The best way to save energy

Efficient light for streets, bridges and public spaces
Enlightening your ideas

“I want light that I can rely on.”
We devote all our energy to your light.

Tridonic has been involved in the quest for perfect light for more than 50 years. Our focus is on achieving better lighting with more and more advanced components, improving the reliability and safety of lighting systems still further and making a real contribution to climate protection. It is our unique expertise that enables us to achieve our prime objective, namely of helping you install lighting solutions that are unbeatable in terms of economy and functionality.

And what drives us above all is our great passion for light and lighting. In combination with our experience and in-depth knowledge of the lighting industry this passion has led to an ever expanding portfolio of products – from lighting components, lighting management systems and LEDs. And in combination with our service expertise it motivates us to support you in all phases of the project as a partner you can rely on. Wherever you are in the world. With a total of 2,300 employees in 30 separate branch offices and a dense network of established sales partners, Tridonic is always nearby – at any of 73 locations throughout the world.

▼ Facts and figures:
- 2,300 employees
- Headquarters in Dornbirn (A)
- 30 separate branch offices
- Worldwide presence
- More than 570 inventions
- More than 2,000 patents
- New products account for more than 40 % of the total
Quality
Tridonic is synonymous throughout the world for products that combine reliability with state-of-the-art functionality.

Expertise
Our in-depth know-how and extensive knowledge of the lighting industry make us your expert in all aspects of light and lighting.

Close customer contact
You are our focus. We want not only to supply you with the best possible equipment but also to support you every step of the way.
Energy saving is a challenge that mother nature has set us. With our wide range of LED solutions, ballasts and igniters we provide you with everything you need to achieve effective and meaningful reductions in energy consumption for street lighting.

Are you planning a new lighting system? Or are you looking to upgrade an existing system by replacing the old mercury vapour lamps for example? Tridonic gives you support at all stages – with innovative products and a wealth of experience. We have already equipped a large number of residential streets with dimmable solutions and illuminated numerous parks with effective and efficient systems. So play it safe. With Tridonic’s high-quality products which will continue to perform reliably even in extreme weather conditions, high temperatures, large fluctuations in temperature or heavy snowfall.

► We provide you with tailor-made solutions for reducing energy consumption thanks to power-reducing ballasts and efficient light sources – all in compliance with the requirements of the particular application and without compromising on the quality of light.
Efficient light for streets, bridges and public spaces

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In towns and cities and in the country the lighting for roads, bridges and public spaces makes an important contribution to the quality of life.

Street lighting provides orientation and increases safety. At the same time, lighting effects are often used to create atmosphere. Urban marketing practitioners have discovered the significance of lighting and are using light to enhance the “linger” appeal of particular areas, especially in town centres.

The requirements that modern lighting systems have to meet are high. The luminaires have to operate in all weathers, comply with lighting regulations and consume as little energy as possible. We help you find the right solution for any application. For you and your customers to protect the environment and the budget.
There are many ways to save energy in street lighting. It makes sense to optimise the operating times of the luminaires and to reduce their output at certain times. Modern ballasts and lamps with high efficiency also reduce energy costs considerably.

The benefits of modern lighting installations are particularly evident when you consider the costs over the whole lifetime of the lighting system – often as much as 30 years for street lighting. So count on us. Count on the reliability and expertise of Tridonic.
Anyone who is out and about in the dark knows how vital lighting is. While the optical requirements of outdoor lighting continue to increase and environmental aspects become ever more important, funds are often limited.

The use of energy-efficient components allows you to meet these requirements while keeping operating costs down. Investment in energy-efficient lighting solutions not only help the environment, they also help your budget.

**Legislation for increased energy efficiency**
Legislation is increasingly applied to energy efficiency, also for lighting. Even outside the EU, the effects of the European Eco-Design Directive for energy-related products (ErP) are already being felt with respect to light sources as well as to control gear.

As of 2015, the sale of mercury vapour lamps will be prohibited throughout the EU. These are technologically obsolete and inefficient. With 40 to 60 lm/W they are many times less efficient than for example 150 lm/W sodium vapour lamps or even modern metal halide lamps.

