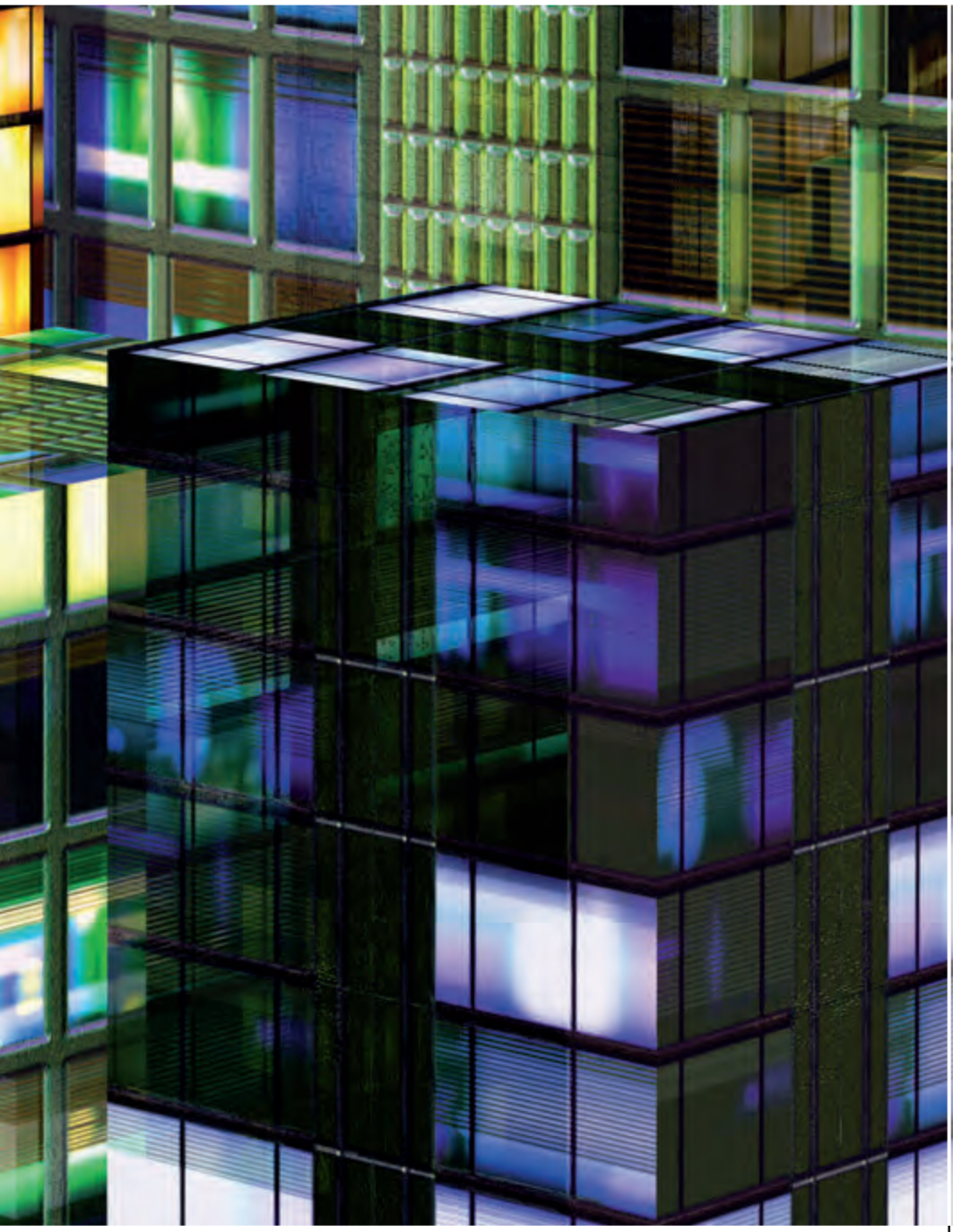
VOSSLOH SCHWABE





LiCS INDOOR

Lighting Control Solutions

LiCS INDOOR



THE ADVANTAGES:

- Light management system based on DALI
- Up to 16 combined brightness and motion detectors
- Up to 6 standard keys
- A product version with EnOcean wireless technology with up to 16 key modules, each with 4 keys that can be configured independently

WHAT MAKES LiCS STAND OUT AGAINST OTHER LIGHT MANAGEMENT SYSTEMS:

- Simple, clear system configuration without additional programming aids (laptop)
- MultiSensors in 3 assembly variants with small casing dimensions, without mains connection
- System extensions for systems comprising more than 64 active elements require the use of an Extender
- Simple system check
- Avoidance of stand-by losses through cut off relay contact on the Light Controller



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CONTROLLING, DIMMING, SAVING

WE'LL TELL YOU WHY



ADAPTING LIGHT TO HUMAN NEEDS

In our modern society, we expect rooms to be suitable for a flexible range of uses. This applies to both public and commercially used buildings. What is a meeting room today will be used for presentations the next day. A shop floor area for production may well be turned into a technical laboratory.

And there are private homes which people use in a much more flexible and varied manner than in the past. The dining table, for example, is transformed in the course of a day from a breakfast table into a laptop workstation, used for correspondence and for spreading documents out, and is then the scene for a cosy candlelight dinner in the evening.

As functions change, the light on them is expected to change with them. It takes intelligent and flexible solutions to meet these expectations. Consider altering system configurations at greatest ease and forget about expensive conversion work. The system lets you actuate individual luminaires or groups of luminaires via standard keys, for example.





