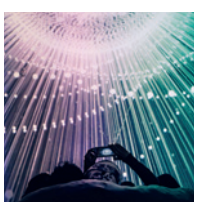
Informing the electrical industry for over **140** years

Electrical Review

September 2018
Volume 252 | No 9
www.electricalreview.co.uk

Transformers
Quantifying contaminants in oil and gas for recycling

Transformers
Quantifying contaminants in oil and gas for recycling

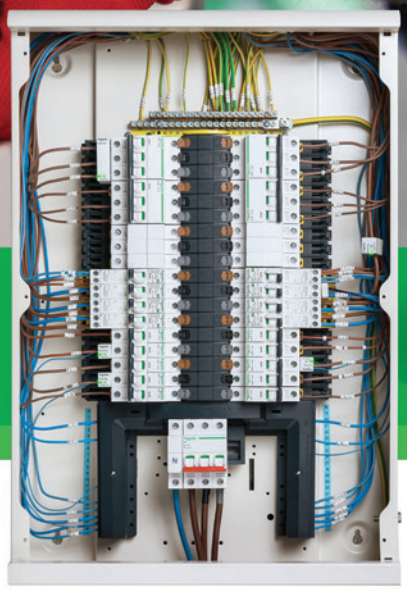


Lighting
Intelligent control systems for the correct amount of light where and when it is needed

Acti9

Isobar P

Quick smart solutions



Acti9 Isobar P distribution boards now offer new and unparalleled reliability, protection and simplified installation whilst building on our existing market leading Isobar solutions.

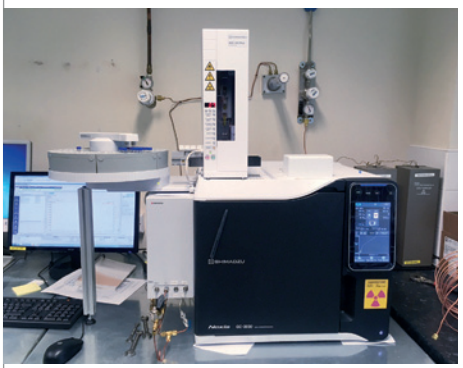
Through over a quarter of a century of market leading innovations, Isobar distribution boards have come to represent a premium level of performance.

Our latest addition, Isobar P, further enhances this reputation by launching the first plug-on neutral & functional earth RCBO.

- **Time saving** due to the quick and simple plug on technology
- **Fast and efficient** due to absence of functional Neutral and Earth wires to unravel and straighten
- **No need to cut**, dress or terminate any functional wires

schneider-electric.co.uk/isobar-p

Life Is On | Schneider Electric



EDITOR: Elinore Mackay 020 8319 1807
elinorem@electricalreview.co.uk

EXECUTIVE EDITOR: Claire Fletcher
clairef@electricalreview.co.uk

PRODUCTION MANAGER
Alex Gold
alexg@sjpbusinessmedia.com

SALES MANAGER
Sunny Nehru +44 (0) 207 062 2539
sunnyn@sjpbusinessmedia.com

ACCOUNT MANAGER
Amanda McCreddie +44 (0) 207 062 2528
Amanda@electricalreview.co.uk

PUBLISHER
Wayne Darroch

PRINTING BY
Buxton

Paid subscription enquiries
Tel: +44 (0) 1635 879361
electricalreview@circdata.com
SJP Business Media
Unit K, Venture House, Bone Lane,
Newbury, RG14 5SH

Subscription rates:
UK £221 per year, Overseas £262

Electrical Review is a controlled circulation monthly magazine available free to selected personnel at the publisher's discretion. If you wish to apply for regular free copies then please visit: www.electricalreview.co.uk/register

Electrical Review is published by

SJP business media

2nd floor, 52-54 Gracechurch Street
London EC3V 0EH
020 7933 8999

ISSN 0013-4384 – All editorial contents © SJP Business Media

abc Average net circulation Jan-Dec 2016 6,162

Follow us on Twitter @elecreviewmag

Join us on LinkedIn

Up and Up

News has revealed energy regulator Ofgem has adjusted its safeguard tariff, controlling the maximum price of each unit of energy.

In one of its twice yearly adjustments, the regulator says the increase is justified, with £47 a year due to higher wholesale energy costs on a variable tariff with the safeguard tariff rising to £1,136 in October for pre-paid fuel.

The safeguard tariff stops suppliers from overcharging customers on poor value deals because suppliers have to keep their prices below the level of the safeguard tariff. It was introduced in April last year for prepayment meter customers.

In February this year, Ofgem extended the safeguard tariff to protect 1 million more vulnerable consumers who are on poor value standard variable tariffs and receive the government's 'Warm Home Discount'.

Dermot Nolan, chief executive of Ofgem, said: "Around 5 million households, including some of the most vulnerable, remain better off and are no longer overcharged for their energy thanks to the safeguard tariff. "Any price rise fofgemor customers is unfortunate. But while the level of the tariff will rise in October, these customers can be confident that this increase is justified and that their energy bill reflects the real cost of supplying gas and electricity. There are also better deals on the market for those who want to save even more money by switching.

"Ofgem is working to put in place price protection for 11 million more households on poor value deals so that everyone pays a fairer price for their energy."

Is this another blow for the most vulnerable in society, or a sensible way of encouraging people to consider switching supplier, leading to those on poor value deals paying a fair amount for their energy?

Objections force shelving of planned plant

A planning application to build an electricity generation plant has been withdrawn by the developer.

Under plans submitted by UKPR, an electricity generation plant would have been built on the site of a former waste tip in Surrey.

It would have seen the installation of up to 33 gas fired generators which could run without a permanent workforce on the site according to Surrey Live.

In planning documents submitted to the council, the developers claimed the site would "not result in any adverse visual impact", while providing a "localised, low carbon energy supply".

Concerns about how it would affect the health of local people, property prices and the wildlife in the area were raised following the publication of the plans.

The local council - Woking - could not/would not give any reason for the turnaround.

Will these complainants be quite so vocal when local power supplies become an issue, or will the developer try again in time?

Beast of a light

Heavy metal band Iron Maiden packed arenas attracting crowds with its spectacular Legacy of the Beast European tour. Helping to bring its richly-designed stage show to life was entertainment lighting from Signify.

The company's Philips Vari-Lite VL6000 beams provide both the heavy-duty punch and the subtlety required by lighting designer Robert Coleman - from a searchlight that depicts war, to illuminating a stunning cathedral and finally, Hell. "They are versatile and incredibly powerful - they've been hitting the back wall of the stadiums," he said. "Also, the combined colours from them have been stunning. I have particularly enjoyed the strobe, especially when blasting the audience." The 38-date Legacy of the Beast European tour ended in London.

LUCECO
LIGHTING SOLUTIONS

Kingfisher Lighting

LED Exterior Range

kingfisherlighting.com

Energy efficient, cost effective Exterior LED Lighting Solutions for:

- Car Parks
- Distribution & Warehousing
- Road & Street Lighting
- Urban Landscapes
- Transport
- High Mast & Flood Lighting
- Sports Facilities

Full lighting design service available

LED

Long life LED luminaires
Contact Luceco on **(01952) 238 100** | **www.luceco.com**

A step in the right direction

Over 25% of all fires in Europe each year are caused by an electrical defect, according to the Federal Ministry of Labour, Social Affairs and Consumer Protection. Despite huge advances in safety measures such as smoke detectors, these accidents still result in 4,000 deaths, 70,000 hospital admissions and property damage rising as high as €126bn.

While current UK electrical regulation remains below the level required to maximise protection against electrically-ignited fires, the 18th Edition to the IET Wiring Regulations – published in July this year – is a step in the right direction. This new national standard includes significant changes such as the requirement for a 'switching device' to be implemented in the installation of renewable energy storage systems and recommendations for Arc Fault Detection Devices (AFDDs) in AC final circuits.

Other countries, such as Germany and the US, already place specific requirements on where AFDD use can be mandated and the 18th Edition of the IET Wiring Regulations has already sparked great discussion about new technology that can mitigate the risk of electrical fires.

Seven steps for survival

With the current 2018 record-breaking summer heatwave potentially stretching on into August, and possible, November, Bsria has created a seven steps to surviving in buildings, factory, office and workplace alike guide:

- Installation of external solar shading – technicalities, practicalities and location allowing.
- Installing glazing that reduces solar gain – possibly 'green' foil that reflects high levels of radiant heat.
- Leaving thermal mass exposed as part of major internal refurbishment of concrete or masonry buildings.
- Making use of night-time free cooling, either using a building's existing ventilation system, or some kind of 'manual' method (security should be taken into account if leaving windows open at night).
- Reducing internal gains by installing energy efficient lighting and ensuring all lights and other electrical equipment are switched off when not in use.
- Installation of energy-efficient air conditioning (although this should be seen as a last resort and it may be a trigger for Consequential Improvements under Building Regulations)
- Use of 'old-school' fans.

Drinking water should play a big part – with water coolers available for staff to keep hydrated and reminders for staff to drink more. One should be aiming for over the recommended two litres per day in hot weather.

Another idea is to unplug electrical devices once they're charged. Indeed: chargers, iPads et al all produce unnecessary heat while they're plugged in – and every little bit helps when you're trying to cool down."

Award winning power protection systems from 400VA to 6MVA

Power protection for the most critical Data Centre, IT, Telecommunications and Fintech applications.

DUCATI CORSE Official Sponsor

Audi Sport Official Partner

Reliable power for a sustainable world

www.riello-ups.co.uk
0800 269 394 sales@riello-ups.co.uk

#myRielloUPS

RIELLO ELETTRONICA riello ups

GOSSAGE

Snouts in the trough

As a member of the European Union, the UK government is required to provide the European Commission with a whole host of statistics each year. Whilst these are all officially placed on the public record, the most interesting parts seem inevitably to be tucked away in obscure Annexes.

As part of my long-renowned capacity for establishing some hitherto obscure factoids, I thought my thousands of devoted readers would be interested to learn that last year the UK government paid out no less than £16.8m in compensation to heavy industry. This was for "indirect" European emission trading scheme costs resulting from higher electricity bills.

You will be pleased to gather the chemical industry got the biggest bung, worth £5.9m. But hot on their heels were the iron and steel makers, who divvied up £5.85 m between them. Companies making paper got £4.6 million. And those humble makers of non-ferrous metals got just £400,000 between them. Still, not to be sneezed at.

I suspect this year the very same companies may be beneficiaries on a similar basis. But I have a nasty feeling, knowing the official date next March for termination of UK involvement in the EU, our friendly government will see little reason why anybody should know about the equivalent 2018-related largesse. Apart of course from the companies benefitting. We shall see.

Chinese checkers

This year marks the twenty first anniversary of the Kyoto Agreement. That was the world's first serious attempt to create a treaty that addresses the threat of climate change. At the time, China was amongst the less developed of emerging economies, with a Gross Domestic Product per head somewhat lower than Namibia.

It was attended by the then US vice-president Al Gore, who – despite receiving many more votes than George W Bush – still did not become President in 2000. But then went on to devote himself to campaigning to alert the world to the perils of global warming. Initially with that memorable documentary "An Inconvenient Truth."

Gore will have been as bemused as everybody else to see a tweet sent out by another man who became president despite receiving almost three million fewer votes than his opponent. This tweet from, Donald J Trump, issued exactly one year before he was 'elected', reads: "The concept of global warming was created by and for the Chinese, in order to make US manufacturing non-competitive."

As the Duke of Wellington said: " If you can believe that, sir, you can believe anything."

Don't damn dams

Do you realise more than 3,500 hydropower dams are being planned or built around the world? And that this number is reckoned to have doubled by 2030? And mostly funded and built by Chinese companies?

Brazil leads the way in terms of the absolute number of new dams. Although China itself is still expected to produce the most electricity using hydropower. As by definition water-based power in non-fossil fuel and thus entirely renewable, you might reasonably expect some serious rejoicing at this trend.

However, given the worldwide attention paid to the new dam in Laos that last month collapsed during its second day in operation, there is an inherent danger of building too many dams, too fast and without sufficient consideration for the consequences. For instance, Laos itself wants to have 110 dams operating by 2021.

A 2012 survey found over 70% of people of the 80 million people worldwide who have been resettled by dams feel they have been impoverished in consequence. Even so dams by definition are here to stay, And should never be condemned out of hand.

Fracking: a Ponzi scheme?

Much rejoicing amongst fracking companies that the UK government is providing yet another incentive for them, by proposing to abolish any requirements to require planning permission prior to start drilling in the countryside . Apart that is from in Scotland, where such activity is forbidden. As it is in Germany. And in France. And in a host of other European countries.

The bans have mostly been introduced for social and environmental reasons. But looking at the financial track record of specialist fracking companies in the USA, those administrations may well be doing a considerable favour to potential investors, by warning them off. Why? Simply because, over the past decade, the American shale industry has proved to be truly a loss-maker extraordinaire.

Total income receipts from both US gas and oil fracking sales is reckoned to be around $ 324 billion between 2007 and 2016. But that sum is exceeded by a total for reported costs for drilling and completion of $350billion. You need to add to that a further $70 bn for leases, royalties and interest. Plus $227bn for the issuance of debt and junk bonds. All of which adds up to total costs of $647 bn . In other words, total reported costs for the US fracking have been more than double total sales revenue.

The unprofitability of fracking means that the industry keeps on borrowing, acquiring new debt, in order to pay back existing debt. If you will forgive me, that sounds to me the very definition of a Ponzi scheme. In other words, just riding for a fall.

