

ECG-SPOT



3/2000

**INFORMATION FOR
OUR PARTNERS IN
THE LIGHTING INDUSTRY**

- **LIGHTS TO GO WITH
THE MUSIC AT MDR**
- **NEW ARRIVAL IN THE
MOUSE FAMILY**
- **LIGHT FOR
JOHANNESBURG
AIRPORT**
- **LIGHT FOR THE
FUTURE WORKSHOP**
- **DALI IN DETAIL**



THERE IS LIGHT. AND THERE IS OSRAM.

OSRAM

CONTENTS

**LIGHTS TO GO WITH
THE MUSIC AT MDR** 3
ECG and T5 fluorescent lamp

**NEW ARRIVAL IN THE
MOUSE FAMILY** 4
Compact, powerful 150 W HTM
transformer

FUTURE WORKSHOP 6
Light and control
with OSRAM expertise

**EFFICIENTLY ILLUMINATED
CAR PARK** 7
Johannesburg International
Airport relies on OSRAM

**ELECTRONICS WINS
THE DAY** 8
Ban on conventional control
gear has an impact

DALI IN DETAIL 10
Information on the digital
interface protocol

NEWS IN BRIEF 12

- DALI represented in the ZVEI
- ECG at a click of the mouse
- New control gear for compact fluorescent lamp

Published by: OSRAM GmbH
Hauptabteilung BLMK
Dr. Claus Schmidt
Hellabrunner Strasse 1
D-81543 München
E-mail: cschmidt@osram.de

Editor: Dipl.-Ing. Ursula Sandner

This text – including extracts –
may only be reproduced by permission.
Circulation: 18,700 copies
<http://www.osram.de>

DEAR READER,

The use of electronic control gear in modern lighting installations is increasingly becoming standard practice. Even more widespread use of this energy-saving technology is currently impeded by the fact that the costs are still primarily examined with an eye to the initial capital outlay, rather than the total costs over the entire service life of the installation.



In order to get things moving in the right direction in this context, the Energy Commission of the European Union has collaborated with industry in elaborating new Directives specifying the requirements for the energy efficiency of control gear for fluorescent and compact fluorescent lamps. Important reasons for doing so included the energy-saving potential and the reduction of CO₂ emissions, which is significant in terms of environmental policy.

The main result of the Directive is a gradual ban on the use of conventional control gear in new installations. This affects roughly 80% of the products on the market today.

The EU Directives, which all EU Member States have to implement in binding national law within a period of one year, will lead to a further increase in the use of ECG (see p. 8).


Slimline T5 fluorescent lamps are a permanent item on the agenda in lighting engineering. The combination of attractive, filigree luminaire design with high energy and cost-efficiency is proving to be the key to success. Above all, the use of "Cut-Off ECG", such as the OSRAM QT-FH or QT-FQ family, brings about a vast improvement in overall cost-efficiency. A 25 % longer lamp service life, minimum electrode losses and substantially higher luminaire efficiency speak for themselves.

As regards the market launch of DALI (Digital Addressable Lighting Interface), the new digital standard, the year 2001 will certainly be a particularly important one. The availability of a wide range of DALI ECG, and also of DALI control units, will help this interface definition achieve a rapid breakthrough.

As the year 2000 draws to a close, I would like to thank all our readers for their interest and their suggestions. At the same time, may I wish you all a Merry Christmas and a successful year in 2001.

Yours,

Hans-Peter Birkhofer



Marketing Manager
Electronic Control Gear

LIGHTS TO GO WITH THE MUSIC AT MDR



ECG AND T5 FLUORESCENT LAMP

BALANCED PROPORTION OF DIRECT AND INDIRECT LIGHT

Since 13 July 2000, the staff of mdr – the Mitteldeutscher Rundfunk broadcasting corporation – have had optimum working conditions on a useful floor space of 30,000 m² in the newly built television and administrative centre in Leipzig. This is not least due to the successful lighting solutions installed in this building complex, which houses the administrative staff, studios and editorial departments.

Attractive luminaires enhance the unusual design of the rooms. Three thousand Type 181 Linea pendant



luminaires from the Blomberg-based luminaire manufacturer bps Leuchten-Systeme GmbH

underline the filigree nature of this lighting solution. This luminaire model is based on slimline FQ 80 W T5 fluorescent lamps with a lamp diameter of just 16 mm and the associated

QT-FQ 1x80 electronic control gear with Cut-Off technology (cross-section: 30 mm x 30 mm).

The high luminous flux of 7,000 lm of the 80 W FQ lamps provides for ideal distribution of the direct/indirect light in the innovative pendant luminaires. Two-thirds of the light is directed at the ceiling in an extremely wide-angle as the indirect component; while the remaining one-third is emitted straight down as the direct component via a parabolic specular louvre. The result of this lighting solution is a pleasant, glare-free lighting atmosphere.

CUT-OFF PROVIDES THE OPTIMUM LUMINOUS FLUX

When used with FQ fluorescent lamps, the Cut-Off technology of the QT-FQ 1x80 electronic control gear unit guarantees a luminous flux maximum in the region of an ambient temperature of 35 °C. The result is up to 10% greater luminaire efficiency with this ECG for FQ T5 fluorescent lamps.

