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FROM THE EDITOR

Australia's power industry has over 45,000 km of transmission lines and 700,000 km of distribution network, and over nine million customers. The ageing electricity infrastructure, pressure to reduce emissions, rapid deployment of renewable energy and rising prices present significant challenges for businesses, householders and the overall economy. Smart grids and related technologies could help address some of these challenges.

Countries around the world are rolling out smart grids and they are all at different stages of deployment. In Australia, a recent four-year trial, backed by $100m funding from the federal government, has found the potential for a net economic benefit of up to $28 billion over the next 20 years from the deployment of smart grid technologies. Technologies such as fault detection isolation and restoration (FDIR), active volt-VAr control (AVVC), and substation and feeder monitoring have the potential to deliver significant savings. The study also showed that peak demand can be more effectively managed through consumer behavioural change and with the assistance of feedback technologies and dynamic tariffs. However, the COAG Energy Council should ensure that sufficient customer protection measures are in place when new dynamic pricing mechanisms are introduced, the report warns. Read more about the findings on page 35.

This issue also features articles on smart cabling, standardising smart buildings and grids, smart hackers that hack these buildings and devices and more. Intelligent devices and buildings promise efficient building management, but they also present privacy and security risks (more on page 57). As with any emerging industry, there will be some teething problems but eventually they'll be ironed out.

Mansi Gandhi - Editor
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STANDARDISATION OF HOME AND BUILDING AUTOMATION SOLUTIONS

Ian Richardson, Director/ Chairman

The home and building automation industry has witnessed rapid changes in technology and this has provided challenges for those wanting to be involved in the industry.

The American human rights activist Malcolm X stated "the future belongs to those who prepare for it today". As technology developed and became more accessible, the early adopters of building automation technology have discovered a beneficial extension for their businesses and have provided important services to their customers.

New technology often spreads like the spokes of a wheel, with various solutions from competing applications all trying to find their place in a crowded marketplace. Whilst choice is a great stimulus for competition, too many competing systems can reduce adequate investment into the development of technology and applications.

In the late 1980s the electrical industry in Europe considered the way forward for home and building automation. At the time there were a number of protocols in use across specific market segments as well as various geographic areas. The industry recognised that having conflicting protocols would hamper the ability of the industry to sustain growth and provide accessible automation solutions to the market.

The technology of the Sigma i-bus system became the foundation of an association known as the European Installation Bus Association (EIBA) in the 1990s. This system was popular across much of Europe. In the French speaking areas of Europe the popular system tended to be the BatiBUS system. The European Home Systems Association (EHSA) was also working for a standardisation of networking for household appliances.

In 1991, discussions took place between these individual groups to provide a common specification for the industry. Utilising EIB as the foundation, a specification was developed to allow EIB, BatiBUS and EHS to communicate on a common platform. This system became known as KNX and has allowed the industry to thrive through interoperability and competition between manufacturers.

KNX technology rapidly gathered support and acceptance in the home and building automation market and in 2003 became approved by CENELEC as the European Standard EN 50090. In the US KNX Technology was approved as the US Standard ANSI/ASHRAE 135 in 2005. In 2006, CEN approved KNX as EN 13321-1 and in the same year KNX technology was approved as the International Standard ISO/IEC 14543-3. KNX technology was also approved as the Chinese Standard GB/T 20965 in 2007.

After being the preferred installation bus in Europe for many years and becoming the international IEC standard in 2006, KNX established itself as the protocol that could provide a futureproof assurance to users, as communication was possible both backwards to old projects and forwards to new projects due to the protection and definition provided by the standard.

Standards provide safety and benefits for users through a protected and defined specification. Having a standard underpin a communication protocol allows an industry to confidently grow to create larger-scale automation solutions without the necessity or inconvenience of gateways and mixed technology. Users only need to learn one technology and manufacturers can develop products in higher volumes at lower prices through a standardised communication specification. Competition is assured as products between different manufacturers are compatible and interoperability is guaranteed by an independent association.

The experience in Europe has clearly shown the adoption of KNX as the international standard IEC 14543-3 allowed the industry to prosper and grow. In 2012 the Building Services Research and Information Association (BSRIA) in the UK published their European Smart Home Market Study which asserted the market share of KNX-based solutions exceeded 70% with an average growth in share of three percentage points each year.

Studies have indicated buildings are responsible worldwide for 40% of the consumption of final energy and 21% of the production of greenhouse gases. Having standardised solutions for home and building automation provides an essential building block for a sustainable future.

In Australia, the building codes require contractors and installers to provide appropriate solutions. Six star green star buildings also require high-level solutions to achieve the energy efficiency standards nominated by consultants, developers, building owners and tenants. Installers have to keep abreast of

IN THE IEC 14543-3 STANDARD THE COMMUNICATION PROTOCOL IS DEFINED ACROSS FOUR DIFFERENT COMMUNICATION MEDIA - TWISTED-PAIR WIRING, POWER LINE, RADIO FREQUENCY AND KNXNET IP. THIS PROVIDES A VARIETY OF SOLUTIONS ACROSS SEGMENTS AND APPLICATIONS.

technology to provide appropriate solutions. The challenge for installers is to invest in systems that will benefit their business without the need for ongoing training of staff on changing technologies. This is where the benefits of standardisation can really assist a business through reduced expenditure on the constant development of staff on different technologies. The knowledge of a standardised system allows staff to hone their skills on smarter and more competitive solutions, which is good for business. With KNX, the IEC standard IEC 14543-3 defines the communication of the home and building automation system, so the installer has the security of not being in a position where a protocol may be unsupported over time and new technologies introduced.

Many installers have seen an installation where one bus technology may have been used for lighting controls and a different technology could have been used in the HVAC system. Yet further technologies control security, audio visual, facade shading, blinds and shutters, etc. A conference room or boardroom could have a different control panel for each of these applications and each system may be stand-alone or could have basic communication via a cumbersome gateway. The installer's dilemma could be that they are required to support all of these technologies in order to service the needs of a customer. Using the standards approach, a single system can be used across these multiple applications. At present there are over 320 different manufacturers producing KNX products compliant to IEC 14543-3 across all of these applications. The installer not only has a single system that can be used to provide the multidiscipline solution, they also have a number of manufacturers where they can source a competitive solution.

The Australian market often follows the trends from Europe and this is sometimes the 'crystal ball' of our market for the next few years. Given this historical trend, as well as the Australian Government's desire to follow IEC standards, it is likely that the growth of automation products and suppliers offering IEC 14543-3 compliance will increase in coming years. As the market develops, the automation segment is also likely to migrate into increasingly cost-effective solutions for residential customers, expanding the already accepted commercial building automation segment.

Modern building automation systems operate with a bus technology that requires a different wiring topology to conventional systems. Often the power circuit feeds the actuating devices and the control is provided by a bus cable to each of the switches and sensors. This change of wiring philosophy can be a challenge for building retrofits, however, if substantial redevelopment works are undertaken then the wiring change can be easily accommodated.

Once a commercial building has been configured using bus technology, the building automation system usually lends itself to simple reconfiguring of the office layout, which reduces cost over the life of the building. Internal walls can be relocated in a commercial space and the need for physical rewiring may be avoided as the system could be reconfigured using the automation bus technology.

In the IEC 14543-3 standard the communication protocol is defined across four different communication media - twisted-pair wiring, power line, radio frequency and KNXnet IP. This provides a variety of solutions across segments and applications.

Most installers are familiar with a lighting control system being able to provide an 'automation' of sorts. This has developed over the years from basic time clock control to presence detection and daylight harvesting where the ambient light conditions from outside of the building are considered so that internal artificial light is only used as a supplement to natural light in order to save energy. The challenge for installers is modern buildings require more from the automation system. In addition to lighting controls, it is desirable to integrate the HVAC system so that unoccupied rooms need not be heated or cooled to the desired occupancy level in order to save energy. External facades, blinds and shutters may also be required to work with the automation system so that, for example, daylight is harvested from outside however shutters must provide shading so that direct sunlight is prevented from heating the glass so that the HVAC system must work harder to cool the building.

Whilst considered a challenge previously, all of these applications can exist on the same platform due to the benefit of standardisation. Various specialist manufacturers in all of these disciplines have developed readily available products that communicate along the IEC 14543-3 standard and a KNX system provides an overall building automation structure for the total solution.

The multidiscipline concept of KNX underpinned by the IEC standard makes it suitable for large and small-scale installations. The KNX system readily interfaces to large BMS systems and IP backbone structures ensuring total scalability for an application.