SAVING ENERGY AND COSTS

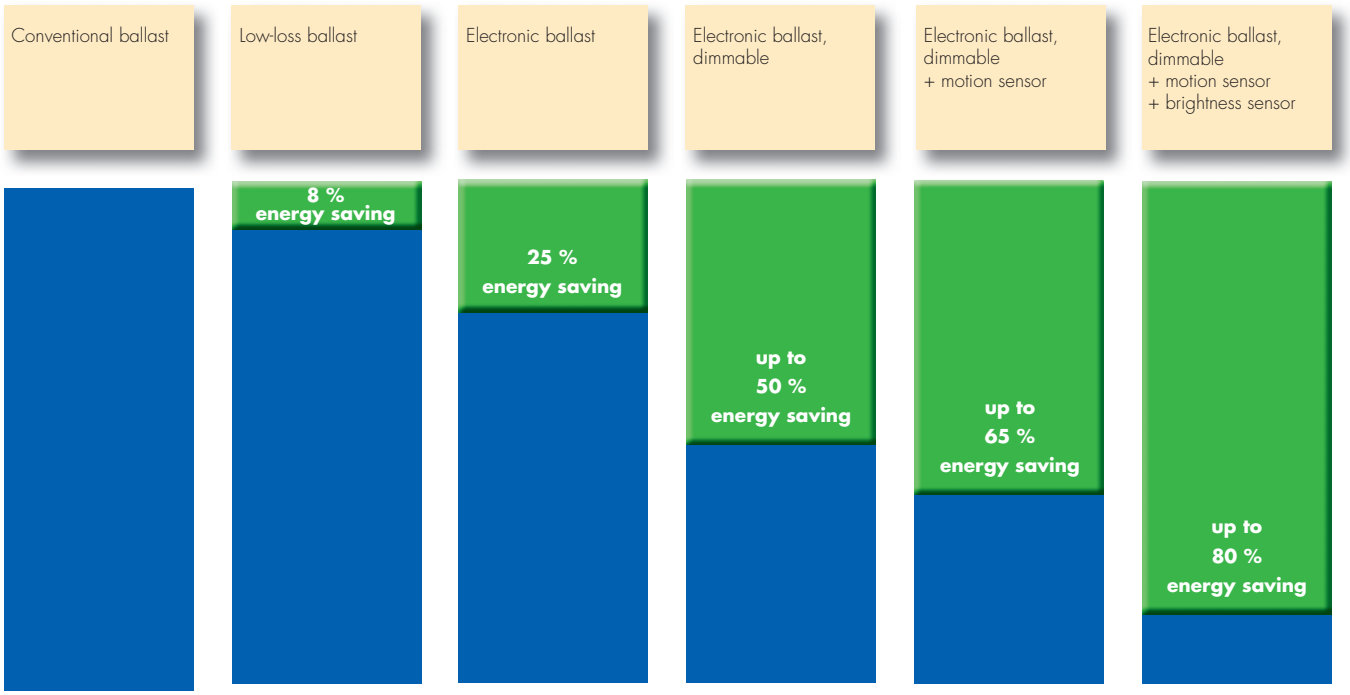
The world-wide shortage of raw materials and primary energy is developing into a global issue. In addition, we are faced with the challenge of protecting the climate by a sustained reduction in CO_2 emissions.

... by efficient luminaires and lamps

Our prime mission is to make most efficient use of energy. The lighting industry is already marked by advanced and advancing energy awareness. Cornerstone examples include the new and further development of a wide range of technologies such as electronic ballasts, dimmable ballasts, T5 fluorescent lamps, LEDs – plus the future OLEDs – as well as more efficient light control systems in luminaires of much improved efficiency.

Saving potentials at a glance

Application example:
office with windows and 2x36 W fluorescent luminaires



CONTROLLING, DIMMING, SAVING

WE'LL TELL YOU WHY





SAVING ENERGY AND COSTS THROUGH LIGHT MANAGEMENT SYSTEMS

Alongside these new highly efficient lighting systems, the trend is also moving towards technologies that focus on a further increase in energy efficiency combined with an additional improvement in comfort. These are light control or light regulation modules that can be used to switch individual luminaires or luminaire groups on and off as required, and to dim them to optimise energy consumption.

Time-controlled lighting systems

These systems have a fixed timed routine. The daily, weekly or annual lighting pattern is determined on the basis of a pre-set timing program. A real-time clock is required for this kind of control.

Sensor-controlled lighting systems

These control systems use sensors to "scan" the environment and ensure that the required lighting situation is set automatically.

Motion sensor

The motion sensor reacts to radiation of heat (infrared rays). Factors which influence detection include:

- Size of the objects
- Distance to the sensor
- Sensitivity of the sensor
- Intensity of heat radiation
- Direction of movement and speed of the objects

Brightness sensor

The light sensor measures the amount of light emitted directly from one or more light sources (artificial light and daylight) as well as the light resulting from reflection. The electrical value resulting from this amount of light is used as an actuating variable by the Light Controller. Modern sensors work in a light spectrum that resemble the human sense of sight.

Quite often, both sensor types are found combined as MultiSensors in one casing.



