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Electrical Review

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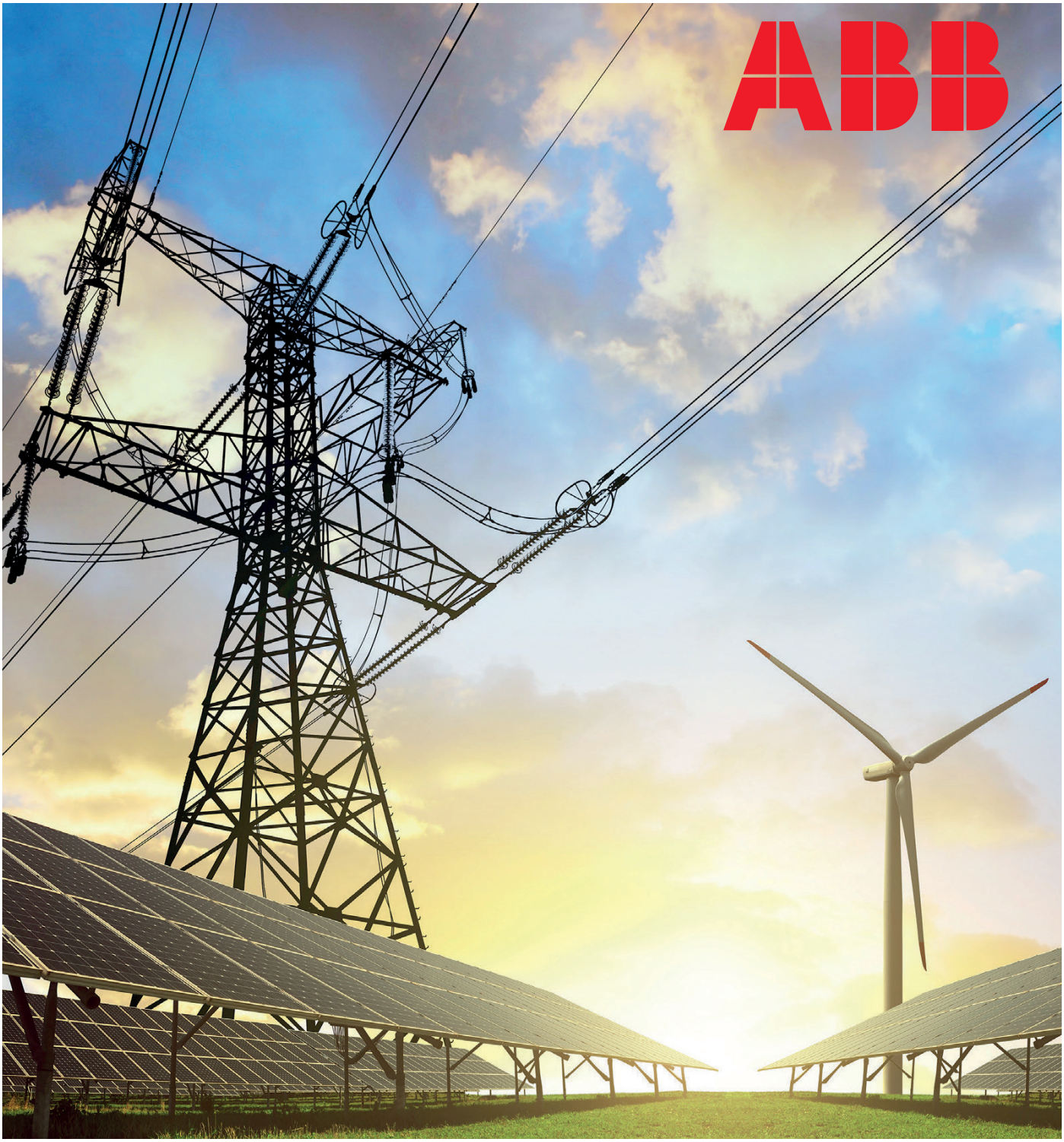

ABB

TXplore goes where man has gone before

Intelligent buildings

Karl Walker, of Beckhoff Automation, spoke with Electrical Review on the impact the Internet of Things will have on smart buildings

Energy efficiency

Michael Akinla, TSE manager EMEA at Panduit outlines how a well-designed white-space can pay dividends

Electrical Review EXCELLENCE AWARDS 2019

In partnership with: riello ups

2019 date confirmed!

Following the success of the inaugural 2018 Electrical Review Excellence Awards, we are delighted to announce the date of next year's event, as well as a new venue:

30th May 2019 The Four Seasons Hotel, London

The 2019 Awards, in partnership with Riello UPS, will feature a wider range of categories across both projects and products, providing businesses with more opportunities to showcase excellence within the electrical sector:

Power – Product of the Year
Power – Project of the Year
Lighting – Product of the Year
Lighting – Project of the Year
Fire Safety & Security – Product of the Year
Fire Safety & Security – Project of the Year
Test & Measurement Product of the Year
Energy Efficiency Project of the Year
Innovative Project of the Year
Sustainable Project of the Year – Sponsored by Smart Grid Forums
Project of the Year – Presented by Riello UPS
Product of the Year – Presented by Riello UPS

In association with DCR Data Centre Review

Data Centre Design & Build – Product of the Year
Data Centre Design & Build – Project of the Year – Sponsored By Heatload
Data Centre Cloud – Product of the Year
Data Centre Cloud – Project of the Year
Data Centre Colocation Supplier of the Year

In partnership with: riello ups

2019 Award sponsors: HEATLOAD by Mafi Mushkila Ltd; SMART GRID FORUMS Driving Clean Energy

Entries will open soon – visit www.electricalreview.co.uk/awards

The Awards offer an outstanding platform for businesses operating in the electrical industry to join Electrical Review's mission to reward excellence, innovation and collaboration.

To find out more, call **Sunny** or **Amanda** on **+44 (0) 207 933 8970** or email **sunnyn@sjpbusinessmedia.com / amanda@electricalreview.com**

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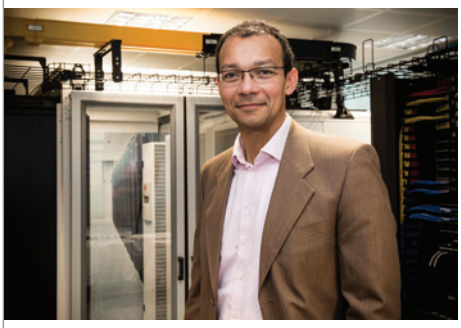

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Fire door safety ignored despite Grenfell tragedy

Despite the shocking tragedy of the Grenfell fire in London last summer, an online poll has revealed 50% of tradespeople don't feel confident in advising customers on fire door safety.

Even with extensive media coverage about the dangers of inadequate fire protection in offices and homes since the disaster, less than 20% of tradespeople polled have seen an increase in demand for fire safety products or parts such as replacement intumescent strips for fire doors.

The results are published in support of Fire Door Safety Week (24 September – 30 September) which aims to raise awareness of the importance of fire doors in saving lives.

The poll followed a national survey of 2,000 adults across the country, carried out by online trade supplier Ironmongery-Direct and supported by the Fire Industry Association. The results illustrate an alarming lack of general public awareness of the life-saving role of fire doors which are a legal requirement in all commercial, public and multi-occupancy buildings.

A particularly disturbing outcome was that 70% of respondents would not know who to contact if they noticed a problem with a fire door. In addition, almost one in two people surveyed admitted that they do not know how to identify a fire door.

Ian Moore, CEO of the Fire Industry Association, said: "Fire doors are one of many essential elements to keeping safe from fire. In all cases, a suitable and sufficient fire risk assessment should be carried out by the responsible person - usually the building owner. A fire risk assessment should determine, through thorough inspection, any potential risks or hazards so that they may be resolved. If you are worried about hazards and risks from fire, you can always contact us, the Fire Industry Association, for free and impartial information and we will be able to direct you to an expert on the subject."

Refrigeration representation

Bsria has become a member of the Institut International du Froid (IIR) (or the International Institute of Refrigeration).

The IIR is at the heart of leading developments in the refrigeration sector. It is the only independent intergovernmental science and technology based organisation which promotes knowledge of refrigeration and associated technologies and applications on a global scale that improve quality of life in a cost effective and environmentally sustainable manner including:

- Food quality and safety from farm to consumer.
- Comfort in homes and commercial buildings.
- Health products and service.
- Low temperature technology and liquefied gas technology.
- Energy efficiency.
- Use of non-ozone depleting and low global warming refrigerants in a safe manner.

58 member countries take part in IIR activities – representing over two-thirds of the global population.

Back to school

NICEIC has launched a second TV commercial promoting the use of registered electricians.

Kids Questions features NICEIC's senior technical presenter Darren Staniforth giving a talk about electricity to a group of schoolchildren.

The children put Staniforth under pressure with a series of curious questions about electricity before the tagline 'With Electrics we are all children – always use a registered electrician' appears at the end.

He commented: "It was a real fun advert to make as the kids' questions were all unscripted.

"That made it difficult for me as I just had to react and provide an answer as best I could.

"And that is the message we want to get across. When it comes to dealing with electrics some people might think they know a little bit, but in reality they don't have all the answers. That is why it is always best left to the professionals."

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Secured partnership

Warrington based Aberla M&E, part of the Aberla Group, has picked up the multi-million M&E package at Burlington Square. The 273-unit residential development, over nine storeys, will be a mix of one and two bed apartments plus penthouse suites, a landscaped courtyard, gym and communal rooftop area. The scheme, for the joint venture partnership between Salboy and Factory Estates, is located on 'Corridor Manchester' and is just a couple of minutes' walk from the University's campus buildings within the learning quarter.

The M&E work package at Burlington Square includes full heating and electrics, fire and security, lighting, ventilation, LV distribution, sub-main cabling, building management systems and electric car charging points.

This wider project team has been brought together once again following the successful working relationship commencing last year during the renovation of the famous Blackfriar Pub, and wider Local Blackfriars development, which clearly demonstrates a strong and effective partnership.

Dr Daniel Strosnider, strategy & sustainability director at Aberla commented "Our successful ongoing relationship with Domis Construction, Salboy and Factory Estates, has proven another significant scheme for our portfolio. It's great to be working together again on the next large-scale project in central Manchester."

"With new investment into the business back in 2017, plus a new management team providing clear and strategic direction, Aberla has gone from strength to strength during this time and, securing repeat work such as Burlington Square, is another step closer to positioning ourselves as the 'go-to' building services contractor in the North West".

Lee McCarren, managing director at Domis Construction said "This high-end development required a trusted partner to carry out the large M&E work package to ensure we hit both programme and budget. Our relationship with Aberla has enabled really positive and open communication from the outset and we're pleased to have them onboard".

Certsure raises £20,000 for Alzheimer's Research UK

Certsure, which operates the NICEIC and ELECSA brands, has raised £20,000 for Alzheimer's Research UK (ARUK), smashing its two year target one year early.

Last year, Certsure staff chose to partner with ARUK, Europe's leading dementia research charity, as its official charity.

Certsure committed itself to raise £20,000 across two years, but through various fundraising efforts, the firm has smashed its target one year ahead of schedule.

There are currently 850,000 people in the UK living with the condition and is set to rise to one million people by 2025. It is only through vital research carried out by ARUK that finding a solution to the problem is possible.

Over the past year, Certsure employees have taken part in sweepstakes, charity auctions, dress down collections, charity auctions, bake sales and runs.

One of the biggest donations came from a charity skydive which saw 22 Certsure staff parachute 10,000 feet from a plane and raised over £10,000 in the process.

Katy Abraham, Regional Corporate Partnerships Officer at ARUK said:

"It's been fantastic working with Certsure and I'm so impressed that they have already hit their fundraising target

Certsure | Alzheimer's Research UK

Make breakthroughs possible

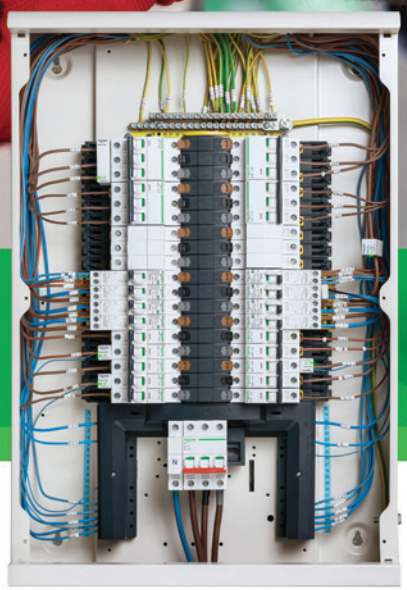
"The enthusiasm and support has been incredible as they have literally thrown themselves out of planes and into this partnership.

Their efforts will make a real difference in our search for a cure to dementia.

Certsure will continue to work with ARUK and hold fundraising events throughout the year, raising even more money for the charity.

Acti9

Isobar P



Quick smart solutions

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- **No need to cut**, dress or terminate any functional wires

schneider-electric.co.uk/isobar-p

Life Is On | Schneider Electric

Napit debut

Napit made its debut at this year's PLASA Show which took place between the 16-18 September 2018 to promote its BS 7909 Competency Scheme and City & Guilds Accredited training programme.

Temporary electrical installations are required at a range of both public and private events and to continue to raise awareness of the importance of electrical safety and compliance within the entertainment industry, NAPIT attended the PLASA show at London Olympia, the worldwide event for entertainment technology.

Napit is currently the only organisation who actively support the events and production industry by offering a competency scheme. As a result, NAPIT were one of four companies to receive a special commendation from the judges during the Innovation Awards, saying "We wanted to commend NAPIT for developing an electrical qualification and competency scheme that is relevant to our industry, including TV, film, events and theatre."

On the final day of the show, NAPIT's technical events manager, Paul Chaffers, spoke alongside industry expert and author of IET's Guide to Temporary Power Systems, James Eade, in the Electrical Standards Update which attracted a large audience.