Moreover, the power loss of the ECG + lamp system is reduced without constant heating of the lamp filaments. At the same time, the lamp service life is also prolonged owing to the lower load on the lamp filaments.

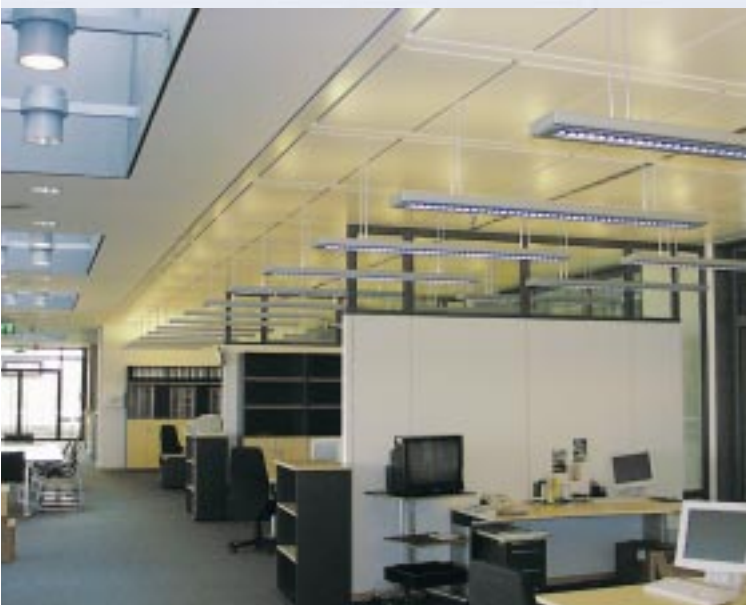


mdr aglow with light from OSRAM

The high-frequency operation of the lamp and the flicker-free instant start guarantee high lighting comfort. Combined with a high-quality luminaire, the result is an efficient lighting solution, for optimum working conditions.

This lighting installation is an impressive example of how the combination of T5 fluorescent lamps and ECG with Cut-Off technology is capable of uniting innovative technology, creative luminaire design and cost-efficiency in an ideal manner: good light skilfully realised.

Cornelia Fürst, OSRAM Munich, and Martin Jost, OSRAM Hanover



181 Linea pendant luminaires, fitted with FQ 80 W T5 fluorescent lamps and QT-FQ 1x80 control gear with Cut-Off technology, make the mdr shine



OSRAM ECG-SPOT 3/2000

NEW ARRIVAL IN THE MOUSE FAMILY

COMPACT, POWERFUL 150 W HTM TRANSFORMER

ELECTRONICS FOR LOW VOLTAGE

These days, the electronic transformer is regarded as state of the art in low-voltage installations. Owing to their numerous advantages – such as a wide output range, safety due to electronic cut-off, small size and low weight – electronic transformers are almost entirely forcing the conventional models out of the market.




former only needs an installation height of 70 mm to 75 mm with the usual ceiling cut-out of 68 mm diameter, depending on the connecting lead used (a 55 mm diameter cut-out requires a height of 115 mm to 120 mm). However, OEMs also benefit from the compact dimensions when installing the unit in luminaires.

The new 150 W Mouse clearly stands out from the competition thanks to its special, functional design.

SIMPLE, EASY ASSEMBLY SAVES TIME AND MONEY

The HTM 150 electronic transformer is designed for an output power of between 50 W and 150 W. Despite its compact design, it has separate terminal compartments for the primary and secondary sides. When fitting an extensive low-voltage installation, the primary sides of the individual units can easily be wired in parallel by using the second pair of terminals in the input side for mains looping. This eliminates the need for time-consuming installation

SPOTLIGHT ON THE 150 W MOUSE

- Output range from 50 W to 150 W
- Compact, functional design for shallow suspended ceilings
- Dimming with dimmers with phase control on the trailing or leading edge for inductive loads
- Option of through-wiring on the primary side
- Option of connecting up to six luminaires on the secondary side
- Electronically reversible cut-off in case of short-circuits, overload and excessive temperature
- High reliability due to proven OSRAM quality   



The HALOTRONIC MOUSE® is easily inserted through a ceiling cut-out for a downlight

of an external distribution unit with strain relief.

With this transformer, several luminaires can also be conveniently connected on the secondary side. The terminal block has three generously dimensioned pairs of terminals based on the elevator principle and is capable of accommodating cable cross-sections of up to 4 mm² for this purpose. As a result, up to six luminaires can be connected directly to the transformer – depending on the leads used – and provided with the prescribed tension/thrust strain relief by means of the cover. This makes expensive and time-consuming distribution unit superfluous.

In addition, the high-quality elevator terminals, which are mounted as a single continuous block, minimise the risk of breaking the soldered connection to the circuit board if excessive torque is applied when tightening the screws. A damaged soldered connection on the output terminal entails the failure of the unit and may constitute a safety risk. On the secondary side, the high currents present when a loose contact develops



The HALOTRONIC MOUSE® electronic transformer is extremely popular thanks to its combination of compact design for installation in extremely confined spaces and particularly high quality and reliability. As a result, the name “Mouse” has almost become the generic term for electronic transformers. The successful HTM versions with output powers of 70 W and 105 W have now been joined by a more powerful, 150 W model.