Ballasts are subject to minimum efficiency ratings as defined in the ErP Directive. Tridonic already supplies electronic and magnetic ballasts for the operation of high-pressure lamps which meet the 2017 efficiency criteria.
**Modern light sources for new and existing installations**

Both in new installations as well as for upgrading existing lighting solutions, different light source technologies can be used depending on requirements and local conditions. LEDs, metal halide lamps and sodium vapour lamps are the predominant technologies.

- **LEDs** are long-lasting but more importantly they generate full light output as soon as they are switched on. They can be dimmed rapidly and continuously. You can create atmospheres with different colour temperatures. The light is directed via a corresponding optic to precisely where it is required. Light and energy can therefore be controlled with high precision.

- **Metal halide lamps** with ceramic burners offer all the benefits of white light with high CRI. White light is perceived as aesthetically pleasing and contrast perception is significantly improved. In addition, with the same level of illumination, white light is perceived as significantly brighter than yellow light. These effects make it possible to switch to a lower wattage sometimes and thereby save energy.

- **High-pressure sodium vapour lamps** give off a warm yellow light and are based on a tried-and-tested and highly-efficient technology. Due to their specific colour spectrum, they are less attractive to insects. These lamps have a large dimming range, even with magnetic ballasts, and are particularly long-lasting.

**Tridonic control gear: benefits for every light source**

There is a huge range of high-pressure lamps. White light or yellow light? Standard wattage or special wattage? Or perhaps LED? The different parameters vary from one type of light source to another. However, the Tridonic operating concept remains the same: Tridonic ballasts are compatible with all groups of light sources – both white and yellow light in various wattages and for various lighting levels, plus LED and high-pressure lamps.
The purpose of a reduction circuit is to adjust the lighting level during the night according to the density of traffic. In practice it has proved appropriate to reduce the lighting level by as much as 50 % at off-peak times.

The light continues to be distributed uniformly so safety and energy savings go hand in hand. For achieving dimmable outdoor lighting Tridonic offers several options with electronic or magnetic ballasts.
Why not just switch off every second light?
Switching off individual luminaires or groups of luminaires seems to be a simple way to reduce energy consumption. However, the results are not ideal because there are sections that are in the dark. Darkness creates a feeling of unease and uncertainty, and there is a greater risk of accidents. With intelligent dimmable solutions, modern technologies and high-quality components it is possible to save a considerable amount of energy without impairing the distribution of light.

Energy savings but still high levels of safety. A dimmable system with uniform distribution of light ensures that people are never left in the dark.
More than one option for dimming high-pressure lamps

Our product range gives you the opportunity to respond with a high degree of flexibility to individual project requirements. It includes both PCIS outdoor DIM dimmable electronic high-pressure ballasts and special magnetic ballasts with power tapping. In the case of lighting systems without a control line or higher-ranking control system the ZRM U6M digital programmable power changeover switch automatically controls power reduction.

You benefit from the option of reducing the output of high-pressure lamps in compliance with the lamp specification by up to 50 percent of the rated value without affecting the lamp service life yet with considerable savings. The luminous flux is reduced to around 30 to 45 percent.

Lamp manufacturers are increasingly approving high-pressure metal halide light sources for power-reduced operation. The DALI/DSI interface of the PCIS outdoor DIM electronic control gear allows the dimming value to be adjusted specifically to the specifications of the lamp manufacturers. It is possible therefore to meet the specific requirements of different light sources. Every lamp is then operated under optimum conditions.

In El Astillero, Spain, the upgrades have led to a reduction in the energy consumption of the street lighting by 40 percent.