Napit's group chief executive, Mike Andrews, said "The positive response that we received at the PLASA Show was extremely encouraging, and we are pleased that our efforts to raise awareness of safety and compliance within the entertainment industry is being noticed. Our Temporary Electrical Systems Scheme and Training enables technicians to expand their professional capabilities, but more importantly it gives clients within the industry the assurance that any work carried out has been completed by a qualified and compliant NAPIT member."

For the duration of the show, everyone who visited the NAPIT stand had the chance to win a £600 prize bundle by taking part in their Find the Fault competition. Participants had to identify 10 faults on the distribution unit, which was supplied by Lamp & Pencil Ltd, within the quickest time to be entered in to the prize draw. Out of 26 hopefuls, the lucky winner was Tom Howard, a theatre technician from Framlingham College who completed the competition in under 27 seconds!

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GOSSAGE

The (in) famous Five

The Big Six energy retailers are set to shrink to five. The Competitions and Markets Authority has given the green light to a merger between Npower and SSE.

This marks a distinct U-turn on its hostile view just five months ago. Then the official line was that consolidation "would substantially cut competition and drive up household bills,." So what has changed?

One logical conclusion is that lobbying by the firms won the day. But a more sophisticated interpretation is that this is simply an acknowledgment by the Competitions and Markets Authority that the big suppliers are already losing hundreds of thousands more customers to dozens of keenly priced start-up rivals.

Npower and SSE are pitching their merger as tremendously good news for householders, arguing that the new firm – rivalling British Gas in size- will somehow be much more efficient and agile, delivering a price cutting bonanza.

This is drivel. This merger is an existential reaction to a marketplace that is now a hostile environment for the Big Six. Or even for the Big Five. And likely to get worse for them when the Government's latest interventionist gimmick, of new price controls, kicks in early December. I suspect the new company, to be known colloquially as NSS in homage to 1930s Germany, has even bigger challenges ahead.

Nasty nip in the air

Plans for a new nuclear power station in Cumbria are moving closer to collapse. Nugen, owned by Toshiba, the troubled Japanese conglomerate, is laying off 60% of the staff involved with developing its Moorside plant. If no buyer is found before January, then the venture is likely to be abandoned altogether.

The Moorside scheme, neighbouring the Sellafield atomic waste site on the Cumbrian coast, has been in doubt since early last year, when financial problems engulfed Toshiba. A mooted sale to Kepco, the South Korean utility, stalled amid political change in South Korea plus a British government rethink of the financial support on offer for nuclear plants, after widespread criticism of the high costs of Hinkley Point.

Nugen was founded in 2009. Toshiba bought into it in 2014 with the aim of deploying reactors made by its Westinghouse subsidiary. However, Westinghouse suffered huge cost overruns building reactors in the United States, which led to it filing for bankruptcy protection and then being sold off last year.

With electricity sales falling consistently each year this century, this debacle is , as the GMB union told the Times, "depressingly predictable."

Monsieur Hulot's Holiday

Those deluded fools who are not true believers that nuclear power will save the world were very depressed when the firmly anti-atom French environment minister Nicolas Hulot very publicly resigned from the Macron Government. Amongst his biggest grouses was a fear that President Macron was reneging from his campaign promises to halve the number of nuclear plants.

Oh ye of little faith. They should learn to read French. Or at least the newspaper Le Monde, which carried the first policy interview with Hulot's successor Francois de Rugy.

Roughly translated, he is adamant that the French state-controlled power company EDF- still clearing the ground to build the Hinkley nuclear power project in Somerset – will need to show that any new generation nuclear reactors can work properly, before any other plants are built.

In essence, de Rugy says his gut feeling is that nuclear power is not an energy source for the future, but carefully adding that there should be no "war of religions" on the issue. de Rugy said "EDF should demonstrate that the European Pressurised Reactor truly works," which given the interminable delays in construction at Flammanville is definitely not the case yet. Six years on from its official completion date, nobody is able to guarantee any date for connection to the grid.

de Rugy also emphasises that EDF " has to demonstrate that the EPR is competitive in terms of costs". For good measure, he concluded that "the important thing is to expose what the economic data is in the nuclear sector , and in the field of renewable energies. And to know what the safety data is. Nuclear risk is not a small risk that can be brushed away". It is surely just as if M. Hulot had never taken his long holiday.

A salutary reminder

Electric vehicles may have a very green reputation. But an important reminder: they can only be as green as the electricity they are using.

The International Energy Agency has found wide ranges in electric cars' net climate benefits over internal combustion engines, according to its' new survey. That has factored in two key variables: how carbon-intensive a country's electricity is, as well as the emissions associated with batteries and other manufacturing inputs of electric cars.

Looked at like this, the carbon benefits of electric cars over petro-fuelled ones drop from 50% to 30% in Europe when adding manufacturing emissions, and are even lower in countries that get more electricity from fossil fuels, like the U.S.

When considering manufacturing emissions, electric cars can even result in a net increase in CO2 emissions in countries like India and China with heavy fossil-fuel power mixes, the IEA says. Caveats definitely worth remembering.

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ABB

TXplore goes where man has gone before

A new robotic inspection service for oil-filled power transformers is giving utilities and industrial operators increased visibility of the condition of their assets without the need for oil handling or for a technician to get inside to carry out a visual inspection. Cost, safety, reduced outage time and digital connectivity are all major benefits.

Non-invasive condition monitoring of an oil-filled transformer is extremely helpful to identify possible faults and avoid failures. However, nothing beats a visual inspection when a utility wants to isolate the exact location or severity of a fault or check the asset's condition after a lightning strike.

CONTROLLING COST AND RISK

The conventional approach to transformer inspection takes around three or more days for a large unit and requires a team of specialists.

The procedure involves disconnecting the transformer before draining it of its insulating oil and then cooling it. A technician must then climb into the potentially hazardous and fragile interior for a manual inspection and to capture still and video images. Health and safety requirements also mean that the technician must be supported by a specialized confined space entry team.

Typically, transformer downtime extends to three days and the approach calls for multiple experts in oil handling, inspection, confined space entry and oil processing. It also introduces health and safety risks to the technician, can potentially damage the asset and impact the environment in the event of any mishap during oil handling.

In contrast, ABB's new TXplore service limits the duration and level of resource required, as well as reducing risk. Rather than putting a technician inside a structure drained of oil, it uses a free-swimming submersible robot that is released into the oil-filled transformer.

An operator guides the robot via a wireless link and captures images and video using multiple onboard cameras, lighting and a wireless data connection. This enables utility engineers and transformer experts to review the transformer's condition, including components such as bushings, leads, tap changer, core top, core support and insulation.

TWO TECHNICIANS AND ONE DAY

Measuring only 18 x 20 x 24 centimetres (cm), the robot's small size and smooth casing mean that it can make a complete inspection of hard to reach areas. A wireless data link ensures no risk of an umbilical becoming tangled in internal components. There is no need to drain the transformer of oil or to call in the services of a confined space entry contractor.

The result is that the TXplore service requires a team of only two technicians to pilot the robot and manage the top-side equipment. It opens the potential to limit outages of critical assets to less than one day, as well as limiting the environmental risk of oil spillage and safety risk for technicians.

A further benefit is that the on-site team can call in support from transformer experts anywhere in the world by sharing the digital footage and imagery in almost real-time.

The new service is suited for use in any oil-filled power transformer and is compatible with mineral oils, ester-based or silicone insulating fluids. While the robot's buoyancy is configured for mineral oil, it can be adjusted for liquids with other densities.

The only limiting factor for the inspection is that there must be an opening on the top of the transformer large enough for inserting the robot.

PROTECTING OIL INTEGRITY

One challenge for the robot's multi-disciplinary development team was that any object that enters the transformer must preserve the integrity of the unit and its oil. When the oil circulates inside the transformer, it provides cooling to the windings and prevents over-heating, therefore is essential to the health of the transformer. Moisture, acidic compounds and sludges can build up in the oil and these can all affect its dielectric strength, the measure of its insulating capabilities.

To avoid introducing any contaminants, the team carried out extensive validation and testing of the robot and its subsystems. Prototypes were tested for leakage for more than 96 hours under various temperature and pressure conditions. In addition, spatial and depth navigation was tested to ensure the robot's stability and to ensure stability of imagery.

The robot prototype was even tested in heavily contaminated oil from a field transformer before being cleaned and placed in fresh oil. This demonstration showed that that the service maintains the integrity of the fresh oil if the correct cleaning procedures are followed.

The team also addressed another side effect – the potential formation of bubbles from the robot's propulsion system. Propellers on some remotely operated vehicles (ROVs) are known to generate bubbles through cavitation. Therefore, extensive stroboscopic testing of the propeller was carried out. Testing at all speeds showed that no gas bubbles formed, even in areas where cavitation has formed on other vehicles, such as the leading edge of the propeller and the gap between the propeller and the shroud.

A LIGHT IN A DARK PLACE

Another essential for the robot is that it relies on high quality visual images and high bandwidth data transmission.

The challenge with capturing images in transformer oil is that it is not clear and can darken significantly as it ages. To give confidence in the solution for older transformers, the robot's design integrates LED illumination to focus light on the inspection areas in front of its cameras. This arrangement has been tested in a variety of insulating oils, with the result that illumination helps to secure very good quality imagery in aged oil at a limited distance.

Before every inspection, an oil analysis will determine the condition and quality of the oil. This provides reassurance that oil condition is unaffected by the test and determines the correct buoyancy settings.

Testing also identifies the presence of toxic PCBs (polychlorinated biphenyls). PCBs are banned in the UK but they still exist in some transformers that were installed before 1987. Because the handling of PCBs is closely regulated, ABB ensures scrupulous cleaning of the TXplore and licenced disposal of contaminated cleaning materials.

Further testing showed that the robot could capture clear and accurate pictures under various conditions and temperatures and that data could be captured and shared with experts worldwide in near-real-time.

The result is a dramatic reduction in inspection time to less than two hours, and with no need to drain or enter the transformer, total downtime can be reduced to less than a day.

NORTH AMERICAN UTILITY LEADS THE WAY

ABB carried out the first robotic inspection of a transformer for a customer in summer 2017 for a North American utility. The TXplore robot successfully inspected a 50-year-old transformer without the need for any oil handling.

The exercise verified the mobility of the robot, visualisation of internal components and the potential for collaboration between local operators and remote experts.

In addition, ABB has carried out TXplore robotic transformer inspection at its own power transformer factory in St Louis, US, as well as for an operational transformer at a critical substation that serves an ABB high-voltage test facility.

Since then, the robot's multi-disciplinary team has refined the design of the submersible and the service solution was launched to the market at the Hanover Trade Fair in April 2018, with the first commercial inspections carried out in May 2018.

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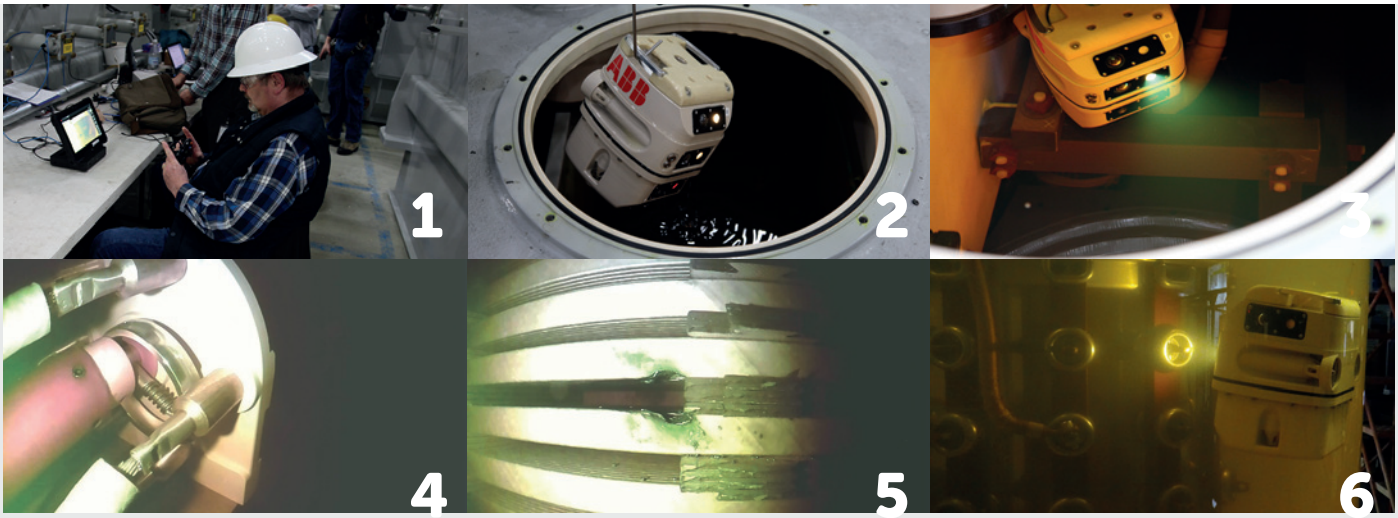
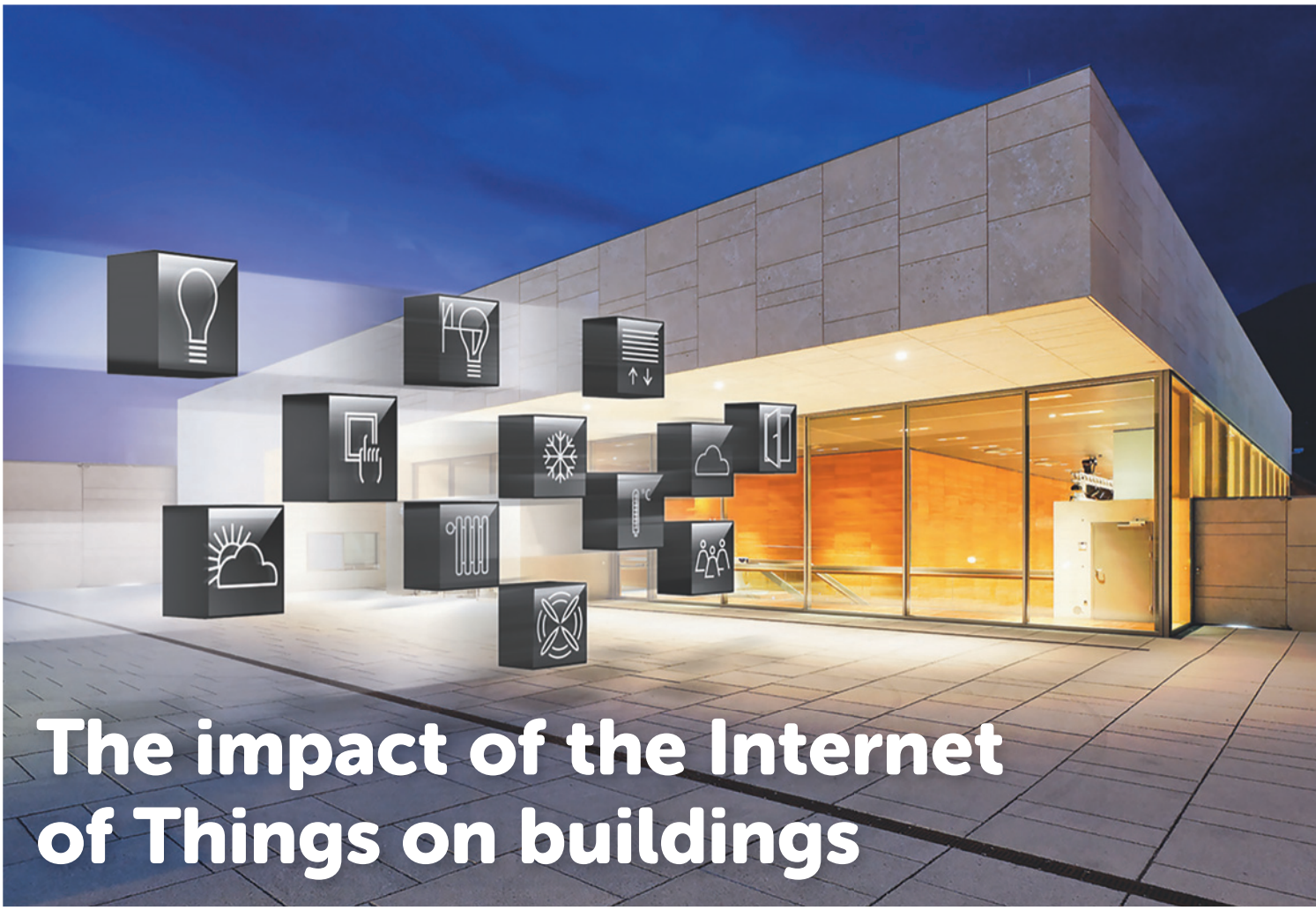