We started this piece with a quote from Malcolm X, "the future belongs to those who prepare for it today". It is up to the consultants, electrical contractors, systems integrators and end users to assess the market trends and decide on the best system for their businesses and applications. Positioning the business for the inevitable growth of the home and building automation market will be important for the sustained growth of individual businesses. The preparation and choices made today will encourage success for the future.

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CUSTOMER CABLING: HOW TO ASSESS THE RISK OF INJURY?

Terry Phillips, former member of the various Wiring Rules committees 1991-2013

In the last issue of *ECD Solutions*, we explained the requirements for customer cabling between separate buildings and why the use of metallic telecommunications cabling between buildings may be risky. This issue, we explain how a cabling provider can assess that risk.

Assessment of the risk of injury to the end user of a telecommunications service, as required by Clause 10.1 of AS/CA S009, is carried out in accordance with Australian Standard AS 4262.1, Telecommunications overvoltages Part 1: Protection of persons.

Factors affecting the probability of a lightning-generated overvoltage occurring are listed in AS 4262.1 as follows:

(a) known lightning damage or injury history within the vicinity of the premises (eg, if Telstra has routinely installed lightning protection on the lead-in cable or is known to routinely install it in the area);

(b) number of thunder days per year for the geographical area (a thunder day is a day on which thunder is heard at least once);

(c) building density - the number of buildings within 100 m of the location under consideration (this provides a measure of the number of connections to earth of the local electricity distribution system);

(d) soil resistivity - the higher the soil resistivity, the greater the area of influence of a lightning strike to ground and the higher the risk;

(e) exposed terrain - elevated locations over 1000 m above sea level or prominences in the terrain, such as cliff tops, ridges, bluffs and hills, are considered to be at greater risk;

(f) building construction - concrete slab and metal-frame construction create a greater earthed environment, increasing the risk that a person may be in direct or indirect contact with local earth during a thunderstorm;

(g) aerial telecommunication cable construction - the risk is considered to be higher if the premises is fed by more than 200 m of aerial cable within approximately 2 km of the premises;

(h) isolated telecommunication service - a service located in a building or structure that is not connected to any public electricity supply system (or where the public electricity supply earth is more than 100 m from the building or structure at which the service is used) is considered to be at higher risk.

How the above factors are applied to determine the level of risk for a particular location is conveyed in AS 4262.1 in the form of a flow chart.

In the case of doubt or uncertainty in assessing the risk, surge suppression should be fitted.

Assessment of the risk of injury due to lightning overvoltages

Examples

If there is no known history of lightning damage or injury in the vicinity and the number of thunder days in the region is less than 10 (eg, Hobart) then the risk is deemed to be low and there is no need for further assessment.

Conversely: if there is a known history of lightning damage or injury in the vicinity or the number of thunder days in the region exceeds 40 (eg, Darwin), the risk is deemed to be high and surge suppression needs to be installed.

Further:

- if there is no known history of lightning damage or injury in the vicinity; and
- the number of thunder days in the region is between 10 and 40 (eg, Sydney); and
- the number of buildings within 100 m of the location under consideration exceeds five, the location is deemed to be low risk and there is no need to consider the remaining factors.
- However, if you get to point 3 (building density) and the answer is 'No', the remaining factors must be assessed and, if the answer to any of the questions is 'Yes' or 'unsure', surge suppression needs to be installed.

Relevance of AS 4262.1 to cabling between buildings

The same principles apply to cabling between two separate buildings as with an incoming landline from a carrier's telecommunications network. The only ingredients needed to create a hazard are an 'earthed environment' in each building, a separate metallic link (telecommunications line) between them and a momentary voltage difference between the earthed environment at each building or between the metallic link (line) and one or both earths. Earthed environment means that the end user may be in physical contact with an earthed object (eg, concrete floor slab, plumbing, etc) or may be touching an earthed electrical appliance (eg, refrigerator, toaster).

Where twisted-pair cabling is to be installed between buildings, assessment in accordance with AS 4262.1 must be applied for the separate building and all factors are relevant.

Notes:

- Absence of power in the separate building does not eliminate the risk.
- If there is a separate power MEN system (ie, electrical earth electrode) at the separate building, there is no bond between the electrical earths at the separate buildings and the risk of one earth being at a higher potential than the other is higher.
- It is important that surge suppression is installed at the separate building as well as the main building.

Risk of damage to equipment

As already discussed, if any equipment connected to the twisted-pair cabling has earthed elements (eg, FTTP NTDs), such equipment is inherently more susceptible to damage from overvoltages than equipment that does not have an earth connection. However, this does not mean that unearthed equipment is immune to damage for the following reasons:

- Transverse (line-to-line) overvoltage induced into the cable may exceed the maximum operating voltage of the equipment and cause component failure.
- All powered equipment is connected to earth via the neutral conductor of the 230 V power (eg, via the MEN link at the electrical switchboard) and all electrical insulation between the neutral conductor and any other conductive element of the equipment has a finite breakdown voltage. Often this breakdown voltage is less than the surge suppression overvoltage limit for the protection of the end user (1500 - 7000 V). Therefore, there will be cases where equipment with a double-insulated power supply that is connected to twisted-pair cabling is damaged even if surge suppression is installed for the protection of the end user.

To reduce the risk of equipment damage, it may be necessary to install 'secondary' surge suppression (ie, for the protection of equipment) in accordance with Australian Standard AS 4262.2, Telecommunications overvoltages Part 2: Protection of equipment. However, that is another story.

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COLLABORATE, INNOVATE OR DIE

Collaborate, innovate or die. That will be one of the key messages delivered to the delegates attending the clean energy industry event, All-Energy Australia.

The event will be held at the Melbourne Convention and Exhibition Centre on 15-16 October.

At the moment there is a severe lack of certainty in the industry, said Greg Pope, business manager for energy and resources with Frazer-Nash. Pope will tell the attendees that "change has to happen. It is a case of collaborate, innovate or fail."

Frazer-Nash works with clean energy developers in marine, wind and solar power and also has clients in transport, defence and the oil and gas industry.

The focus in a lot of other sectors is moving towards asset management and the long-term sustainability of enterprises; this hasn't been the case in the clean energy industry, said Pope. "It is imperative that rather than just concerning themselves with getting projects off the ground, clean energy developers, investors and regulators concentrate on wider issues such as installation, operation, maintenance, decommissioning and disposal."

The best outcomes are achieved by addressing these types of issues during the design phase.

While we've lived with a centralised electricity model for some time, with prices increasing rapidly and consumers and businesses feeling frustrated by the lack of options, change is imperative, said Lyle De Sousa, a commercial lawyer and mechanical engineer and founder of Legal Energy Lawyers and Consultants.

In addressing All-Energy Australia 2014, he will say that "we need to move to a far more flexible and decentralised structure that accommodates new business models".

"The regulatory regime we have is geared to the old order. People need to work together to ensure innovative projects are established, allowing consumers and businesses to take greater control of the way they source their electricity.

De Sousa is confident we will end up with "a revolutionary system over the next 10 to 15 years, but the form it will take will be dependent upon the mindset of developers and network businesses".

Ric Brazzale, managing director of Green Energy Trading, an environmental credit agent, said the biggest challenge facing the renewables industry is the federal government review of the renewal energy target (RET).

"Activity will halve. More than 6000 people will lose their jobs and I promise you I am not being alarmist - they are the cold, hard facts," said Brazzale. The solar industry is made up of more than 4000 businesses - predominantly small businesses - around the country.

Brazzale said more than 1.3 million Australian families have already embraced solar energy and if the renewable energy scheme is left alone that number will double in five years. He is calling for policy certainty from the federal government, asking it to leave the RET as it is and allow industry to "get on with the business of investing in and developing new projects". Brazzale said, "Industry will be brought to its knees, unless it does a better job selling its 'solar is good' message to politicians and the broader community.

"We need a grass roots campaign. Businesses have to get out there and pound the pavement, make contact with local MPs and demonstrate the benefits of the projects they continue to undertake."

More than 120 speakers and in excess of 150 local and overseas exhibitors will participate in All-Energy, with much interest from Europe and Asia. Upwards of 5000 people with a professional interest in clean and renewal energy from about 25 countries are expected to attend the free multistream conference and exhibition.