FUNCTIONAL DESIGN FOR VERSATILE APPLICATIONS

Independent transformers are usually installed for operating downlights in suspended ceilings. To this end, the device is inserted into the false ceiling through the round cut-out for the downlight. Consequently, the housing of the HTM 150/230-240 is optimised for this specific application, as are the smaller 70 and 105 W versions.

Thanks to the tapered ends of the housing and its small dimensions (153 mm x 54 mm x 36 mm), the trans-

in this way rapidly lead to charring and can, in the worst case, even trigger a fire.

**A MAJOR ADVANTAGE:
UNIVERSAL DIMMABILITY**

Typical of the Mouse – and also of the new, high-power version, of course – is its operation both with dimmers with phase control on the leading edge for inductive loads and with electronic dimmers with phase control on the trailing edge. The cheaper dimmers with phase control on the leading edge – as used for conventional transformers – demonstrate their strengths when cost is the central aspect.

Dimmers with phase control on the trailing edge can show off their talents when it comes to installations where absolutely silent dimming is required. In either case, the electrical engineer benefits from the universal dimmability and, ultimately, also from the fact that both types of dimmer operate perfectly and there is no risk of confusion when making a selection.

**PROVEN QUALITY FOR HIGH
RELIABILITY**

A sound circuitry design in combination with generously dimensioned components leads to absolute reliability and a long service life. As a result, the transformer is approved for ambient temperatures of up to 45 °C ($t_a = 45 \text{ °C}$), despite its high output power and compact design.

The reversible safety cut-off function ensures protection in the event of a short-circuit. The electronic transformer automatically reduces its output power in the event of overloading caused by excessive lamp loads or exceedingly high temperatures.

Needless to say, the HTM 150/230-240 and the other members of the Mouse family comply with all the regulations concerning radioshielding, total harmonic distortion, immunity, etc. All HTM models bear the ENEC, VDE, VDE-EMV and MM marks.

The new product in the Mouse family offers a wide range of advantages, as well as an excellent price-to-performance ratio.

Dr. Claus Schmidt, OSRAM Munich

NEW LABELLING OF DIMMER/LOAD COMBINATIONS

In order to simplify selection of the correct combination of dimmer and load, German manufacturers will in future label dimmers and, among other things, electronic transformers with the same pictograms. In other words, when installing an electronic transformer in combination with a dimmer, the electrician will then only have to make sure that at least one of the letters in the symbol matches. An electronic transformer with the letter “C” can be operated with a dimmer with phase control on the trailing edge that is also labelled “C”. As the devices of the Mouse family bear both an “L” and a “C”, they can be operated both via a dimmer with phase control on the trailing edge and equally via an inexpensive dimmer with phase control on the leading edge for inductive loads (labelled “L”). International standardisation has been applied for, so that the new labelling can also establish itself as a standard outside Germany.

An electronic transformer with the label alongside is suitable for operation with dimmers with phase control on both the trailing edge and the leading edge (for inductive loads).



FUTURE WORKSHOP

LIGHT AND CONTROL WITH OSRAM EXPERTISE

COMPETENCE IN DEMAND

Under the direction of *Prof. Claus Weyrich*, the Central Engineering Division (ZT) of Siemens AG combines and coordinates the latest technologies from all specialist departments throughout the company. As a specialist network and a partner for innovation, ZT offers its customers – the various divisions of Siemens – support for the business of the future.

The showroom – the “Future Workshop” – conveys the technical competence of the Central Engineering Division to internal and external partners in attractive surroundings. Demonstrations and presentations can be optimally supported by the modern technology in the room – that comes from Siemens wherever possible – and the wide range of products and the cooperation within Siemens AG can be demonstrated.

THE CHALLENGE OF LIGHT AND CONTROL

OSRAM has made a successful contribution to the result. Its system competence as regards light and control forms the basis for the group-wide exploitation of synergistic potentials. The demanding project was handed over to Siemens AG by OSRAM LIGHT CONSULTING GmbH



A photo-realistic computer simulation shows the finished “Future Workshop” before the start of construction

in turnkey condition. The scope of supply included the supply and development of custom luminaires with specifically designed reflectors, electrical installation work and the integration of building installations, media and computer networks in an EIB instabus system.

The control equipment is far superior to all the systems available on the market: it centres on a database with specific control commands for every bus system. The control system is designed for universal use and can be adapted to other protocols, such as DALI, LON or Luxmate. Even non-EIB data protocols from media technology can be emulated.

The user interfaces are styled individually, e.g. on the basis of Corporate Design specifications. The user can intuitively program the light schemes and the grouping of the luminaires himself. Similarly, any Windows application can be started from the control system and used for media presentations.