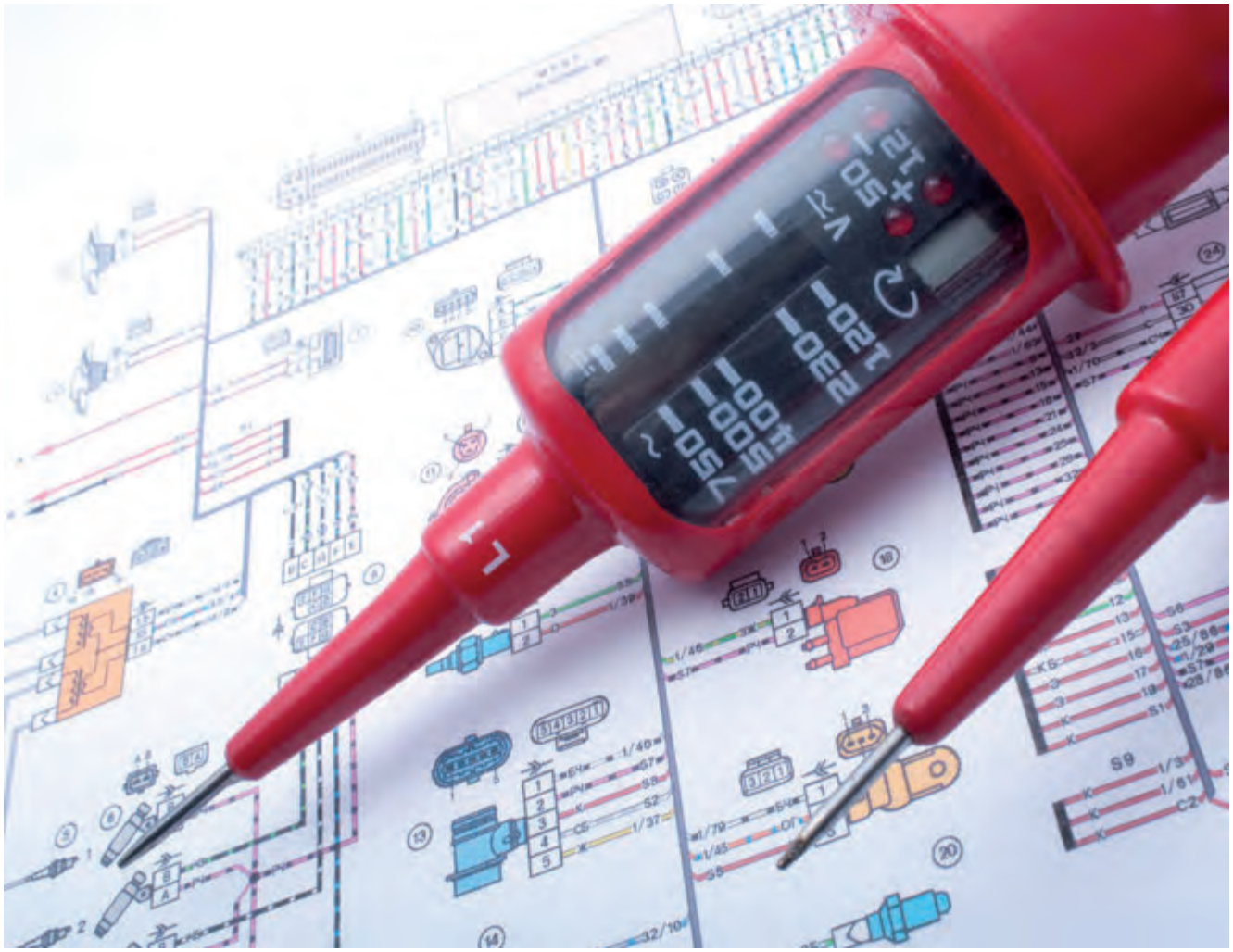


SAVING ENERGY AND COSTS THROUGH INTELLIGENT SYSTEM MAINTENANCE

During system operation, a further significant factor is important besides the energy costs:
maintenance of the entire system.

During this maintenance work, the complete system is checked for perfect functioning at defined intervals. In conventional lighting systems, each individual luminaire has to be located and checked. Depending on the size of the system, a lot of effort and correspondingly high costs are involved.

Intelligent control systems are able to carry out these checks permanently or on demand. The current status of the checked system can be requested as a test protocol.



INCREASING COMFORT

THROUGH AUTOMATION





In addition to cost and energy reduction of a light management system and its tailoring to suit specific needs, the comfort level also plays a decisive role.

With intelligently designed lighting systems, human intervention is no longer absolutely necessary. Sensors ensure that there is sufficient lighting even in unknown surroundings (hotel corridors, stairwells) without light switches having to be found and actuated. Equally, wondering about whether lights have been switched off or not is a thing of the past.

If the room use changes, the lighting is adapted accordingly. If a video projector presentation is started during a meeting, the lighting level is adapted to the pre-configured lighting level at the touch of a button.

... through sensor-controlled systems

With these systems, the sensors are responsible for controlling and regulating the lighting. Motion detectors recognise a person's presence, for example, and adapt the lighting according to pre-settings. The motion detector also reacts when the person leaves the room, and switches the lighting off after a certain delay or switches it to a reduced level. There is no need for manual intervention during this whole process.

... through time-controlled systems

These lighting systems are controlled through the time of day, day of the week or even season. A digital timer or sequencer selects pre-set illumination scenes according to a specified time pattern.