1. TXplore operator with joystick | 2. Service requires an opening in the top of the transformer | 3. The ROV can move freely inside the transformer | 4. Inspection image | 5. Identifying the exact location of faults | 6. TXplore robot in test tank.



The impact of the Internet of Things on buildings

Karl Walker, market development manager for Beckhoff Automation, spoke with Electrical Review on the impact the Internet of Things will have on smart buildings – both now and in the future.

Innovations in building design and architecture, alongside the introduction of advanced materials, have delivered us commercial buildings set up to prioritise occupier comfort and energy efficiency – but have things really changed all that much? Temperature and CO2 sensors still provide the feedback for HVAC systems and motion sensors are still used for lighting systems. We still hear about significant 'performance gaps' relating to the average energy consumption within buildings and equipment still breaks down without displaying any visible signs of failure.

With this in mind, it's surely time as ask why the obvious issues are yet to be solved.

It's been argued that much of the blame lies squarely at the feet of the main contractors, attempting to "value engineer" every last penny out of a building's construction costs, with control systems often the first to fall victim. Others might blame the "that's the way we've always done it" attitude of the M&E design consultants.

In truth, many deep-rooted issues could be solved by improving the fundamental lines of communication between equipment and systems as well as revisiting the way in which users interact with embedded building systems.

IOT ENABLED

Following the introduction of 'Industry 4.0' and through the implementation of open networking standards and increased automation technology, manufacturing has benefitted from vastly improved methods of self-optimization, self-configuration, self-diagnosis, cognition and intelligent support of workers in ever-increasingly complex processes.

Forming the backbone of this success are IoT-enabled devices providing real-time data to improve the understanding of current operating conditions and detecting faults and failures in production, combined with various software packages that provide overall equipment effectiveness (OEE) information to factory management in order to highlight the root causes of problems and possible faults and weak points in the system. Furthermore, these systems are able to gain self-awareness and self-predictiveness, which provide a greater insight into the status and performance of the factory as a whole. Peer-to-peer comparison and the convergence of health information from various components provides a precise health prediction down

to component level, triggering maintenance actions that result in near-zero downtime.

So, why should a building work any differently from a machine? A machine is expected to perform to specification, otherwise there are serious ramifications. It's almost as if people aren't really important and their performance output as a result of having to work in a poor environment is inconsequential. A recent report from Morgan Stanley claims that buildings optimised for occupants can command 3% more rent and gain a 10% increase in equity value, have a significant increase in workers' productivity (and reduced absenteeism) as well as potentially reducing energy usage by 30%.

An energy efficient, occupant-optimised intelligent building can be achieved by taking a more holistic approach to building controls and collecting, aggregating and processing all building data which includes all systems, sub-systems, plant and sensors;

- Sensors detect changes, such as occupancy, temperature, air quality or motion in a room and feed that information to building management systems.
- Building management systems enable facility managers to automate and manage the different variables of a building's operation, including temperature, ventilation and lighting.
- Collected data is stored and analysed over time so that adjustments can be made and further savings can be realised, which could even include the optimisation of space.

ADDED VALUE

Although the principles of control of a smart building require a new way of looking at the problem, they don't necessarily result in a "rip it out and start again" outcome for the control hardware.

IoT-enabled sensors and gateways allow new devices to be added to existing systems and existing (or additional) systems to be connected to one another. Using standard and open IoT protocols such as MQTT, AMQP and OPC-UA, data can be easily collected, collated and processed in a central location, either on-premises or in the Cloud, where analytics software can make sense of it all and optimise and continually fine-tune the control processes, as well as providing a 'single pane view' to occupants, facilities managers and energy managers.

Additionally, many IoT-enabled sensors are wireless or use existing IT infrastructure, thus minimising installation time and disruption. Thanks to the openness of IoT, this new data can be freely used by any of the other devices within the system to improve control decisions. Internet-based information, such as weather and traffic conditions, can also be incorporated into control and optimisation algorithms. For the user, interaction with these systems can be greatly simplified via mobile phone or assistant technology such as the Google Home or Amazon Echo.

> **Minimising installation time and disruption**

LOOK TO THE FUTURE

IoT devices will be encountered on an increasingly regular basis, with new products and systems continuously arriving on the market. The electrical sector has a significant role to play in helping to push IoT towards the mainstream and is well placed to take advantage of opportunities in the design, installation and maintenance of IoT technologies.

As the technology matures, IoT looks set to inject fresh impetus into the smart building revolution, unlocking its true potential and delivering information that can and will make a real difference in pursuit of greater transparency and interoperability - ultimately improving levels of comfort and efficiency. Designers, building managers and electrical engineers will eventually find themselves presented with the tools required to shape intelligent, connected infrastructures that optimise efficiency and comfort levels and transform the way we think about our buildings, cities and associated infrastructure. ER

Making the intelligent connection a reality…

Jon Belfield, president of the Building Controls Industry Association discusses how young people are integral to enabling intelligent commercial buildings to go from strength to strength, not just in the short term, but over the foreseeable future…

Cloud Technology. Internet of Things (IOT). These are just a few of the advances in technology which are responsible for transforming standard buildings into intelligent, sustainable and cost-efficient buildings…

Without noticing, we have all embraced technology in ways that we might never have considered 10 years ago, such as contactless payments, e-tickets, voice recognition or even controlling home lighting from a smart phone. Today's buildings are becoming increasingly smarter and this will soon become the 'norm'…

Sophisticated buildings are the "must-have" for any savvy building owner in the current climate, not because of a need to follow gimmicks but to comply with new legislation, improve the environment and ensure building occupants are both healthy and productive. The drivers for smarter buildings are manyfold and include the fact that it must stack up commercially.

Today's contemporary buildings are equipped with a vast range of smart and effective controls and systems which is becoming increasingly 'expected' by occupants as opposed to 'pioneering' – and this pattern is set to continue. Such innovative features are designed to target aforementioned concerns by improving energy efficiency, reduce operational costs and make the wellbeing of occupants a top priority.

However, for any business to be on top of their game and remain ahead of the competition, managing change is vital, as is moving with the times. Even the most successful of organisations can put themselves at risk if they opt to stand still or be complacent. That's why there is a focus to be pro-active to shape businesses to reflect market expectations so that the opportunities brought by innovation can be maximised…

EVOLVING TECHNOLOGY

So, here's the challenge, as technology and buildings evolve, people and job roles within the industry also need to develop to meet increasing demands for system integration and smart technology. This has created a perfect opportunity to attract more young talent to the building controls sector.

We live in a technology driven society – which many young people may simply take for granted; whether that's ordering an Uber on a smart phone, chatting to family members across the world via video chat, or downloading music to listen to at the gym. Direct access to technology often starts from a very early age and I'm sure many of you will have noticed children ably using tablets, often more confidently than the adults around them. These 'tech-savvy' youngsters are the next generation of electrical engineers….

An exceptional example of young talent helping to extract the most out of intelligent buildings is Greg Smith of E.ON Control Solutions. Greg claimed the prestigious accolade of the Young Engineer of the Year Award at the 2018 BCIA Awards and at just 29 years old, he made the impressive transition from an Air ▶

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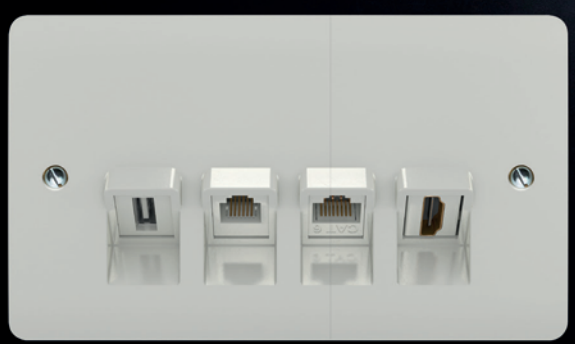


Crabtree

Traffic Trainee Cadet and pseudo pilot to a Commissioning Engineer.

Greg's responsibilities include working on Building Management Systems (BMS), integration, electrical installation, problem solving, fault finding, commissioning, graphics and software writing. He has been able to demonstrate his overall in-depth knowledge by updating the control of existing components to ensure an overarching energy efficient solution which is more often than not the clients' end goal. What's more, Greg is a team guru for the Tridium solution which provides a single user interface to all of the companies' intelligent building systems.

Greg, like many of us believes that automation will soon become a necessity thanks to the ongoing rise in technological advances. He believes the industry will continue to grow through the use of effective building controls to ensure commercial buildings are promoting wellbeing while being energy efficient.

INTELLIGENT APPROACH

Innovation and technology is driving intelligent buildings forward and therefore, we must continue to be adaptable in the ways in which we future-proof our commercial buildings. This can be achieved with help and expertise from millennials and by seeing things through their eyes.

> **Driving intelligent buildings forward**

Sometimes a fresh new perspective to problem-solving is exactly what is needed, with Greg himself stating that there is always more than one way to solve a problem and that's one of the most exciting parts of working with intelligent buildings as an engineer…

As engineers, young or old, we live in a wonderful era where the unchanged laws of physics and thermodynamics together with experience, blend beautifully with the smart technology that is so readily accepted by the likes of Greg. Our opportunity therefore is to encourage new talent into the industry and really capitalise on the combination of skills that we have.

I, like many others, have witnessed a dramatic transformation over the past 30 years with the emergence of intelligent buildings, smart cities and so forth. From a purely personal point of view, working alongside young engineers keeps me sharp and relevant as an engineer in a rapidly changing world and I honestly believe that we can learn the most from each other. Young engineers are our future and there is no doubt in my mind that these are exciting times to be working within the dynamic industry as ongoing changes in technology will continue to create endless opportunities… ER

OVERLOAD PROTECTION: what you need to know

During the countdown to the 18th Edition of the IET Wiring Regulations becoming mandatory in January 2019, Hager's team of experts has been out meeting electrical contractors across the UK as part of the company's 'Regs Live' campaign.

One of the key areas of discussion as a result of the new regulations are the changes to overload protection. Here Steve York, Residential Market Manager, from Hager sets out the background to the changes and highlights methods electrical professionals can employ on installations to ensure they remain compliant.

WHAT HAS CHANGED IN THE 18TH EDITION REGARDING THE OVERLOAD PROTECTION OF DEVICES?

The 18th Edition regulations state that devices such as RCCBs and switches provide no protection against overload, therefore they shall be protected by an overcurrent protective device (OCPD). In addition, a separate regulation states that overload protection of these devices shall not solely be based on diversity factors of downstream devices.

WHY HAVE THE CHANGES BEEN MADE?

Devices such as switches and RCCBs in distribution boards and consumer units may have historically had their rated current determined after having taken diversity into account, but without having considered overload protection of the devices.

Where RCCBs or switches do not have the correct overload protection there is a risk of overheating which can affect the functional characteristics of devices and in extreme cases result in fire.

HOW CAN I ACHIEVE THE PROTECTION REQUIRED IN THE NEW REGULATIONS?

There are a number of methods which can be implemented to achieve overload protection for RCCBs and switches. These include:

Method 1 – ensure that the sum of the rated current of the downstream MCBs does not exceed the rated current of the switch or RCCB. This method would need to consider the consequences of any spare ways and later additions.