▼ At a glance:

- Dimming is an intelligent form of energy saving
- Tridonic offers you a varied product range so you have the flexibility to react to individual circumstances and objectives
Potential energy savings thanks to state-of-the-art control gear and lamp technologies

*The calculations are based on the following conditions:
Number of luminaires: 1,000
Operating time for the lighting system: 12 hours/day, 365 days/year
Operation with reduced dimming level: 7 hours/day
Electricity costs: 0.12 euros/kWh

<table>
<thead>
<tr>
<th>Light source</th>
<th>Wattage</th>
<th>Control gear</th>
<th>Lamp output dimmed to x %</th>
<th>kWh per year</th>
<th>Savings in comparison to HM + CCG in € per lamp</th>
<th>Saving in comparison to HM + CCG in %</th>
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<tbody>
<tr>
<td>Mercury vapour lamp (HM)</td>
<td>125 W</td>
<td>CCG*</td>
<td>-</td>
<td>613.20</td>
<td>-</td>
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<tr>
<td>... replaced by sodium vapour lamp (HS)</td>
<td>70 W</td>
<td>low-loss CCG**</td>
<td>-</td>
<td>368.80</td>
<td>29.33</td>
<td>40 %</td>
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<td></td>
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<td>low-loss CCG stepDIM</td>
<td>310.58</td>
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<td>354.34</td>
<td>31.06</td>
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<td>ECG DIM</td>
<td>257.76</td>
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<td>-</td>
<td>354.34</td>
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<td>297.84</td>
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<td>ECG DIM</td>
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<th>Light source</th>
<th>Wattage</th>
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<td>Mercury vapour lamp (HM)</td>
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<td>CCG</td>
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<td>1,200.12</td>
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<td>741.97</td>
<td>54.98</td>
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<td>low-loss CCG stepDIM</td>
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<td>75.66</td>
<td>53 %</td>
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<td>ECG</td>
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<td>83.90</td>
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<tr>
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<td>ECG</td>
<td>-</td>
<td>704.30</td>
<td>59.50</td>
<td>41 %</td>
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<tr>
<td></td>
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<td>ECG DIM</td>
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<td></td>
<td>ECG DIM</td>
<td>511.15</td>
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<td>57 %</td>
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</tbody>
</table>

* CCG: magnetic ballast
** low-loss CCG: low-loss magnetic ballast
*** ECG: electronic ballast
Typical applications

We help you turn your ideas into reality

Helix Bridge, Marina Bay, Singapore
The unusual design of the footbridge which connects the Marina Centre and Marina South in Singapore is further enhanced by the lighting concept using TALEX LED. The external skeleton of the 280 m long bridge is made of stainless steel and gives pedestrians the impression of moving through a double-helix DNS molecule.

The unique night-time lighting concept by Cox Architects, named EMO lighting, uses TALEXchain D511 RGB LED light chains from Tridonic and constant-voltage 0025 K220 120-240/12 V 25 VA TALEXconverter units provided by Illuminate Enterprise, the local Tridonic sales partner.

TALEXchain use the benefits of the latest Chip-On-Board technology (COB) from Tridonic to guarantee constant colour rendering with a 140 degree beam characteristic for uniform lighting plus unrivalled operating safety and service life.

Karl-Marx-Allee, Berlin, Germany
215 candelabra by the German architect Richard Paulick from the 1950s have been faithfully reproduced and brought up-to-date in energy terms with Tridonic components.

The luminaires were originally fitted with 4 x 250 W mercury vapour lamps. The new luminaires, manufactured according to protection class II, use the light provided by four energy-efficient 70 W metal halide lamps, respectively. Tridonic OMBIS 70 ballasts with dual insulation and Tridonic ZRM 2,5-ES/C igniters ensure specification-compliant operation. The luminaires were supplied by lighting manufacturer Hellux Constructions-Licht GmbH, a long-standing Berlin company. Thanks to the use of efficient lamp and control gear technology, energy consumption of the luminaires illuminating the boulevard has been reduced by around 70 %.

Tranchee couverte, tunnel in Meyrin, Switzerland
Traffic through the historic centre of Meyrin in the Canton of Geneva has been drastically reduced from 25,000 vehicles per day to 5,000 thanks to a newly built tunnel. Over a length of 565 m and a width of 8 m, appropriate illumination is provided by luminaires from Rigamonti, Tessin, lamps from Aura and GE and control gear from Tridonic.