CALCULATION EXAMPLES

Example: Warehouse

Basis of the calculation: 17 hours per day, 24 days per month, kWh rate in €: 0.2

Conventional ballast (old version)

lamp: 20 x 36 W T8

System power	kWh	€/month
45 W	367.20	73.44

lamp: 38 x 58 W T8

System power	kWh	€/month
70 W	1085.28	217.06

Energy costs/month in €	290.50
Energy costs/year in €	**3,486.00**

DALI electronic ballast
(new version + lighting control system)

lamp: 20 x 36 W T8
(effect. power with electronic ballast approx. 32 W)

System power	kWh	€/month
36 W	293.76	58.75

lamp: 38 x 58 W T8
(effect. power with electronic ballast approx. 50 W)

System power	kWh	€/month
55 W	852.72	170.54

- 20 % brightness sensor (constant light regulation)	45.86
- 30 % motion sensor	68.79
Energy costs/month in €	114.64
Energy costs/year in €	**1,375.68**

REDUCTION OF COSTS BY A TOTAL OF 61 %

Example: Shop

Basis of the calculation: 10 hours per day, 20 days per month, KWh rate in €: 0.2

Conventional ballast (old version)

lamp: 47 x 36 W T8

System power	kWh	€/month
45 W	423.00	84.60

Energy costs/month in €	84.60
Energy costs/year in €	**1,015.20**

DALI electronic ballast
(new version + lighting control system)

lamp: 47 x 36 W T8
(effect. power with electronic ballast approx. 32 W)

System power	kWh	€/month
36 W	338.40	67.68

- 20 % brightness sensor (constant light regulation)	13.54
- 30 % motion sensor	20.30
Energy costs with light control/month in €	33.84
Energy costs with light control/year in €	**406.08**

REDUCTION OF COSTS BY A TOTAL OF 60 %

LIGHT MANAGE-MENT SYSTEMS

INTERIOR APPLICATIONS



GENERAL INFORMATION ON LIGHTING CONTROL SYSTEMS

The demands made on interior lighting can be as varied as the building's uses. Starting with private domestic use through department stores and supermarkets, offices and production halls to large-scale complexes such as airports, hotels and shopping centres. This huge range of applications leads to a wide range of requirements on the light management system. Only a high degree of flexibility and adaptation to the respective application will result in the expected advantages for users.

Single luminaire solutions
The term is used here to mean single luminaires such as floor luminaires or desk luminaires. The whole light management system (controller and sensor) is usually integrated in the luminaire. They are often operated independently of the basic lighting.

Multiple luminaire solutions
This system represents a group of luminaires that all react in the same way to the light management system. Application examples include hallways, smaller warehouses and underground garages. Quite often, the control unit is installed with the sensor in a so-called "master luminaire". The other luminaires are then connected to the "master luminaire" as "slaves". Alternatively, the control unit can be placed in the suspended ceiling.

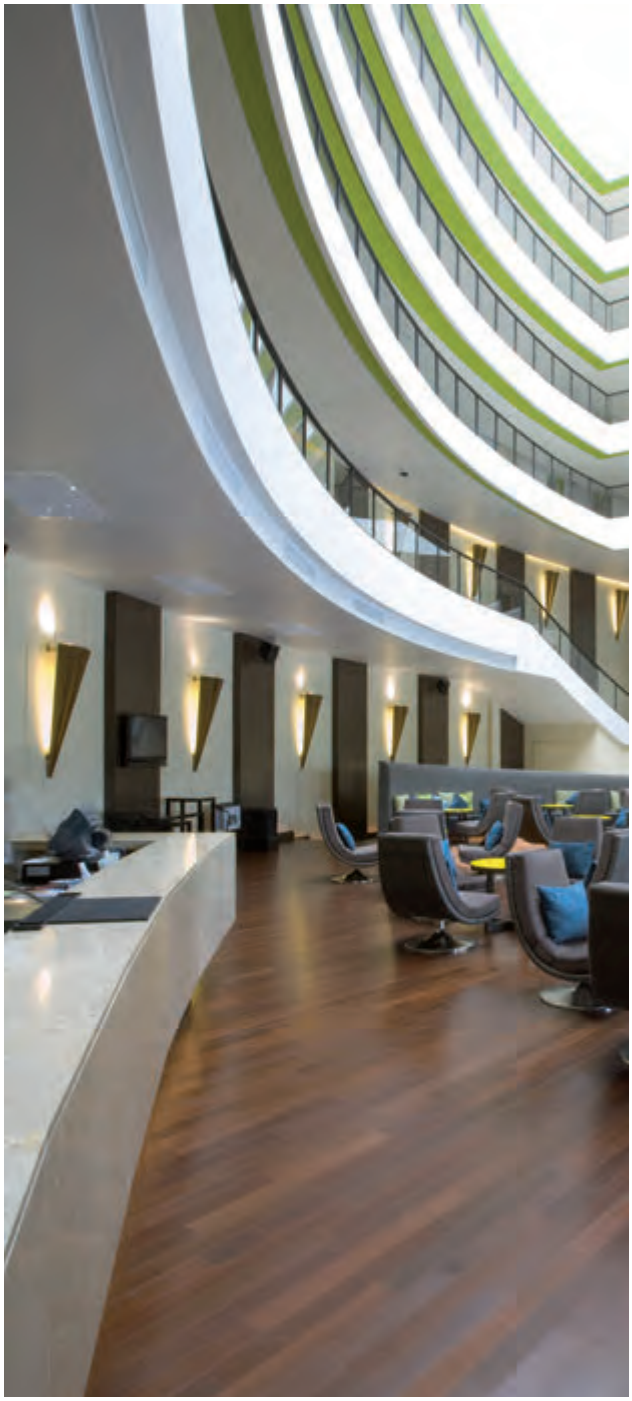
One-room solutions
In this case, there are usually more than one group of luminaires to be regulated individually. The individual addressability of the luminaires can also be required. Examples include open-plan offices, classrooms or gyms. The controller is placed in the master luminaire, the suspended ceiling or in the switch cabinet. The sensors are often mounted on or in the ceiling, independently of the luminaires.