Method 2 – ensure that the rated current of a switch or RCCB stated by the assembly manufacturer is not less than the rating of the upstream OCPD. In a domestic installation this could be a 60 A, 80 A or 100 A cut-out fuse.

Method 3 – select a consumer unit or distribution assembly that only utilises RCBOs on outgoing circuits. Consideration will still need to be given as to the rated current of the main switch.

WHAT IS HAGER'S RECOMMENDATION?

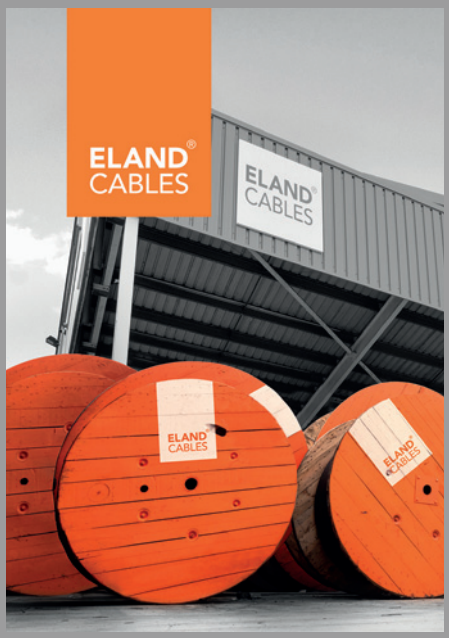
Hager feels that the easiest and most flexible solution for installers is to use a consumer unit which is 100 A rated, with 100 A RCCBs fitted as standard.

This enables the installer/ designer to be confident that the consumer unit allows conformity to the overload protection requirements for RCCBs and switches regardless of the size of the upstream cut-out fuse fitted or the configuration of the downstream MCBs.

For more information on the 18th Edition and how Hager is on hand to support electrical contractors visit: www.hager.co.uk/18thEdition

The evolution of CPR – where are we more than 12 months on?

July 1, 2017 was a date that changed the European cable industry. From that date forward all newly manufactured and imported cables for use in fixed installations in building and construction projects had to be compliant with the Construction Products Regulation (CPR). Many were left confused despite a 12-month introductory period; still questioning 'if' and 'when' minimum classes were required. 1 year down the line we ask - is there more clarity in compliance or are we still baffled?



Briefly, CPR assesses cables for how they react in the event of fire, classifying them from Aca to Fca. All cables, with the exception of fire performance cables, must be compliant if they are to be used for fixed installations inside a building. Testing requirements depend on the classification, covering vertical flame propagation, flaming droplets, acidity and smoke density. Compliant cables are accompanied by conformity certification including a DoP (declaration of performance) and CE CPR labelling, all designed to aid purchasing decisions.

How is this translating to installations across Europe? Despite CPR being designed to offer a common language to reference fixed installation cables, countries still have their own national standards body applying the regulation in different ways, making navigating compliance a challenge. Some countries use risk-based assessments to decide the appropriate CPR classification. Sweden, for example, mandate a Euroclass Dca cable in low risk installations but allow Eca cables where the building is fitted with fire suppression systems – allowing the architect to make informed design decisions. In contrast, the UK and Ireland, even in the 18th Edition of BS7671 the Wiring Regulations (published July 2018), make little reference to CPR and stipulate no mandatory minimum Euroclass over-and-above compliance.

So, what does all that mean in reality? With the highest Euroclasses Aca and B1ca currently reserved for fire performance cables the market currently offers cables classified B2ca, Cca, Dca, Eca, and Fca. Here are 3 common cable materials and their respective CPR classes:

- PVC insulated and/or sheathed cables – Eca
- Rubber (including silicone) cables – Cca
- Low Smoke Zero Halogen (LSZH) cables – Dca to B2ca

The range of cables at higher Euroclasses has increased over the last year as the market begins to understand demands. Many were introduced as Eca simply to provide compliance rather than submitting for higher and more expensive levels of testing. Certainly in the UK, best practice generally recommends use of Euroclass Eca cables and above, and LSZH cables where appropriate. Polyurethane (PUR) and Polyethylene (PE) sheaths, which would have Fca rating due to their flammability, may be specified if the installation environment demands it. These instances urge for due consideration and building safety.

Many will find this a confounding mix of information. To add to confusion, cable can still be compliant without a CPR classification if it was made available for sale inside Europe prior to 1st July 2017. And yet, everyone throughout the supply chain holds equal responsibility for ensuring compliance. If you're a designer from one country, delivering a project in a different European country, it can seem like a minefield.

The advice remains clear - 'don't despair'. Work with a trusted supplier who offers the relevant technical expertise, refer to guidance from national organisations such as BASEC, and educate yourself to the point of knowing the core principles - enough to identify when you need additional help. And don't forget, you can contact cpr@elandcables.com, visit elandcables.com/the-cable-lab, or contact Eland Cables' technical hotline on 020 7241 8500 for more information including arranging CPD Certified CPR training for your team.

12 months on from adoption, if you know what to look for and what questions to ask, CPR compliance is straightforward - don't get caught out!

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Unlocked energy savings for rolling stock

Train operating companies are under increasing pressure to offer good value to passengers and their share holders. This has prompted the adoption ofg total cost of ownership (TCO) as the basis of their decision making when buying rolling stock. That is driving train manufacturers to improve the energy efficiency of their designs. Wes Gilbert, head of strategy and business development, explains how TE's innovative approach to roofline electrical transmission is helping train manufacturers to develop rolling stock that offers a step reduction in energy consumption

When Siemens launched its Velaro Novo train at InnoTrans 2018 in September, it highlighted how the new design was the most economically efficient high-speed design on the market. Siemens' design team has improved the aerodynamics of the train by 30 percent and achieved weight savings of 15 percent while opening up 10 percent more passenger space. At the same time the new train has deliveredae 30 percent on maintenance budgets.

Of these, aerodynamic performance is perhaps the most important. Aerodynamic effects are proportional to the square of the train speed, therefore any reduction in drag or air friction will result in major energy savings over the 30-year life of the train – and therefore lower energy bills and carbon emissions.

Around 60 percent of traction energy in high speed rail is lost to aerodynamic drag and friction. Therefore, when developing its new high-speed train, Siemens carried out extensive improvements to the carriage body, underframe and bogies, as well as making enhancements to the shape of the head of the train. The design engineers also developed an aerodynamic approach to the coach roof, with the adoption of high-voltage equipment that is fully housed inside its aerodynamic profile.

This arrangement is a significant change from the traditional approach in which air-insulated high-voltage components stand proud of the carriage roof to maintain electrical clearance and avoid flashover. Thisl arrangement has several drawbacks. The increased drag consumes energy and creates noise in high-velocity air streams. In addition, pollution, humidity, salt and other factors can affect the dielectric strength of the air – as a result train engineers previously needed to re-engineer conventional air-insulated roofline systems for every project.

NEW-GENERATION ROOFLINE SYSTEM

Siemens' new streamlined roof design has been made possible by the adoption of TE's new-generation roofline system. This modular system integrates all the components needed to transmit high voltage at 15 kilovolt (kV) or 25 kV from the pantograph to the traction transformer.

The modular system integrates all the functionality of surge arrestors, circuit breakers, power cables, insulated bushings and metering transformers.

TE Connectivity developed the modular system after recognising that only marginal improvements were possible for existing technology. Traditionally, such systems have relied on air gaps to insulate the live conductor and the train roof. However, because the dielectric strength (insulating capability) of air is affected by environmental factors we decided toe replace air as the insulating medium with advanced solid dielectric materials. This change means that live conductors are sealed in a purpose-built module and protected from the environment. Now, a single type of module can be used on railway lines that run through a polluted industrial landscape, along a coast or through a damp mountainous region.

LOW PROFILE FOR AERODYNAMIC PERFORMANCE

In addition, the high dielectric strength of the insulation materials has allowed us to ▶

THE IMPORTANCE OF UPS MAINTENANCE

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reduce the size and weight of the roofline subsystem. While a conventional system reached a maximum height of around 500 mm above the train roof and required a cut-out through the top of the car, the new design is only 220 mm high.

This low profile eliminates the need to create a hole through the coach roof, resulting in a smooth aerodynamic profile. These two design features reduce drag, and they also keep noise levels down, therefore reducing the impact of railways on their neighbours and improving the comfort of journeys.

Ultimately, the new roofline system has also opened up new flexible approaches for train engineers. The unit no longer needs to sit proud on top of the roof and can now be integrated inside the roof profile, as Siemens has done on the Velaro Novo. Or it could even be mounted vertically inside the carriage body, giving potential for a significantly different layout of the electrical subsystem.

The low profile and flexibility can also be a major advantage when electrifying lines with height restrictions from existing civil structures such as bridges and tunnels, or when introducing double decker rolling stock.

WEIGHT SAVING

Another major advantage of the Velaro Novo is that Siemens has achieved a 15 percent weight saving. Every kilogramme of weight saved will save energy over every kilometer travelled – and these add up over the 30-year life of rolling stock.

For a local commuter train with regular stops, every 100 kg weight saving translates into lifetime energy savings of 36 MWh and five tons of CO2.

The new roofline system is playing a part in this weight saving initiative. It weighs around a half of previous versions at a total of 79 kg, and this effect is multiplied on trains with multiple motorized carriages.

Electrical installations offer other opportunities to reduce weight on board trains by switching to thin-walled wire and cable for low voltage power distribution, signal and instrumentation in carriages. Conventional rail cables use insulation material that is dosed with minerals to deliver fire resistance, low smoke and low toxicity and reduce the potential for risk in fire situations.

> **“There is less load on the infrastructure”**

However, thin-wall cable is based on fire retardant polymers that meet safety standards for rail at the same time as using less material overall. The result is cable that is between 30 – 50 percent lighter and 50 – 100 percent less bulky than conventional thick-wall cable.

The average commuter train has eight cars, each of which might carry around 30 km of cable that weighs 500 kg or more. As a result, switching to thin wall cable has potential to save several hundred kilograms per car.

However, there are additional benefits to saving weight. There is less load on the infrastructure, therefore weight savings open up potential for savings in maintenance.

For electrical installers, lighter products also mean easier and more straightforward handling and therefore safer working. And in the case of thin wall cable, smaller cable means that engineers can pack more cable into the same cross section.

OPERATION AND MAINTENANCE BENEFITS

Looking again at the 15 or 25 kV roofline systems, the interchangeable modules will also help to control maintenance costs as well as simplify design and manufacture of new trains.

In the world of high voltage substations on the electrical grid, operators have reported higher levels of reliability and availability from indoor gas-insulated switchgear than from outdoor air-insulated switchyards. Failure rates of GIS are only a quarter of those for AIS.

It’s a similar case for onboard high-voltage transmission, where high-voltage components must also cope with high wind speeds, vibration and mechanical shock.

Over the years, we have worked with many train manufacturers to reduce the likelihood of flashover in conventional systems roofline systems.

We’ve found that every component in an air-insulated system can be the root cause of flashover – not just the high performance insulators and switchgear, but also the support structures and even the nuts and bolts that hold the assembly together.

For example, a few loose strands on a low quality copper braid could reduce the air clearance, or create a concentration of ionized particles around the strands and increasing the likelihood that the electric field will overcome the dielectric strength of air. Alternatively, a nut or bolt specified in low-grade steel is more susceptible to corrosion and will eventually shed oxidized particles. In turn, these will build up on insulators and reduce their effectiveness, increasing risk of failure.

In contrast, the new-generation system is fully encapsulated, which gives enhanced protection to the switches and live conductors. As a result, the module eliminates multiple potential failure points, improving reliability and reducing the maintenance costs to the train operator.

So, with potential to reduce energy consumption and improve reliability, the new-generation roofline module is a step-change in technology that can improve the performance and cost-effectiveness of railways. ER

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Reducing the risk of power problems

Riello UPS general manager Leo Craig looks ahead to IP Expo Europe and outlines a pair of popular uninterruptible power supplies set to shine at the enterprise IT trade show.

When the thousands of IT managers, CIOs, and technology experts descend on ExCeL London for this month's IP Expo Europe, they'll do so amidst a backdrop of ongoing change. The tech world refuses to stand still, whether it's addressing the increasing threat of cyber-attacks or harnessing the growing influence of artificial intelligence.

Our lives are driven so much by data and the 'Internet of Things' that by 2025 it's predicted the typical person will interact with a connected device more than 4,800 times a day – once every 18 seconds!

An obvious knock-on effect from such a data-driven society is the huge – and continually growing – amount of storage and processing capacity we need, whether in vast data centres or on-site server rooms. To satisfy these demands, hard-pressed heads of IT also depend on a clean, continuous supply of electricity.

Even so, research shows that more than four-fifths (81%) of UK businesses experience at least one significant energy-related failure a year. And with the most cautious estimates revealing IT downtime costs companies a minimum of £5,000 a minute, not having robust plans in place to mitigate against such catastrophic consequences simply isn't an option.

THE ULTIMATE INSURANCE POLICY

That's where a dependable uninterruptible power supply (UPS) comes into play. When the worst happens and there's a blackout, a UPS gives your computers, servers, and critical IT equipment the time to safely shut down without damage or disastrous data loss. Modern UPS systems also smooth out sags and surges to ensure a consistent, high-quality supply too.

Whether it's a small independent shop, a university IT room, a factory, or hyperscale data centre, a UPS is your ultimate insurance policy against power problems. Even so, there's a perception amongst many IT administrators and electrical contractors that a UPS is just too complicated to fully understand. With so many different models and manufacturers, it's perhaps understandable that choosing the right UPS can sometimes prove a tricky task.

But while it's true a UPS is a complicated piece of machinery, the reality is that specifying one can be as easy as establishing the load figure – the total power your equipment uses – and the runtime you require, basically how long you need the UPS to provide backup power.