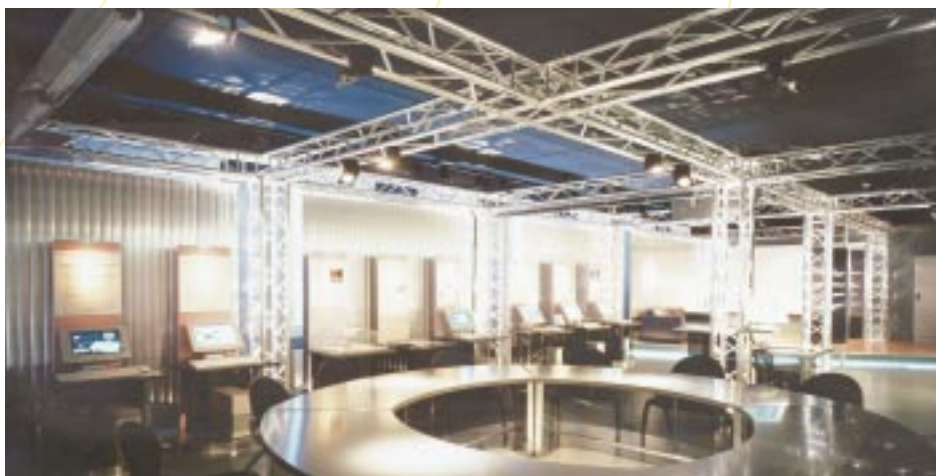
This makes it possible, for instance, to control lights and blinds while using the same user interface to show PowerPoint presentations via the media equipment. Similar technology has already been used for the light studio of OSRAM Taiwan.

Fluorescent and compact fluorescent lamps can be controlled via the universal 1...10 V interface or the DALI interface – in combination with HF 2x58 DIM electronic control gear, for example. Electronic transformers can likewise be integrated in light schemes via the HT 1-10 DIM dimmer modules.

SUCCESS IS AN OBLIGATION

The builder-owner, Siemens ZT, was given a realistic impression of the finished project even during the planning and conceptual design phase, making it easier to reach a decision. OSRAM LIGHT CONSULTING proved its worth as a competent partner. Following the success of this project, a follow-up order is already in the offing: the implementation of the “Studio for Innovators”.

Mourad Boulouednine,
OSRAM LIGHT CONSULTING GmbH,
Munich



Siemens presents the latest technologies in the “Future Workshop”

EFFICIENTLY ILLUMINATED CAR PARK

JOHANNESBURG INTERNATIONAL AIRPORT RELIES ON OSRAM

PASSENGERS AND MORE

Passenger and cargo volumes in air traffic are increasing worldwide. Existing airports are being expanded as a result. These include Africa's busiest airport, "Johannesburg International". Its expansion is the central element of an infrastructure improvement programme with a contract volume of Euro 265 million (US\$ 249 million). This programme was established in order to cope with the expected volume of 18 million passengers per year in 2001.

The five-storey car park with 4,000 parking spaces was one of the first buildings to be put into service. As the owner of the airport, the "Airports Company of South Africa" specified that the lighting solution was to be characterised by an aesthetic, pleasant light atmosphere, combined with efficient energy utilisation and lower maintenance requirement.

ALL CUSTOMER DEMANDS MET

This requirement calls for the use of electronic control gear. A total of 14,000 L58W/840 LUMILUX® PLUS fluorescent lamps and 7,000 QUICKTRONIC® QTIS 2x58W control gear units are installed in the car park. The foyer is illuminated by HQI® 400 W high-pressure discharge lamps and DULUX D/E26W compact fluorescent lamps. All lamps and ECG units were supplied by OSRAM South Africa.

Using custom luminaires from Addlite, the light planners Chorn, Kirkland and Riccardi created pleasant, indirect lighting in the car park that is intended to convey a feeling of safety at the same time. The requirements profile also demanded an aesthetic design and sufficiently good visibility for drivers.

REFERENCES ARE THE PROOF

The previous involvement of OSRAM in prestige projects paid off. Thus, the Petronas Towers in Malaysia, the highest building in the world, and the improvement of the lighting scheme at Frankfurt Airport proved to be key factors when it came to reaching a decision and awarding the contract.

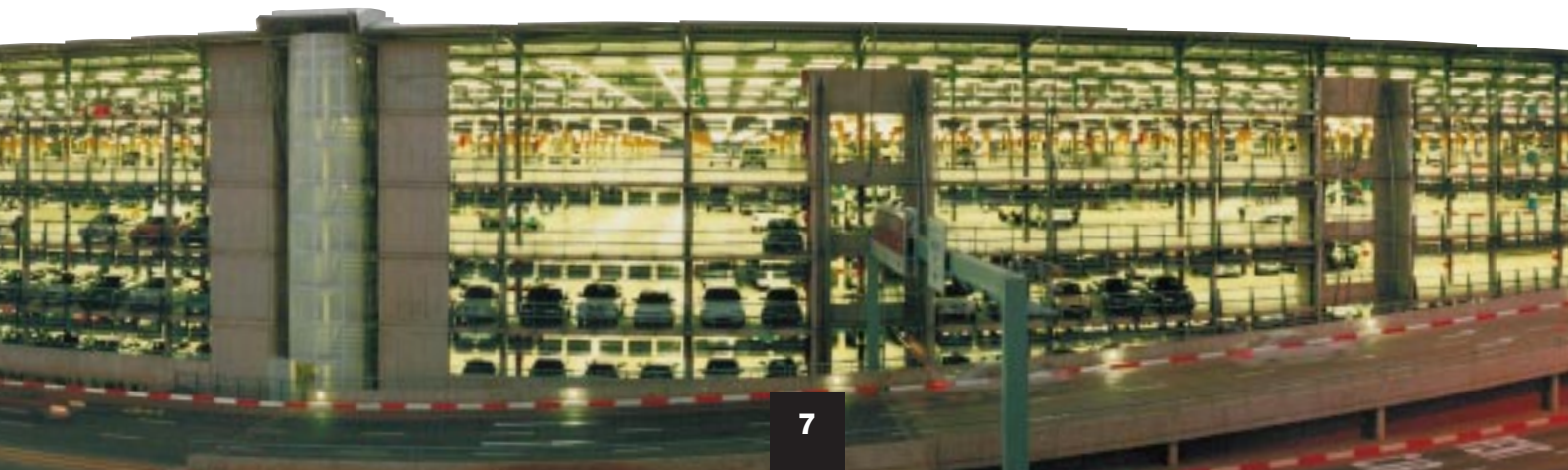
With this experience, OSRAM was able to demonstrate that the ECG and LUMILUX® PLUS lamps used at Frankfurt Airport reduce energy consumption. Moreover, the guaranteed ECG service life of 50,000 hours with a failure probability of less than 10% was exceeded by far.