Multiple-room solutions
Several groups of luminaires and single luminaires are controlled individually in different areas. Examples include one floor of an office building with individual offices, copy room, tea room, meeting room, toilets and hallways or the entrance area of a hotel with lobby, public area, bar and toilets. The sensors are usually integrated in the ceiling and the controller is located centrally in the switch cabinet.

Building solutions
In larger building complexes, a central light management system can be formed by linking individual light control systems. The requirements for these building parameters are usually more than just light control. Complete building automation with a central control unit is required. In this case, light control is only part of the overall solution.



LIGHT MANAGE-MENT SYSTEMS

TECHNICAL IMPLEMENTATION



The different technologies used for light management systems are often extremely different and usually not compatible with one another.

LIGHT MANAGEMENT SYSTEMS WITHOUT CONTROL LINE

Phase cutting leading-edge dimmer and phase-cutting trailing-edge dimmer
Part of the mains voltage semi-wave is "cut off" in this case. This semi-wave share can be regulated and has the effect of dimming the light by between 0–100 %. Incandescent lamps as well as high and low-voltage halogen lamps are dimmed using this principle.

LIGHT MANAGEMENT SYSTEMS WITH CONTROL LINE

1–10 V
With this system, the control unit is wired separately to the mains supply via a 2-wire cable. The analogue 1–10 volt signal controls the luminaire control gears. Only analogue control gears (1–10 V) are suitable for this technology. Depending on the quality and execution of the control gears, dimming values between around 1 and 100 % can be achieved. A mains switch or power relay is required to switch the lighting off.

DALI
DALI stands for "Digital Addressable Lighting Interface" and is the international standard for connection and operation of DALI devices from different manufacturers. DALI system installation is particularly simple and cheap since a special bus line is not required.

Standard installation cables can be used, and if necessary, the mains cable can be routed together with the DALI bus line in a 5-wire installation cable. Bus tree, star and series structures are possible. Only the loop form must be avoided. Polarity does not have to be taken into account with the DALI bus.





Control gears connected to a DALI system can be addressed as a group or individually. DALI enables up to 16 groups, 64 individual addresses and 16 illumination scenes to be freely defined. DALI systems can be integrated in a building management system with the aid of suitable interfaces.

In addition, DALI facilitates free and highly flexible light design.

MANUFACTURER-SPECIFIC SYSTEMS

There are other, usually manufacturer-specific solutions available alongside the ones already mentioned. These proprietary (closed) systems are available for a wide range of different requirement levels. One thing they all have in common, however, is their incompatibility with other manufacturers and systems.



COMPONENTS

FOR INTELLIGENT INTERIOR LIGHTING



Light Controller L/LW

LIGHT CONTROLLER

The VS Light Controllers are light management systems that were developed to control and regulate light independently of PCs and higher-order bus systems.

Communication between the Light Controller and the luminaire is achieved using the standard DALI protocol. The Light Controllers comply with all the parts of standard IEC 62386 currently valid. Within this standard, the number of maximum possible luminaires is defined as 64. The Light Controllers L/LW have been designed for mounting to a 35 mm DIN installation rail e.g.. The lighting system can be configured completely and easily without a PC or radio control being necessary. Any later modifications to the system can thus be carried out without any problems.

LIGHT CONTROLLER L AND LW

Up to 6 independently configurable standard keys can be connected to one Light Controller L and LW. In addition, 16 MultiSensors can be attached to the DALI bus. In this case, the maximum current load for the Light Controller bus must be observed (see LiCS Indoor manual). The LW Light Controller also allows the integration of up to 16 radio-operated modules that can be equipped with up to 4 independently configurable keys each. In addition, the LW Light Controller is perfect for reducing installation expenditure during modernisation work, thus saving on installation costs and time.

The Light Controllers are particularly suitable for controlling systems with different groups:

- Easy and flexible combination of the system participants in different groups due to EnOcean technology
- Switching and dimming of the groups using standard keys
- Activation of a digital timer through a key
- Requesting scenes using standard keys
- Constant light regulation of groups/single luminaires
- Motion detection in different variants, automatic and semi-automatic
- Stand-by function to minimise loss thanks to the use of an internal cut-off relay contact
- Use of a password to prevent misuse



Light Controller S



Light Controller XS

- Different menu languages available
- System analysis software to detect malfunctions and support maintenance

Additional advantages with the Light Controller LW through integration of radio-operated keys:

- Avoidance of mortising work (e.g. during retrofit work/renovations or work on listed buildings)
- Implementing radio-operated modules for wall mounting and as remote controls
- Reduction of fire loads
- Improved insulation behaviour of the building walls, since no holes and slots are necessary

LIGHT CONTROLLER S

Suitable for independent operation (e.g. in false ceilings). According to the DALI standard, up to 64 ballasts and up to 16 MultiSensors can be connected. These participants all work within the same group. Please note the maximum power consumption at the DALI bus (see manual).