In the tunnel itself, 255 x PCA EXCEL one4all ballasts are used, while 79 x PCIS outdoor DIM ballasts are installed in the transition zone. The ballasts are controlled via DALI signal by a SAIA-Burgess control system. The tunnel lighting is operated as a single unit, while the luminaires in the transition zone are controlled in groups. A major benefit of DALI control is that assignment to groups and dimming behaviour can be changed at any time without rewiring. This means that the safety concept and energy efficiency requirements are perfectly met.
Typical applications

We help you turn your ideas into reality

Street lighting of La Roda, Spain
The town of La Roda in Central Spain has converted the majority of its outdoor lighting to a more economically efficient system. The existing lamp posts were to be retained and the solution could not involve cost-intensive lighting management systems. Metal halide lamps are now used to illuminate the streets and plazas in the landmark town centre and special buildings. Elsewhere in the town, however, atmosphere is provided by sodium vapour lamps that produce an orange glow. Thanks to Tridonic's PCS and PCIS outdoor DIM B011 HID electronic ballasts, the outdoor luminaires can now be operated in an energy-saving manner. A major benefit of these devices is their flexibility: they can be used for different light sources and are able to dim lamps late at night without any problems. The stepDIM signal is generated and automatically adapted to the switching times in the luminaire. No external controller is needed. The power reduction results in less energy consumption and residents can count on safe, flicker-free lighting. Thanks to the use of Tridonic control gear, the lamps will last for their maximum service life, which is another commercial benefit as it keeps maintenance costs low.

Street lighting at the Paris-Orly airport, France
The focus of the extensive modernisation of the French airport was on sustainability and saving energy. Part of the renovation involved converting the access road to the “Pavillon d’Honneur” from a two-sided lighting system involving 150 W HPS lamps with spacings of 20 m into a single-sided installation using Thorn 103 W (7,700 lm) StyLED luminaires fitted with Tridonic Outdoor converters. The result is 25 % energy savings plus additional safety and comfort for travellers. Aéroports de Paris is highly satisfied with the appearance, the high performance and the environmental compatibility of StyLED. In order to make it as easy as possible for the electrical engineer to connect the luminaires to the mains power supply, they feature Tridonic connection technology using screwless terminals.

Rednitzhembach, Germany
After an upgrade with a supplementary impedance modern high-pressure sodium vapour lamps are used instead of high-pressure mercury vapour lamps. This reduces energy consumption significantly.

Key figures: 577 luminaires were upgraded from 80 W mercury vapour lamps to 50 W sodium vapour lamps.

Energy balance: Each year the new lighting installation reduces power consumption by 77,000 kWh, corresponding to a reduction in CO₂ of 43 tonnes. Around 10,000 euros are saved in energy costs so the upgrade pays for itself after only 6 years.
Depending on requirements and local conditions, a number of technologies are used to illuminate streets, bridges and squares. What are the benefits of each of these technologies?

Whether you choose an LED solution or high-pressure lamps with electronic or magnetic ballasts, Tridonic is a partner you can count on. Our product range is both wide and deep. With LED systems, modules and converters as well as HID control gear, we provide the appropriate technological basis for your lighting solution.

LED systems, modules and converters

- Full light output immediately after switching on
- Extremely long service life
- Fast and continuous dimming
- Suitable for control systems
- Flexible, state-of-the-art luminaire design
- Particularly suitable for new lighting concepts and “City Beautification”

High-pressure lamp technology

- Optimum lamp operation
- Compatible with the extremely good light-quality of Tridonic lamps
- High lighting quality (HI)
- Continuous dimming
- Suitable for control systems
- For new installations and upgrades

LED modules for street lighting

Tridonic brings the benefits of LEDs to street lighting. Here we offer you a flexible range of durable high-performance LED solutions that can easily be controlled with high precision.