Certainly past investors in fracking in Poland have quit with their fingers badly burnt. Ask Chevron. Or Exxon Mobil. So even as the cheerleaders for would-be UK frackers like Ineos and Caudrilla cheer, I would wave at them this quotation from the Financial Times investment column Lex: "The cult following still believes that fracking in the UK could be profitable. Investors should allow market forces to finally kill it off." Er, quite so.

VERTIV™

Your reliable buddy: The COMPANO 100 universal testing tool

In principle, any test set that can output a current and a voltage is suitable for the vast majority of wiring tests. It should also have inputs for measuring current and/or voltage. However, on closer inspection, some devices reveal major disadvantages when used for such tests. Some errors, such as faulty make-before-break contacts of the test switches, are impossible to verify at all. Polarity checking with traditional sources and measuring inputs is of course possible, but a cable must always be run from the measuring point back to the source – a task that is very time consuming. If this is not done, multiple errors can go undetected. Furthermore, the points of injection are often far away from the mains sockets, forcing the engineer to find power sockets and roll out extension cables for mains connections.

To tackle these issues, OMICRON's COMPANO 100 equips engineers with an easy-to-use, universal protection test set for the primary and secondary injection of test signals.

BATTERY-POWERED

Designed with mobility in mind, the COMPANO 100's powerful energy source will last throughout the entire work day, eliminating the need to search for sockets or use awkward extension cables. This makes the device ideal for use in frequently changing test environments such as substations, industrial facilities, rail networks and renewable power generators. Weighing just 10kg, this compact and robust test set also has an integrated handle to enhance its portability.

HIGH ACCURACY

The assumption that test sets always provide preset values is a common misconception. Often, the "power case" is actually a voltage source and the output signal must be readjusted in line with the load. For sensitive equipment and tests, this can quickly lead to incorrect results or even damage, as relays can be destroyed without this being realised. Like all OMICRON test sets, COMPANO 100 is a fully electronically controlled signal source and it outputs the preset value directly. The high accuracy remains intact even with very small values and it supplies a wide variety of frequencies, signal waveforms, automatic ramps, pulse ramps and DC all via a powerful voltage and current output. Two analog or binary inputs (optional) complete the connection options of the test set.

NUMEROUS APPLICATIONS

COMPANO 100 was designed as a flexible test set for numerous applications – from classic wiring testing and micro-ohm measurements to simple relay testing and continuity testing with high currents – it unites numerous test functions in one compact design. This makes the device very appealing to energy suppliers, rail network operators and service providers alike, not to mention industrial application users and device manufacturers.

EASY OPERATION

Illuminated controls and a brilliant colour display make using the COMPANO 100 child's play – even in the dark! Easy operation via the control wheel and clearly structured menus also make the device comfortable and easy to use, even in adverse conditions. An emergency stop button placed at the center of the unit also ensures maximum safety in all scenarios.

The applications are clearly structured in modules to allow test steps to be implemented quickly and easily, and the most frequently used modules can even be accessed directly via predefined buttons – a great benefit when a device is operated by various users.

COMPANO 100 FACT BOX:

- Fully electronic device delivers exact set values
- Implements complex, predefined sequences and ramps
- Signal generation for fast polarity checks
- Long operation time due to the latest battery technology
- Low weight: 10 kg
- Testing of static and numerical relays
- 150 Volts AC /220 Volts DC
- 110 Amps AC/ 100 Amps DC Frequency range 15 to 500Hz

david.brazier@omicronenergy.com
www.omicronenergy.com

Josef Schmidbauer
Application engineer

Amazingly versatile

COMPANO 100 is a lightweight, handy and cost-effective testing tool for all of the basic testing tasks found in electrical energy systems. Predefined test modules and its innovative battery operation make it the most versatile single-phase test system on the market. Therefore, applications such as wiring, transformer and protection relay tests, as well as microohmic measurements are much easier to handle.

www.omicronenergy.com/compano100

OMICRON

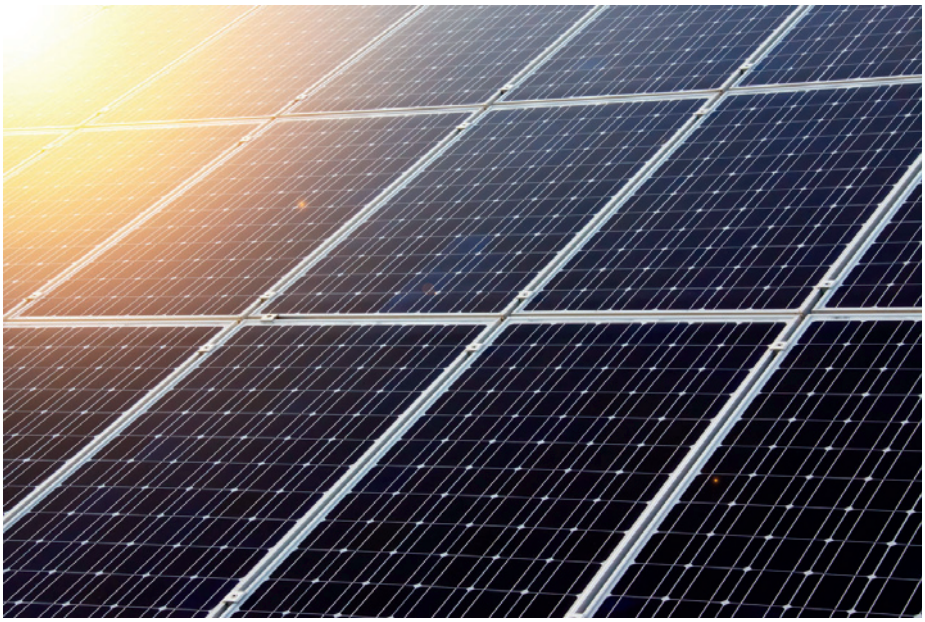
UPS: Transitioning from reactive to proactive

Emiliano Cevenini, vice president of commercial & industrial vertical for Vertiv EMEA, explores how we can utilise UPS batteries to not only generate revenue, but help support the energy grid and push the shift towards renewable energy.

Business continuity has always been critical for many industries such as air transportation, healthcare and banking, and more recently with the explosion of web services, the data centres supporting these businesses have become more vital.

Reliable technology and solutions are therefore paramount to ensure consistent uptime. Aside from the outage of service to customers, which in itself brings about serious consequences, in 2017 almost a quarter (24%) of businesses worldwide reported that the average hourly cost of critical server outages was between $301,000 and $400,000.

Therefore, investments are made heavily into Uninterruptable Power Supply (UPS) systems to ensure that business interruption is minimised even further. This back up device acts as 'insurance' for the business should something like a mains failure occur. However, National Grids are becoming more reliable. The grid in the UK was awarded in excess of £378m worth of contracts for the capacity market to ensure consistent power, while Germany's power grid ranks among the most reliable in the world.



> **In 2017 24% of businesses worldwide reported that the average hourly cost of critical server outages was between $301,000 and $400,000**

Although reliability of the grid is improving, it doesn't mean that power failures won't ever occur. For that reason, UPS systems are still a vital investment for mission critical businesses, but today, we are seeing new opportunities for these organisations. UPS owners can rely on a bank of stored energy within the batteries of the device that until now were, put simply, doing nothing. This is where the opportunity lies: to utilise this energy in a different way, if not for backup power at that moment in time.

EXPLORING THE UPS OPPORTUNITY

The batteries within the UPS have the potential to transition from being a backup source only to having a more proactive function. The concept is that the battery has the capability to feed electricity in the other direction, i.e. into the public power grid, in times of low consumption or high own generation. The owner of the UPS not only participates in the balancing energy market and stabilisation of the grid, but also opens up a new stream of revenue.

Our partnership with E.ON in Germany is an example of how this works in practice. At Vertiv, we develop and install the technology that enables batteries to act in this way for our current, and future UPS customers. A portion of the battery then becomes part of E.ON's virtual power plant, whereby it aggregates the various producers and consumers and markets them, meaning that the customer receives a guaranteed profit without compromising with the primary mission of the UPS, which is to protect the critical load.

A key component of this is the use of lithium-ion batteries. Typically, lead-acid batteries are used in critical energy infrastructures, but lithium-ion batteries are smaller, lighter and have a large number of charge-discharge cycles. As well as having a longer service life, these kinds of batteries also achieve a higher density and operate in a wider temperature range meaning they are ideal for the energy markets.

SUPPORTING RENEWABLE RESOURCES

But not only does this use of UPS batteries allow for new revenues and a way to support the energy grid, it also allows UPS owners to help contribute to the shift to renewable energy. In Germany, the government aims to get 35% of its power demand from renewables by 2020, and in the first half of 2017, surpassed its target with 37.6% of its power coming from renewable sources.

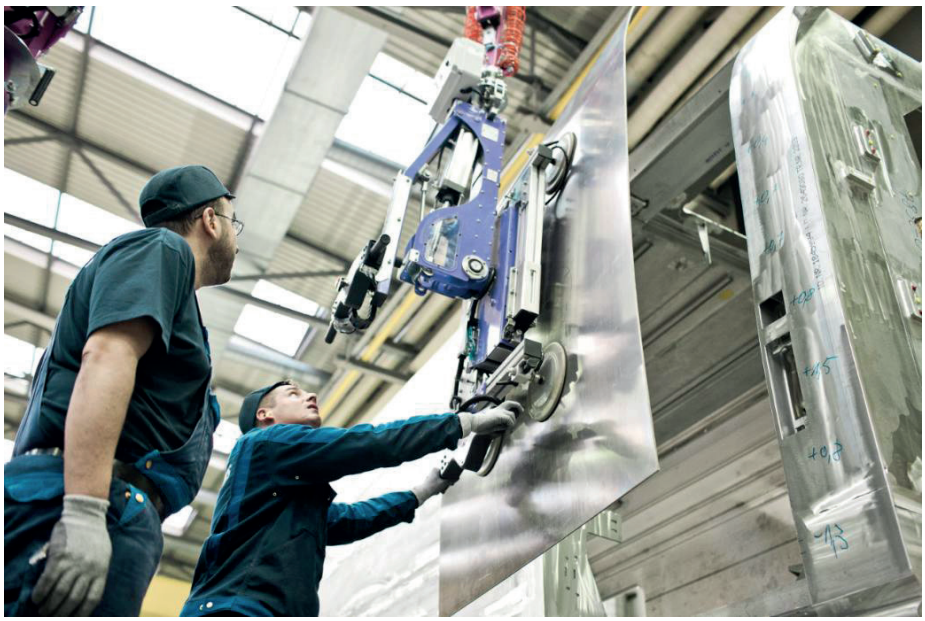
However, the shift from a fossil fuelled and nuclear powered grid to one that runs partly, if not completely, on renewable energy is not smooth. Given that renewable sources are not necessarily guaranteed 24/7, relying on elements such as wind or sun, this can result in an irregularity of power. Being able to drive energy into the power grid that otherwise isn't being used becomes of great support here. This concept, and as our work with E.ON in Germany shows, is a prime example of how UPS owners can help to manage the frequency of the grid when these sources are not predictable or available in a cost-effective manner.

The time is now to unlock the added potential of UPS batteries. With lithium-ion here and ready to be utilised, there is no reason as to why using batteries proactively, as opposed to only reactively, can't become a reality for all UPS owners. Our German customers are already reaping the benefits of an extra stream of revenue thanks to the partnership with E.ON, while also supporting the country's transition to a renewable grid. ER

Transforming manufacturing with the Internet of Things

Brian Foster, head of industry finance at Siemens Financial Services in the UK, spoke to Elinore Mackay, editor of Electrical Review, on how digitalised technology will transform the UK's manufacturing industry and how new financing methods are key to this development

Manufacturing is changing rapidly as advancements in new generation digitalised technology (also known as Industry 4.0) are helping to transform the production process through greater integration of physical production with digital technologies, such as robotics, software, sensors, virtual reality and 3D printing to name but a few. The connection of devices or appliances to the Internet (known as the Internet of Things) is a core pillar of the digitalisation of manufacturing, enabling manufacturers to monitor and swiftly act upon data flowing from connected people, machines and systems. These changes will allow manufacturers to innovate more rapidly and increase revenues through greater efficiency and agility.



"Manufacturers must implement smart production"

The manufacturing sector currently accounts for 10% of the UK's economy but investment in new and constantly adapting technology is predicted to see this expand. A recent UK government-commissioned report found that the positive impact of Industrial Digital Technologies, including Internet of Things (IoT) technology, over the next decade could be as high as £455bn for UK manufacturing, increasing manufacturing sector growth between 1.5 and 3 percent per annum, creating a net gain of 175,000 jobs and reducing CO2 emissions by 4.5%.

Information and data is collated by computers (often cloud-based) that enables manufacturers to monitor and adapt their production process to help achieve greater efficiency. IoT has the ability to transform every area of manufacturing - from operations such as asset management and machine maintenance to planning, quality control, and field service. Perhaps the most interesting and far-reaching change, however, will be the ability to provide mass customisation, enabling manufacturers to provide tailored offerings in everything from vehicles to clothes.

To achieve this, manufacturers need to implement smart production lines and IoT-enabled supply chains to react faster to customer requirements, and so deliver these higher-margin items.

It is predicted by 2020 more than half of major new business processes and systems will incorporate some element of the IoT technology. However, keeping pace with such advancements requires considerable capital expenditure. In this context, it is ▶

PowerControl

UPS HEALTH CHECKS

WITH AGE COMES AN INCREASED RISK OF FAILURE

Discover how £thousands could be saved with a free, non-invasive UPS efficiency review conducted on-site from Power Control.