The foyer is bright and friendly

The first construction phase has been successfully completed. Now, the task on hand is to cooperate with the Airports Company of South Africa on further improving the lighting engineering at the airport – an extremely interesting challenge from the point of view of OSRAM.

Grahame Boyle, OSRAM South Africa



ELECTRONICS WINS THE DAY

BAN ON CONVENTIONAL CONTROL GEAR HAS AN IMPACT

WITHDRAWAL ORDERED

The Commission, Council and Parliament of the European Union have reached an agreement: the vast majority of conventional magnetic control gear units (CCG), with which linear fluorescent lamps and compact fluorescent lamps are operated, are facing their gradual end. The European politicians have their sights on the CCG with the lowest energy efficiency or – to put it positively – the greatest energy-saving potential. Consequently, CCG units with high energy losses, which account for 15% in the current market situation, will be banned in the first stage, probably starting at the end of 2001. In the year 2005, they will be followed by another group of CCG units whose market share is currently in the region of 65%. Thus, a total of approximately 80% of the conventional control gear units available at the moment will be taken off the market.

GREENHOUSE EFFECT AND MORE

The driving force behind the search for and the replacement of or ban on “energy gobblers” is the Protocol of the UN Summit on the Environment and Development in Rio de Janeiro, in which the participating states agreed to reduce their CO₂ emissions. For the European Union, however, this idea was not the sole reason for its effort: in addition to environmental protection, the goals of security of supply and competitiveness are likewise of importance.

The ban adopted by the European Parliament was preceded by studies on the lighting sector which indicated that increased efficiency would yield the greatest energy savings in this sector. The energy saved would make industry and commerce more competitive, while at the same time reducing dependence on imported energy. After all, the operation of fluorescent lamps – i.e. of lamp + control gear – accounts for 53%

of the total lighting power consumption of the EU of 105 TWh per year.

CONTROL GEAR COMPARISON

As part of preliminary work, “C.E.L.M.A. Components”, i.e. the control gear group in the Committee of European Luminaire Manufacturers' Associations, rated the energy efficiency of the lamp + control gear systems in Classes A (good) to D (poor): A1, A2, A3, B1, B2, C and D.

The designations A1, A2 and A3 cover electronic control gear, Class A1 representing the lowest energy loss. The magnetic units with the lowest energy loss are assigned to Class B1.

The European Commission took this preliminary work as its basis. The tables elaborated by C.E.L.M.A. for Classes D and C correspond with “Stage 1” and “Stage 2”.

SCHEDULE FOR THE FUTURE

The “Prohibitory Directive” will enter into force before the end of this year. This time marks the start of the 18-month transitional period, during which the existing products can continue to be sold as in the past. After that, “Stage 1” of the Directive will apply in all Member States of the European Union.

Five years after the effective date of the Directive, the first stage will be replaced by the second, at which time the permissible input power of conventional control gear will be reduced by 2 W or 3 W.

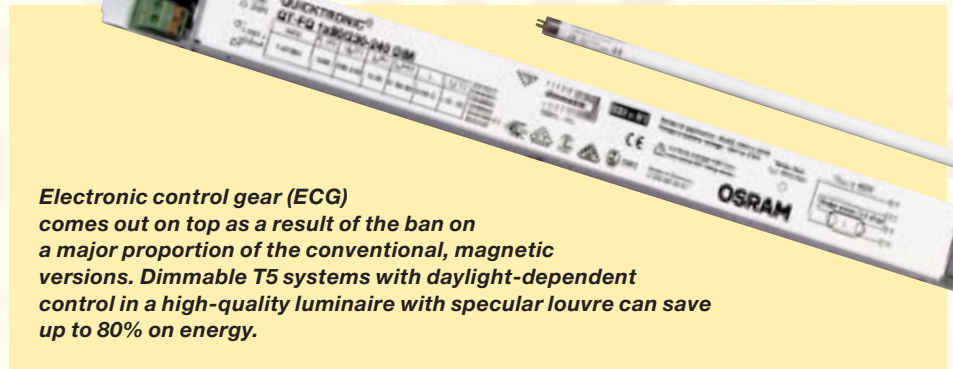
Control gear category	Lamp output at the CCG (50 Hz)	Maximum input power of the control gear – lamp circuit		
		Stage 1 (ban on class D)	Stage 2 (ban on class C)	
Control gear for linear lamps	15 W	25 W	23 W	
	18 W	28 W	26 W	
	30 W	40 W	38 W	
	36 W	45 W	43 W	
	38 W	47 W	45 W	
	58 W	70 W	67 W	
Control gear for single-tube compact lamps	70 W	83 W	80 W	
	18 W	28 W	26 W	
	24 W	34 W	32 W	
	36 W	45 W	43 W	
	Control gear for twin-tube compact flat lamps	18 W	28 W	26 W
		24 W	34 W	32 W
36 W		45 W	43 W	
Control gear for twin-tube compact lamps	10 W	18 W	16 W	
	13 W	21 W	19 W	
	18 W	28 W	26 W	
	26 W	36 W	34 W	
Control gear for triple-tube compact lamps	18 W	28 W	26 W	
	26 W	36 W	34 W	
Control gear for compact lamps of double-D design	10 W	18 W	16 W	
	16 W	25 W	23 W	
	21 W	31 W	29 W	
	28 W	38 W	36 W	
	38 W	47 W	45 W	