Converters for LED modules

The compact one4all TALEXconverter units are ideally designed for integration of LED technology into compact lamp heads. The extremely robust TALEXconverter models allow targeted control as well as active monitoring of the LED modules.

PCIS outdoor DIM

These electronic dimmable ballasts for metal halide lamps and sodium vapour lamps were developed specifically for outdoor applications. Controlled via stepDIM, DALI or DSI.
CCG with power tapping
These special magnetic ballasts allow you to operate high-pressure sodium vapour lamps at two different output levels.

ZRM U6L and ZRM U6M A001
The power changeover switches give you the option of switching the lamps to a lower power level – with or without a control line.

ZRM U6M A003
The timer-controlled power switch allow you to switch the lamps to a lower output level even without a control line.

High-pressure lamps and magnetic ballasts

- Reliable and established technology
- Extremely durable ballasts
- Dimming option: stepDIM (HS)
- Moderate investment costs
- Particularly suitable for functional lighting

Lamps and electronic ballasts

- Very efficient HD lamp technology
- Easy upgrade and replacement
- Compatibility with existing installations

PCIS outdoor DIM
These electronic dimmable ballasts for metal halide lamps and sodium vapour lamps were developed specifically for outdoor applications.
Controlled via stepDIM, DALI or DSI.

La Roda, Spain
Energy saving at the highest level

LED system solutions for street lighting

Light emitting diodes have become an essential part of modern lighting technology. While used only for specialist applications in the beginning, these days they represent a true alternative.

And for good reason, as the Tridonic TALEX LED solutions demonstrate in everyday use. They are compact and reliable, resistant and durable, and can flexibly be adapted in terms of colour and brightness to suit the requirements of specific projects or applications.

The compactness and flexibility of the LED have opened up a new level of design freedom in luminaire design. In addition, LEDs can emit different light colours. In particular the different colour temperatures are welcomed in outdoor lighting as a means of increasing visibility and a feeling of safety.

Other benefits of the LED are continuous dimming and the fact that the required lighting effect is achieved as soon as they are switched on. This is supported by the use of intelligent converters to control the LEDs.

LEDs are durable, which is a strong argument for their use in street lighting. With an expected service life of 50,000 hours and more, LED systems considerably reduce maintenance costs.
Targeted light for optimum illumination

The use of LEDs enables the composition of an optimised colour spectrum which supports contrast perception and optimises mesopic vision. Thanks to LED technology, the light is optimally directed and thus enables uniform illumination. This targeted direction of light often results in more uniform illumination and increased energy efficiency without having to alter the lamp post spacing.
Ready for the future with LED
Tridonic has developed the TALEX LED systems (LED light engine) specifically for outdoor use. They are supplied in constant lumen packages. Therefore the existing system can be extended with more efficient modules or a damaged lamp head can be replaced without difficulty at a later date. The patented Glob-Top process ensures precise definition of the colour temperature. This ensures that divergences in the colour temperature are avoided and the optical impression of the lighting system is retained. At the same time, the standardisation of the systems – which correspond to the electrical, thermal, mechanical and optical standards of the lighting industry – guarantees that your investment is safe for years to come.

TALEX LED systems – more than a module
The Tridonic light engines comprise several components – LED module, converter, cable and accessories – and represent a perfectly inter-compatible system solution.

TALEXengine STARK RLE* (Road Light Engine) has been designed especially for use in street lighting and comprises TALEXmodule STARK RLE and specifically adapted outdoor converters.

*available in the 2nd semester of 2012
LED technology will define the future of street lighting as improvements to its luminous efficacy continue to be made. This is demonstrated most impressively by TALEXengine STARK RLE as the LED light engine designed for outdoor applications.

This energy-efficient light source has been designed to be combined with reflectors and is therefore suitable for upgrading existing fixtures and for using as the basis for new fixture designs. The main applications of the light engines, which are available in a choice of 3,000 K, 4,000 K and 5,000 K colour temperatures and a colour rendering index of CRI > 60 or CRI > 80, include illumination for residential streets, municipal parks, footpaths and car parks. The appropriate versions with 2,500 lm, 4,000 lm and 6,000 lm provide the required brightness.