- Motion detection automatic and semi-automatic
- Constant light control
- Push function
- ON/OFF function
- Stairwell function (timer)

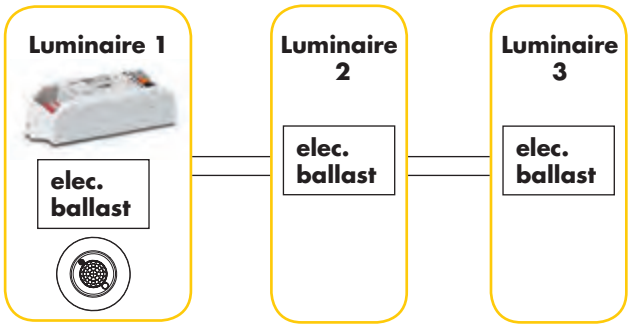
These characteristics qualify the Light Controllers L, LW and S excellently for a range of applications such as:

- Offices and meeting rooms
- Industry and warehouse areas
- Supermarkets and shops
- Stairwells and hallways
- Sanitary facilities

LIGHT CONTROLLER XS

The Light Controller XS was designed for space-saving installation in luminaires. For example, 3 ballasts and one sensor can be integrated on the DALI bus or, alternatively, the unit can be used to control 10 ballasts without sensors. This makes it possible to set up island solutions with the greatest possible flexibility. The following functions can be selected using the dip switch on the Light Controller XS:

- Push function
- ON/OFF function
- Automatic and semi-automatic motion detection
- Constant light setting



COMPONENTS

FOR INTELLIGENT INTERIOR LIGHTING



MultiSensor SM

MULTISENSOR

The use of daylight and motion sensors increases both energy saving and comfort. For this purpose, we have developed a new MultiSensor to record brightness conditions and movement.

The MultiSensors specially developed for the LiCS Light Controllers have been optimised in terms of size, making them one of the smallest sensor series for DALI systems on the market. To achieve this, the manufacturers have done away with the external power supply. Power supply to the sensors is completely through the DALI bus.

To be able to serve a further spectrum of applications, the sensor has been developed in three casing variants: for flush-mounting to the ceiling, surface-mounted to the ceiling and integration in the luminaire. The complete configuration of the MultiSensors is carried out at the Light Controllers.

There are 2 different kinds of sensors integrated in the MultiSensors:

Motion sensor
This sensor detects infrared radiation (heat) and evaluates the movement of the radiating body. The sensor's detection capacity depends on the following factors:

- Size of the body
- Distance from the sensor
- Difference in temperature between body and background temperature
- Speed of movement
- Direction of movement



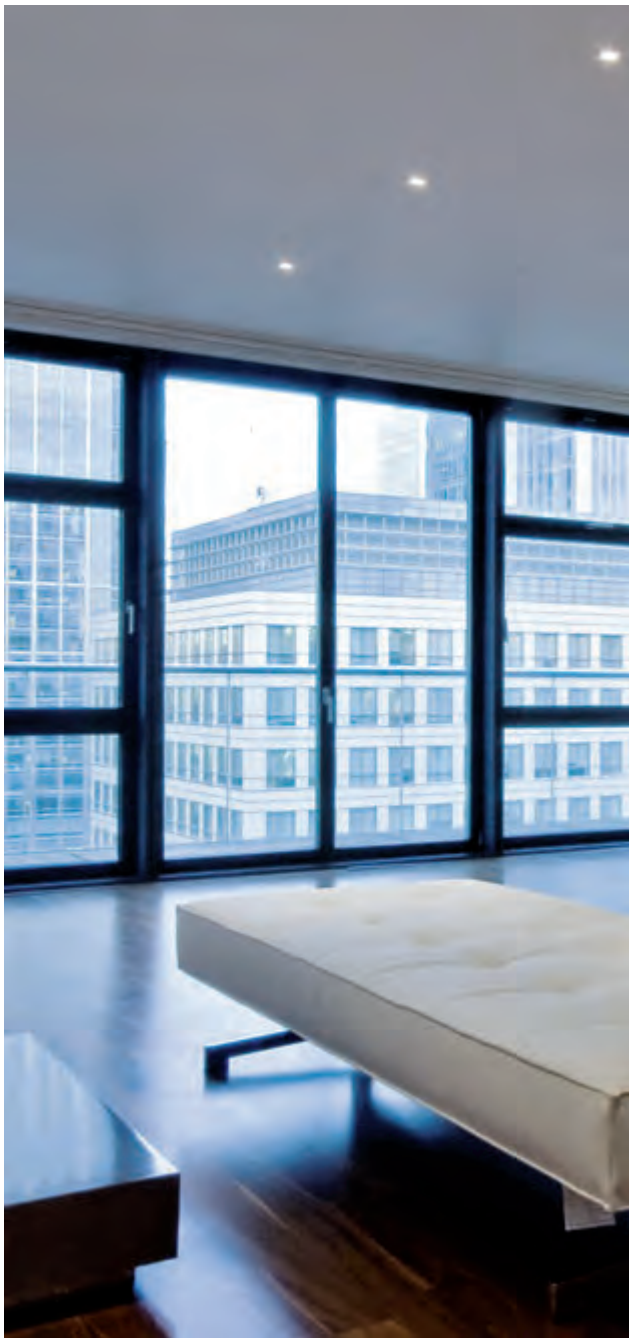
MultiSensor IL



MultiSensor FM

Brightness sensor
The MultiSensor has been developed in such a way that it maps the sensitivity to brightness of the human eye.
This results in people feeling that the system dimming behaviour is "natural". The amount of light hitting the brightness sensor is registered, independently of the type of light (artificial or natural light) used, transformed into digital information and transmitted to the upstream Light Controller. This compares the value with the set reference value and adapts the light level of the respective luminaires.

Areas of application
Thanks to different casing variants (MultiSensor SM, FM, IL) the sensor can be used in many indoor applications with different LiCS Light Controllers.