In smaller settings, runtime might need to be just a few minutes to guarantee safe shutdown of your IT equipment. For larger or mission-critical settings, you might need several hours' grace to run your operations until the mains supply is back on.

PROTECTING YOUR PEACE OF MIND

Riello UPS's award-winning range of uninterruptible power supplies include solutions covering everything from the smallest desktop PCs to the most advanced supercomputers used in hyperscale data centres.

At IP Expo Europe we'll be showcasing a couple of models that are proving particularly popular with IT administrators and electrical contractors.

First up is our Sentinel Dual. Available in 5-10 kVA versions, these UPS systems are specifically designed for smaller sites that require reliable power protection to be delivered in a very limited footprint. Suitable for powering a small home-based office through to a sizeable IT room, the Sentinel Dual ensures maximum uptime with a minimum of fuss.

This versatile online single-phase UPS operates at up to 95% efficiency and can be installed either in rack-mounted cabinets or as a floor-standing tower depending on your server room layout. It has hot-swappable batteries, giving IT managers the confidence their system can be proactively maintained without ever interrupting the critical load.

Another similarly popular product is our Multi Sentry, which is ideal for protecting the power supply of high-density loads typically found in blade servers. It's been developed for sites that have limited power capacity or issues with harmonics and has one of the smallest footprints in its category, freeing up valuable floor space for other uses.

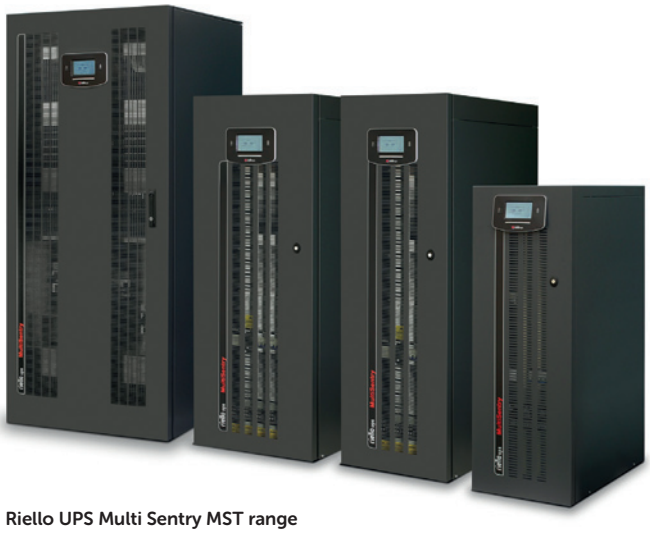
Multi Sentry is available in 12 sizes ranging from 10-200 kVA, with the transformerless UPS capable of operating at efficiency levels of up to 96.5%, significantly reducing the amount of wasted energy.

LOOKING AHEAD TO IP EXPO EUROPE

This year's IP Expo Europe (3-4 October) promises to be the biggest and best yet. Bringing six major events together under a single roof at ExCeL London, it's the must-attend show where IT managers can find out the latest trends and developments in key areas such as cloud storage, cybersecurity, and AI.

It's one of the highlights in our calendar and the Riello UPS team is really looking forward to exhibiting once again. We'll be at stand K8 demonstrating some of our UPSs, while we'll also talk through our extensive range of support services, such as our cloud-based Riello Connect remote monitoring platform and our industry-leading UPS maintenance plans, including our Diamond package. This ground-breaking contract is the first in the UK to commit to both a four-hour emergency response time and a guaranteed fix inside a further eight hours.

Register for a free IP Expo Europe visitor pass here: www.ipexpoeurope.com/2018-Exhibitors/Riello-UPS-Ltd



Riello UPS Multi Sentry MST range

Riello UPS Sentinel Dual SDU Rack

Riello UPS Multi Sentry MST 30-40kva

> By 2025 it's predicted we will interact with a connected device more than 4,800 times a day – once every 18 seconds

Riello UPS Sentinel Dual SDU Tower

Keep it real(time)

Software-Defined Electricity (SDE) has the potential to radically improve the stability, productivity and efficiency of our power networks, alongside many other benefits unique to this technology. Chris Doerfler, SDE expert and founder of 3DFS Software-Defined Electricity, is here to answer some of our questions on what, how and why you should implement SDE in your data centre.

WHAT IS SOFTWARE-DEFINED ELECTRICITY?

Software-Defined Electricity (SDE) is a hardware power electronics system installed in parallel to the power network at the panel level. Once commissioned and activated, the electricity provided to all of the loads in that panel is synchronised in real-time.

Real-time electrical power synchronisation delivers power unity throughout the downstream circuits, maintains harmonics below 2%, balances the consumption across the phases, nearly eliminates neutral and ground current, as well as providing perfectly matched impedance with ultimate lightning protection at all times – no matter the load power consumption or upstream power fluctuation.

In non-engineer terms, real-time electrical power synchronisation guarantees the most efficient and stable, least harmful and costly electricity at all times.

WHAT HARDWARE IS REQUIRED TO ACHIEVE THIS?

The hardware is called a VectorQ Series power controller. Presently, the VectorQ2-60 is available for purchase and protects 60kW of power consumption in 208/240V power networks with real-time synchronisation. On the product roadmap is the VectorQ5 (2019) which will operate in the 480V space and be available in a wide spectrum of power coverage.

WHAT IS THE TECHNOLOGY BEHIND SDE?

The core technology behind SDE is Task Oriented Optimal Computing (T2C). This flexible computing methodology allows for the error free data acquisition, modeling and control to occur at true real-time relative to the speed electricity flows.

This ultra-fast computing capability is what controls the power electronics portion which is a Flash Energy Storage System, providing precision injections of capacitance or inductance as required in the moment based on instant demand.

HOW WOULD THIS BE BENEFICIAL IN A DATA CENTRE ENVIRONMENT?

Nearly everything in a modern data centre has been built with the expectation of uncontrolled, fluctuating power. From the ever presence of surge protection, PDU and UPS devices to the multiple levels of redundancy, up through the oversizing of generators, there is clear concern that power will not be consistently available and that there will be power fluctuation when it is.

When Software-Defined Electricity is installed in a data centre environment, optimal power quality and balance is a constant no matter how power is consumed or delivered.

> **When Software-Defined Electricity is installed in a data centre environment, optimal power quality and balance is a constant no matter how power is consumed or delivered**

In a few years, the designs of newly built data centres will shed nearly all of the devices that are used today to condition power, however in the meantime with existing data centres, there are still quite a few benefits that will be immediately recognised when SDE is retrofitted including: ▶

"It takes 20 years to build a reputation and 5 minutes to ruin it. If you think about that, you'll do things differently."

Warren Buffett

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ENERGY SAVINGS

Streamlining the 'in the moment' power demand, results in maximum energy efficiency when powering loads. All inductive loads like motors for HVAC and CRACs will experience a 20-25% reduction in energy consumption. IT loads like power supplies UPS, servers, routers etc., will experience a 10-15% reduction in energy consumption.

Additionally, there are numerous interaction effects that occur in a network with uncontrolled power fluctuation, that result in a lot of energy waste during power delivery that will be prevented by maintaining synchronisation in real-time.

> **In a few years, the designs of newly built data centres will shed nearly all of the devices that are used today to condition power**

DYNAMIC POWER NETWORK STABILITY

Real-time electrical power synchronisation is performed every microsecond based on the analysis of the power demand at the nanosecond level. By performing at this moment in time, the electrical power always matches the demand, able to instantly adjust in response to real-time anomalies and unexpected events like lightning or the loss of an upstream phase. This is an entirely new level of expectations for flexibility and safety in power delivery.

This same level of power network stability is delivered during the transition off grid, whether to flywheel, UPS, generator, batteries, etc. The electrical power is synchronised through transition at the same microsecond level for constant, balanced power throughout each stage preventing the harmful voltage transients and impedance mismatch that typically occurs in an uncontrolled power network. This indefinitely extends the amount of time the data centre can remain off grid without any harmful effects.

NEVER BEFORE SEEN POWER NETWORK VISIBILITY

The algorithms performed within SDE constantly build models of every load's power consumption pattern. As each electronic load performs in its natural environment, the baseline operation power consumption pattern becomes more and more defined. Every circuit on a circuit board has a pattern of power consumption and the fidelity of measurement performed by SDE is detailed enough to build these patterns into the model. Every load in a power network always has an up to the microsecond accurate model being built at this level, constantly.

Having this real-time baseline signature of operation based on such fine detailed power consumption modeling, opens up an entirely new layer of visibility into load performance. This powerful data not only reveals the internal workings of each load from the panel level, but provides instant insight into any deviation from the model that is always updated. It is this insight that provides 100% accuracy in security detection and predictive analytics which is required in today's world of cyber and physical threats.

WHY IS REAL-TIME POWER ANALYSIS SO IMPORTANT?

To control electricity at the speed it is flowing requires data, analytics and modeling to occur at even faster speeds and must always be 100% accurate. It is impossible to control electricity without real-time analysis.

HOW WOULD A DATA CENTRE OPERATOR GO ABOUT INSTALLING SDE INTO A FACILITY?

VectorQ2 power controllers are installed in parallel to the power network and can be done within 30 minutes without disrupting power.

There is a voltage connection on each phase with ground and neutral being wired if ▶

applicable. Each phase also requires a flexible current transformer to be wrapped around upstream of the voltage connection for measurement. Each unit is network connected for secure data transfer, and that is the full installation. Commissioning requires flipping the breaker at the voltage connection.

ROUGHLY HOW MUCH ENERGY/ MONEY COULD A DATA CENTRE OPERATOR EXPECT TO SAVE ANNUALLY WITH AN SDE SYSTEM?

I always point out to clients that energy savings and dollar savings are not directly connected. There are penalties, tariffs, demand charges, etc. Energy savings are guaranteed as mentioned previously, however the most important concept to understand about SDE is that it minimises energy consumption and maintains balance across the phases at all times, during any event. This results in the absolute lowest amount of energy consumed to operate and the least possible exposure to penalties, tariffs, demand charges, etc. related to electricity.

The other side of SDE is performance and capacity improvement. Depending on the data centre business model, location, market access, etc, improved performance and capacity from every load operating in the power network can produce additional revenue. Every data centre will benefit from the power network stability improvement with increased uptime.

The best approach to understanding the financial impact of operating with clean electricity is to build a financial model that includes the performance and capacity, in addition to the ancillary maintenance and replacement costs for all of the loads (power network infrastructure, cooling and IT) in the power network in addition to the multiple layers of energy savings.

> **“It is impossible to control electricity without real-time analysis”**

ARE THERE ANY SPECIFIC AREAS OF A DATA CENTRE SDE WOULD BENEFIT MOST?

The benefit of SDE is universal to the entire power network and all loads. There are certain loads that are more important in the day to day operation of data centres and whose improvement will be quickly noticed and highly appreciated.

UPS devices, transformers and the IT loads will instantly balance and operate noise free. The improvement in operation will be clearly noticeable upon commissioning and open up capacity in all three. UPS and transformers will have more power capacity and IT loads will have better data transfer capacity.

Over 24-48 hours, the cooling equipment will cycle many fewer times for shorter increments of time, the power supplies, breakers, wires, and loads themselves will be operating at a cooler temperature than they did previously, wasting less energy in operation.

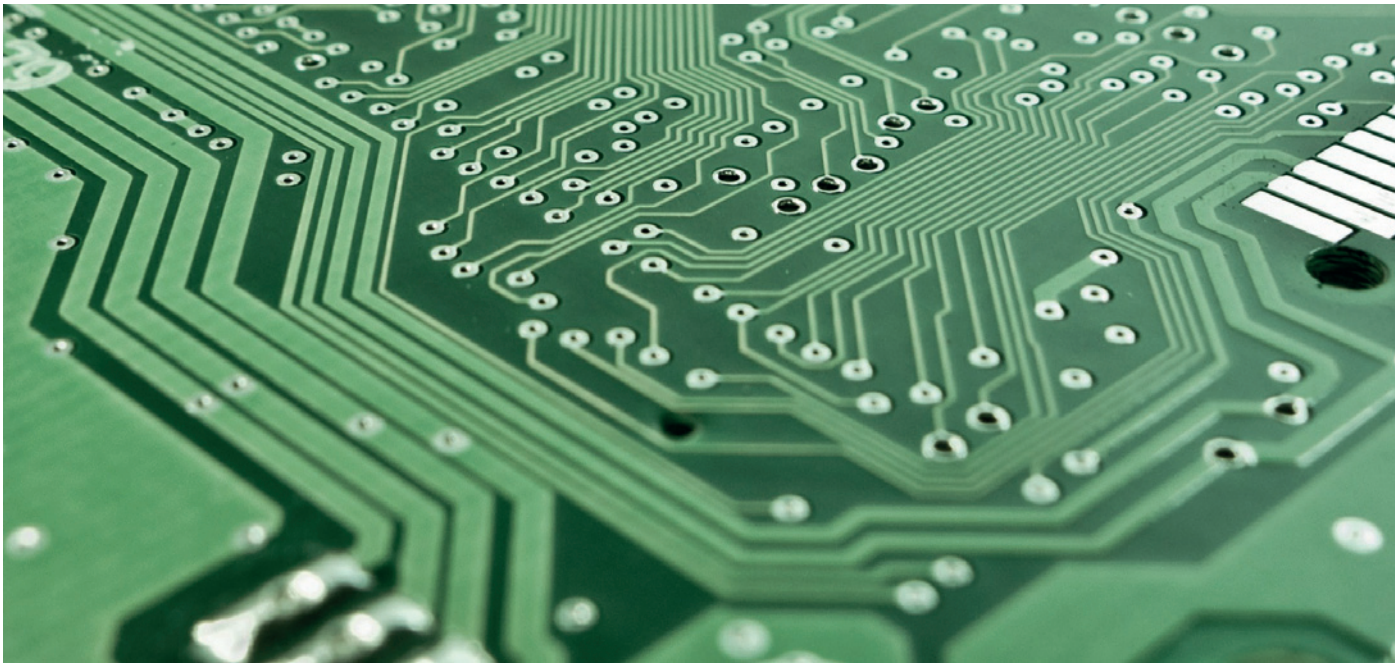
Transition to backup power equipment will not induce fluctuation in the power supplied to the data centre and maintain the same power quality stability as when on grid while consuming less fuel.