**Completely sustainable**
The directional light, together with the high luminous efficacy of up to 100 lm/W, adds up to an excellent optical efficiency of almost 90 %. This provides the basis for extremely energy-efficient operation. Compared with conventional fixtures the energy consumption and therefore the energy costs can be reduced by as much as 80 %.

**Added value every day**
The dimmable TALEXconverter LCAI units are perfectly designed to control TALEXengine STARK RLE. Different operating modes such as chronoSTEP, 2-channel layout, DALI, DSI and stepDIM, enable it to be easily integrated in local control strategies. There is stepDIM for simple night-time brightness reduction with a time, right up to the intelligent chronoSTEP function in TALEXconverter LCAI one4all. In this case, the converter evaluates defined parameters and for example automatically reduces the illuminance during off-peak times.

With TALEXengine STARK RLE product series Tridonic has developed a Zhaga-compliant LED system solution for outdoor applications. This means that excellent white light quality is available in the municipal environment. Parks, squares and paths will all be given a brilliant make-over.
LED system solutions for street lighting

Maximum possible design freedom with TALEX LED modules
TALEX module RECTANGULAR and TALEX module SPOT have an outstanding 140° beam characteristic and allow excellent thermal management with simple positioning of the cooling element in the luminaire. These high-performance, durable lighting packages can be used for energy-efficient wide-area illumination, particularly of large open spaces such as squares, parks and pedestrian areas. Enjoy the freedom of design and help yourself from our wide-ranging portfolio of high-performance LED modules in a variety of shapes and light colours.

<table>
<thead>
<tr>
<th>TALEX module RECTANGULAR</th>
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<tbody>
<tr>
<td><strong>Luminous flux</strong></td>
</tr>
<tr>
<td><strong>Colour temperature</strong></td>
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<tr>
<td><strong>CRI</strong></td>
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<tr>
<td><strong>Service life</strong></td>
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<th>TALEX module SPOT</th>
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<tr>
<td><strong>Luminous flux</strong></td>
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<td><strong>Colour temperature</strong></td>
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<td><strong>CRI</strong></td>
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<tr>
<td><strong>Service life</strong></td>
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</table>
PCIS outdoor DIM electronic ballasts have been designed specifically for outdoor applications.

A high-quality filling compound provides effective protection against moisture, dust and vibrations for the electronic components. The device also has enhanced protection against transients. The PCIS outdoor DIM electronic ballast can be dimmed in different ways – with very little effort at two levels, or continuously with digital control between 100 percent light output and the lamp-specific minimum value.

**stepDIM**

**Energy saving with two fixed output levels**

In stepDIM mode the PCIS outdoor DIM device switches between two output levels. For sodium vapour lamps, for instance, the light output settings are between 100 and 40 percent. If necessary, these values can be changed before installation via the integrated DALI interface.
The outlay required to integrate PCIS outdoor DIM devices into existing lighting systems is very low – with or without mains control line. If there is no control line available, the ZRM U6M A003 handles control for power reduction at the correct time depending on the time of year. You can therefore offer your customers an independent lighting solution that automatically reduces output without the need for an external control system. For details on the function of the ZRM U6M see page 33.

A stepDIM installation with PCIS outdoor DIM devices pays for itself in only a short time. A 150 W sodium vapour lamp operated on stepDIM consumes around 30 percent less energy than a standard solution if over a total operating time of 12 hours the light output is reduced to 40 percent for 7 hours.

For more information please refer to the brochure on electronic HID ballasts for high-intensity discharge lamps.
Infinite dimming:  
For the extremely efficient use of energy  
The PCIS outdoor DIM electronic ballast can be infinitely dimmed via the integrated DALI interface. Any dimming level from 40 (for sodium vapour lamps) to 100 percent can be set.