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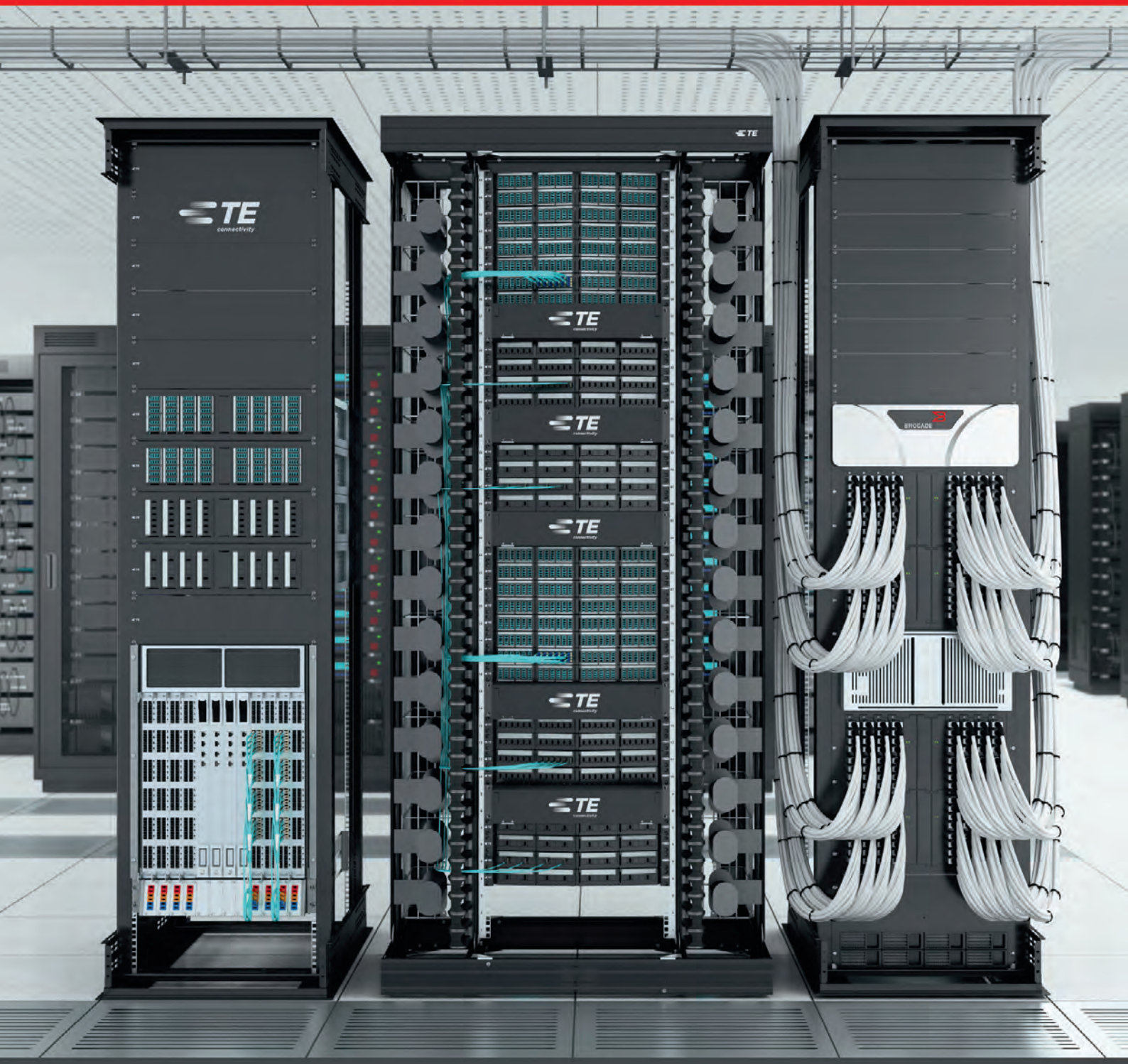

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QUALIFICATION VS CERTIFICATION

Michael Florence, Business Development Manager

Installers and technicians are expected to cost-effectively demonstrate that their data cabling is installed correctly and is capable of supporting ethernet applications. With a wide array of testers on the market purporting to do similar things, and some just a fraction of the price of others, it's difficult to determine the best way to test your network.

Depending on the requirements, a technician will need to test the cable with at least one of the following devices: certifier - sweeps a frequency range of a cabling link to determine if it meets the requirements of the standards defined by TIA and ISO; qualifier - places 'real world' performance demands on a cabling link in order to prove the ability to support ethernet and gigabit applications.

Certification

Certification is the process of measuring high-frequency electrical properties of a cabling link to determine if it meets the requirements of Category 5e, 6, & 6a or ISO's Class D, E, Ea, F, Fa performance as defined by the TIA/ISO standards.

It is like testing the structural capability of your cabling 'highway'. When a datacom contractor certifies a cable to a TIA/ISO standard, it is assumed that testing to Cat5/6/6a/7 standards is specifically to test the capability to run IP traffic. While this is often the case, certification of a cable link ensures many other types of data and networking protocols can successfully operate on the certified network.

Certification measures the physical layer of the cable. Depending on the standard, a certifier will test a multitude of parameters (eg, NEXT, return loss, insertion loss, delay skew) and derivative calculations based on these parameters (eg, ELFEXT, PSNEXT, ACR) to a specific frequency defined by the standard. The certifier must also comply with TIA/ISO Level III, Level IIIe, and Level IV accuracy requirements. Cabling contractors, who install or upgrade structured cabling, use certifiers in order to certify their results for warranty purposes.

Some testers (qualifiers) available on the market are sold as 'certifiers' to confuse potential buyers into thinking that they are getting the capabilities of a certifier at a fraction of the price. To test copper, a certifier must measure all parameters of the TIA-568-B or ISO 11801 specification and meet Level III, Level IIIe and Level IV accuracy levels.

Many cable and connectivity manufacturers offer installation warranties on their cabling systems. For these warranties to be honoured, the installer must be approved (attend manufacturer-specific training) by the system manufacturer and must certify the cabling system with a true cable certifier such as the Ideal Industries LanTEK II. Certifiers are most often used by cabling contractors who are installing or upgrading structured cabling in order to certify their results for warranty purposes.

Qualification

Qualification is the method of testing that does not measure the electrical characteristics of the cable but uses other performance testing characteristics in order to determine the link and performance capability. While certification ensures capabilities of the cabling for a wide variety of data and networking protocols, qualification specifically runs tests relative to IP networks. It is a cost-effective way to demonstrate that the cabling is installed

correctly and capable of supporting ethernet applications without certification. Many qualification testers allow technicians to isolate cabling problems from networking problems. They also allow technicians to identify and troubleshoot a wide range of problems within the network infrastructure.

An interesting and beneficial characteristic of qualifiers is that due to the fact that they run tests higher than the physical layer, they are not limited to testing one type of physical media. For example, the IDEAL Industries SignalTEK II FO tests copper and fibre links to one standard (IEEE 802.3ab) with one device, with no requirement for expensive aftermarket fibre adaptors. The unit uses the type of SFP modules found in a standard networking switch. The device is a full copper and fibre (MM 850 nm, SM 1310 nm and SM 1550 nm) tester, testing to an international IEEE standard for one-fifth of the price of a certification device.

Conclusion

Qualification testers cost significantly less than certification testers. But a qualification tester can't be used to test cabling for the purpose of providing system warranties. If there is a requirement to provide test data for warranties, certification is the only option. Saying that, more than 80% of new cabling being installed does not require certification testing because most of the volume of newly installed cabling is going into smaller projects such as retail, small commercial and residential installations. Qualification testers are suitable for these jobs because they ensure confidence in the performance of the finished system and provide documentation of performance to the end user.

TRIO Test & Measurement Pty Ltd
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Fibre test tool

JDSU's FiberChekMOBILE tool turns a mobile device into an essential fibre test tool. With this Android application, users can connect essential fibre test tools such as a P5000i digital analysis microscope or an MP-Series USB optical power meter to their existing smartphone or tablet and complete jobs faster, correctly and on time - the first time.

Benefits include: eliminate subjective guesswork with automated pass/fail test results; inspect fibre endfaces to IEC 61300-3-35 standards or customer specifications; measure optical power and loss at multiple wavelengths; save results and generate certification reports to prove the quality of work; leverage onboard mobile capabilities to improve user productivity; minimise typing with voice-to-text speech recognition; share certification reports from the app by email; instantly save results onboard or to cloud-based storage drives; always have the latest enhancements with automatic version updates; pinpoint test locations with automatic GPS tagging; view image details with inch-to-zoom screen touch capabilities.