PERSONAL RESPONSIBILITY IS REQUIRED

So, how can you see that the Energy Efficiency Directive really is being complied with? This is where the manufacturer comes into play, as it applies the CE mark to its control gear on its own responsibility. This mark indicates that the manufacturer complies with the fundamental requirements of all the applicable Directives and has conducted the prescribed conformity assessment procedure.

As a rule, the Low-Voltage Directive – i.e. the product safety standards – and the EMC Directive are considered to be relevant in this context. By the end of the transitional period at the latest, the CE mark will additionally signify compliance with the Energy Efficiency Directive. Being the basis of the conformity assessment, the “Technical Documentation” will have to be extended accordingly. As in the past, this documentation can be inspected by the supervisory authorities if there are doubts as to whether the product complies with the Directives.

The declaration of conformity issued by the manufacturer or the state-authorized testing and certification agency must be extended to include the Energy Efficiency Directive. Both, i.e. the “Technical Documentation” and the declaration of conformity, must be available before the CE mark can be used, or its use continued, after the end of the transitional period.



Electronic control gear (ECG) comes out on top as a result of the ban on a major proportion of the conventional, magnetic versions. Dimmable T5 systems with daylight-dependent control in a high-quality luminaire with specular louvre can save up to 80% on energy.

SIGHTS SET ON FURTHER STEPS

Even more stringent regulations, above and beyond the second stage of the Energy Efficiency Directive, are already being considered, e.g. a ban on C.E.L.M.A. Class B2. According to the Directive, the Commission must submit an “assessment of the results achieved” to the European Parliament by 31 December 2005. The aim being pursued here is a further improvement in the efficiency of control gear. This assessment based on market observation is to reveal whether the potential savings have been achieved.

As a result of the Energy Efficiency Directive, it is expected that there will be a substantial change in the market following the enactment of the first two stages.

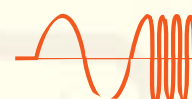
Of course, every consumer will benefit from this, and from the power savings when operating lamps on ECG. The pay-back time – i.e. the time until the higher cost of acquisition is offset by the lower operating costs resulting from the higher efficiency – is estimated at roughly 15 years for private households. The pay-back period in the service sector and in industry is in the region of just two years.

CHANGE ON THE CONTROL GEAR MARKET

In summary, it can be stated that certain types of magnetic control gear with high potential for energy savings will be banned in the next few years.

The Energy Efficiency Directive of the European Union introduces the obligation to fit new lighting equipment with energy-saving control gear. With an eye to the possibility of further bans after 2005 and the savings that can be achieved, a rapid switch to electronic control gear in both production and application offers great opportunities for the future.

Richard Kotschenreuther,
OSRAM Munich



OSRAM ECG-SPOT 3/2000

DALI IN DETAIL

INFORMATION ON THE DIGITAL INTERFACE PROTOCOL

TARGETING SIMPLICITY

The analogue 1...10 V interface for controlling lighting components set standards in terms of functional reliability, ease of installation and handling – standards against which future systems will also be measured. That is the reason for its widespread use and its success. The new interface definition, DALI (Digital Addressable Lighting Interface), which will replace 1...10 V technology in the medium term, has taken up the challenge of this time-proven control option. Consequently, ease of handling must be one of the aims of all DALI-based systems.

SAFETY EVEN WITHOUT SELV

Every control system is defined by the physical characteristics at the interface, such as voltage and current, and by the properties of the lines used as the transmission medium. With DALI, a generously dimensioned signal-to-noise voltage ratio and, in addition, the wide ranges for digital “Low” and “High” largely rule out interference with data transmission (Fig. 1). Consequently, there is no need for shielded control lines. As with the 1...10 V interface, the mains and control inputs into the ECG are isolated. The use of safety extra-low voltage (SELV) was dispensed with in order to permit inexpensive installations without special-purpose leads and cable glands.

With DALI control gear from OSRAM, the function of the interface is independent of the polarity of the control lines. In addition, an integrated overvoltage protector prevents damage in the event of mains voltage accidentally being applied to the control terminals as a result of possible incorrect wiring.

INTELLIGENT COMPONENTS

Every controller functions as a “master” and alone controls communication on the control line. In contrast, being “slaves”, ECG units can only respond to an enquiry from the “master”. DALI consistently uses a system with distributed intelligence – an intelligent controller communicates with intelligent components.