IS THIS A COSTLY SYSTEM TO INSTALL? ARE THE RESULTS WORTH THE COST?

Guaranteed stability and consistency in a data centre power network with an assured reduction in energy consumption and new visibility into operations is worth it at any price. For large quantity orders the payback is within two years.

WHAT SORT OF ANALYTICS CAN BE ACHIEVED THROUGH SDE AND HOW IS THIS BENEFICIAL?

As discussed above, under ‘Never before seen power network visibility,’ there is nothing that happens in a power network that cannot be identified, logged, and tracked with 100% accuracy in the moment. This is true for every load. The future of data centres is to be totally and completely predictive in operation and power consumption. ER



Powerful analysis of digital substations

Due to the increasing implementation of the IEC 61850 international standard for communication between Intelligent Electronic Devices (IED) in operational substations, the world of protection engineering is evolving. Ali Abdulla, Application Specialist at OMICRON elaborates on the changes arising from this:

'As the power industry transitions towards a smarter grid, significant efforts have been made in digital communications to improve efficiency and performance in all tasks to reduce outages in case of faults. Nowadays, testing the increasingly complex automation and communications of intelligent protection devices consumes more time than testing the protection functionality.

The replacement of part, or all, of the hardwired interfaces with communication links requires the development and implementation of new methods and tools so that engineers can maintain the same level of security during the testing process, while also taking advantage of all the benefits that IEC 61850 offers. The tools required for troubleshooting in a digital station are different to those for conventional station. Traditional tools and techniques cannot check point to point communication connections between intelligent electronic devices (IEDs). Furthermore, in a conventional station you can connect a voltmeter and measure if the voltage reaches the correct terminal, whereas in a digital station special software tools are needed to 'sniff around' on the process bus to see the GOOSE signals and Sampled Values, and generally to check what happens in the system when it does not respond in the expected manner. As hard-wired schemes are converted to GOOSE and SV based schemes, test personnel will need new skills, testing methods and documentation tools to troubleshoot these schemes.

The testing of protection devices and schemes in digital substations does indeed bring challenges, but it also presents new opportunities to conduct tests with greater safety and efficiency while contributing to the reliability of the grid.'

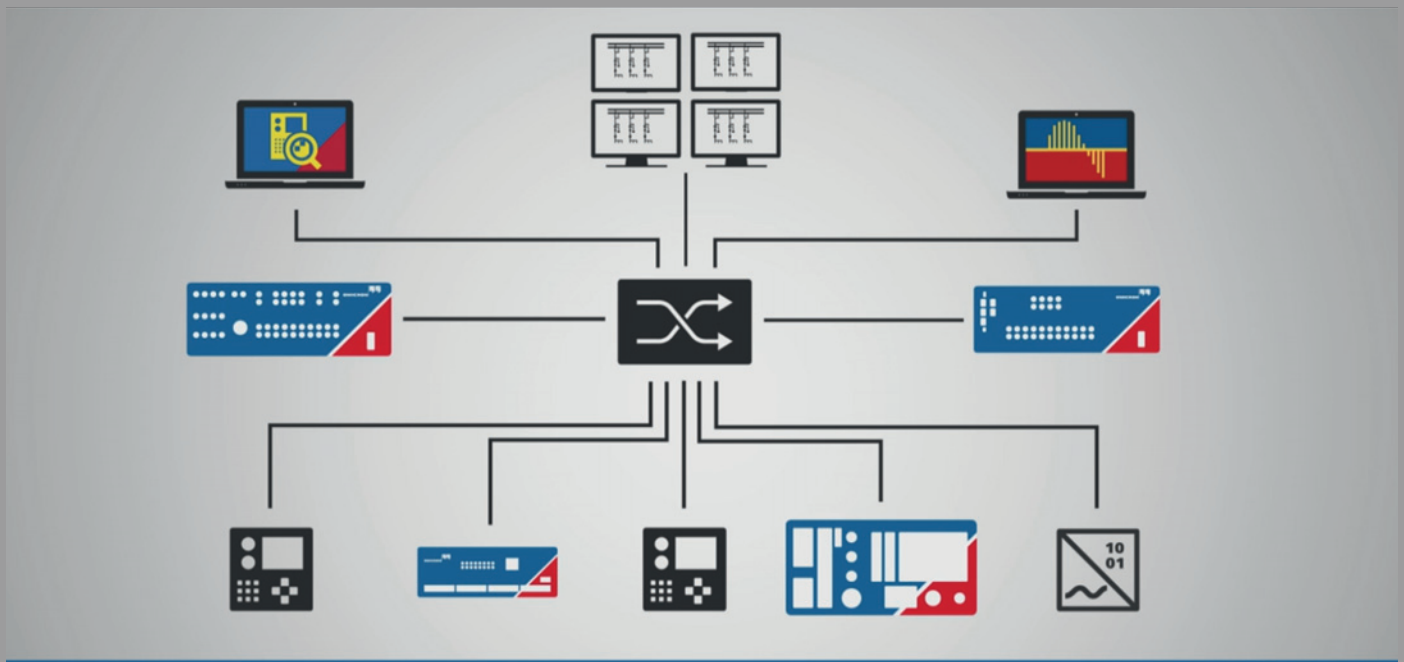
To address these challenges and opportunities, OMICRON has been involved in developments for testing IEC 61850 communication for over 15 years and is now the market leader for testing solutions in accordance to the standard, providing advanced testing tools and training courses which complement each other to serve protection engineer's different needs:

- Client/Server communication
- Sampled Values
- GOOSE
- Binary I/O extension for power utility automation

OMICRON's UK Protection Testing Conference & Workshop, 16-18 October, gives protection engineers the chance to join experts from around the world to exchange experiences, engage in an interesting conference and participate in workshop sessions. Application-based papers will be presented by manufacturer and commissioning companies and practical demo sessions will be held on the following topics:

- IEC 61850 system verification and data management
- Tips and tricks associated with Test Universe
- Simulation-based and distributed protection testing with RelaySimTest using one or more CMC test sets

For more information about OMICRON's power utility communication solutions, events and training courses, please visit our website: www.omicronenergy.com I info.uk@omicronenergy.com



OMICRON offers many testing tools for Power Utility Communication in Substations

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Our 3-phase test set **CMC 430** is the newest member of the CMC family and combines its outstanding performance as a relay tester and calibrator with hybrid measurement and recording facilities. Its lightweight and rugged design ensures excellent portability. Appropriate software tools also allow numerous applications from quick manual testing to distributed scheme tests which makes the CMC 430 a highly flexible solution.

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OMICRON

A new breed of ATS for smarter backup

Len McGanity, product manager at ABB, explains how a new approach to Automatic Transfer Switches (ATSs) can enhance operation of mission-critical power supplies.

WHAT IS AN ATS?

ATSs play an essential role in data centres and other facilities where continuity of power is critical. They detect when power is lost on the main supply and then automatically power switch loads over to a secondary supply, as well as powering up backup generators.

Outages affect all sites at some point, even those with 'five nine' reliability of 99.999%. When they happen, ATSs ensure constant uninterrupted power to supply servers and other critical equipment.

WHAT IS IMPORTANT IN AN ATS?

Until recently, ATS installations could have as many as 30 connection points between the ATS controller and switch to carry signals for services such as metering, sensors and PLCs. However, every electronic connection is a potential source of failure – therefore by opting for an ATS with minimal connectors, operators will benefit from higher inherent reliability.

> **TSs play an essential role in data centres and other facilities where continuity of power is critical**

Another benefit of such simplicity is more straightforward installation and maintenance. Simplicity of an ATS unit can be further enhanced by reducing the number of external components and accessories. Instead, such accessories can be integrated into the ATS, for example metering or communications modules that slot into defined space inside the ATS.

This reduces the amount of installation and wiring, as well as the space required elsewhere in the cabinet. While this also saves installation, it also helps control costs and reduce complexity as panel builders can use standardised panels, even when the data centre operator has specific requirements for their installation.

Modular accessories also help from a maintenance perspective, as modules can be swapped easily when required, reducing downtime and service costs.

One important feature with any mission-critical equipment is that it should operate reliably in the most unexpected of conditions. While the data centre environment is well protected from extremes of temperature and vibration, ATS units should be reliable to switch seamlessly even after being exposed to fault-level voltages during a short circuit.

HOW CAN ATS UNITS INTEGRATE INTO MONITORING SYSTEMS?

As more operators are turning to condition-based monitoring, remote

diagnostics and remote control to manage their assets, they are asking for electrical equipment to be digitally enabled. That is why the latest generation of ATSs can be sourced with modules for in-built intelligence and digital communication, as well as metering.

At the most simple level, this allows in-built condition and temperature monitoring. This provides peace of mind so that operational staff know that their ATSs are always ready at a moment's notice. It will also raise an alert when the units require maintenance, meaning that operators will only need to maintain kit when it is needed, rather than using the conventional approach of time-based maintenance.

More sophisticated services such as automatic load shedding are also possible, by combining the capabilities of intelligent software, metering and communication modules. This is valuable for sites where the backup generators are only sized to provide power for critical loads.

When load shedding is enabled, an intelligent algorithm in the ATS will compare the generator's capacity with the power consumption. It will then review a list of low-priority loads and automatically switch off the most appropriate ones. This decision-making is based on the priority of a load and the power drawn, as well as 'respect time'. This is the minimum period that a load must remain connected or disconnected – and this feature is designed to support long-term reliability.

Once mains power has returned, the ATS will then reverse the process, switching loads back over to the main supply and switching low-priority loads back on while powering down the genset safely.

The communication interface is also valuable during installation and commissioning, particularly. It enables remote programming, configuration and testing, which is a major advantage when working on a project where multiple ATS units will protect multiple circuits.

> **It is beneficial if your chosen ATS unit enables both emergency and manual operation – even under load**

With many SCADA and Building Management Systems in operation in the data centre sector, it's important that the communication interface is compatible with existing technology as well as having capacity for future-proofing.

As such, the latest generation of equipment, such as ABB's TruONE ATS, can communicate using two standards at once from the seven most common protocols: Modbus, Profibus, DeviceNet, Modbus TCP, Profinet, EtherNet/IP and Open ADR, as well as IEC 61850.

WHAT TO LOOK FOR IN ATS TECHNOLOGY

ATSs are used around the world in facilities where uninterrupted power is essential. Existing ATS technology was based on combining switches, controllers, sensors and interfaces.

One drawback of this was that these arrangements were often complex and time consuming to install, with multiple connectors being potential points of failure. Some also require special arrangements during maintenance.

As a result, ABB developed the TruONE ATS to package the switch and controller into a package connected by a single digital connector to enable straightforward operation. Ergonomic studies have found that this method reduces installation by 80% and cuts time required for cabling and commissioning by up to 90%.

Being a digital connection, the controller or Human Machine Interface (HMI) can be mounted on the outside of a panel door and completely isolated from line voltage to ensure safe operation for site-based maintenance staff.

Integrating the digital communication interface will help data centre operators future-proof their operations and streamline operations with remote and cloud-based monitoring via digital platform systems.

When selecting a suitable ATS for your facility it is also essential that it provides continuous operation so that generator use during business hours goes unnoticed, resulting in minimal disruption.

Additionally, safety and protection should always be top of the agenda, it is beneficial if your chosen ATS unit enables both emergency and manual operation – even under load – without opening the panel door when the HMI is mounted to the ATS frame.

This way, the HMI can be detached from the frame for door mounting, offering more flexibility for the panel designer. Additionally, regardless of the HMI installation method, there's no need to connect dangerous line voltages to the door, mitigating the risk of operator injury due to equipment malfunction. ER

London event explores a new dawn for EU data centres

DCD>London returns to Old Billingsgate on November 5-6, 2018 To discuss the dynamic European IT infrastructure landscape, addressing the major themes which are transforming the data centre industry across Europe.

"We are excited to be back in 2018 with brand new industry partnerships and formats, ensuring we cover the latest themes and help connect buyers, sellers, consultants and industry experts throughout the two days," said George Rockett, CEO and co-founder of DatacenterDynamics.

"From Brexit, and the new demand for edge solutions, to advancing automation technologies and the growing focus on renewables, disruption is hitting every layer of the industry creating new opportunities for industry stakeholders," he added.

This year's conference will cover the digital transformation of industries and technologies such as the cloud, blockchain, AI and robotics. Other major themes will include how the industry is approaching energy efficiency measures, extending the lifecycle of legacy data centres, and the hybrid IT landscape which combines on-premise, colo and cloud.

As always, the event is set to host a wide range of seminars and talks from key players in the industry, including appearances from:

- Brian Janous of Microsoft
- Dean Nelson of Uber/iMasons
- Jim Smith of Equinix
- Joe Kava of Google
- Susanna Kass of Baselayer

The seminars will discuss current and prevalent industry topics such as:

- The rise of reference architecture - How Uber is responding to their unique computing requirements
- Case Study: How a cloud provider harnessed the power of immersive cooling tech in their cloud data centre
- How is living between on-prem, colo, & cloud reshaping the European DcaaS market?
- Adapting to regulatory and political uncertainty across Europe

New features and partnerships for 2018

DCD's global content partner Uptime Institute will provide original content and expert speakers, in a mini-track covering ▶

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hybrid IT, climate resiliency, software-defined power and other industry trends.

The Infrastructure Masons industry group will also host a series of discussions and a workshop during the two-day event.

HOSTED ROUNDTABLES

This year's event will introduce Hosted Roundtables which aim to provide attendees with the opportunity for hour-long discussions on critical industry issues for small, focused peer groups.