What to expect from a free health check:

- **Visual inspection:** to evaluate the age and condition of the UPS system and battery set in situ through input/output voltage performance and load percentage
- **Environmental inspection:** test the surrounding area for temperature, humidity, ventilation and dust
- **Physical condition:** check for any signs of corrosion, damage and dust deposits within the UPS system
- **Infrastructure evaluation:** check the bypass panels, electrical discharge and cabling

The UPS health check is followed up with an efficiency report which will not only establish your ongoing and future costs but will also compare your existing UPS unit with other comparable systems. This will identify how efficiently your UPS solution is running.

Find out how much your business could save with a free UPS health check and efficiency audit. Email info@powercontrol.co.uk or call 01246 431431

Power Control Ltd, Rotherside Road, Sheffield, S21 4HL
www.powercontrol.co.uk

essential for manufacturers to seek new and sustainable ways of investing without hampering cash flow.

Against this backdrop, access to a range of smart and sustainable financing techniques, such as pay for outcomes, technology upgrade & update and working capital solutions (known as Finance 4.0) is critical to a company's ability to sustainably invest in the new fourth-generation of digitalised technology and automation equipment.

Finance 4.0 covers a range of requirements from the acquisition of a single digitalised piece of equipment, right through to financing a whole new factory. These financing methods can help make the upgrade to digitalised technology affordable and potentially cost neutral (or better) for the manufacturer.

Finance 4.0 arrangements tend to be offered by specialist providers, such as Siemens Financial Services, that have a deep understanding not only of how the digitalised technology works, but also of how that technology can be practically implemented. At times, the financing arrangement will be an embedded component of the value proposition, offered right at the beginning of the sales cycle. In other cases, the technology provider will refer its customer to one or more finance providers to fund the sale. This contrasts with the standard financing terms usually available from generalist financiers.

The benefits of digitalised technology for the manufacturing industry are significant and far-reaching and manufacturers are keenly aware of the need to keep up with new technology that is developing at rapid speed.

To best navigate this, such manufactures should consider working with a specialist financier to help them understand the most sustainable ways to invest in Industry 4.0 technology.

Whilst this can be a challenge, companies that delay investment and fail to embrace the opportunities available to them, risk being left behind by the competition. ER

1. The Manufacturer, IoT connectivity data analytics are transforming manufacturing, https://www.themanufacturer.com/articles/iot-connectivity-data-analytics-are-transforming-manufacturing/

2. EEF, Manufacturing Factcard 2017/18

3. HM Government, Made Smarter Review, 2017, https://www.gov.uk/government/publications/made-smarter-review

4. Manufacturing Global, Digitisation in the manufacturing industry, 23 March, 2018, http://www.manufacturingglobal.com/technology/digitisation-manufacturing-industry

5. Gartner, press release, 14 January, 2016, https://www.gartner.com/newsroom/id/3185623

IT'S IN OUR DNA.

Sudlows has been providing infrastructure and technical services to companies like yours for over 100 years. Call 0800 783 5697 or email hello@sudlows.com to discover more about what we can do for you today, tomorrow and for the next 100 years.

www.sudlows.com

SUDLOWS
working at the core of your business

CRITICAL INFRASTRUCTURES | ENTERPRISE SERVICES | FIBRE SPECIALISTS | ELECTRICAL SERVICES | BUILDING SERVICES | FACILITIES MANAGEMENT

End of the road for Halogen – the final phase-out

Electrical Review spoke to Simon Reed, general manager, Global FMG Business Unit for Sylvania

From September this year, almost all halogen lighting will be phased out to make way for more efficient and cost effective solutions. This is the last of a number of EU Eco-Design measures, which were first put into place in 2009 to bring the industry closer to meeting targets set out under the energy strategy for 2020.

The incandescent light bulb has existed for over 130 years, however, about 90% of the energy it produces is in the form of heat as opposed to light, making it hugely inefficient. That translates into 75% more energy used than LED alternatives. Therefore the switch from incandescent to LED is a vital business decision, and in light of the impending halogen phase out across the EU, it demands immediate attention.

THE JOURNEY TOWARDS AN EFFICIENT FUTURE

The European Union has long been committed to fighting climate change and in 2009 it announced bold plans to reduce energy use by 20% by 2020. With 39% of a commercial property's electricity consumed by lighting1 and 50% of lighting deemed highly inefficient, it's easy to understand why this energy source has such an important role to play. What's more, with energy companies predicted to drive up bills by 30% by 20302 in response to the European Commission's drive for energy efficient operations, the case for LED has never been stronger, especially when compared with other less energy efficient solutions.

With that in mind, in 2009 a series of EU Eco-Design measures where introduced to gradually phase out inefficient lamps in favour of energy-efficient alternatives. Between 2009 and 2012, this saw the gradual removal of clear incandescent lamps from the market, and those previously

defined as special purpose (incandescent rough service, high/low temperature and clear glass decorative filament). The use of halogen directional mains?voltage and low?voltage lamps (GU10, PAR, R-type) where then outlawed in 2016.

The latest and final deadline designed to bring the industry closer to meeting the energy strategy for 2020, will come into play from the September 2018. This will see mains voltage non-directional halogen lamps banned, marking the phasing out of almost all halogen lighting. Fridge and oven lamps, halogen capsules, linear R7s bulbs and low voltage halogen lamps such as MR16, will remain available.

According to the European Commission3, in 2018 the switch to energy-efficient lamps will result in total annual energy savings that match the annual electricity consumption of the whole of Portugal (48.0 TWh of electricity). This means a saving of 15.2 million tonnes of CO2 emissions by 2025. So the potential impact of these measures are there for all to see.

BE LED BY LED

Replacing halogen with LED is not a new development. Many home and business owners have already benefited from upgrading their lighting. However LEDs still only make up 10% of the globe's lighting systems4 due to the legacy of incandescent and halogen, leaving significant room for change.

With that said, LED is predicted to become the predominant source of lighting over the next decade. This is partly due to the forced removal of a halogen option and partly due to looming regulatory deadlines which aim to increase the sustainability of buildings and cities across the EU.

In addition to being significantly more energy efficient, LEDs offer a considerably longer service life. For instance, the average lifespan of LED is said to be approximately 50,000 hours5 in comparison to that of incandescent (1,000 hours), halogen (2,000 hours) and compact fluorescent lamps (15,000 hours). Therefore while many have long bemoaned the cost of LED in comparison to alternative sources, given their lower energy consumption and the fact they don't require replacing as often, there is no debating that they represent a smart investment.

THE EVOLUTION OF LED

Energy efficiency aside, LEDs have also long been criticised for their limited diversity of colour temperatures. As such, many argued that LEDs produce cold, white light that fail to replace the warmth and ambience provided by halogen and incandescent alternatives.

The latest leading LED solutions however are capable of replicating the charm and aesthetic of traditional halogen lamps by offering a range of warm colour temperatures to create soft, relaxed and elegant atmospheres in any residential or hospitality space. Homeowners in their own properties as well as guests in hotels, bars and restaurants, want and expect to feel comfortable and relaxed in their setting. LEDs can create an environment within which they can do exactly that.

> **Homeowners want and expect to feel relaxed in their setting**

What's more, they also come with high performance glare-controlled optics, which help to increase productivity and wellness in any office environment. Additionally, leading ranges come with enhanced flexibility – a key consideration particularly for retail settings.

Many can be adjusted to varying angles with ease, to provide high quality light which draws attention to specific areas in store to help boost sales. They also provide the flexibility to accommodate future changes to store layout and design trends.

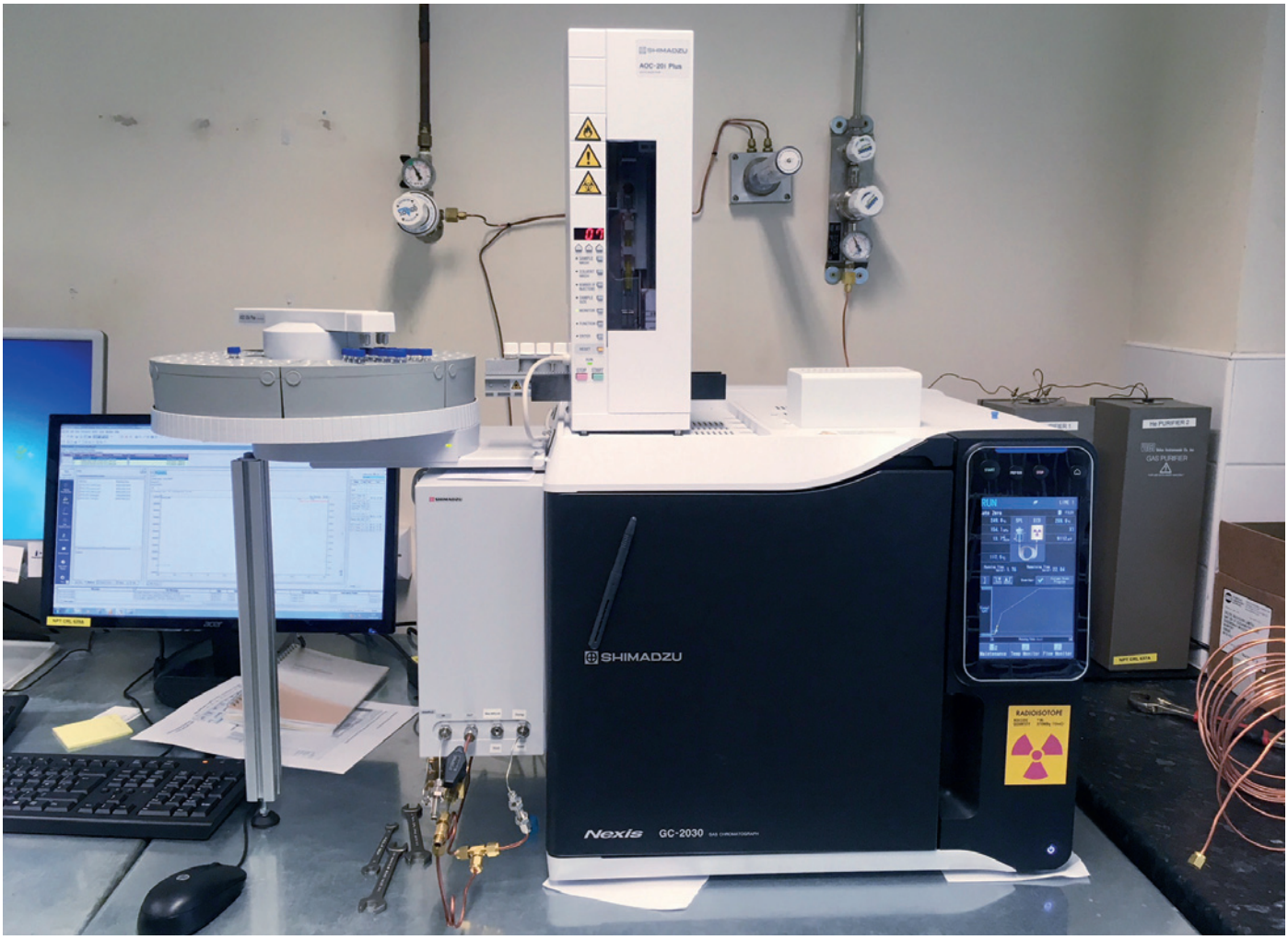
A NEW DAWN FOR LED

The European Commission's drive towards the use of more energy-efficient lighting has been met with apprehension by many that have long embraced halogen. However, the latest developments in LED promise to ensure that retailers, home and business owners can still achieve the look and feel of halogen, while realising the long-term value that LED has to offer. ER

1 https://www.energy.gov/energysaver/save-electricity-and-fuel/lighting-choices-save-you-money/led-lighting
2 Committee of Climate Change
3 http://europa.eu/rapid/press-release_MEMO-09-368_en.htm
4 http://theinstitute.ieee.org/technology-topics/power-and-energy/how-led-systems-will-drastically-improve-energy-efficiency
5 https://www.lightbulbs-direct.com/article/how-long-do-led-bulbs-last/

Quantifying contaminants in oil and gas for recycling

Celtic Recycling specialises in the recovery, management and recycling of redundant heavy electrical equipment, including the removal and dismantling of oil - and gas-filled - transformers from National Grid sites across the UK. The company spoke to Electrical Review, explaining how both oil and the gas can be recycled after testing to ensure the levels of any contaminants are within the specified limits



The company has long used gas chromatography (GC) to analyse polychlorinated biphenyls (PCBs) in insulating oils but lacked the capability to screen sulfur hexafluoride (SF6) from gas-filled equipment. With new legislation on the horizon that is set to make it more difficult to import virgin SF6, Celtic Recycling invested in a dual column Nexis GC-2030 to broaden its GC capabilities to include gas analysis.

Celtic Recycling is one of a number of specialist contractors that work with National Grid and other major electricity industry companies to safely remove, dismantle and recycle end of life, high voltage electrical equipment. Its site in Newport, Gwent, is home to the company's laboratory, which is responsible for the analysis of oil and gas from transformers for recycling, ensuring that levels of any contaminants fall below the specified threshold values. While the laboratory has been analysing PCBs in insulating oils by GC for several years, SF6 analysis is a more recent challenge. Legislative changes are set to increase the demand for recycled SF6, and so the company upgraded to a customised Nexis GC-2030 to enable gas analysis and enhance PCB testing. ▶

WHY TEST FOR PCBS?