COMPONENTS

FOR INTELLIGENT INTERIOR LIGHTING



Extender

EXTENDER

The LiCS Extender makes it possible to address up to 64 luminaires via one DALI address.

- With cord grip for independent installation
- The number of luminaires can be extended almost without limit

The Extender for DALI systems can only be used in connection with a DALI controller. With DALI commands, the Extender reacts like a DALI ballast for fluorescent lamps.

The Extender can be used to extend the maximum number of DALI control gears in a standard DALI system. This makes it possible to install the DALI Extender in place of a control gear, and to address it if necessary. Up to 64 DALI control gears can be connected to the Extender output which all react in the same way according to the input signal.

The Extender has a DALI bus supply on the output side, allowing connection of the maximum length of the DALI bus again in accordance with the standard.

The above-mentioned characteristics can be multiplied as often as required by connecting Extenders in series.
This means the Extender is always used when large groups of DALI control gears are to be operated with the same signal at one DALI controller.

Examples for this include:
- Warehouse areas
- Production halls
- Supermarkets
- Long hallways and corridors





ANTENNA FOR THE LW LIGHT CONTROLLER

Problem-free wireless operation requires the connection of an antenna that has been set to the respective frequency. The requisite antenna is provided by Vossloh-Schwabe in two models.

The screw-base model comes with a detachable connection cable (2 m), while the magnetic-base model is fitted with a non-detachable connection cable (2.5 m).

When fitting the antenna, care must be taken that it is not shielded by metal objects, e.g. steel cabinets, radiators, ventilation shafts etc., to ensure optimum signal reception.

For installation information and technical data please visit www.vossloh-schwabe.com

- Magnetic base antenna with connecting cable
  Best.-Nr. 186211
- Screw-base antenna
  Best.-Nr. 186212
- Connection cable for screw-base antenna
  Best.-Nr. 186213





COMPONENTS

FOR INTELLIGENT INTERIOR LIGHTING

Advantages of EnOcean technology:

- High reliability
- Low energy consumption
- Coexistence with other radio systems
- Open transmission protocol
- Large selection of manufacturers



ENOCEAN TECHNOLOGY

The many advantages of EnOcean technology make the design of the LiCS light management system even more flexible and convenient. These are only two of the many reasons why we integrate the wireless technology in our products.

In order to meet the maintenance freedom requirement with a long radio range, EnOcean has developed a technology which can send control commands or data without an external power supply or battery and can transmit them over around 300 m in free field, around the length of three football pitches. All the transmitter needs are tiny energy quantities of about 50 microjoules per action, comparable with lifting a mass of one gram by 5 mm. Pressing the key on a remote control requires much more than this. A tiny dynamo which generates energy in a similar way to a bicycle dynamo turns finger pressure into electrical current.

One of the arguments against radio technologies, in addition to the ecological aspect, is the potential radiation load. In this case, the extremely short transmission times have a further important advantage.

The renowned ECOLOG Institute has examined low-power radio-operated light switches using EnOcean technology. The result is surprising, since it reveals that the radiation generated is significantly lower compared to a conventional wired switch.

The reason for this is that there is a cut in signal during the switching of conventional switches. In other words a broadband radiation impulse directly at the switch. This radiation impulse is almost dispersed after a short stretch. But it almost always affects the person at the switch.

In the case of radio-operated switches with low-power electronics, there is no cut in signal when switching takes place, instead, a radio signal is transmitted to a receiver for one thousandth of a second.

The switching command is implemented at the receiver which is usually a few metres away, however, so that the broadband radiation impulse is dispersed in the environment (electro-smog). The significant reduction of wiring in the wall also considerably reduces low-frequency 50 Hz radiation.

TECHNICAL DATA



Light Controller L/LW

Ref. No. (L/LW)	186189/186190
Supply voltage	220–240 V AC
Frequency	50–60 Hz
Power consumption	9.0 W
Ambient temperature t_a	5–50 °C
Degree of protection	IP20
Protection class	I
DALI output	max. 200 mA
No. of DALI ballasts	max. 64 ballasts
No. of MultiSensors	max. 16 sensors
No. of wireless modules (only LW)	max. 16 modules
Weight	250 g
Dimensions (LxWxH)	126x90x68 mm





Light Controller S

Ref. No.	186210
Supply voltage	220–240 V AC/DC
Frequency	0/50–60 Hz
Power consumption	6.5 W
Ambient temperature t_a	0–50 °C
Degree of protection	IP20
Protection class	II
DALI output	max. 200 mA
No. of DALI ballasts	max. 64 ballasts
No. of MultiSensors	max. 16 sensors
Weight	150 g
Dimensions (LxWxH)	175x42x31,5 mm

Light Controller XS

Ref. No.	186220
Supply voltage	220–240 V AC/DC
Frequency	0/50–60 Hz
Power consumption	0,8 W
Ambient temperature t_a	5–50 °C
Degree of protection	IP20
Protection class: Suitable for luminaires of protection class I and II	
DALI output	max. 20 mA
No. of DALI ballasts	max. 10 ballasts
No. of MultiSensors	max. 1 sensor
Weight	30 g
Dimensions (LxWxH)	83x30x19 mm





MultiSensor

Ref. No. (SM/FM/IL) 186191/186192/186193

Control input ..... DALI acc. to IEC 62386

Current (via DALI) ..... 10 mA

Ambient temperature t_a ..... 0–50 °C

Degree of protection IP20

Protection class II

Weight ..... 30 g

Dimensions SM ..... Ø 53 mm, h=48.5 mm

Dimensions FM ..... Ø 40 mm, h=43.8 mm

Dimensions IL ..... Ø 45 mm, h=31.9 mm

Detection area of the motion sensor
(with the sensor mounted at a height of 2.5 m) ..... Ø 6 m