Roundtables will delve into some of the following topics:

- What does the next generation of hyperscale and edge networking and interconnectivity look like?
- Building the infrastructure that will support 5G cloud and IoT; will it be a proprietary future or an Open one?
- Hybrid IT and data mobility: Is my next 'data centre' in my office, in a colo, in a cloud or on a blockchain?
- How is the data centre responding to IT transformation in financial & fintech services?

The roundtables will feature insight from industry experts including:

- Yuval Bachar of Linkedin
- Pablo Jejcic of Vodafone
- Rhonda Ascierto of Uptime Institute
- Kelly LeValleyHunt of BlockApps
- Mohamed Shawky of Deutsche Bank

Other interactive elements tested in 2017 will also make their return to London this year:

VIP EXECUTIVE CLUB

The Executive Club is a hub for our senior technical decision makers to come together to meet, exchange ideas and participate in a range of varied conference gatherings, whilst gaining the latest insight in cutting edge technologies and updates on the urgent issues shaping the data centre industry.

TECHNICAL PROCUREMENT SPEED NETWORKING

Join us at this session to discover the latest technology launches that could affect real savings for your business. Through a series of dynamic introductions you have the chance to meet new technology providers. You will make brand new connections as you move tables, swap business cards and chat to fellow end users and potential suppliers.

1-2-1 MEETINGS

Our VIP manager will work with you to create a pre-booked schedule of tailored meetings with the technical providers of your choice. Thereby reducing the time you spend on selecting new partners and enabling you to arrive onsite with your diary full and ready to go.

GET INVOLVED

This year's event expects to welcome over 1,700 attendees, who will be joined by industry heavyweights such as Schneider Electric, Eaton, Rittal, Systemair, Deutsche Bank, IBM, EdgeConneX, Keppel, Google, Equinix and many more.

If you would like to get involved in the DCD>London conference or exhibition, which takes place on November 5-6 at Old Billingsgate, London, please contact: giovanni.zappulo@datacenterdynamics.com Free passes are available for end users and consultants. ER

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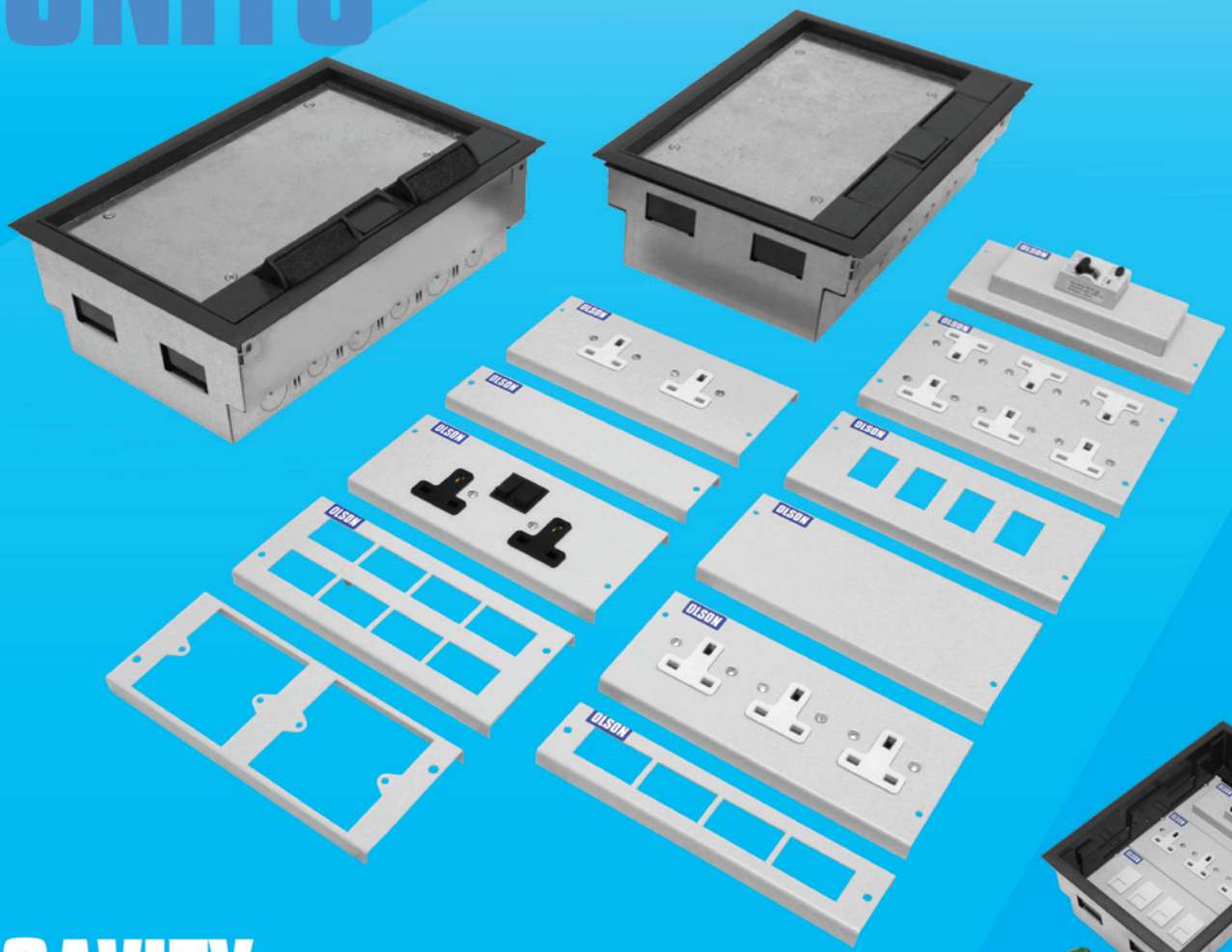

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Save your energy

Michael Akinla, TSE manager EMEA at Panduit outlines how a well-designed white-space can pay dividends when it comes to energy savings and efficiency.

Competition in the data centre market continues to intensify in the build and operation for both colocation and owned sites. The momentum to improve energy efficiency has been helped by developments driven by hyperscale operators (high performance, simplified specification), customer requirements (reducing PUE, reducing cost per kW utilisation) and manufacturers' equipment warranty parameters (higher operating temperatures).

High energy use in the technology suites of data centres has been a necessary weakness in many data centre operators' strategies. The long-standing policy of over specifying cooling systems, was based on the belief that equipment should be operated at a temperature that staff were comfortable working in.

Today, operators and most customers understand that with energy costs for cooling systems outpacing energy used in the technology suites themselves, it is time to design for performance and efficiency.

A well-designed white space with a monitored and controllable cooling/environmental system may use a greatly reduced level of energy. In many cases, the latest developments in thermal planning, monitoring and cooling optimisation are saving hundreds of thousands of pounds in energy costs, as well as pre-empting problems and providing a more resilient and reliable data centre.

Data has become an increasingly valuable corporate asset and the requirement to develop systems that guarantee data availability and delivery have led more board-level IT decisions toward standards-based solutions.

COOLING STRATEGIES

International standards such as ASHREA TC 9.9, ETSI EN 300 and EN 50600-2-3 are driving acceptance of best practice in the technology suites and data centre environments. ASHRAE TC 9.9, provides a framework for compliance and determining suitable Information Technology Environments (ITE).

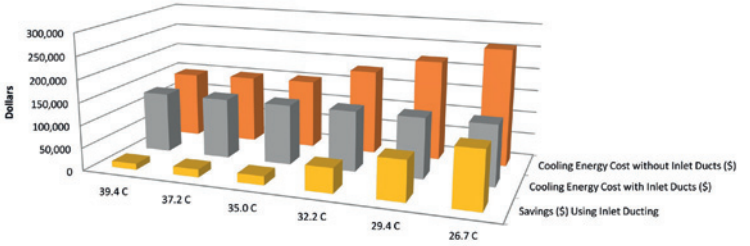
These industry guidelines provide detailed technical information to allow data centre operators to implement cooling strategies that allow optimised equipment operation at carefully monitored and controlled airflows, temperature, humidity and other significant variants.

1. Cabinet/rack level – Measurement of inlet temperature and Relative Humidity (RH) for racks at the bottom, middle and top of the cabinets. Maintaining a recommended (18-27oC) as well as allowable (15-32oC) thermal ranges
2. Containment level (in addition to 1) – With a cold aisle containment system, the hot aisle temperature can be in the range of 50oC; instrument and monitor the outlet temperature at the top of the rack and cabinet. When using a hot aisle containment system, temperatures across the room can be monitored.
3. Data hall level (in addition to 1 and, or 2) – Humidity and temperature needs to be monitored near each CRAC/CRAH at the Supply and Return. Relatively Humidity is recommended at 60% RH and allowable at 20% - 80% RH
4. Airflow management and cooling system control – An airflow management and cooling system control strategy should be implemented. With good airflow management, server temperature rise can be up to 15oC; with inlet temperature of 27oC the hot aisle can be 55oC.

> **High energy use in the technology suites of data centres has been a necessary weakness in many data centre operators' strategies**

A current data centre client has designed out mechanical refrigeration to its technology suites, utilising instead an N+1 Indirect Evaporative Cooling (IEC) system, which provides highly efficient climate control, while offering a resilient back-up capability in the unlikely scenario of a unit failure. ▶

Panduit Net-Contain With vs Without Inlet Ducting



Target Switch inlet Temperature	39.4 C	37.2 C	35.0 C	32.2 C	29.4 C	26.7 C
Savings ($) Using Inlet Ducting	13,409	17,316	19,561	54,044	87,484	124,784
Cooling Energy Cost with Inlet Ducts ($)	132,817	132,817	132,817	132,817	132,817	132,817
Cooling Energy Cost without Inlet Ducts ($)	146,226	150,133	152,378	186,861	220,301	257,601

This system design also incorporates free-cooling technologies resulting in increased reliability, higher energy efficiency, increased sustainability and lower operating costs. The site is compliant with the ASHRAE Thermal Guidelines (2011 and 2015) and is the only European data centre working with the Open Compute Project's data centre program to standardise data centre designs. This cooling system is designed for a temperate climate and regional variation will require modification to ensure maximum efficiency is gained.

> **Energy efficient data centre cabinet systems allow higher data centre temperature set points and reduce cooling systems energy consumption by up to 40%**

ESSENTIAL EQUIPMENT

Each data centre technology suite has a capacity of up to 2.2MW, whether that is shared or for individual customers. These offer a single span open hall, which utilise hot aisle containment enclosures, such as Panduit's Net-Contain system, offering higher density racks, up to 40kW, to be optimised using industry leading cooling and monitoring technologies.

Energy efficient data centre cabinet systems allow higher data centre temperature set points and reduce cooling systems' energy consumption by up to 40%. The phrase, look after the pennies and the pounds look after themselves is never more relevant than in this situation. Controlling small air leaks in the cabinets and enclosures maintains air separation between hot and cold air streams, this leads to large savings in cooling energy costs.

In this situation, the regulated cool air from the Indirect Evaporative Cooling (IEC) system, is diffused into the technology suite. Utilising hot aisle containment allows the operator to effectively manage airflows across devices, such as server racks, facilitating cool air to be drawn into the front of the enclosure and cabinets through the hot equipment. The hot exhaust air is then directed up and away from the equipment through exhaust ducts, into the ceiling space and recycled to the IEC system for heat transfer.

Today's white space processing equipment has higher operating temperatures, and this allows warmer white space operational temperature, meaning that less energy is needed to equalise the 'Air Inlet' temperature. Device Inlet temperatures between 18-27°C and 20-80% relative humidity (RH) will usually meet the manufacturers' operational criteria. What does become increasingly important is the capability to monitor and control the recommended environmental range, including temperature and relative humidity (RH) and to maintain an allowable environmental envelope, where the systems are operating at optimum performance.

EFFECTIVE ENVIRONMENTAL MANAGEMENT

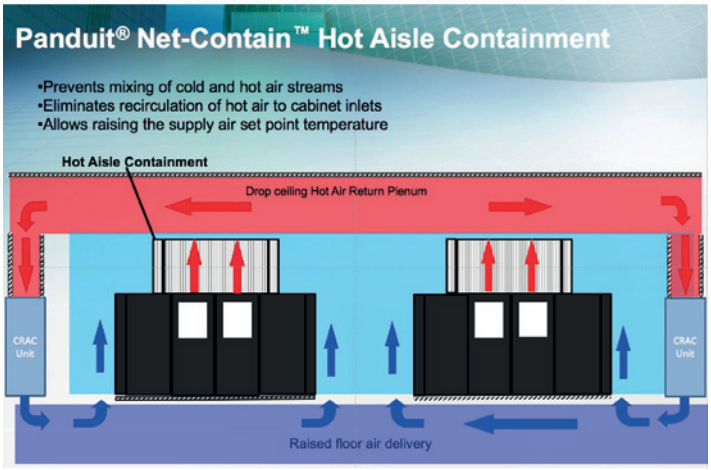
Monitoring systems, such as SynapSense, provide various levels of data, so it is important to understand the level of granularity that is required for your needs. Once airflow management is optimised, the automated system, often wireless and increasingly on a mesh network to maximise its capability, should offer active control to mitigate temperature control risks associated with fan failures, maintenance schedules relocations, changes in IT load and software patches and failures.

The chosen solution should offer an advanced wireless sensor mesh network, where sensing devices, gateways, routers, server platforms and a comprehensive software platform provide connection and monitoring across the entire technology suite. The system needs to integrate data sets from every key piece of equipment to provide management with a highly versatile tool for analysis and intelligent trend gathering.

CONCLUSION

Data centres are an increasingly important hub within the digital economy, many older sites with legacy technology, expensive cooling equipment and minimal monitoring and analysis capabilities are becoming inefficient to the extent where it is change (upgrade) or die (lose your clients to higher performance, more efficient sites).

All data centres are different whether it's the construction, the region, the availability of energy or at what price. As such, they require individual solutions to achieve the most effective position within the market. Today, the market is evolving faster than ever, but the constant remains; the data centre must be more efficient and offer 100% uptime.