In the past, PCBs were used as dielectric insulating fluids in transformers and other high voltage electrical equipment. At the time they were thought of as the 'wonder substance' because they have superb insulating properties and don't break down. Their use was banned in the 1980s after it became clear that they were hazardous to humans and the environment, however, insulating oil containing PCBs is still occasionally found as electrical equipment has a long life span. While samples that are high in PCBs are very rare, trace level contamination may still occur. Typically, this is attributed to PCBs being pumped out and replaced with an alternative oil to comply with legislation; any residual PCBs cause trace contamination of the fresh insulating oil. For this reason, all samples received by Celtic Recycling undergo quantitative GC analysis for PCBs over the range of 5 to 100 ppm. Samples below the legal limit of 50 ppm can be reused and recycled, while any oils containing PCBs above this level are treated as hazardous waste and destroyed.

THE SF6 CHALLENGE

Changes made to EU legislation since 2015 will make it increasingly difficult to produce or import new supplies of SF6, an inert gas with a global warming potential many thousands of times greater than carbon dioxide, making it extremely harmful to the environment. SF6-filled equipment can be emptied and the gas recovered and stored, but great care must be taken in case arcing has occurred within the equipment, resulting in the formation of highly toxic contaminants. Portable analysers give a broad indication of any contaminants that are present, such as hydrogen fluoride, sulfur dioxide and moisture, most of which can be removed using molecular sieves. One of the biggest contaminants is air, and Celtic Recycling has invested in an air separation plant, enabling it to produce recycled SF6 of 'good as new' quality. Once the cleaned gas has been analysed and its quality certified by quantitative GC analysis, it can be resold. Currently, no other company in the UK is able to offer this service.

A BESPOKE GC SYSTEM

Celtic Recycling wanted to increase capacity for PCB analysis and, at the same time, introduce GC screening of SF6, which could not be done using the laboratory's existing instrument. While PCB testing can be performed using a standard GC set-up with an electron capture detector (ECD), SF6 required a system tailored to gas analysis. This led the company to choose a twin column Nexis GC-2030, taking advantage of Shimadzu's state-of-the-art technology and expertise in gas sampling and custom-build instrumentation.

Shimadzu worked with the laboratory to customize the system so that it samples SF6 directly from a gas cylinder, using a barrier discharge ionization detector (BID) to determine whether any contaminants were present. Shimadzu's patented BID is a universal detector that can detect all organic compounds except He and Ne. It offers significantly enhanced sensitivity compared to thermal conductivity and flame ionisation detectors – enabling the detection of all types of trace components at the 0.1 ppm level – and incorporates unique electrode-preserving plasma generation technology that ensures long-term stability. To avoid saturating the detector, the design incorporated a 'dump valve', allowing SF6 to be diverted once the substances of interest had eluted. PCB samples were introduced via a split/splitless injector, and analysed using an ECD.

REAPING THE BENEFITS

The Nexis GC-2030 was installed at the end of 2017, and the laboratory is already seeing the benefits. Not only has it extended the laboratory's GC capabilities to include SF6 analysis, it also provides additional flexibility, as the SF6 and PCB set-ups are installed alongside each other in a single instrument. This avoids the need to switch out columns and change detectors, or to install two separate instruments, one for each type of analysis. The inclusion of a BID helps to futureproof the system, as this detector is suitable for many other applications should business needs change in the future.

Previously, GC analysis was performed using nitrogen carrier gas, but the laboratory opted to use helium with the new set-up. This has reduced the PCB run time from 45 to 22 minutes, significantly improving turnaround times and allowing more samples to be run in the same time period as before. The system's powerful LabSolutions software enhances integration, making it easier to detect small peaks and discern them from background noise, and resulting in increased PCB sensitivity compared to the laboratory's older instrument.

The laboratory has now established a quantitative assay to determine the level of any contaminants in the SF6 gas, improving the accuracy for most compounds from around 1,000 ppm using the portable analysers to single figure ppm with the Nexis GC-2030. To date, the implementation of the new GC assay has allowed Celtic Recycling to recover and certify over 3,000 kg of SF6 gas for sale and reuse in new equipment.

Celtic Recycling's laboratory chemist, Jennifer Rapp, commented: "I am really pleased with the new system and enjoy working with it. It is easy to use, and I can generate customised reports that look very professional with just a few clicks. Maintenance is quite straightforward and it is very easy to change columns; having a light inside the oven is a definite advantage – I hadn't realised how dark the oven is until now! The product specialists at Shimadzu have been great, providing training and helping me to set up the methods. It's good to know that I can rely on their support." ER

Widest selection of continuous-flex cables

#1

... number one in moving cables

Unmatched Testing. Widest selection. 36 Month Guarantee.

Guarantee igus chainflex 36 month guarantee

Reduce downtime with chainflex®
- More than 1,200 cables from stock
- 7 cable quality levels available
- Cable types include: Control, Data, Ethernet, Fibre Optic, Bus, Measuring System, Servo, Hybrid, Motor, Robot

Shop now: www.igus.co.uk/chainflexshop
Free samples available: www.igus.co.uk/cf-sample

igus®
plastics for longer life®

sales@igus.co.uk
Tel 01604 677240

Why use a transformer turns ratio tester?

In principle, measuring the ratio of a transformer is straightforward – simply connect an AC supply and measure the voltages on the primary and secondary. Surely all you need is an AC source and couple of multimeters? But can you improve the level of safety and efficiency when performing the test? Do you need to buy a dedicated transformer turns ratio (TTR) test set? Elinore Mackay spoke to Tony Wills of Megger

In reality, the deceptively simple description given above for transformer ratio testing applies only to single-phase transformers. When testing three-phase transformers, things start to become rather more complicated. The same basic technique can be used but, depending of the configuration of the transformer, calculations may be needed to convert the meter readings into useful results. Table 1 shows some of the factors that need to be applied in specific cases.

TRANSFORMER CONFIGURATIONS/ VECTOR GROUPS	TVR RECALCULATION FACTOR, TVR ("TTR") = K*TNR
Dd	1
Dy	√3
Dyn	√3
Dz	1.5
Dzn	1.5
Yd	√3/2
YNd	1/√3
Yy	1
YNy	1
Yyn	1
YNyn	1
Yz	√3/2
YNz	√3/2
Yzn	√3
YNzn	√3
Zd	1
ZNd	2/3
Zy	√3/2
ZNy	1/√3
Zyn	1
ZNyn	1

Table 1. Nameplate ratio to voltage ratio ("TTR") recalculation

Further, if the testing is being performed with just two multimeters, it is only possible to test on a phase-by-phase basis, which means that a lot of connecting and reconnecting of the meters and the power source will be needed. If a three-phase supply is available, it might be possible to speed things up a little by using six multimeters, but few test engineers are likely to have so many multimeters readily to hand. In any case, a test set up using six instruments is unwieldy and the potential for mistakes – possibly dangerous mistakes – is huge. Testing with basic equipment is even more complicated if the transformer has multiple taps.

It's also important to think about the power source that will be used in a basic test set up, particularly when working with three-phase transformers. A three-phase source may be available, but how can it be safely connected to the transformer? And how will it be protected against overcurrent or short circuits that might occur if there's a problem during testing? In many cases, there will be no easy answers to these questions.

Now let's move on to the accuracy of the test results. When working with ordinary multimeters, an accuracy of around 0.5% is typically the best that's likely to be achieved. This may be adequate in some instances, but higher accuracy makes the ratio test a more sensitive tool for uncovering potential transformer problems that could later lead to an in-service failure.

While measuring transformer ratios, it's also very useful to measure the test current, which will give an indication of the transformer's magnetising current, and to measure the phase difference between the HV and LV windings, as an anomalous result here may indicate core problems. When using only basic equipment, these supplementary tests are difficult or even impossible to perform.

"We've seen that a very basic test set up for measuring transformer ratios, while attractive because it uses only standard test equipment, has many limitations in terms of safety, accuracy and convenience. The solution is to use a dedicated TTR test set, but what benefits can an instrument of this type be expected to offer?" Wills said.

One of the most important of these is safety. A modern TTR test set will apply no more than 80 V to the transformer under test – less for compact handheld single-phase testers. It will be arranged for easy connection to the transformer, and will minimise the need for disconnection and reconnection during testing.

A good single-phase TTR will produce reliable results and may be all that's needed in some instances. Such a test set can, of course, be used to test three-phase transformers, but as the tests have to be performed phase by phase, the benefit of not having to disconnect and reconnect the leads during testing is sacrificed. This is important, as making test connections on most power transformers involves climbing a ladder. Making and remaking connections when testing a three-phase transformer with a single-phase TTR involves multiple ladder climbs, and each climb is potentially hazardous.

Therefore, if three-phase transformers are often tested, a three-phase TTR will prove to be a better investment than a single-phase instrument. A further benefit is, with the best three-phase testers, a remote test switch will be available as an accessory, and this makes testing even faster and more convenient.

A modern TTR will provide high accuracy, 0.1% being typical, and once the transformer configuration has been set up, it will automatically apply the appropriate calculation factors to the measured test results, eliminating the need for tedious and error-prone manual calculations. As would be expected, the instrument will also include provision for measuring test currents and phase differences.

Another major benefit of using a modern TTR is that it will make it easy to handle the data produced by ratio testing. This may not immediately seem to be a significant issue, but it's worth remembering that for every winding there will be a ratio, current and phase measurement and, for a three-phase transformer the number of results is multiplied not just by three, but also by the number of taps – and it's quite usual for a transformer to have as many as 21 taps. Ratio testing does, therefore, produce a lot of data!

A modern TTR test set will store and organise all of this data, and populate the appropriate forms while the test is being carried out. Not only does this automatic handling of data save time and eliminate the risk of transcription errors, it also means that the results can be quickly assessed before leaving site to ensure that the necessary tests have been correctly completed and that there are no major problems needing urgent attention.

It's easy to think that transformer ratio testing is so simple that there's little point in investing in dedicated test equipment. However, as we have seen, the reality is very different, and a good TTR test set will quickly repay its modest cost in terms of time savings as well as the usefulness and accuracy of the results it produces. ER

zencontrol setting the new standard in lighting control

In a world where lighting control appears to have stagnated its good to see a manufacturer ringing the changes with a Lighting management solution that is designed to seamlessly integrate into smart buildings; a true Internet of Things (IoT) enabled controls offering

Based on DALI 2 this sophisticated lighting management solution provides the UK's first truly open and integrated lighting controls package. Intelligent switches and sensors based on Part 103 of the IEC 62386 DALI standard provide a frame work for communication and interoperability that ensure compatibility between different manufacturers products.

No longer does an end user or contractor have to restrict the control system by the limitations imposed by the lighting management company.

Freeing up the hardware was always the intention of DALI, however the reality was that many of the early controls systems were restricted to ensure a tie in with their dedicated hardware. That was some 15 years ago when DALI 1.0 was ratified and within this time period technology has evolved and so has the ways in which we procure and manage our buildings.

> **"The digital revolution has been transformative within many industries"**

The digital revolution has been transformative within many industries and Lighting control is no exception. We talk about tracking and intelligence yet without DALI 2.0 this really isn't an option, DALI 2 has put the intelligence into the sensors and switches for the first time.

There are of course any number of proprietary solutions within the market that deliver a level of control but in all instances, they are specific to a manufacturer and their chosen software solution. They are ultimately hardware focused and depending on such systems puts the installation under immense pressure with regard to changes through life and general maintenance.

Open protocol is the way forward and zencontrol is the first Lighting management company to embrace DALI 2.0 and provide their customers with a choice. Now as with all standards its possible to enhance

features and zencontrol switches and Multi sensors have additional characteristics that differentiate them from their competition. Features such as colour measurement and management for Daylight and Human Centric Lighting. Tracking and measurement of space utilisation along with Power measurement of the connected load.

Linking DALI 2.0 to the wider network is our range of smart gateway modules again based on the DALI 2.0 upgrade and the IEC62386 Part 306 IP to DALI gateway. Taking inputs from intelligent DALI 2.0 control devices and sharing their information over the TCP/IP backbone. These gateways can be either DIN rail mounted or take the shape of the more typical wiring centre that is very common in commercial lighting installations. The LCM to give it, its full name is BACnet enabled and is capable of working out of the box. A dedicated algorithm enables the LCM to assign sensors and drivers, along with emergency invertors to specific outputs and reduce on site commissioning to a minimum. Certainly, for Cat A developments this provides the ideal fit and forget solution.

The LCM family is further enhanced by the Room Controller which provides a full DALI circuit of 64 outputs and 63 inputs. Again, BACnet enabled this super smart gateway provides the ideal solution for complex floor plates where multiple cellular spaces need to be connected and controlled locally.