Extender

Ref. No. 186194

Supply voltage ..... 220–240 V AC/DC

Frequency ..... 0/50–60 Hz

Power consumption ..... max. 6.5 W

Ambient temperature t_a ..... 0–50 °C

Casing temperature t_c ..... max. 65 °C

Degree of protection IP20

Protection class I

Control input ..... DALI acc. to IEC 62386-102/-201

Current (via DALI) ..... 2 mA

DALI output ..... max. 200 mA

No. of DALI ballasts ..... max. 64 ballasts

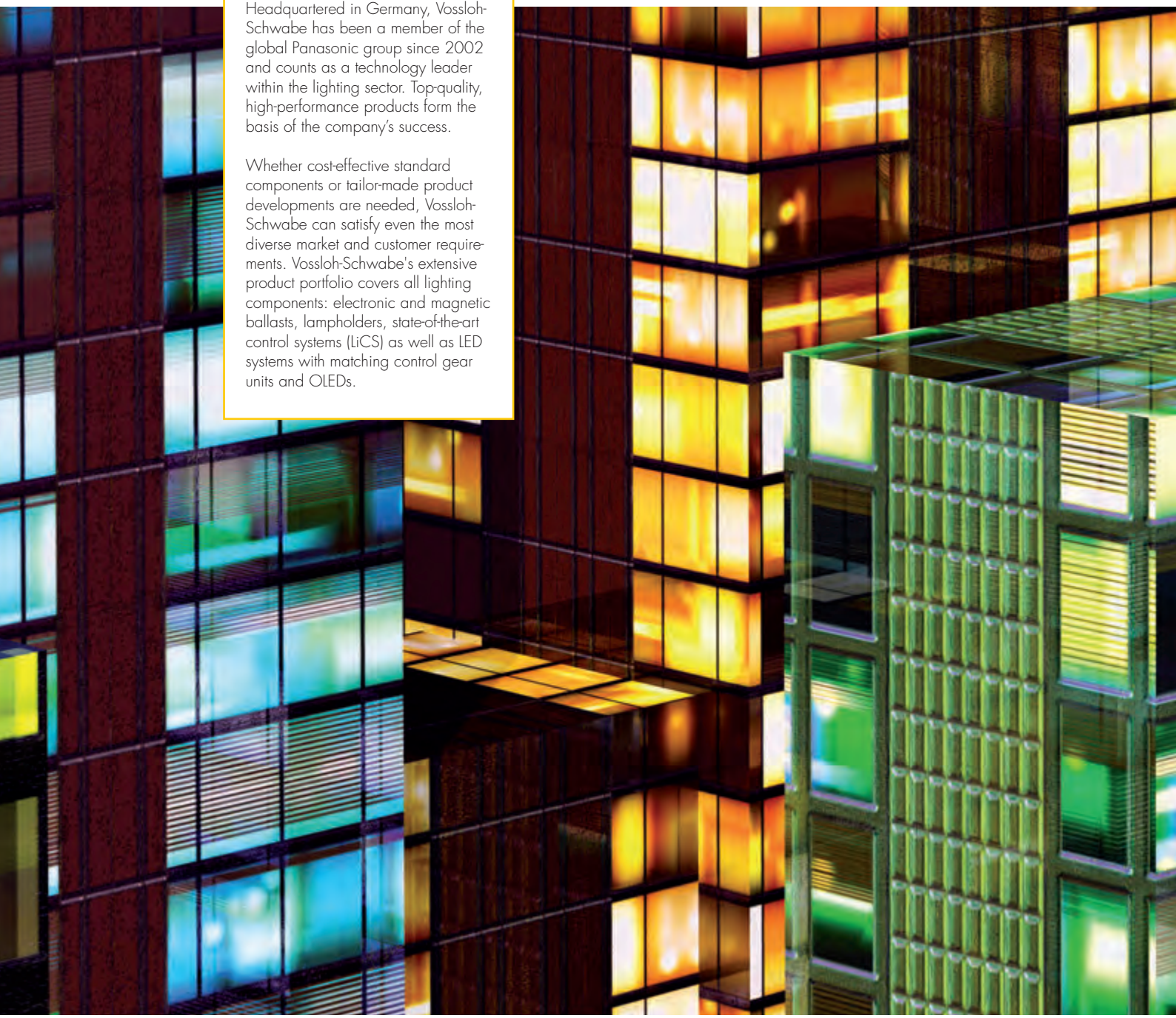
No. of MultiSensors ..... 0 sensors

Weight ..... 150 g

Whenever an electric light goes on around the world, Vossloh-Schwabe is likely to have made a key contribution to ensuring that everything works at the flick of a switch.

Headquartered in Germany, Vossloh-Schwabe has been a member of the global Panasonic group since 2002 and counts as a technology leader within the lighting sector. Top-quality, high-performance products form the basis of the company's success.

Whether cost-effective standard components or tailor-made product developments are needed, Vossloh-Schwabe can satisfy even the most diverse market and customer requirements. Vossloh-Schwabe's extensive product portfolio covers all lighting components: electronic and magnetic ballasts, lampholders, state-of-the-art control systems (LiCS) as well as LED systems with matching control gear units and OLEDs.



A member of the Panasonic group Panasonic

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