The tool lets users easily certify fibre connectors and links to industry standards and share reports, right from their mobile device: making it easier than ever to complete jobs faster, correctly and on time.

JDSU Australia Pty Ltd
www.jdsu.com

Field transport tester

Anritsu's MT1000A Network Master Pro field transport tester is suitable for mobile backhaul installation and verification.

Communication networks are becoming increasingly sophisticated as network operators install new technologies such as OTN, MPLS-TP and ethernet in their metro and backhaul networks. Cloud-based services and the associated data centres mean the operator needs to support fibre channel links while continuing to maintain legacy PDH and SDH networks. The MT1000A brings these network test requirements to a portable device, making it a suitable tool for field testing.

Features include: compact and lightweight design for portability in the field; high performance in a small form factor; modular platform; supports testing from 1.5 Mbps to 10 Gbps; metro and core network OTN installation and maintenance; carrier class ethernet installation and troubleshooting; powerful storage area networking (SAN) testing; quick and easy testing of SDH/SONET/PDH/DSn networks; testing of client signals mapped into OTN; easy and intuitive GUI; dual port at all rates; WLAN/Bluetooth/LAN connectivity; PDF and XML report generation for documentation of test result; remote operation and remote control (scripting).

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Data centre cooling efficiency

Schneider Electric has introduced the second generation of the InRow RC, the ACRC301S and ACRC301H. The two models are said to significantly improve cooling efficiency by reducing power consumption while also increasing capacity.

The ACRC301H high-temperature model, designed for optimal heat removal, leverages warmer water temperatures and outdoor ambient air temperatures to increase chiller efficiency. Part of the company's InfraStruxure line and suitable for high-density applications, InRow RC reduces the distance between the heat source and heat removal, eliminating the mixture of hot and cold air streams.

The models also feature variable speed fans that reduce energy consumption during off-peak cooling periods or when the data centre is partially loaded. This decreases data centre energy consumption to match the demand of the heat load.

With a user-friendly design, the models feature an intuitive, 4.3″ colour touch-screen display.

The models feature increased cooling capacity with up to 40 kW (136,000 BTUH) and 1510 L/s (3200 CFM) max airflow with conditions at 7.2°C EWT, 49°C RAT, 6.6°C dT for the ACRC301S (standard temp) and up to 60 kW (205,000 BTUH) and 1982 L/s (4200 CFM) max airflow with conditions at 12.8°C EWT, 49°C RAT, 6.6°C dT for the ACRC301H (high temp).

The models feature improved energy efficiency with 1.0 kW at maximum operating condition for ACRC301S (standard temp) and 1.9 kW at maximum operating condition for the ACRC301H (high temp).

The InRow RC condensate management system ensures coil temperatures remain above the dew point by preventing condensation, a process achieved by recirculating coil water; compatible with the ACRC301H unit.

The intelligent controls monitor and actively adjust cooling capacity to ensure proper server inlet temperatures. The microprocessor controller provides visibility into the operation and status of the unit.

The InRow RC is compatible with EcoAisle and Active Flow Controller.

Schneider Electric Buildings Australia Pty Ltd
www.schneider-electric.com

Field-terminable plug

AFC's field-terminable category 6A plug is simple to terminate, requires no specialised tools and supports high-performance 10 GB networks.

Termination is accomplished by inserting the conductors into the wire manager, squeezing the wire manager to terminate the conductors and inserting the wire manager into the plug housing.

All eight conductors are simultaneously terminated when the wire manager is squeezed. This process ensures consistent, reliable terminations every time.

AFC Group Pty Ltd
www.afcgroup.com.au

Cable fault locator

The Megger EZ-Thump 12 kV power cable fault locator, available to rent from TechRentals, is suitable for HV testing and specialises in power cable fault finding.

This portable unit incorporates a 12 kV Hipot tester, time domain reflectometer (TDR) and surge generator. It can be powered from an AC supply or internal batteries (3 h recharge time provides 30 min of thumping).

Surge generator produces a 500 J, 0 to12 kV @ 12 mA pulse. Kit includes the Megger MPP1002 pin-pointer to locate faults while thumping. Features include: automatic fault locating procedure, automatic end-of-cable and fault detection, DC testing up to 12 kV with automatic breakdown detection, quick-step and expert modes.

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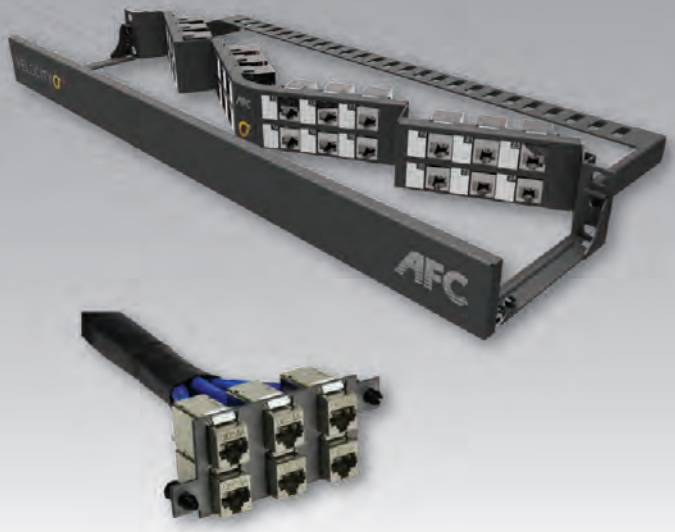

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Field-terminable plugs

Warren & Brown's CAT6A RJ45 field-terminable plugs are designed to support data rates up to 10 Gbps, making them suitable for many of today's applications and ensuring that cabling networks are futureproofed to support these high data rates. Shielded (MFP8) and unshielded (UFP8) versions are both available in either T568A or T568B configurations. The performance specifications of the plugs exceed the ISO/IEC 11801:2010 for Cat 6A and support any current copper ethernet from 10 Mbps up to 10 Gbps.

The plugs also support IEEE 802.3af Power over Ethernet (PoE) and IEEE 802.3at PoE+, which demonstrates the high quality of the components. In PoE+ applications, up to 600 mA can run over the small contacts of an RJ45 plug. When unplugged, with the application still running, these contacts can be seriously damaged. The special design of the MFP and UFP8 CAT6A RJ45 plugs ensures that the disconnection spark occurs in a part of the connector that is not used for data transmission. The CAT6A MFP8 and UFP8 plugs can be used for any IP device with an RJ45 jack and are suitable for use with solid as well as stranded wires.

Warren & Brown Technologies

www.warrenandbrown.com.au

Security system

Ness Corporation has released the SmartLiving suite of security control panels, GSM/GPRS communicators and two-way wireless products.

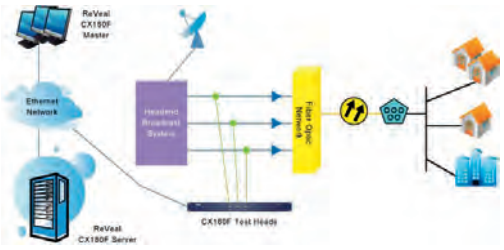
The SmartLiving line-up of control panels, all in metal enclosures, has a vast application range spanning from five terminals (10 zones) to a hundred terminals (200 zones) all with an extensive suite of powerful features.

The system can be programmed from any keypad or from a PC running the free SmartLeague graphical software tool. The SmartLiving ethernet interface provides full internet connectivity for remote access, programming and extensive user control using the free Alien iOS and Android app.

The system is ready to connect and interconnect with a variety of monitoring options available from PSTN to voice dialling and even SMS via GSM. The system allows users to monitor back-to-base using dial-up, GSM or GPRS and even perform remote system diagnostics and programming via GPRS. Bookings are open for installer/integrator training courses running across all Ness branches.

Ness Corporation Pty Ltd

www.ness.com.au



CATV forward path monitoring system

The VePAL CX180F is a rackmount monitoring system to check the performance of analog and digital channels being transmitted downstream or towards customers across a CATV HFC network.

Equipped with three test ports, key signal parameters including level, BER, MER and Constellation are scanned continuously and non-intrusively. Advanced spectrum analysis across the entire operating frequency band detects ingress which can lead to signal impairment and/or failure.

The ReVeal CX180F controller/server package, which forms an integral part of the system, continuously checks for signal values that exceed user-defined thresholds. Out-of-tolerance parameters trigger alarms which inform and alert the head end operator of problematic links and service.