Software is driving intelligent buildings

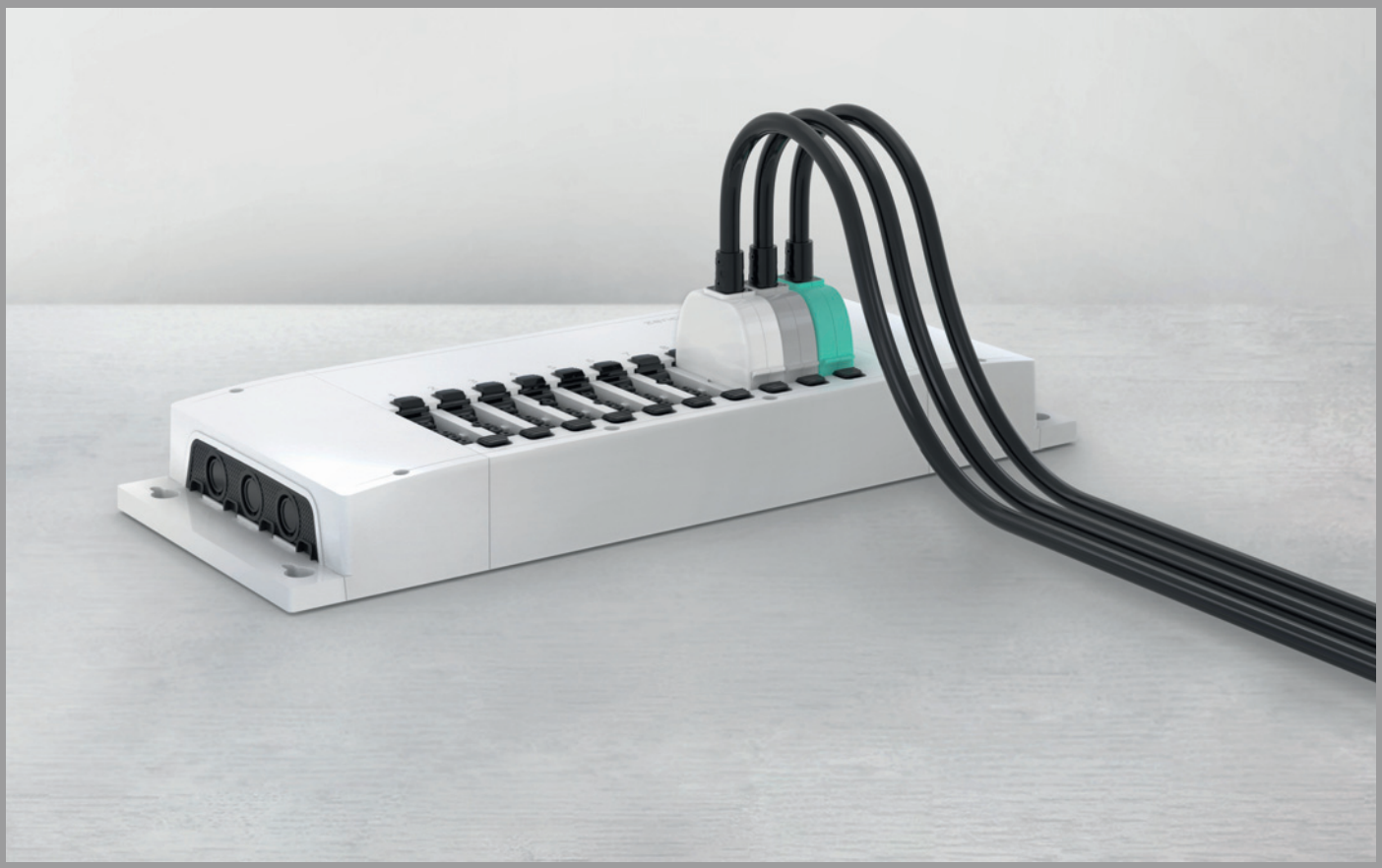
As all zencontrol Application controllers are BACnet enabled there is no need for an Area Controllers, in fact Area controllers are a thing of the past. Each gateway is intelligent and as such provides a common backbone of connectivity between connected Application controllers.

No additional computing power is required to allow a DALI 2.0 smart switch or sensor to link across multiple DALI networks and allows the creation of a virtually unlimited number of control zones. Using DALI 2.0 zencontrol can program time of day profiles specific to a smart controller so the function of the sensor or switch can adapt throughout the day to reflect the use of the building.

Software is driving intelligent buildings and the interaction of multiple technologies into a single visualisation of a building requires dedicated API's to provide a route to interact between disparate systems. We at zencontrol have delivered a number of projects to different BEM's companies to provide a holistic approach to the control and management of the clients building.

Having successfully delivered intelligent lighting controls solutions in the UK for over 14 years zencontrol and Ektor can help you to create a truly smart and intelligent building that is fit for today and the future.

The future of lighting control is zencontrol.



Testing and maintenance across borders

Whether it is safety tests for your electrical switchgear, efficiency tests for your boiler or upkeep for plant parts and equipment, the need for ongoing maintenance is vital. However, when completing international projects, where the management of a facility is transferred to a local team, how can maintenance of the site and its components be preserved? Dave Friar, international operations director at Boulting explained to Elinore Mackay what you should do when preparing to hand over maintenance control on an overseas project

Planning for the ongoing maintenance of a new facility or plant is important, particularly before it begins operation. According to Efficient Planet, a badly maintained ten-year-old plant can cost more to maintain than a properly maintained 25-year-old facility. So, developing a comprehensive maintenance plan can help save both time and money.

However, when handing over the ongoing management of a new overseas facility, where you won't have easy access to the plant equipment or data, working closely with your in-country counterparts is vital.

COLLABORATION ACROSS BORDERS

While many international facility managers don't always realise the importance of implementing maintenance plans, it is essential for the plant's construction team to ensure it is considered as a significant element of the project from the outset.

Whether that is providing familiarisation training for on-site staff to learn how to use, maintain and install replacement parts, or by simply offering user manuals, the more information on-site teams have the more likely they can keep everything running smoothly. ▶

Safer transformer testing for your future

MWA

Transformer test set

Routine testing of power transformers just got safer. Megger's MWA test set performs three-phase turns ratio and winding resistance with just one lead set, meaning fewer ladder climbs and reducing risk of user injury.

For more information visit en.megger.com/MWA

Megger®

Power on

Megger Ltd, Archcliffe Road, Dover, CT17 9EN, T. +44 (0) 1304 502101

Boulting can provide recommendations for ongoing maintenance techniques before we handover a facility. This can keep maintenance needs at the forefront of the plant management team's attention when they begin work. On-site teams also receive both physical and digital copies of equipment manuals to have on hand should any equipment need emergency upkeep.

Should in-country teams request maintenance assistance, it provides an ideal opportunity to scope out the entire plant and offer suggestions or efficiency ideas for future preservation. Developing your relationship with them from a supplier to a trusted advisor will not only cement your ongoing relationship but may also bring new business opportunities too.

REMOTE SUPPORT

Of course, travelling across the globe just to change a switch is not only costly but also wastes a lot of downtime in the facility. Many providers offer wireless transmitters for some of the facility's key components. These wireless transmitters then connect to both the plant's own monitoring system as well as the supplier's trackers to remotely supervise the system.

> **Elements can be assessed from across the globe**

This means key elements like generators and switchgears can be assessed from across the globe for cost and energy saving opportunities. This can be key for some specific parts, which have much shorter lifespans due to climate and the level in which the plant is operating.

For instance, switchgears are tested to EU standards, where typically circuit breakers are designed to able to meet 10,000 operations. As climate and altitude conditions vary from country to country, it is impossible to test equipment for all eventualities. Working in extreme conditions can greatly impact the operational life expectancy of equipment.

Being aware not only from the beginning of the project, but also reminded of the need for regular maintenance and replacement through remote monitoring can help in-country management teams predict maintenance needs before components unexpectedly break.

Offering your support and ongoing services will not only maintain your relationship but the plant too.

Having an unexpected vehicle breakdown, or boiler failure can leave you stranded and out in the cold. Be sure to not leave you international customers feeling the same when you transfer the ownership of the facility to them. ER

Join us in Manchester, UK for EuroDoble 2018

EuroDoble is a forum for sharing best practices for managing European power networks, power stations and industrial sites.

Being in the power industry means you face a long list of challenges and concerns. At EuroDoble, we bring you together with your peers to discuss the pressing topics that impact your job – all to ensure the reliable flow of power.

Find out more about the event and read the programme at **events.doble.com/eurodoble** or contact **events@doble.com**.

Control your lighting

Whilst the advantages of converting from outdated fluorescent lighting to LED technology are substantial, they become far greater when integrated with an intelligent lighting control system, which delivers the correct amount of light where and when it is needed

When dimmed, LED lighting becomes more energy efficient and automated systems like daylight harvesting and occupancy sensors can turn on or dim lights according to changes in light, need or the time of day.

Wireless lighting control systems however are designed to control lighting without the need for complex wiring systems and provide increased flexibility in the way an area of a building can be used. Instead of positioning switches and sensors where wiring permits, building operators can place controls where they are needed with ease to optimise lighting performance.

Automated lighting networks can radically reduce energy consumption whilst delivering optimal lighting performance, where it is needed. Typical savings, when combined with LED luminaires are between 60-95%, depending on its application – ranging from commercial to industrial, education to healthcare and even hospitality! In addition to the obvious energy savings, an intelligent lighting system allows activation of an individual light or groups of lights from one device, sets lights to turn on and off or dim at precise times and creates customised lighting for a specific task.

A wirelessly connected system eliminates the disruption, cost and maintenance burden associated with hard-wired installations, whilst still allowing full control of the lighting system. The resulting system is at heart simple - yet infinitely scalable to the needs of the installation. From a single light fixture to thousands, within the same system, there is no upper limit.

New solutions make lighting networks a breeze to design as well as install and maintain. Software enables users to upload their floorplan – existing or proposed - for quick lighting layout creation, via easy-to- ▶

OLSON®

POWER DISTRIBUTION UNITS

SUSPENDED UNIT
THE RETRACTOR
AVAILABLE NOW! YOU ASKED, WE LISTENED.

Designed and Manufactured in the UK

+44 (0)20 8905 7273 | sales@olson.co.uk | www.olson.co.uk

SINCE 1961

use 'drag and drop' tools. Once installed, the connected system creates a digital network, where luminaires communicate wirelessly, controlled by Android app or web interface, with simple software.

Setting or adjusting the lighting can be achieved without any wiring changes. Luminaires can be added or replaced, and re-configured at the touch of a button – ideal when refurbishing or adapting internal layouts – and without any expensive re-commissioning.

LIGHT STATUS MONITORING AND MAINTENANCE

An extensive status monitoring dashboard provides on-demand reports of the 'health' of LED sources and drivers, highlighting any critical failure points that need attention.

> **Setting or adjusting the lighting can be achieved without any wiring changes**

For those involved in providing lighting support to sites, for example facility managers, the solution caters for 'active' maintenance support, in addition to delivering 'reactive' lighting maintenance solutions fast and effectively. Neither of these functions require maintenance teams to carry out surveys or make visits to the relevant site.

In addition to its routine maintenance capabilities, an intelligent lighting control system provides automation of routine emergency light testing and maintenance requirements, for example with self-test features for emergency lighting. Without the need to attend site and test individual light fittings, users are alerted to faults as and when they occur. With logging and fault recording functionality, it eliminates the need for manual recording.

MEASURING SUCCESS AND PROGRESS

Reporting on the energy consumption of all connected lighting fixtures allows analysis and measurement of a single site, or all the sites being managed. This makes a wirelessly connected system ideal for reviewing the energy performance of multi-site portfolios. Energy and facility managers can log in to review data from any site location as little or as often as needed.

A major advance of this integrated solution is that it can be applied to new builds, retrofits, old and new lighting. Light Brain modules can be connected during the LED lighting upgrade, saving the time and costs of an additional lighting control installation. Because the technology is retrofittable – any luminaire and even individual lamps can be replaced with new LED and wireless-enabled luminaires. All data can be monitored via the Android App (or remotely via web interface) or downloaded for easy analysis.

The savings can be substantial. Operating your lighting where it is needed – rather than at 100% brightness constantly – not only minimises energy consumption, but also extends lighting lifecycles and reduces maintenance costs. Example cost savings for a distribution centre fitted with LED lighting and Light Brain are claimed to around 87% with a payback of less than two years.

A wirelessly connected system qualifies for government schemes such as the Carbon Trust Green Business Fund. By claiming 100% first year capital allowance, through the Enhanced Capital Allowances Scheme (ECA), installers can offset the cost of a Wireless LED lighting control, LED luminaires, and their installation.

Lighting control systems are an effective way to reduce energy and operating costs. However, hard-wired systems can be expensive and time consuming to install, particularly in existing buildings, so it's no wonder wireless technology continues to gain popularity for building operators. ER

Safe Isolation saves lives

Stay safe, prove dead and lock off with Martindale VIPDLOK kits

The simple solution to safe maintenance

- Essential for compliance with Electricity at Work Regulations for safe working
- Includes industry leading voltage indicator, proving unit, locking off devices and tags
- New VI-15000 Voltage Indicator, CATIV 1000V for all installations categories
- Safe because it's simple, no batteries, no ranges, no switches

Now available NEW VIPDLOKPRO

Get the right locking off device every time with Martindale PRO Kits

Available from your wholesaler and online

www.martindale-electric.co.uk

Call: 01923 441717 **email:** sales@martindale-electric.co.uk

MARTINDALE ELECTRIC

Sensitive architectural solution

Building controls specialist BEG has helped deliver an integrated lighting control strategy to a college at one of the finest universities in the world

St. John's College, a constituent college of the University of Cambridge, which is ranked fourth in the Higher Education World Reputation Rankings, was founded in 1511 by Lady Margaret Beaufort, mother of King Henry VII. The college's alumni include winners of ten Nobel Prizes, seven prime ministers, 12 archbishops, two princes and even three Saints.

The ancient college, which has some parts dating back to 1200's, required a lighting control solution as part of the refurbishment of the New Court building.