In street and tunnel lighting, DALI and DSI are generally used exclusively for communication between the ballast and system interface. The luminaire is then controlled via a higher-ranking tele-management system. This separation of the system interface and ballast reduces the amount of configuration needed in the event of maintenance work and gives you the option of selecting any tele-management system you want.

An infinitely dimmable lighting system with PCIS outdoor DIM devices achieves extremely high efficiency thanks to its flexibility. This is because the light can be adjusted to provide precisely the right amount at any time. If for example the output of a 150 W sodium vapour lamp is reduced in a number of stages, the energy consumption is reduced by around 35 percent compared with a standard solution.

Example of gradual power reduction

For very low energy consumption the output of the street lighting is reduced smoothly.
A flexible future
Since the PCIS outdoor DIM gear permits control via stepDIM, DALI and DSI, your investment can be phased: This means that today you can install a simple independent stepDIM solution and then at a later stage integrate the same ballast in a higher-ranking control system. New light sources are also being used more and more in this lighting segment. We would be pleased to discuss your requirements with you.

Example of gradual power reduction

Different communication protocol e.g. wireless, powerline communication

The products at a glance:

- PCIS 100, 150, 250 outdoor DIM B011
- PCS 50 and 70 outdoor DIM B011
- PCI 45, 50, 60, 70, 90, 140 outdoor DIM B011
- ZRM U6M A003 power changeover switches without control lines

El Astillero, Spain
Magnetic stepDIM ballasts with power tapping allow you to operate lamps reliably at two different power levels. Make use of off-peak periods to save energy.

Tapped ballasts:
reduce output to reduce energy consumption
With a magnetic ballast you can dim a sodium or mercury vapour lamp in accordance with its specifications to as little as 50 percent of its rated output without impairing the life of the lamp. For this arrangement two versions have basically become established on the lighting market.

The most commonly used is the tapped ballast which reduces the output of the lamp with standard impedances. These ballasts provide two standardised impedances. An OMBS 150/100 for example is designed to operate 150 W HS lamps. For reduced power mode it provides a tap with the impedance for 100 W HS lamps. This reduces power draw by around 47 percent.

Alternatively, ballasts can be used that are designed specifically for 50 percent light output in reduced mode. A good example is the OGLSU 250 50 Percent. For a power reduction of 36 percent it reduces the light output of a 250 W HS lamp by half.
Power changeover switch ZRM U6M: power reduction with CCG stepDIM without a control line

The ZRM U6M A001 power changeover switch enables the illuminance to be automatically changed by selecting either of the two power taps (100 percent and 50 percent) on the ballast. Thanks to the integrated digital circuit, there is no need for external control lines. You can therefore provide an installation without any additional control lines very cost-effectively.

The ZRM U6M power changeover switch operates an internal relay at defined times. The time between switch-on (dusk) and switch-off (dawn) is averaged as the reference time. This time is “natural midnight”, which is always between 00:15 and 00:45. A microprocessor uses this reference time to determine the required changeover time.

The basic configuration set at the factory is a changeover time of 2.5 hours before natural midnight (approx. 22:00) or 4.5 hours after natural midnight (approx. 5:00) and can be reprogrammed at any time after installation.

This diagram shows an example of the switching times in the spring or autumn. You can see that the switch-on times for the entire installation (yellow area) are much shorter than in the winter months because of the amount of daylight available. The reduction time of 7 hours (factory default), which is based on the average switch-on time, is still in the same place, in other words the reduction takes place at the same time.

Power changeover without a control line with ZRM U6M

### Diagram

- **No-load operation**: pins 1 and 2 switched
- **100 % operation**: pins 2 and 3 switched

**Power changeover without a control line:**

- ZRM U6M A001 for CCG
- ZRM U6M A003 for ECG
Power changeover switch ZRM U6L:
Power reduction with magnetic ballast
CCG stepDIM with control line
If a control line is available, you can reduce the power of tapped ballasts via power changeover switch ZRM U6L or ZRM U6L/T.