Is your electric meter smart?

Misconceptions around advanced technologies often lead to the emergence of urban legends. This is currently the case for the integration of smart electric meters. Electrical Review spoke with Jonathan DiGiacomandrea, applications engineering manager at battery specialist Ultralife Corporation, to uncover the truths behind powering the energy saving devices and find out what electrical engineers and OEMs can do to ensure the rollout is a success

With a global consciousness to reduce carbon emissions, utility companies across the UK are rolling out smart meters in an attempt to help consumers take greater control over their energy consumption. This movement is part of the UK Government's plans to have every eligible home in the UK fitted with a smart meter by 2020.

While electricity users will be able to reap the benefits of the modern electrical grid, research from Which? Indicates that the introduction of smart meters is expected to save utility companies around £300 million a year.

Of course, it's not just the UK investing in smart meters. In 2016, 70.8 million smart meters were installed across the US, but the smart electric meter is currently the most mature in China and accounted for 70 per cent of the total smart meter shipments in 2016.

With forecasts expecting this figure to increase across the world, many consumers are concerned over the safety, reliability and functionalities of the devices, particularly for domestic use. So, what are the facts?

WHAT IS A SMART METER AND HOW DO THEY WORK?

A smart meter is an electronic device that records consumption of electric energy and communicates the information to the electricity supplier for monitoring and billing.

Smart meters typically record energy hourly or more frequently, and report at least daily, by using electronic communications technology. Similarly to the SIM card in a mobile device, this information is communicated remotely and in real-time. A benefit of this is that the information can be closely monitored so that consumers can conserve energy and reduce costs as a result.

Smart meters can also be used to resolve any technical problems. This is because they are designed to electronically report the location of any power outages, which allows utility providers to quickly locate and restore power to the affected area.

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MARTINDALE ELECTRIC

WHAT DATA IS COLLECTED BY SMART METERS AND HOW IS IT STORED?

There is a lot of confusion about the data collected by smart meters and how this is stored. Quite simply, smart meters collect and store data about the amount of gas and electricity used in a facility or home. Smart meters do not collect any personal information that can identify you such as your name or address.

While the data may not be personal as such, there are still laws in place to protect and control the flow of this data. This includes permissions on who can access and share the data, as well as the frequency on how often data from the smart meter is sent to the supplier.

As mentioned, smart meters have their own dedicated communications systems and do not use the internet. Cybersecurity has been at the forefront of the smart meter rollout and the designing of the meters, ensuring that they are well protected against cyber threats. In fact, devices installed in the UK have been created with input from the Government and The Government Communications Headquarters (GCHQ).

Why are people concerned about safety?

WHAT CAN ELECTRICAL ENGINEERS AND OEMS DO TO ENSURE THE ACCURACY OF SMART METERS?

In comparison to traditional analogue meters, which require users to submit the meter's readings to the utility company to find out the usage and expenditure, smart electric meters automatically transmit the information to the utility provider. This eliminates the practice of estimated bills and means consumers can expect to pay only for the energy that has actually been used, rather than overpaying.

To transmit this information back to the utility provider, smart meters require short bursts of power. This means that the batteries installed in the device must support high continuous discharge, offering high-pulse current for wireless and programmable logic controller (PLC), bidirectional transmissions.

Ultralife is seeing many original equipment manufacturers (OEMs) integrating non-rechargeable batteries into their smart metering applications. This reduces the maintenance required, but means OEMs require batteries that have a long service life to avoid inaccurate and missed readings as a result of losing power.

In comparison to traditional chemistries, Ultralife's Lithium Manganese Dioxide (Li-MnO2) and Lithium Thionyl Chloride (Li-SOCl2) battery chemistry has proven performance in servicing metering applications for up to ten years.

This increases the reliability and convenience of smart meters and as they work as part of the smart grid, the devices also offer greater efficiency and service to consumers.

WHY ARE PEOPLE CONCERNED ABOUT THE SAFETY OF SMART METERS AND DO ELECTRICAL ENGINEERS AND OEMS HAVE ANY REGULATIONS OR STANDARDS TO COMPLY WITH WHEN CREATING THE DEVICES?

Fears over the safety of smart meters have emerged because of the devices producing a small amount of radio frequency (RF) energy while in operation. Research from the Federal Communications Commission shows that the level of RF emitted by smart meters is below that of mobile devices and so does not hold a significant threat to human health.

Smart meters are covered under the UK and EU product safety legislation, which requires manufacturers to meet stringent regulations to ensure the product is safe. This must be completed prior to the device going onto the market.

In fact, manufacturers are expected to supply independently certified testing results, demonstrating that the meter can generate accurate readings. Often, the meters are still subjected to further tests prior to installation by utility companies, to mitigate the chances of a meter that clocks the consumption too fast.

Ultralife has been manufacturing cells and batteries for a wide ranging of applications for over 20 years. With full compliance to ISO 9001 and ISE14000 standards, OEMs and design engineers can easily integrate the company's batteries into their metering applications, knowing they are not only reliably fit for purpose, but also compliant with manufacturing safety and quality standards.

WHAT CAN OEMS DO TO OVERCOME THE MYTHS SURROUNDING SMART METERS?

We expect that as smart meters continue to be rolled out and replace millions of manually read meters in homes and businesses, a lot of the fears surrounding safety and accuracy will become a distant memory.

In the meantime, to help overcome the myths surrounding smart meters, Ultralife is urging OEMs and electrical design engineers to ensure they are employing the most appropriate power sources for their devices. For example, Ultralife's Lithium Manganese Dioxide (Li-MnO2) and Lithium Thionyl Chloride (Li-SOCl2) batteries.

Operating at a nominal voltage of either 3.0V or 3.6V depending on the chemistry chosen, the batteries are also able to operate safely and effectively from -40 degrees to +72 degrees Celsius. In addition to this, the batteries retain over 98 per cent of their capacity after a year of storage at room temperature, so they do not suffer from the passivation that affects many other lithium chemistries.

These batteries are offered in a range of sizes, making them ideal for various metering application designs. For example, Ultralife's Li-SOCl2 line is available in a variety of cylindrical sizes. Similarly, the Li-MnO2 range is also available in a variety of cylindrical sizes, however they are also available to order in the Ultralife Thin Cell® form factor.

By considering the characteristics of smart meter applications when choosing the power solution for their device, electrical design engineers and OEMs can support utility companies in providing consumers a simpler means of managing their utility costs, while providing more efficient energy as a result. ER

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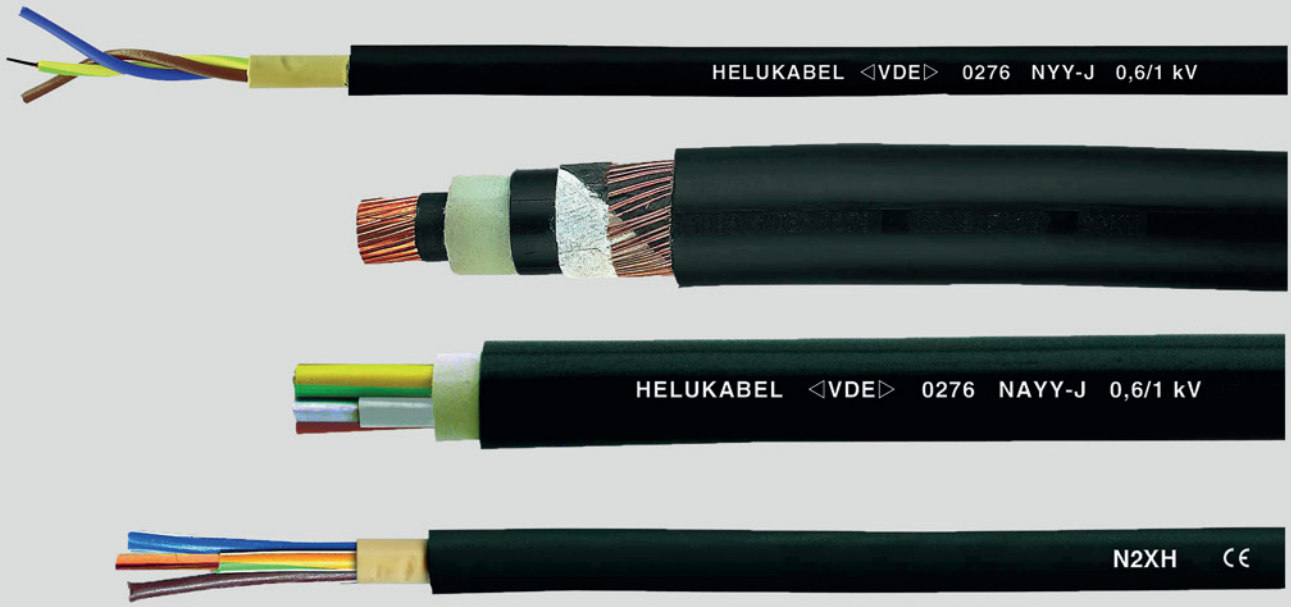

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PLUGGING INTO THE WHOLESALING MARKET

ERA, the UK's leading home security specialist, is breaking into the electrical wholesale market following a new business win supplying smartware security products to electrical wholesaler, Electricbase.

Electricbase branches are incorporated alongside Buildbase and Plumbase branches and form part of Grafton Group PLC.

ERA Key Account Manager, Darren Bates, said; "ERA already has a longstanding relationship supplying more traditional ironmongery safety products to the Buildbase builder's merchant stores, and this latest move is a natural progression as ERA's 'connected home' smartware product portfolio grows.

"The rise of smartware home technology continues to gather pace with many consumers wanting the 'connected living dream'. Innovation is integral to ERA's philosophy and the company's smartware range provides the cutting-edge security technology that consumers now demand as well as an excellent profit opportunity for professional locksmiths and electrical contractors alike."

ERA • 01922 490000
www.eraeverywhere.com

BOOST FOR CCTV RANGE

With an ambition to supply the most comprehensive range of high quality CCTV products through the electrical wholesale network, ESP announces yet more additions to its 4 megapixel range, in the form of 4 MP Wi-Fi CCTV kits.

Marketed under the well-known ESP brand, HDView, the 4MP Wi-Fi CCTV kits are packed with features, making them ideal products to satisfy the growing demand for reliable security solutions. 4 Megapixels provides a higher density pixel count to achieve improved clarity over 1080p (2 Megapixel). The systems have been designed with ease of set up as a key feature, including the option for remote monitoring via smart phone or tablet, using ESP's specially developed HDviewWF APP.

The 4MP Wi-Fi CCTV kits include a stylishly designed 4 channel Network Video Recorder, premium quality Western Digital hard drive, 4MP HD day/night cameras, system power supplies, mouse and HDMI cable. Hard drive options are 1TB; 2TB or 4TB.

ESP • 01527 515150
www.espuk.com

NEW CORRIDOR FUNCTION

As well as launching new and innovative products, Scolmore is committed to making improvements to existing products to enhance their performance. The new Inceptor EVO LED Bulkhead is a prime example, offering all the same great features of the original version, but now with the addition of corridor function which will help reduce energy consumption. Scolmore has a patent on the product's unique design.

The corridor function feature provides a dimmed level of light for periods of vacancy. It is activated automatically when no movement has been detected, with the operator defining the set time period for no movement (between 8 seconds and a maximum of 20 minutes). A simple switch, located on the driver, is used to activate the corridor function. Switch to 'on' and the light output will dim to 15% of its rated lumen output when no movement is detected. Switch to 'off' and the light output will turn off when no movement is detected.

Scolmore • 01827 63454
www.scolmore.com

LOOKING RADIANT

Sylvania changes the way we look at LED lamps with the new ToLEDo Radiance.

The Sylvania ToLEDo™ Radiance changes the entire look of the room with a simple flick of a switch. It merges the boundaries between lamp and luminaire and provides an imaginative retrofit solution to change the feel of a space. The unique circular shape makes it a far more stylish and attractive looking lamp than conventional LED retrofit solutions, ensuring it can be incorporated into any interior décor.

"The ToLEDo™ Radiance is a creative design with features that are both special and unique," comments Anuj senior product line manager LED lamps at Sylvania. "Its unconventional design and elegant shape are going to appeal to everyone and make it stand out from the crowd."

The lamp offers a diffused lit effect ensuring the light is always bright and uniform.

Sylvania • +44 (0) 207 011 9700
www.sylvania-lighting.co.uk

ROLE MODELS INSPIRE FUTURE TALENT

Talented people working in electrical design engineering are to be recognised as part of a campaign to encourage others to follow a career in construction.

Launched in March 2018, UK Construction Week (UKCW) established its Role Models campaign, with help from the Construction Youth Trust, to inspire others and raise awareness of the breadth of roles available in the construction industry. The winner will be announced on 10 October on the UKCW Stage at the NEC, followed by a champagne reception and a meet and greet with keynote speaker, Barbara Res.

After much consideration, the judges put together a shortlist of 36 people from more than 130 high-quality entries. The shortlisted entrants include Daniel Sullivan, a electrical design engineer from Ridge & Partners LLP.

UKCW • 0203 225 5200
www.ukconstructionweek.com

SINGLE-USE PLASTIC CRACKDOWN AT UK CONSTRUCTION WEEK TO BENEFIT CLEAN WATER IN NAIROBI

In an attempt to reduce the number of single-use plastic water bottles thrown away at the UK's largest construction show, UK Construction Week (UKCW) has partnered with Join the Pipe to install water fountains around the event providing free tap water to its 35,000 visitors.

Everyone will be able to top up at water stations at every bar at the show and at Join the Pipe's stand (stand number H200 in Hall 12).

The first thousand visitors to attend one of the three CPD hubs on each day of the event will also receive free reusable UKCW water bottles.

The initiative will help to raise awareness of Join the Pipe and is raising funds for its drinking water projects in developing countries, including a scheme in Nairobi aimed at providing clean drinking water in under-developed urban areas of the Kenyan capital.

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