Meeting the need of architectural sensitivities

The controls would be used to reduce operating costs, whilst also having to meet the needs of its architectural sensitivities and minimise light pollution.

Cambridge-based Baulogic Limited, which specialises in the design, installation and maintenance of building control solutions, in conjunction with B.E.G carried out a detailed site survey. Taking into consideration the building's unusual design, the company selected the BEG wall mounted Indoor 180 KNX detector.

The German manufacturer, founded in 1975, provides one of the widest ranges of presence and motion detectors in the controls market today.

Mark Gedrych, director at Baulogic Limited, said: "Most of the lobby spaces on either side of the central spiral staircase have tall cathedral ceilings, with archways between each area, neither of which we were allowed to touch.

"That's why we selected the BEG. wall-mounted KNX 180 detectors for these areas, mounted at 2.4m off the floor, and chose frames that were colour-matched to the paint colour which had been selected by interior designers Eve Waldren Design.

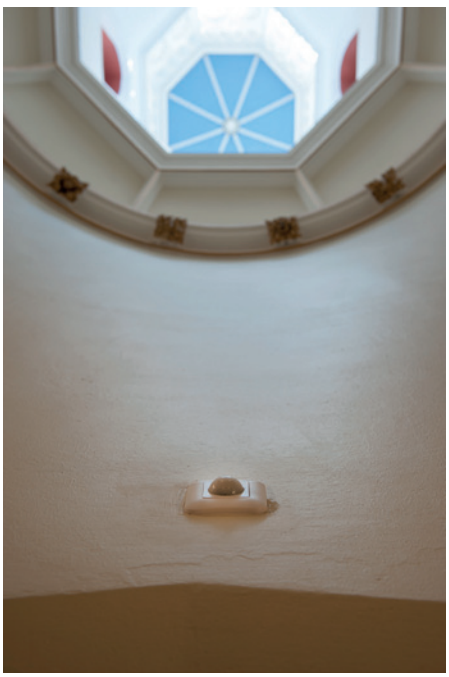
"The overall effect is very pleasing because the detectors blend nicely into the renovated 1830's neo-Gothic spaces whilst still providing excellent coverage to catch Fellows and guests as they exit their rooms surrounding the lobby spaces on all sides."

In a few areas, BEG were able to employ the ceiling mounted detector PD4 KNX SM, which gives coverage of up to 24m diameter. When fine tuning the detection areas, the strategic decision was made to fit some detectors with lens shields. This prevented lights being triggered when people are just walking past, as opposed to entering an area.

Shields are intelligently designed to slip over an existing lens, so they do not change the overall appearance of a detector. The shields can be modified to give clearly defined detection areas. The shields are seen as a great addition because the lights come on only when needed, thus saving energy when not required.

Stephen Payne, systems sales manager at BEG said: "At BEG we are delighted to have worked with Baulogic in one of the most successful and prestigious universities in the world.

"There were some interesting challenges as this celebrated college building had certain unique features, such as the archways. Between BEG and Baulogic, we came up with a tailored solution that provided a fantastic lighting solution for St John's College which will reduce its running costs and limit its light pollution." ER

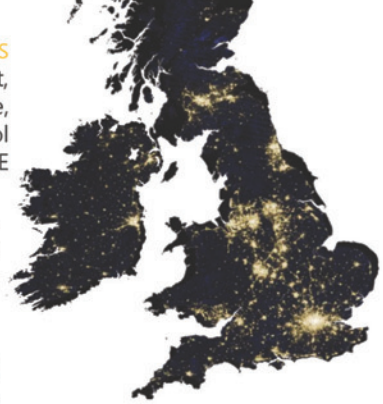


VENTILUX
THE EMERGENCY LIGHTING SPECIALISTS

PHONE
+44 (0) 151-5464155

WEBSITE
www.ventilux.com

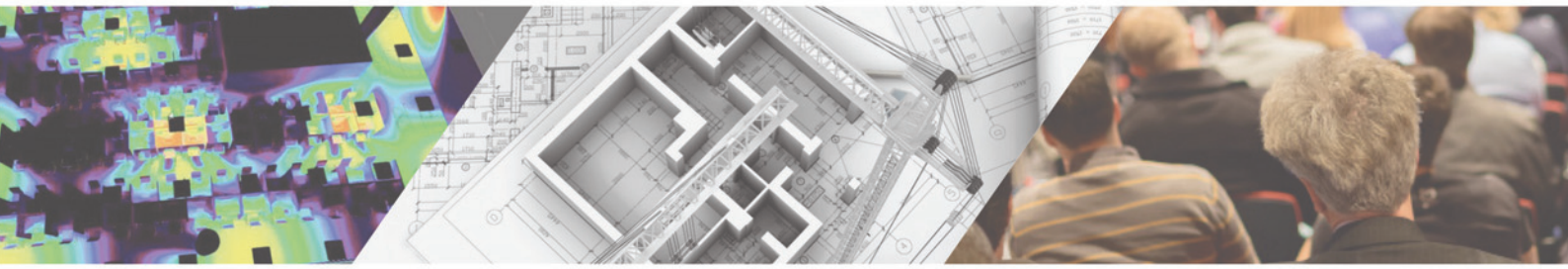
ADDRESS
Arbour Court,
Arbour Lane,
Knowsley, Liverpool
L33 7XE



Ventilux designs, manufactures and offers an extensive range of safety system products and services, including Emergency Lighting, Central Battery Systems, Emergency Lighting Commissioning, Service and Maintenance. Ventilux was founded in 1986, and has since grown steadily to become one of the largest Independent Emergency Lighting Manufacturers in Europe & the Middle East.

Ventilux operate, and are certified to, ISO: 9001:2015.Modern manufacturing technology combined with stringent quality control ensures that Ventilux products provide the customer with top quality and excellent value for money.

LUX LIGHTING DESIGN, QUOTATION SERVICE & BIM FILE PROJECT SUPPORT



Services

- **Free design for live projects**
- **Compliant emergency lighting designs**
- **Product families BIM file support**
- **Value engineering**

DIALux

- Reduced luminaires
- Less Wiring
- Reduced Labour Costs

Lighting Design & Quotation Service Overview

VENTILUX prides itself on its flexible Engineering Design Department. This department consists of technical expert engineers all highly trained graduates dedicated to developing cost effective Emergency Lighting designs. Our design experts plan, budget and design for client specific requirements. Our design team utilise's a state-of-the-art lighting design software package called DIALux to ensure quality and compliance in our Emergency Lighting designs. Ventilux also has the ability to Project Manage small, medium and large projects from design phase, to commissioning and handover. We have specialist engineers to provide technical assistance at all times to ensure complete peace of mind.

BIM Support Service Overview

Ventilux are proud to now offer Building Information Modeling (BIM) files for majority of their Emergency Lighting range. Ventilux prides itself on its in house design department. This department consists of industry technical expert engineers, all highly trained graduates dedicated to developing cost effective Emergency Lighting Solutions. These files are available for download for specific product pages, for more information please visit **www.ventilux.com/services/bim-file-support** to view our BIM file demonstration video.

CERTIFIED PROFESSIONAL DEVELOPMENT PRESENTATIONS

Subject
British Standards BS5266-1 :2016.

Topics

- **Scope of the standards**
- **Specific Lux Levels Requirements**
- **Practical Solutions**

CPD MEMBER
The CPD Certification Service

CPD CERTIFIED
The CPD Certification Service

Seminar Overview

The British Standard provides the emergency lighting designer with laid down guide lines which form the general basis for the designer to work to. British Standard BS 5266: Part 1: 2016. This seminar will provide; An overview of the BS5266: Part 1: 2016 Standard, identifying particular locations and the recommended Lux levels and response times for those locations.

The requirement for testing of the emergency lighting, financial implications, reduction of risk and the feasibility of the use of automatic testing of the emergency lighting system. Practical Solutions will also be discussed on how these specific requirements can be achieved.

GET UP TO SPEED AT BUILDING TECH LIVE

9–11 OCTOBER 2018 | NEC BIRMINGHAM

With the 18th Edition Wiring Regulations going far beyond what the industry was expecting, electrical engineers, contractors and specifiers will be keen to prepare for 1 January 2019 by connecting with experts, associations, manufacturers and service providers to ensure that they are fully compliant. Don't miss out on the chance to access all these at Building Tech Live at Birmingham's NEC, between 9 – 11 October 2018, as part of UK Construction Week.

Building Tech Live is the must-attend event for anyone involved in the electrical supply chain. It has been designed in consultation with industry associations to deliver educational content, challenging debates and the latest technological advancements in the industry. As part of the UK's premier built environment event, visitors will have access to seminars, CPD sessions, an innovation trail, networking opportunities and more than 10,000 innovative products and 650 exhibitors.

Essential education

Electrical professionals will want to head straight to the Building Tech Live Theatre, supported by Voltimum and ECA, where they can upskill on the latest electrical regulations, cybersecurity, fire safety and prevention, augmented reality, virtual reality and artificial intelligence.

Must-attend sessions include:

- What you need to know about the 18th edition with Gary Parkins from ECA;
- Increased fire prevention through the use of AFDDS with Marc Gaunt from Eaton;
- Verifying on-site skills – ECS check with David Thomas from ECA;
- The smart home for the smart electrician with Steveå Martin from ECA;
- Fire safety, low fire hazard cables with Dan Colborne from Nexans; and
- Emergency lighting and fire alarm standards update with David Hunnisett from ESP Ltd.

The latest products

Visitors will have first-hand access to the products incorporating the very latest technological advancements in IoT (Internet of Things), lighting, automation, security, communication technology and more.

KORE Wireless will be on stand BT255 to demonstrate how transformative business performance can be achieved through the Internet of Things (IoT) and how visitors can keep up-to-date beyond the show with their 'Paving the Way to IoT' podcast series.

Risco will be talking about the new version of their 2-way iWAVE DT/DT PET detectors. Compatible with the Agility 3 intrusion system, the wireless security system offers live video, app support and a web application.

GEWISS will also be on hand to talk about their high-quality and energy efficient power solutions including Smart [3], the first LED lighting solution in the world with exceptionally high protection of IP69. The Electrotechnical Certification Scheme

buildingtechlive.co.uk

CONTENT PARTNER voltimum

ASSOCIATION PARTNER ECA Excellence in Electrotechnical & Engineering Services

(ECS) will be showcasing its new online system, ECS check, that allows main contractors and clients to verify the skills and qualifications of electrical personnel working on projects.

This new initiative is intended to raise the profile of electrical contracting among the wider construction industry and procurement community.

Other Building Tech Live exhibitors include Technology Management, SALTO Systems, Vivaldi SRL and Vaisala.

Nathan Garnett, UKCW event director, said: "Building Tech Live is at the heart of our innovation theme this year. What these architectural, communications and connectivity, smart lighting and security technologies offer for commercial and residential fit-outs is mind-blowing.

"This is such a forward-thinking sector, so Building Tech Live is an unmissable event for any electrotechnical expert who wants to be up to date on the latest technology and to see how it all works together."

The future of construction
Running throughout Building Tech Live and beyond is UKCW's 2018 theme: the 'Future of Construction'. Exploring the latest innovative ideas, products and systems in the construction industry, an Innovation Trail will showcase companies including: Canon, GEWISS, Kore, Okappy and My Smart Box, whose smart electronic parcel boxes made them a 2018 honoree at the CES Innovation Awards.

Internet of Things
One certainty is that the IoT will feature heavily in the future of construction, which is why it features heavily at Building Tech Live. Visitors will get a real, practical experience of IoT in the Gooee IoT Arena.

The arena will showcase Gooee's award-winning IoT ecosystem with its partnered companies, including Aurora, to provide an insight into their roles in co-creating IoT offerings to end-users.

Unmissable speakers
There will be something for everyone across the stages of the extensive seminar programme.

The Digital Construction Hub will delve into digital project case studies and thought leadership on the adoption of BIM and the latest technologies. Talks include: Alex Giles, from, Action Sustainability on BIM maturity for all the supply chain; Dr David Greenberg, from EAVE, on IOT and innovation in construction; and Ivan Gasparetto, from BIM Direct, on project management in construction.

Those seeking to learn more about energy policy post-Brexit, carbon reduction, new fuels, and the future can head over to Energy 2018 where the REA Theatre and the Sustainability Hub will showcase everything relating to renewables, innovation and power solutions within the built environment.

Invaluable CPD sessions
CPD sessions of interest to all those involved in the electrical trade include:

- Re-evaluating building regulation fundamentals with Richard Harral, technical director at the Chartered Association of Building Engineers;
- 10 must-do things when bidding for large contracts with Nick Pearce, strategic director and Claire Carsberg, managing director at JPC
- The Internet of Things security with Dr Gregory Epiphaniou and Professor Prashant Pillai from the University of Wolverhampton;
- The direction of energy and sustainability standards within construction with Dr Gavin Dunn, chief executive at the Chartered Association of Building Engineers.

Awards, role models and Rockaoke
Visitors can celebrate the installers, manufacturers and wholesalers leading the way in the building technology market at the 2018 Voltimum Smart Solutions Awards, hosted by journalist and television presenter Steph McGovern.

Finally, visitors can network in a more relaxed environment at the Beer Festival sponsored by Velux. Featuring street food, live bands, rockaoke and a selection of beers, gin and fizz, it's the perfect wind down to a successful day.