Features include: three independent monitoring ports in one 1U 19″ rackmount unit; monitors analog, digital TV channels and FM carriers; fast continuous scan of all active channels; on-demand channel camp-on for long-term analysis; detailed digital channel QAM 64/256 analysis with constellation; on-demand ingress noise scan from 5 to 1000 MHz; ethernet system interface to CX180F server and controllers; secured access to prevent unwanted intrusion; cost-effective solution for small head end deployment yet easy for future expansion.

TelecomTest Solutions

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Certification and testing solutions

Fluke Networks' trio of Accelerator solutions enable speedy fibre inspection, certification, and testing. The FI-7000 fiberinspector pro, singlemode multifiber pro, and smartloop OTDR are said to reduce the time to complete fibre jobs by more than 50%.

Instead of relying on subjective assessment of fibre end faces, the FI-7000 fiberinspector pro delivers pass/fail certification in two seconds or less. The device inspects the fibre connector's end face, analysing the fibre core, cladding, adhesive layer, and contact surface for damage and defects before generating a pass/fail designation per the IEC 61300-3-35 standard. It also incorporates advanced analysis software to highlight detected damage and defects, which makes contaminated areas easier to identify.

Existing Versiv fiberinspector owners can utilise the device's analysis capabilities with a simple firmware update.

The singlemode multifiber pro is specifically designed for singlemode MPO cabling. It is said to cut test time by up to 95%, from roughly 6.5 min to 20 s. It automates the difficult parts of loss testing, making pass/fail certification of MPO fibre trunks and cassettes more efficient. Multifiber pro automatically detects the most common singlemode (1310 or 1550 nm) and multimode (850 nm) wavelengths. The device's non-contact large-area input port accepts both UPC and APC connectors.

The smartloop OTDR tests two separate fibre links in a single test. This eliminates the need to travel to the far end of the connection to perform tests; it is also said to cut network testing time by 50%. The device uses algorithms to automatically separate fibres for individual pass/fail analysis and display, further enhancing the ease and speed of testing, especially in environments where the far end is difficult or dangerous to reach. With the smartloop OTDR, fibre-optic cabling installers and contractors can reduce the time they spend onsite and avoid losing or damaging their test equipment.

Fluke Networks

www.fluke.com

Enclosure system

Erntec's SE frame enclosure system is suitable for 19/21/23″ and industrial enclosures for applications that require up to IP54 and EMI/RFI.

The system is suitable for electrical, industrial, telecommunications, defence, data and cabling, power and energy, process control and automation, IT and scientific industries. The system offers flexibility in configuration and extension options.

Features include: heavy-duty galvanised SE frame flexible in 50 mm grid increments; compliant with DIN 41 488, IEC 60 297-1 and 2, IEC 60 917; IP rating up to 54; self-tapping screws in assembly ensure tight and electrically conductive connections; conducting surfaces and the replaceable system elements; contact protection in accordance with VDE 0160; easily customised with various, panel, door, roof options including many accessories and fit-outs; frames can be easily bayed to created modular solutions.

ERNTEC Pty Ltd

www.erntec.net

Waterproof connectors

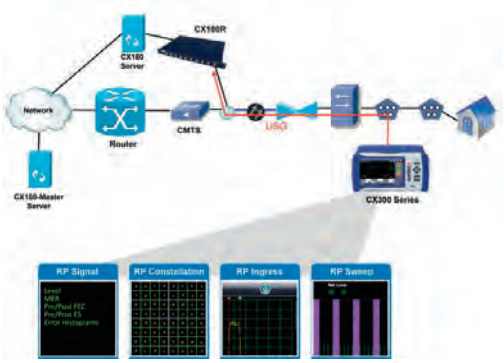
GT Contact's range of waterproof RJ45 ethernet connectors is applied to signal usage of wireless outdoor AP, outdoor LED display and lighting, outdoor lamp, marine, automation machine and IPC/military NB.

The company offers four series within the RJ45 category in two shell materials (polyamide 66 and nickel-plated zinc) with a minimum IP67 rating ensuring excellent protection from water ingress. The copper-alloy contacts are gold plated, maintaining continuity.

The connectors are made of fine copper, Au plating and Ni plating material.

Connector-Tech ALS Pty Ltd

www.connectortech.com.au



CATV rackmount head end system

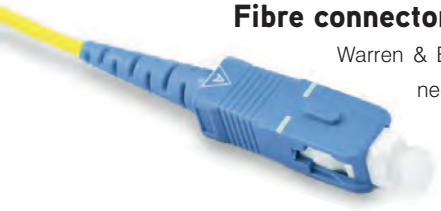
The VePAL CX180R rackmount head end system completes the requirement of DOCSIS 3.0 deployment where higher QAM on the return path becomes necessary and mandatory.

The compact 1U rackmount chassis supports simultaneous and continuous ingress scanning of all 10 ports at a fast sweep rate of 200 ms and dual ports are available for return path spectrum, QAM, MER, BER and Constellation analysis.

The unique system architecture is an affordable entry solution which can be scaled easily for future network expansions. The system is completed by a controller software package offering 3D graphics for detailed analysis of ingress, alarm detection/generation and trouble ticket management. A server option coupled to the system is capable of storing 30 days of ingress monitoring data for reference.

Features include: 10 monitoring ports in one 1U 19″ rackmount unit; up to two dedicated test heads for continuous ingress scan of all ports; up to two independent test heads for spectrum or return path analysis; ingress scan detecting fast transient noise that affects return path; spectrum analysis from 5 to 65 MHz, -40 to +55 dBmV; return path QAM 16/64/128 analysis with constellation; works with CX120 USG for detailed return path QAM 64/128 analysis; 100-T Ethernet interface to CX180R server and controllers; secured access to prevent unwanted intrusion; cost-effective solution for small headend deployment; easy system expansion without system shutdown.

TelecomTest Solutions
www.telecomtest.com.au



Fibre connectors

Warren & Brown Technologies now offers 'A' Grade fibre connectors as an option for its fibre-optic cable assemblies.

The company continues to operate its own local fibre termination facility in Melbourne, which allows it to assemble custom fibre cable assemblies using the new A Grade connectors. The latest development also enables the company to expand on its ability to offer local Australian customers fast turnaround time for these components.

The Telstra spec IEC grade connectors used in these cable assemblies are said to enable ultrahigh speed (Tbps), new-generation DWDM networks to operate with minimal losses. The singlemode 'A' Grade connectors are available for LC, SC, A/SC and E2000 connectivity. The average insertion loss for the connectors is 0.07 dB and the maximum insertion loss is 0.15 dB, while the return loss is >65 dB.

The 'A' Grade optical fibre cable assemblies (patchcords) will be available in markets throughout SE Asia, India, Middle East, North America and Europe. It should be noted that the Grade A connector standards are still to be ratified and officially accepted by IEC.

Warren & Brown Technologies
www.warrenandbrown.com.au

Anti-slip plywood

The Big River Anti-Slip Plywood product features a slip-resistant coating designed to provide protection against injury on both indoor and outdoor workplace platforms, ramps, walkways and floors. It features a textured paint finish with crushed glass and the reverse side of the panel has a phenolic film for moisture protection in damp, wet and external areas.

The plywood has been tested for slip resistance in both wet and dry scenarios - both delivered results at the highest slip resistance classification. Manufactured locally in Grafton, New South Wales, the Anti-Slip Plywood has a high-strength F17 structural plywood certification to Australian Standard AS2269 together with the maximum rating of P5(V) classification in the slip-resistance testing of pedestrian surfaces in wet conditions and D1 in dry conditions.

Suitable for both temporary and permanent flooring and ramps, the product has applications on construction sites, building areas, hospitality (kitchen), aged care facilities, hospitals and medical environments. The plywood is also suitable for high-risk areas including cool rooms/freezers, dishwashing areas, cooking areas and doors leading to and from the kitchen where changes in floor surfaces occur. Other features include: pressure cleanable and chain of custody (AFS/PEFC) certified.

Available in a range of sizes and thicknesses, the product can also be custom made to size and scarf jointed if larger sheets are required. It comes in three standard colours: safety yellow, black and grey. Customised colours are also available, dependent on volume.

Big River Group

www.bigrivergroup.com.au

Industrial ethernet managed switch series

The EDS-G512E-8PoE from Moxa is a communication solution for high bandwidth ethernet powered devices (PD) in industrial applications.