Data are exchanged and dimming operations controlled via the processor (Fig. 2) in the DALI ECG. For instance, the controller issues the “Scene 1” command and the processor then sets the required target light value. With DALI, a single command is enough to deal with this task.

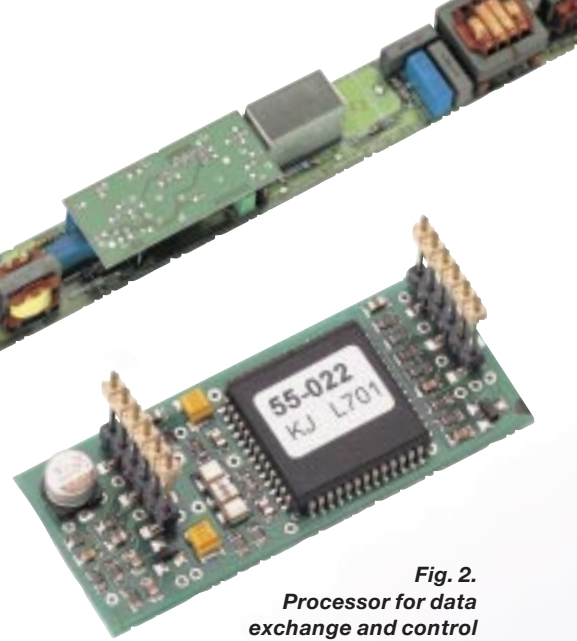


Fig. 2. Processor for data exchange and control of dimming operations

The processor compares the light value stored for Scene 1 with its current brightness value and determines the difference. From this, and the defined, fixed time for dimming, the processor then calculates the dimming speed.

The result is that all units dim synchronously, meaning that the dimming operation is completed simultaneously, regardless of the initial brightness value.

The distributed intelligence of DALI only requires a relatively slow useful data transfer rate of 1,200 bit/s.

The data stored in the ECG units when putting DALI systems into service include the following:

- Group membership of the DALI ECG (maximum of 16 groups, multiple assignment possible);
- Individual address for direct addressing of each ECG (maximum of 64 individual addresses);
- Light values for the individual scenes (maximum of 16);
- Dimming speed;
- Response to a power failure at the interface (emergency power characteristics).

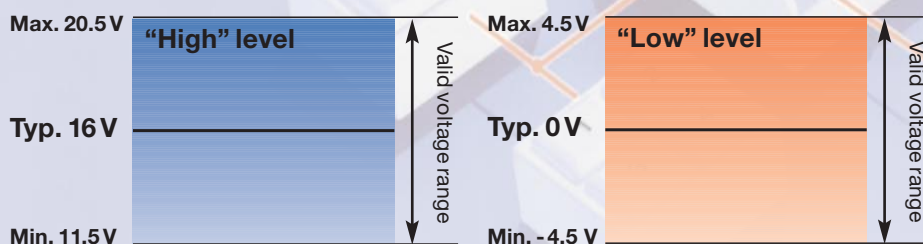


Fig. 1. Defined voltage ranges for “High” and “Low”, guaranteeing a generous signal-to-noise voltage ratio

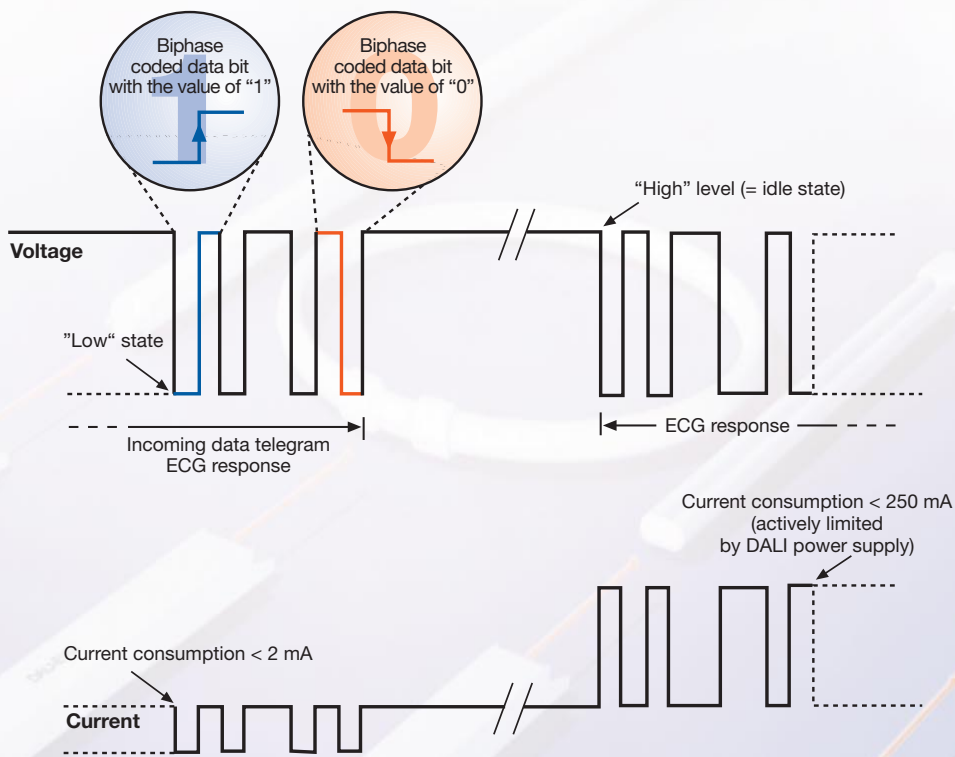


Fig. 3. Current and voltage characteristics at the ECG control terminal

In addition, all units can be addressed jointly at all times, even without "commissioning" the installation (building-site function).

