the effectiveness is permanent.
**A scalable system for well-being**

B.E.G. is the first manufacturer to develop a wellness-multisensor with “tunable white function”. The detector adapts the colour temperature of the white light to the circadian rhythm of the human being.

To do so, it regulates the colour temperature of the connected lights in such a way that the artificial white light corresponds to daylight most perfectly. This is called Human Centric Lighting (HCL).

*We call it PureColour.*
Our field operatives are all experts and undergo regular training. Therefore you will always have a capable contact on your side, even beside you on site.

Our in-house staff are highly trained and will be happy to advise you on all aspects of your order. And for product questions, your contact will always be there to supply answers.

You can obtain our products exclusively through electrical wholesalers. Thanks to our long-term collaboration, wholesaler staff can help you in most cases with questions on B.E.G. products.

Our planning department is happy to help you in the planning of large projects. Send us your CAD drawings by email and we will send you a free proposal with product recommendations.

Any special requirements? Then do not hesitate to contact us.