Features of the switch series include: up to 30 W of power per PoE+ port in standard mode and up to 36 W for heavy-duty devices; 8 Gigabit copper ports and 4 SFP Gigabit fibre slots for large bandwidth data transmission; SmartPoE management tools for easy operation and monitoring of PoE powered devices; 3 kV LAN surge protection and -40 to 75°C operating temperature tolerance. The series supports MXstudio industrial network management suite for large-scale deployments and management.

The solution is designed with a series of smart management tools that simplify the process of remotely controlling and monitoring the power devices. The tools include a power management function to optimise the system accordingly and a diagnostic function to detect PD conditions with failure detection and LED indicators. Other features include Turbo Ring and Turbo Chain technology, and Moxa's industrial network management software, to ensure network reliability and uptime.

MOXA Inc

www.moxa.com

SECURING SMART BUILDINGS

Today's smart home promises efficient building management, but often the systems are not secure and can only be retrofitted at great expense. Scientists are working on a software product that defends against hacker attacks before they reach the building.

Botnet - a term from the world of computers - is gradually tiptoeing its way into the world of building automation. You have to anticipate this kind of attack scenario, according to Dr Steffen Wendzel of the Fraunhofer Institute for Communications, Information Processing and Ergonomics FKIE in Bonn. The researcher from the Cyber Defense department is an expert in hacker methods and, working jointly with Viviane Zwanger and Dr Michael Meier, meticulously examines them.

Attackers infiltrate multiple computers - 'bots' (from the word 'robots') - without their owners' knowledge, weave the computers together into nets and misuse them for computer attacks. The researchers studied something that does not yet exist at all today: attacks by botnets on smart homes using internet-linked buildings or building operations. They found that the threat is absolutely real: internet-controlled electric roller shutters, HVAC and locking systems could all be used for these kinds of attacks.

"Our experiments in the laboratory revealed that the typical IT building is not adequately protected against internet-based attacks. Their network components could be hijacked for use in botnets," Wendzel says. In the process, the hackers do not have to seek out the PCs as in the past; instead, they look for the components in building automation that link the buildings with the internet. These are small boxes installed in the buildings that look and work like routers for home computers.

"However, they are configured quite simply, can only be upgraded with some difficulty and are loaded with security gaps. The communications protocol that they use is obsolete," explains Wendzel.

Sentinel software switches between internet and building IT

To ensure that the heating, lighting and ventilation of buildings can be controlled via the internet, it is necessary to install special equipment. This involves mini-computers that measure temperature, light or humidity and are incorporated into networks. "Keeping them up to the latest standards is expensive," Wendzel says.

At FKIE, the team has developed security software that can easily switch between internet and building IT. The technology filters out potential attacks from communications protocols even before they reach the four walls of the actual bricks-and-mortar home or office building. No matter what technologies are being used within the building, with this approach, they do not have to be replaced.

The researchers additionally examined the conventional communications standards of building automation and, building upon these, they have developed rules for data traffic. If arriving data do not adhere to these rules, then the communications flow is modified. "The software operates like a firewall with normalisation components," explains Wendzel.

All the results that are sent on their way to the systems are tested for plausibility by an 'analyser'. If the alarm goes off, then the incident is immediately dispatched to the 'normaliser'. This either blocks the incident in its entirety or modifies it accordingly. The basic research has been concluded successfully. "In the next stage, we want to make the technology production-ready with an industrial firm. In no later than two years, there should be a product on the market," states Wendzel.

In their analysis of botnet attacks, the researchers sketched out definitive threat scenarios for smart homes. "From my perspective, the most compelling issue is monitoring," the cyber-defence researcher says. When the attacker hacks into the building operations IT, he or she will learn where the residents or tenants are located and what they are doing, in a worst case scenario. That includes everything, right down to going to the toilet. Intruders, for example, could use this data in order to prepare for a burglary or raid. In this case, the hacker is acting in a passive capacity, simply tapping data. However, he or she could be equally capable of actively invading the systems. Take a contractor from the energy industry, for example. He could profit from more oil or gas sold if the consumption of multiple heating systems is artificially elevated. A recent example demonstrates how real this scenario is: last year, there was a gap in the security system of a heating system connected to the internet. Attackers had the ability to shut down or damage heaters. Therefore, security expert Wendzel is currently advising against carelessly linking all building functions in private homes to the internet.

Information management solution

At Work Software has released four new software products (Training At Work, Audits At Work, Chem At Work and Risk At Work), plus a new version of its OHS At Work software.

Training At Work provides facilities to manage and report on the training of personnel, the certifications and licences they hold, and the competencies they have achieved. It provides reminders for training events and for required certification/competency renewals.

Audits At Work provides facilities to manage, undertake and report on all types of internal and external audits (whether operational, chemical, financial etc) and ensure that follow-up actions are completed.

Chem At Work allows the user to maintain a chemical register, assess risk levels, keep safety data sheets (SDS) up to date and give all staff access to the SDSs relevant to them.

Risk At Work provides facilities to manage, analyse and report on all types of risk (whether WHS, environment, chemical, financial, operational or reputational).

At Work Software Pty Ltd
www.atworksoftware.com

Optical fibre patch panels

The 2RU splice and patch subracks provide a high-density solution for fibre-optic networks.

The 6008 series splice and patch, patch only or splice only subracks (patch panels) are optical fibre management modules that provide an efficient high-density solution. These subracks (patch panels) can be mounted on to a HDODF, any 300 mm deep ODF or data rack and provide good optical fibre cord protection and management.

Features include: maintains fibre bending radii throughout, for terminated optical fibres at minimum 30 mm; supplied with set of splice cassettes; two splice protector clips provided on each splice tray; sturdy swing-out tray design incorporates built-in splice tray holder; swing-out design allows easy access to splice and patch areas; fully symmetrical design allows cable entry/exit of cables from either left or right side; suits 19″ and 21″ rack mounting in front/mid/rear/front offset configurations.

The panels are supplied with adaptors and pigtails (some variations excluded) and are available to suit any connector type (simplex and duplex). The design ensures minimal fibre movement and disruption when tray is opened. Other features include: loose tube, tight buffer or ribbon fibre options available; hook and loop style fasteners supplied; supplied with mounting brackets and mounting hardware; A grade SC/A, SC, LC adaptors available as an option; large selection of patch panels, splice holders, through adaptors available to customise to requirements.

Warren & Brown Technologies
www.warrenandbrown.com.au

Energy metering PDUs

Enlogic's intelligent range of energy metering PDUs provide comprehensive and accurate energy measurement data needed to reduce waste, enhance operations, and prove the business case for optimisation.

The PDUs, supplied by B&R Enclosures, actively monitor the data centre environment. The unit sits within the rack, continually looking for threats from electrical circuit overloads and any physical and environmental conditions which might place critical IT computing loads at risk.

Combining a B&R data cabinet with Enlogic power distribution provides a smart rack capable of delivering the required information. B&R can pre-configure a smart rack by wiring sensors and pre-installing accessories as required.

B&R Enclosures Pty Ltd
www.brenclosures.com.au

Data centre solution

CommScope's DataCenter on Demand solution provides a flexible, efficient, purpose-built alternative to the traditional brick and mortar data centre.

The solution features a range of available data centre options for organisations implementing an initial data centre or adding to an existing facility. The solution offers capabilities and customer benefits including: proven technology based on systems operating in extreme climates for more than six years; scalable solutions from one to thousands of racks without disruption; proven annual average data centre power usage effectiveness (PUE) of 1.03 to 1.06 (industry PUEs typically range from 1.8 to 2.9).

Other features include: standardised repeatable designs that reduce complexity and shorten planning and deployment time; customisable configuration, with off-the-shelf components supporting multiple TIER levels, security, fire and core infrastructure; pre-integration with CommScope iTRACS data centre infrastructure management (DCIM).

CommScope

www.commscope.com

EtherNet/IP absolute encoders

The Allen-Bradley 842E absolute encoder comes standard with dual port ethernet and M12 connectors thus providing users with an easy, money-saving installation. It also includes an embedded Ethernet/IP switch to connect additional Ethernet/IP capable product in series or support a device level ring (DLR) for ethernet media redundancy.

The 842E Ethernet/IP encoder provides high-resolution absolute positioning and is available in single-turn, 18-bit resolution and multiturn, 30-bit resolution. It is suitable for automotive, materials handling and general factory automation applications.

The encoder comes in hollow-shaft and solid-shaft variants and features a protection class up to IP67 and an RSLogix 5000 Add On Profile.