Power changeover switch ZRM U6L ensures that during the short changeover phase a minimum current flow is maintained so the high-pressure lamp does not go out. Power changeover switch ZRM U6L/T also contains a time delay circuit so that the high-pressure lamp is operated at 100 % power during the start-up phase, even after brief power outages. This changeover delay prevents the light source from ageing prematurely.

Power reduction for high-pressure sodium lamps with tapped control gear and power changeover switch ZRM U6L

<table>
<thead>
<tr>
<th>Lamp</th>
<th>Control gear</th>
<th>Changeover switch</th>
<th>Reduction to % luminous flux</th>
<th>Total Wattage W</th>
<th>Lamp current A</th>
<th>Lamp wattage W</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>full</td>
<td>reduced</td>
<td>full</td>
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<tr>
<td>NAV-T 50W</td>
<td>OMBS 50/55</td>
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<td>OMBS 100/70</td>
<td>ZRM U6L</td>
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<td>123</td>
<td>84</td>
<td>1.20</td>
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<td>NAV-T 150W</td>
<td>OMBS 150/100</td>
<td>ZRM U6L</td>
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<td>181</td>
<td>97</td>
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<td>OMBS 250/150</td>
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<td>133</td>
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<td>OGLSU 250/150</td>
<td>ZRM U6L</td>
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<td>280</td>
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<td>NAV-T 400W</td>
<td>OGLSU 400/250</td>
<td>ZRM U6L</td>
<td>40</td>
<td>429</td>
<td>215</td>
<td>4.60</td>
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<tr>
<td></td>
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<td></td>
<td>full</td>
<td>reduced</td>
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</tr>
<tr>
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<td>OMBSU 150 50 %</td>
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All measurements taken for a free-burning lamp. Measured values may vary from lamp to lamp. The measured values relate exclusively to the lamps used.
Components

2 High-pressure sodium vapour lamp
3 Magnetic ballast with power tapping
4 Igniter
5 Power changeover switch

Another energy-saving opportunity: additional impedances

Converting from mercury high-pressure lamps to sodium high-pressure lamps is simple, quick and cost-effective with Tridonic additional impedances.

For more information, please contact your Tridonic partner!
ecolution

Integrated sustainability in all areas

With ecolution, Tridonic sets new sustainability standards that go far beyond just environmental protection.

ecolution is a synonym for the integrated sustainability strategy which influences every aspect of our company. ecolution is nothing less than the foundation for the way we think and act at Tridonic: We evaluate the entire production and life cycles of our products and services in terms of environmental compatibility and economic efficiency. This is the driving force that motivates us. Accordingly, we set standards that go far beyond mere environmental protection, assuming responsibility towards our employees and our customers, towards the environment and society.

Minimum costs, maximum energy efficiency
For years, local authorities, electricity suppliers and industrial enterprises have been conducting intensive research into identifying potential areas for cost savings. Their attention has focused above all on lighting for streets, footpaths, parks and gardens. Replacing old technology costs money. But fresh ideas can lead in new directions.

Dimming for greater energy efficiency
With the option of dimming, Tridonic operating devices and power changeover switches pave the way for massive energy savings in outdoor applications. They enable you to reduce the output and therefore save energy as soon as full output is no longer needed. The options include simply reducing the output during the night and achieve maximum efficiency with infinitely variable dimming. Advantage can be taken of off-peak times to reduce energy consumption significantly.

▼ ecolution stands for:

- protection of the environment and climate
- savings in natural resources
- use of recyclable materials
- increased return on investment
- eco-friendly production and packaging
At Tridonic our daily quest is to create perfect light. 2,300 experts worldwide are working tirelessly to control, regulate and operate lighting in exactly the way you want it. And we have been doing this for more than 50 years with enormous passion and in cooperation with you. **We devote all our energy to your light.**

Visit www.tridonic.com to find your personal contact at Tridonic.

Further information and ordering data:

- **Product catalogue**
- **Data sheets available at** www.tridonic.com, “Technical data” menu
- **Certificates at** www.tridonic.com, “Technical data” menu
- **FLASH customer magazine**

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