ERROR DETECTION INCLUDED

All data bits on the control line are transmitted as two half-bits with different logic states. This form of transmission is referred to as biphase or Manchester coding and is used in virtually all infrared remote controls, for example, for reasons of reliability. It is capable of compensating for frequency fluctuations, as synchronisation on the edge in the middle of each data bit is possible at any time. Errors in the data telegram result in violation of the coding rules and are detected immediately (Fig. 3).

FLEXIBLE POWER SUPPLY

With DALI, data telegrams are injected by shorting and releasing the line and thus by the corresponding "Low" and "High" logic states. This shorting can be induced both by the ECG and by the controller. In this system, the interface power supply need not be part of the controller, but can be connected to the control line at one or several points. However, the maximum permissible total current of 250 mA may not be exceeded. In idle state (no data transfer) a voltage of roughly 16 V DC is present at the ECG.

SIMPLE INSTALLATION

DALI imposes only very low demands on the transmission line. In principle, any type of line with insulation for mains voltage can be used, as long as the permissible voltage drop on the interface line is observed. It may not exceed 2 V over a line length of 300 m at 250 mA (Table). As with the 1...10 V interface, the mains supply and control line can be in the same cable, meaning that, for example, a 5-core NYM cable can easily be used to connect the DALI ECG units.

Cross-section	Length
2 x 0.5 mm ²	116 m
2 x 0.75 mm ²	174 m
2 x 1.0 mm ²	232 m
2 x 1.5 mm ²	300 m

Permissible line lengths (max. 300 m) in relation to the line cross-section

The maximum line length between the two most distant DALI components is 300 m. The kind of wiring is freely selectable, except that a closed ring is not permissible in the circuitry.

Michael Hani, OSRAM Munich, and Axel Pilz, OSRAM Traunreut



DALI REPRESENTED IN THE ZVEI

DALI stands for "Digital Addressable Lighting Interface", the new interface definition, and is regarded as the future standard for the digital control of dimmable electronic control gear.

In March 2000, the DALI Working Group was established under the roof of the Federation of the Electrical Engineering and Electronics Industry (ZVEI e.V.) in Frankfurt/Main. Its members are among the leading manufacturers of electronic control gear and light control systems and include OSRAM, Philips, Helvar, Tridonic, Vossloh Schwabe, May & Christe, Hüco, Trilux and Hadler. *Hans-Peter Birkhofer* was elected Chairman of the Working Group.

The objective of the DALI Working Group is the joint marketing of this new standard. In addition to work in the standardisation committees, this primarily involves such activities as

- Preparation of documentation, e.g. the DALI Handbook,
- Publication of articles on the subject of DALI,
- Finding of industry partners for the development of further DALI components,
- Monitoring of the compatibility of the individual DALI components.

In future, continuously up-to-date information will also be available on the Internet at "www.dali-ag.org".



ECG AT A CLICK OF THE MOUSE

Electronic control gear (ECG) – a price-less pearl in a shell – is within everyone's reach from now on. All the important information on OSRAM ECG can be called up on the Internet by mouse click. The following path shows you the way:

www.osram.de

→ Produkte → Betriebsgeräte



The "Elektronische Vorschaltgeräte" navigation item offers general information. In the overview of lamp/ECG combinations, a mouse click guarantees the right OSRAM ECG for the chosen lamp. In addition, an overview of the technical data of the ECG can be found under "Produkte".

Further navigation items are also available, such as Medien/Literatur/Systeme, Beleuchtungslösungen, FAQs (frequently asked questions), Kontakte and Technische Daten. There are numerous ways of utilising these OSRAM web pages – you can download documentation or simply page through it, monitor trends in lighting engineering, or view specific questions and answers regarding ECG.

Needless to say, the content is constantly updated, making the OSRAM site an ideal reference work as well.



NEW CONTROL GEAR FOR COMPACT FLUORESCENT LAMP

The QT-T/E 1x57/230-240 electronic control gear for the new DULUX®-T/E 57W IN compact fluorescent lamp is now available. This unit is particularly suitable for use in lighting solutions requiring high luminous efficiency in a small space.

The luminous efficiency of the DULUX®-T/E 57W IN compact fluorescent lamp is comparable to that of an incandescent lamp with an output of 200 W. This substantially reduces the energy consumption without sacrificing brightness. The "high-frequency light" guarantees high lighting comfort and flicker-free starting of the fluorescent lamp.

The QT-T/E 1x57/230-240 electronic control gear offers time-proven OSRAM quality. Being a high-end product, this QUICKTRONIC® ECG with Cut-Off technology has all the prerequisites for maximum efficiency.

ECG units with Cut-Off technology lead to a significant improve-



ment in luminaire efficiency of up to 10%. Moreover, the lamp service life is prolonged, as the load on the filaments is reduced without constant heating current. In addition, the ECG losses are lower, as is the power loss of the lamp as a result.