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FUSION SPLICING – CORE ALIGNMENT VS CLADDING ALIGNMENT

The growth in worldwide fibre-optic communications has led to an increase in demand for economical and convenient fusion-splicing systems for a wide range of deployments including telco backhaul, access networks, FTTH, LAN, sensing and submarine installations.

The construction of efficient fibre-optic networks is dependent upon the ability to make pristine connections between fibre-optic cables. Fusion splicing is the process by which two optical fibres are joined together to create one continuous optical path. The goal is to fuse the two fibres together so accurately and securely that light may travel through the fibres without loss.

Prior to splicing, the cable jacket and other protective materials are removed from the fibres, and each fibre is cleaned. The fibre is then cleaved using the score-and-snap process. The cleaver's precision blade exposes a clean fibre end face that is perfectly flat and perpendicular to the axis of the fibre. The closer to 90 degrees the cleave angle is, the lower optical loss the splice will yield. The two fibre tips are then heated by an electric arc and pushed together to create a continuous link. Once the fibres are fused, the splicer will provide a loss estimate and perform a proof test. The proof test applies a force to the fibre in opposing directions to check the mechanical integrity of the splicing joint. A splice protector sleeve is placed over the joint and, with heat applied, shrunk down over the fibre to provide additional mechanical protection.

Currently, commercially available fusion splicers fall into two categories according to how they align the fibres for splicing.

Cladding alignment

Cladding alignment is a passive alignment that relies on the accurate pre-alignment of fibre V-grooves that grip the outer surface or cladding of the fibre. Fibres are adjusted inwards and outwards. The advantage of this method is that the technology required is low cost and fast, so it is still utilised on low-cost field fusion splicers and ribbon splicers. Fibre position, core-cladding eccentricity and mode field diameter (MFD) influence the effectiveness of cladding alignment and subsequent splice performance. Fibre position is influenced by contamination on the fibre or V-grooves. While the operator controls this parameter, core-cladding eccentricity and MFD are fibre manufacture parameters, and typically come into consideration when splicing new to old fibres and also dissimilar fibres such as singlemode G652.D to G657.A.

Core alignment

Active alignment of the cores, or core alignment fusion splicing, is currently the most commonly used fusion splicing technology. Although more expensive and complex technology, it is also more powerful and flexible, and less sensitive to variations in the cable. Core alignment splicers use a combination of image and light detection systems that 'see' the fibre cores to measure and monitor core position during the alignment process. Fibres are located in V-grooves and are adjusted horizontally, vertically and in/out to allow core-to-core alignment. The ability to control core location on fibre results in improved splice performance, as the splicer can compensate against influences such as fibre offset due to contamination or core-cladding concentricity mismatches.

As always, best practice extends further than having the right piece of equipment. Maintain a clean and contamination-free work area by regularly cleaning stripping tools, cleaver blades and pads, V-grooves, camera lenses, mirror and splicer travel case. Observe safety precautions such as disposing of fibre offcuts in sharps containers. Regular operator maintenance of equipment is also vital - this includes arc calibration, electrode stabilisation and battery cycling, as well as monitoring cleaver performance and adjusting cleaver blade position when required. Using manufacturer's original consumables such as electrodes and cleaver blades will enhance your equipment's performance. Using endorsed services centres ensures access to manufacturer-trained and certified technicians, and manufacturer original parts and firmware.

AFC Group Pty Ltd
www.afcgroup.com.au

CASE STUDY

Vietnam trials FTTH network

Warren & Brown Technologies has played a key role in Vietnam's fibre-to-the-home (FTTH) trial project. The company provided initial consultation services, including network planning and design, detailed engineering and installation as well as training and product supply for the project.

W&BT provided a customised solution to Vietnam Telecom (Viettel) and also took total responsibility for the project. The project started to take shape in May 2013 when a contingent of Viettel executives visited Australia and, hosted by Warren & Brown Technologies, met with management teams from NBN Co and Telstra. The Viettel team immediately recognised the value of the Australian NBN and entered into negotiations with W&BT to develop a trial network.

W&BT and Viettel then entered into an agreement for the consultation service to roll out the proposed FTTH network in April 2014 starting with W&BT working with Viettel in the design of the optical distribution network (ODN) and in establishing which PON architecture would be best suited to urban and rural areas.

Later in May 2014, W&BT was awarded the consultancy work to prepare the design and construction guidelines for the ODN for the first pilot site that would cover 600 homes.

The project focused on rural medium-density applications and is part of the initial FTTH rollout in Danang City in Central Vietnam. The project had been delivered on behalf of Viettel to serve 600 households in the area, offering both IP and RF TV connectivity.

The IP connectivity includes internet, IP telephony and IP TV for customers wanting to connect broadband internet and digital TV. In addition, analog RF TV will be offered for customers requiring only RF cable TV connectivity.

© iStockphoto.com/setixela

W&BT also provided detailed theory and practical training in all aspects of fibre-optic cable technology fundamentals, cable installation, termination and testing procedures for FTTH PON networks to all Viettel technical personnel throughout all of the Vietnam provinces.

According to Warren & Brown's managing director, Neil Domelow, the experience and expertise gained from the company's previous involvements in the Australian NBN as well as projects in Holland and the Philippines was important in showcasing the company's capabilities.

We were able to draw on our knowledge gained from our internationally experienced group of engineers to come up with a system tailored for the conditions - which performed as soon as the switch was flicked, said Domelow.

Warren & Brown introduced to this project the use of spider web ribbon fibre, which was one of the key products offered along with various W&BT indoor and outdoor optical fibre termination products.

Warren & Brown Technologies
www.warrenandbrown.com.au

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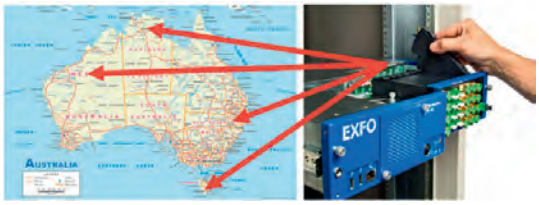

Stand-alone remote optical time-domain reflectometer

Fibre Guardian is a stand-alone OTDR remote test unit, designed to monitor critical fibres without the larger investment required for a client-server RFTS application.

The unit is suitable for situations which require fulfilment of stringent support-level agreements that require restoration time of less than a few hours or network/service availability of 99.99% or higher. It is also suitable for use when there is a need to measure and improve contractor efficiency throughout the restoration process or when there is difficulty finding qualified personnel for on-site troubleshooting. It enables an organisation to begin investing progressively, starting with the most vulnerable part of their network.

The unit doesn't require a server or external PC and it can be accessed remotely from virtually anywhere with no need for third-party remote-access tools.

Other features of the unit include: multitasking test system for multiple users; discovery and auto-provisioning functions; SMS-triggered test-on-demand; flexible alert subsystem; high measurement range and peak-level monitoring; secure and seamless integration with a LAN.

The product is fully scalable to EXFO's client-server fibre test and monitoring solution NQMSfibre at a future date, without any change to the test units. The system solution includes functions such as alarm management and reporting, trouble-ticket handling and a view of the entire network status on a schematic. The solution enables network operation and maintenance to be centralised and integrates with existing network management systems.

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www.teltec.com.au

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LED emergency light

The Pierlite Mine Master is an energy-efficient LED industrial luminaire with wattages up to 52 W producing an LER over 89 lm/W. The light has an option of amber for environmental applications. The average rated life is 50,000 h at L70 with a CCT of 6000 K and CRI >70. The luminaire is rated at IP66, making it a suitable choice for a variety of applications including conveyor lighting, wash plants and security lighting.

With a choice of system wattages ranging from 25 to 52 W and a diverse range of optical performances, the light is suitable for the safe illumination of infrastructure such as conveyors, walkways and platforms on mines, power stations, wharves, sugar mills, eye wash stations and general industrial plants.

Features include: durable aluminium or stainless steel body options; high-performance optics with improved illumination uniformity; UV-resistant moulded lens with integral IP66 silicone seal; pre-wired maintained with remote emergency box available; non-maintained available, choose either integral emergency gear or D50 pre-wired attached LED emergency extension bracket.

The light suits standard diameter 34 mm poles and spigot brackets and is available in amber and green LED emergency versions. It is compliant with Australian Standards AS/NZS2293.

Pierlite Australia Pty Ltd
www.pierlite.com.au

Microinverters

Enphase Energy's fourth-generation microinverters are optimised for higher-power modules. As per previous generations, the M250 and M215 microinverters will operate by sending bidirectional data to the Envoy communications gateway, with the recently added Wi-Fi option. The Envoy connects to the Enlighten software platform to provide good solar system intelligence and reliability.