Free visitor tickets for the show are also available now from www.buildingtechlive.co.uk

Ticket holders have unlimited access to all nine UKCW shows. Discover renewable energy at Energy 2018; experience the Internet of Things at Building Tech Live; see what is possible with wood and other surfaces at Timber Expo and Surface and Materials Show; understand the latest systems at HVAC 2018; attend the Infrastructure Hub at the Civils Expo; take part in interactive demos at Plant and Machinery Live; and get access to Grand Designs Live.

Keep up to date with the latest information about exhibitors, product launches and speakers at Building Tech Live at www.buildingtechlive.co.uk and on Twitter at @BuildTechLive or using the hashtag #BuildingTech2018.

What's next? The future of energy storage

Our energy needs are evolving and the way we choose to store it should reflect that. Justin Ellis, senior manager at Comms Express explores the different energy storage options available to us as our resources change and the need for sustainability continues to grow.

Due to the rapid depletion of fossil fuels, clean and renewable energy sources are going to be critical to the future of the planet as we move forward. Sources that are sustainable and efficient will become of greater importance and, in particular, there will be a major shift towards using the most economically viable energy storage solutions.

When it comes to energy, the need for uninterrupted power supply (UPS) is one that continues to grow. Being 'online' (i.e. powered up) 24/7 is now widely accepted as the norm in terms of electronics, websites, and other products and services.

So which technologies are likely to prove the most popular going forward in terms of energy storage? Is the future battery powered? If so, which type of battery? Or is there an alternative energy storage solution on the horizon?

PUMPED-HYDRO STORAGE

Gravity can be a wonderful thing and it forms the basis of this type of storage/generation. Water is pumped from a reservoir at the bottom of a mountain to one located higher up the mountain. When electricity is required, the stored water is released from the upper reservoir, with the force of gravity driving it through a hydro-power turbine that generates the electricity.

This form of grid power storage accounts for 99% of global bulk storage at present. Located in Virginia, USA, the Bath County Pumped Storage Station is the best-known example of this form of storage and has been deemed the 'world's largest battery', boasting a generation capacity in excess of three gigawatts.

Whilst pumped-hydro storage may be capable of managing a huge capacity and is highly efficient, its major limitation is the need for a suitable mountain. Not every country possesses such landscapes.

FLYWHEELS AND SUPERCAPACITORS

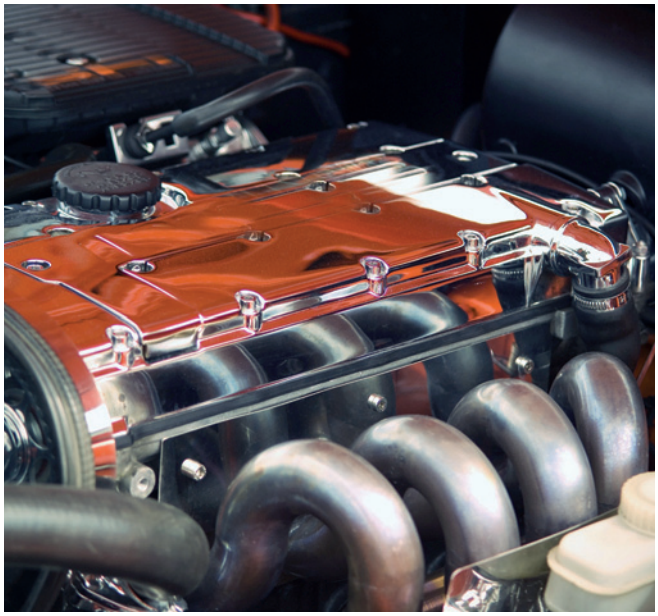
Flywheels and supercapacitors are both able to recharge and discharge faster than most batteries. Flywheels work by spinning a rotor at high speed using electrical energy. This creates kinetic energy which is stored within the rotor until it's needed, at which point it is converted back into electricity. Supercapacitors are similar, but store the power electrically. Energy is stored as a static charge, and there is no chemical reaction when discharging or charging.

LITHIUM-ION BATTERIES

Lithium-ion batteries benefit from low self-discharge rates and high-energy density. There is potential to use this technology for electric vehicles (EVs) and as a backup for regional and national electricity networks. In South Australia, Elon Musk's firm Tesla has just completed the installation of the world's largest lithium-ion battery facility that will have the capacity to power 30,000 homes for an hour. Tesla is one of several companies committed to making lithium-ion batteries widely accessible and affordable.

SOLID STATE BATTERIES

These batteries use solid electrolytes and electrodes instead of liquid electrolytes. They are cheaper and smaller than lithium-ion batteries and have a higher energy density. They are able to be recharged far faster and they emit less heat.



This technology isn't viable as yet, but major companies such as Dyson and Toyota are investing heavily in it and aim to have it on the market by 2020.

REDOX FLOW BATTERIES

In comparison to other grid-scale storage systems such as lithium-ion, flow batteries (which use liquids to create charges) are considerably cheaper and less vulnerable with a longer lifecycle. They also have the potential to store large quantities of energy for extended periods of time.

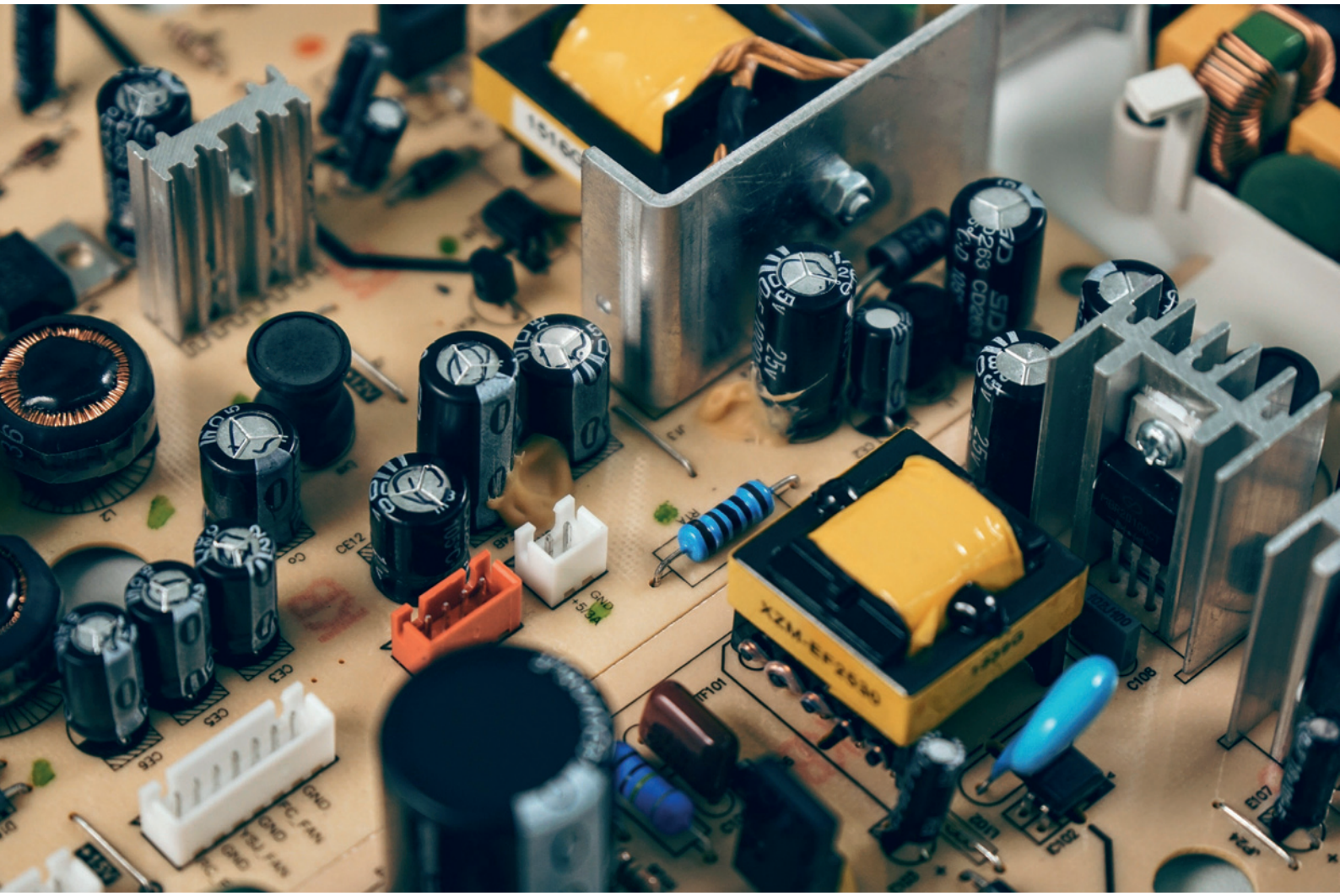
"Tesla is one of several companies committed to making lithium-ion batteries widely accessible and affordable"

VEHICLE-TO-GRID SYSTEMS

Using electric vehicles (EVs) as energy storage systems is becoming an increasingly attractive option. Between journeys, most cars are stationary. These V2G (vehicle-to-grid) systems are able to exploit this and transfer this stored electricity to grids in order to help in meeting demand at peak times. Essentially, these cars act as mini power plants.

HYDROGEN FUEL CELLS

Hydrogen fuel cells are quickly growing in popularity, particularly in the automotive sector. Hydrogen is one of the most abundant elements on the planet, so this is a great source ▶



to focus on. Hydrogen fuel cells are able to continually produce electricity provided that there is a constant supply of hydrogen. This means that they don't need recharging, but a regular supply of hydrogen must be fed in to continually generate power. Hydrogen fuel cells are already used for powering cars, buildings, and even NASA satellites.

> **Hydrogen is one of the most abundant elements on the planet, so this is a great source to focus on**

COMPRESSED AIR ENERGY

Compressed air energy uses pressurised air to drive a turbine and generate electricity. It is already the second most prevalent type of volume energy storage and is gradually becoming more efficient.

LIQUEFIED AIR

When air is cooled to -196 degrees Celsius, it turns into a compressed liquid which can be stored. When mixed with ambient air, it becomes a gas again and expands in volume rapidly, enabling it to power a turbine in the process. This form of storage has a high capacity, together with the potential for it to make use of waste heat and cold from industrial processes. UK company Highview Power Storage is leading the way with a trial of this technology at the Pilsworth landfill gas generation facility.

WHERE ARE WE NOW?

Although a lot of the above technology isn't quite there yet among the masses, it is promising that large organisations are taking the necessary steps to make sustainable sources more widely available.

Exponentially, we can expect to see more batteries entering the environment over the next few years, and although some utilities and corporate customers are concerned about the ecological impact of large-scale energy storage systems, there is still plenty of room for improvement when it comes to creating a more sustainable way of storing and recycling energy. ER

YUASA BATTERY

RELIABLE STANDBY POWER WHEN ALL ELSE FAILS

European market leader for all industrial applications, including:

UPS FIRE & SECURITY TELECOMS
ENERGY STORAGE RENEWABLE

Yuasa, the world's leading battery manufacturer, delivers unrivalled quality, reliability and performance for all industrial power needs.

Don't take risks with your backup power.
Demand the best standby batteries... Demand Yuasa!

Discover more at ***www.yuasa.com***

GS YUASA 100 ANNIVERSARY

100 Years of History, 200 Years of Expertise

The advantages of VRLA batteries

Alex Emms, operations director at Uninterruptible Power Supplies Ltd, a Kohler company, discusses all things VRLA batteries, how they operate, your options, advantages and what to watch out for.

All UPSs depend on some form of stored energy technology that can accept energy during normal mains supply operation and release it as a backup supply during a power cut. Although some UPSs employ flywheels or hydrogen cells for this, most use batteries. Of these, lead-acid types remain the most popular choice for UPS manufacturers and users. Other battery technologies, particularly lithium-ion, are increasingly popular, but all have issues as well as advantages.

One reason for lead-acid's continued presence is the steady replacement of the original, vented flooded cell types with sealed or Valve Regulated Lead Acid (VRLA) batteries from leading manufacturers like Yuasa.

Several VRLA types are available, all offering advantages over the older-technology flooded cell type. Their common major benefit is their use of recombination; oxygen released from the positive plates during discharge, recombines with hydrogen generated at the negative plates to form water. This eliminates the regular water top-up maintenance requirement of flooded cells, while also preventing battery gassing. Risks to personnel health or of damage to nearby equipment are also mitigated. Additionally, the batteries can be built as sealed units, and stored or used in any orientation.

> **"The VRLA advantages mean that the batteries can be used in cabinets alongside the UPSs rather than in separate battery rooms."**

KEY VARIANTS OF VRLA BATTERIES

- Gel types, which are manufactured with a gel state electrolyte; a thick, putty-like gel comprising the electrolyte with added silica dust, that is not fully solid to contain acid and has no leakage. The modern gel battery was invented by Otto Jache of Sonnenschein in 1957.
- AGM or Absorbent Glass Mat batteries feature a highly-absorbent, slightly undersaturated fibreglass mesh between the battery plates, which contains the electrolyte. The resulting design is compact with high vibration resistance. The first AGM cell was the Cyclon, patented by Gates Rubber Corporation in 1972 and now produced by EnerSys. In the mid-1980s two UK companies, Chloride and Tungstone, simultaneously introduced 10-year life AGM batteries in capacities up to 400 Ah, stimulated by a British Telecom specification for batteries to support new digital exchanges.
- Thin Plate Pure Lead (TPPL) technology is a more recent and higher-performance version of the AGM type. It offers rapid charge and discharge capabilities, high charge density and a long operating life. The batteries also have a wide operating temperature range with superior performance at low temperatures. Additionally, their shelf life is over twice that of conventional lead-acid types.

The VRLA advantages mean that the batteries can be used in cabinets alongside the UPSs rather than in separate battery rooms, even if the UPSs are operating within an office environment. However, VRLA batteries should not be enclosed within sealed containers, because they can gas if accidently overcharged. This can generate enough pressure to cause an explosion if the gases are not vented.

While VRLA technology offers the advantages described, the batteries should still be regarded as the weak link in any UPS application because they have a finite working life and will eventually require replacement. However, this life can be maximised by taking care to operate within a well-managed environment, and setting up a regular maintenance schedule.

The UPS design should protect the batteries from undercharging, overcharging and over discharging. The charging systems should completely eliminate AC ripple and have temperature-compensated outputs to prevent overcharging at elevated temperatures. The UPS operating environment should also be maintained at around 20°C, as higher temperatures will reduce the battery life and possibly cause damage, while lower temperatures reduce battery performance.

In addition, the batteries should be regularly tested for open-circuit and float voltage, and checked for corrosion, cracks, leaks, swelling, connections and cleanliness. With the correct environmental and maintenance strategies in place, VRLA batteries offer reliable, stable solutions with good performance. ER

buildingtechlive.co.uk

#BuildingTech2018 @BuildTechLive

PART OF
UK CONSTRUCTION WEEK 2018

EXHIBITORS INCLUDE:

EATON Powering Business Worldwide

SALTO inspiredaccess

GE

REGISTER
FREE

Green data centres: How to build a sustainable internet

Russell Poole, managing director of global interconnection and data centre company Equinix, outlines the role data centre operators can play in building a sustainable internet and highlights some of the steps and design techniques Equinix has taken to make this possible.

The global explosion of data is being driven in large part by the Internet of Things (IoT), digital payments and a rise in the number of data exchanges – trends which are only set to grow as the world embraces digital. This unprecedented increase may mean huge progress for the digital economy, but it comes at the cost of significantly higher energy demands and poses a new challenge for data centre operators looking to minimise their carbon footprint.

Equinix's Global Interconnection Index – published for the first time in 2017 and due to be repeated in the coming months – forecasts that direct interconnection between businesses will outpace the public internet by 2020. Private data exchanges between businesses are forecasted to grow nearly 2x faster than global IP traffic in the same timeframe, and by nearly 6x in data volume, leading to a drastic increase in data traffic moving privately between businesses within the confines of data centres.

> **"The growth of private data exchanges between businesses will lead to a drastic increase in data centre traffic"**

This escalating growth will be powered mainly by non-renewable fuels. As such, there is a need for the industry to look for a greener way of operating and embrace the shared responsibility to reduce environmental impact. But what ▶

dependence upon local distribution networks.

Implementing these specialised technologies means that for close to 85% of the year, LD6 is cooled purely by natural air. It also uses 100% renewable electricity from mixed sources through a utility green programme and carries a Power Usage Effectiveness (PUE) rating – which measures how much of a data centre's energy use goes on powering the computing equipment versus how much goes on overhead such as lighting and cooling – of 1.2. This figure is significantly below the industry average.

> **Retrofitting existing data centres and developing new and advanced technologies to make them more sustainable poses a whole new set of challenges**

MAKING A CONVERSION

As one can imagine, retrofitting existing data centres and developing new and advanced technologies to make them more sustainable poses a whole new set of challenges. The design expertise comes in knowing how to deploy solutions in the most effective way within the confines of the infrastructure and physical footprint available.

Our AM3 data centre in Amsterdam, launched in 2012, is an example of how sustainable measures can be implemented in a new design data centre to make it future proof. AM3 is fitted with highly efficient hybrid dry coolers for optimal use of free cooling for most of the time a year.

AM3 also uses an Aquifier Thermal Energy Storage system that draws water from a cold well 170 metres underground and cools the facility once the ambient temperature hits 64 degrees Fahrenheit. The groundwater - warmed up by the facility - is then injected in hot wells and stored for half a season. The heat generated by the data centre is used to heat the Equinix office building next to AM3 during the winter. The thermal energy in the hot ground water well of AM3 is used to heat several nearby buildings of the University of Amsterdam. We are currently investigating using the excess heat from AM3 to heat thousands of houses in the residential area 'Middenmeer' next to the Science Parc.

In addition to this, we also implemented a 'green roof' which not only makes the building more aesthetically pleasing, it helps with cooling and reduces the runoff from rainwater, which could otherwise pollute nearby water sources.

AN INDUSTRY-WIDE GOAL

The progress made on making the industry more sustainable has required much investment, thoughtful design and lots of hard work. But this has been made easier by the commitment to collaboration we're now seeing across the entire industry. Many of our customers share our goal to operate on 100% clean and renewable energy globally and leaders in the field are taking this matter very seriously. At Equinix, we are continually sharing advice and best practices with our partners across a variety of industries on how sustainability targets can be met.

There is no doubt more needs to be done before the industry becomes fully carbon neutral, but we are very optimistic about the future. By building facilities that tackle the pressing issues of today, whilst also preparing for the demands of the future, we are steadily moving towards the long-term sustainability and success of our industry. ER

measures are data centre providers taking to meet these pressing sustainability goals?

A SUSTAINABLE FUTURE

Large and sustained commitments by the world's leading data centre companies to source renewable energy, is driving the deployment of renewable generation sources at a faster rate than traditional fossil fuels in many regions of the world. Commitments to source power from lower carbon alternatives ensure that digital progress becomes decoupled from the carbonisation of our economy; protecting our planet as progress continues to accelerate.

Equinix understands that our actions impact the world around us, which is why energy efficiency has underpinned our design process over the last 20 years.

In 2015, Equinix was the first of data centre provider to publicly commit to a long-term goal of using clean and renewable energy to power its entire global data centre footprint – currently comprised of 200 facilities across 52 markets. This commitment was referred to by Greenpeace in its report Clicking Clean as 'a giant step forward for building a renewably powered internet'. In just two years, we hit 77% of our renewable energy goal, thanks to sizeable investments in projects involving wind and other renewable technologies.

GREEN BY DESIGN

Applying sustainability innovations from the ground up when building data centres has become standard practice at Equinix, and we are already reaping the rewards. Our flagship LD6 data centre in Slough was the first in the UK to receive the coveted Leadership in Energy and Environmental Design (LEED) gold rating – a key milestone on our journey to create a sustainably-powered internet.

As Equinix's LD6 data centre was built from scratch, there was significant freedom in both design and development – allowing us to use advanced techniques that prioritise sustainability from both an operational and environmental perspective.

The green construction and design choices pioneered at LD6 have since been leveraged as a best practice in many new builds in other markets globally. This includes indirect evaporative cooling, indirect heat exchangers, rainwater harvesting and air handling units, as well as a bore hole to an underground water source. These methods not only improve the operational sustainability of the data centre, they also reduce the site's ▶

Electrical Review

The invaluable resource for electrical professionals informing the industry for over 140 years

Register now for your free subscription to the print and digital magazines, and our weekly enewsletter

SUBSCRIBE FOR FREE TODAY

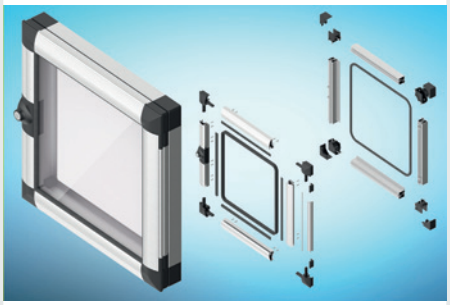
www.electricalreview.co.uk/register

WINDOW KITS FOR QUICKER SELF-ASSEMBLY

The EMKA PROflex aluminium window system enables users to fabricate what they want, when they want it, off the shelf for use as windows or mounting panels with or without depth frame for clearance of door mounted instrumentation.

The DIY approach enables panels to be outsourced in non-standard materials to non-standard sizes. It also allows for standard sizes to be adapted or modified to suit custom requirements at short notice.

The PROflex window system can be configured as a low profile window or as a protection for indicators/buttons/switches that protrude from the door panel. The system incorporates an integral cylinder lock mechanism or multiple locks on longer sizes.



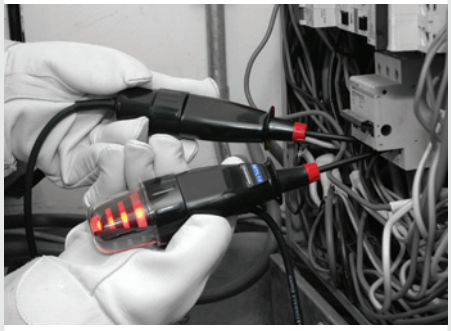
EMKA • 024 7661 6505
www.emka.com

HIGHER VOLTAGE SAFE ISOLATION

Now available from Martindale Electric is the new Drummond MTL15 Test Lamp, designed to extend safe isolation procedures into higher voltage applications.

Building on the success of its existing industry endorsed MTL10; the new Drummond MTL15 Test Lamp now has a 1000V CAT IV safety rating and LED indication for AC/DC voltages ranging from 50 to 690V, ensuring compliance with health and safety requirements for safe working in all BS EN61010 installation categories.

The new MTL15 is suited to higher voltage applications with four distinctive bands of LED illumination which provide safe and clear indication for voltages at 50, 230, 400 and 690 volt thresholds.



Martindale Electric • 01923 441 717
www.martindale-electric.co.uk

PROTECTION TESTING CONFERENCE & WORKSHOP

From October 16–18, 2018 Omicron will host the third UK Omicron Protection Testing Conference & Workshop at magnificent Crewe Hall.

Protection experts from around the world will gather to exchange experiences, engage in an interesting conference and participate in practical workshop sessions.

Target audience
* Protection and measurement engineers working for utilities, railway, industry
* Manufacturers of protective equipment
* Service providers, project companies
* Regulatory authorities, consultants
* Universities

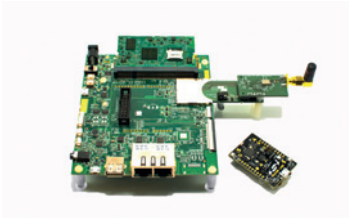
Conference day
A collection of application-based papers will be presented by manufacturer and commissioning companies, followed by a relaxed social evening.

Omicron • 01785 251000
www.omicronenergy.com

IOT DEVELOPMENT KIT CONNECTS OUT OF THE BOX

RS Components (RS), the trading brand of Electrocomponents plc, a global multi-channel distributor, has introduced a Cloud-enabled development kit that kick-starts IoT-sensing projects by allowing users to collect and analyse data on a dashboard within minutes after unboxing.

The UrsaLeo UL-NXP1S2R2 kit contains a Silicon Labs Thunderboard 2 sensor module, ready to connect to UrsaLeo's services platform in the Google Cloud. Pre-registered access helps developers get productive quickly, and start configuring their own dashboards and charts, set event-based text or email alerts, and run Google analytics. Apps and APIs are provided to help manage sensors locally, run diagnostics, and share information seamlessly with other enterprise software or third-party tools such as business intelligence applications.



RS Components • 07795 400651
www.rs-online.com

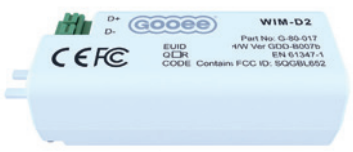
ON ANOTHER WIM

Gooee's latest WIM-D2 DALI Dongle supports the major driver brands and provides a wireless interface between DALI drivers and Gooee's ecosystem. It operates on the DALI bus as a controller providing a communications and sensing interface for a luminaire utilising a powered DALI bus.

The modular control device based on the Gooee Core it provides switching, power monitoring and communications services for a luminaire and / or sensors. The design separates power, communications and control boards allowing support for a variety of control solutions.

The Wireless Interface Module can connect to a wireless network for control via either a Gooee Core (Bluetooth Mesh), IEEE 802.15.4 (Zigbee or Thread) or WiFi depending on the communication module chosen.

Meet product experts and discover their range of solutions on their stand at this year's Building Tech Live, part of UK Construction Week 9-11 October 2018 at the NEC.



Gooee • 01727 836 611
www.gooee.com

AURORA LAUNCH

Aurora Lighting, one of the world's largest private LED lighting and technology companies, has launched its new linear at Light+Building 2018, which, once installed as part of the AXiO smart lighting platform can assist in reducing energy savings by up to 50% by using control and engage with customers and staff alike.

The linear solution is the first in a range of products developed on the AXiO platform. Specifically tailored for commercial and retail applications, the AXiO Linium has been designed to deliver a highly efficient, continuous stream of light and is suitable in general areas, retail front of house, back-of-house, offices, shopping centres, and more. Ease of installation and elegance combine with low maintenance and full support with the option to upgrade to wireless control and sensing capabilities in future due to modular design.

Aurora Lighting • 01793 467200
www.auroralighting.com

The Galaxy VX UPS: The possibilities are uninterruptible ...

Explore a galaxy of innovation.

The Galaxy™ VX UPS provides unyielding power-security for high-demand large data centre and industrial applications. Its future-proof, pay-as-you-grow architecture grants exceptional cost of ownership, and with a kVA of 500+ and the ultra-high efficiency ECOnversion™ Mode, you'll run your enterpise with uninterrupted peace of mind.

We drive INNOVATION...
And we do it at every level with EcoStruxure™ for Data Centre.
Join us at DCD London to know more.

schneider-electric.com/galaxyvx

Life Is On | Schneider Electric