The M250 and M215 microinverters produce 250 W and 215 W rated AC output power and pair with modules up to 310 and 270 W.

Both the microinverters are rated at 95.7% EU efficiency and have been built to withstand the harshest environmental conditions. They are IP67 rated and have undergone over one million hours of testing in extreme temperature and humidity environments prior to launch.

Enphase Energy
www.enphase.com/au

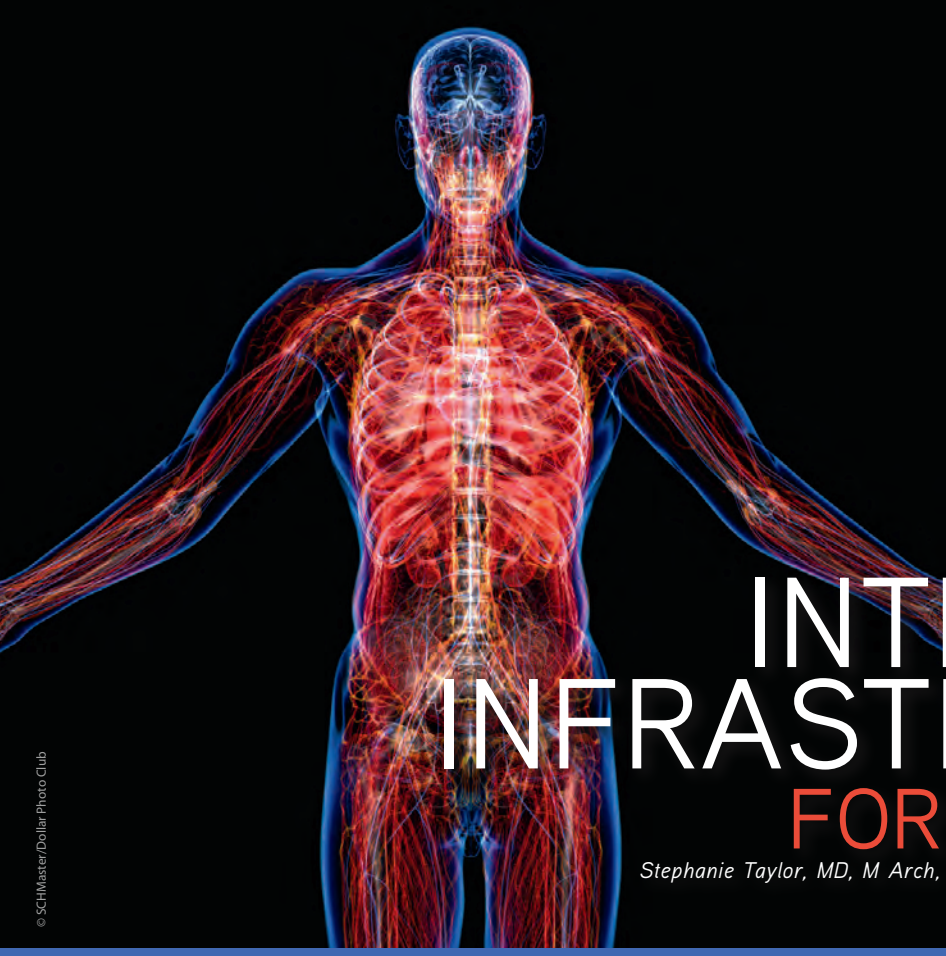
Long-life mini LED

With a long-life, 35,000-hour, 12 W LED, the Source Four Mini LED is suitable for museums, restaurants, theatres and other smaller-scale installations that want to meet new energy codes and regulations.

It has interchangeable lens tubes providing crisp optics in the field angles of 19, 26, 36 and 50°. There are shutters to limit the spill of the light onto other pictures in the gallery or to just light the product on display. When a customer wants to project their logo there is a gobo slot for an E-size pattern holder and a frame slot for a colour gel if the mood needs to be changed.

The LED comes in a track-mount, a canopy-mount and a portable version all with the transformer neatly attached or hidden and is available in white, silver or black. At 23 cm long, they can fit into the smallest of corners and, with a diameter of 6.35 cm, fit through a very small hole. Other features include: rugged, die-cast fixture body; die-cast aluminium construction (A380 grade); high-impact resistant, thermally insulated knobs and shutter handles; 18 AWG input wire size; input voltage 190-250 V, 50/60 Hz; and dimmable (forward and reverse phase).

Jands Electronics
www.jands.com.au



INTELLIGENT INFRASTRUCTURE FOR HEALTHCARE

Stephanie Taylor, MD, M Arch, CIC and Irina Lindquist, Solution Architect, Healthcare

With overall energy use by health services expected to rise and Australian hospitals already using twice as much energy as commercial office buildings, hospitals are taking creative approaches to energy management.

Despite the development of more precise and less invasive diagnostics and interventions, heathcare costs continue to increase without improvement in patient outcome. One reason is the hidden cost of treating patients for harm sustained during their hospitalisation. Adverse patient events (APEs), which include but are not limited to healthcare-associated infections (HAIs), falls that result in injury, serious medical errors and wrong site surgeries, can cause this harm.

APEs come with a high cost - not just for a hospital budget, but also for human health and wellbeing. Building automation solutions could help prevent these issues and reduce costs. Proper safeguards used within a healthcare or hospital facility's infrastructure can lead to improved clinical outcomes and increased patient satisfaction and safety, as well as an overall reduction in costs for the healthcare organisation. For example, if a hospital decreased the occurrence of three prevalent APEs, they could expect to see a total savings of over $151,000 per bed per year.

Understanding the disconnect

In a busy healthcare environment, hospital staff may make mistakes or not follow proper protocol. Patients' lives could be at risk if the hospital infrastructure is not designed or regulated to prevent APEs.

Clinical staff primarily focuses on providing patient care, but rarely do they understand how the hospital's structure could benefit a patient's wellbeing. Conversely, the hospital's facility management staff is not involved with clinical care and may not fully understand how the physical structure can support patient safety and healing.

Patient care and hospital budgets have suffered tremendously as a result of this disconnect: studies show that seven to 10 of every 100 hospitalised patients in developed countries like Australia will acquire healthcare-associated infections. Worldwide, the expenses incurred by hospitals due to APEs are far too high.

Using human anatomy as a model to improve infrastructure

The human autonomic nervous system (ANS) regulates the physiological structure of the body unconsciously so humans can focus their thinking on functional activities. The ANS only demands conscious attention when there is a problem. Without this specialised neurological network, we would never be able to sleep or work because we would be necessarily preoccupied with keeping our bodies alive.

The human body's strategy provides the following guidelines for a well-designed and fully integrated hospital:

- A functional layout that reduces opportunities for infections, falls and human errors
- Barriers against infection transmission from external sources
- Automatic alerts when a critical barrier is breached or when other problems occur
- Minimal opportunities to harbour infectious organisms in sterile spaces
- Facilities that are continuously cleaned and disinfected

In order to design and optimise a hospital's infrastructure to mimic the human ANS and improve patient care, it is important to understand the various origins of harm.

It is impossible for each individual in a hospital to know if all safety measures are functioning properly. Like the human body, a healthcare facility needs a fully integrated ANS for continuous, behind-the-scenes surveillance, alerting the proper staff only when problems arise. This ANS, or intelligent hospital infrastructure, integrates mechanical system monitoring, interdepartment communication and automatic alerts to reduce the chances of APEs regardless of the origin - from the patient or staff to the room or physical infrastructure.

> LIKE THE HUMAN BODY, A HEALTHCARE FACILITY NEEDS A FULLY INTEGRATED AUTONOMIC NERVOUS SYSTEM FOR CONTINUOUS, BEHIND-THE-SCENES SURVEILLANCE, ALERTING THE PROPER STAFF ONLY WHEN PROBLEMS ARISE.

Built-in protective mechanisms sustain optimal conditions, commanding clinical staff attention only when intervention is required to correct a potential accident. Records of both routine monitoring and alerts are then available to monitor trends and improve processes and efficiencies across the healthcare organisation. For example, automatic hand-hygiene monitoring records can be used for staff feedback and in research.

To implement an automated, human-hospital model, hospitals should:

- Seek out organisations with both physical infrastructure and healthcare knowledge and expertise to address the unique challenges of hospitals
- Integrate solutions that address the needs of the healthcare facility, while automating tasks to improve the quality of patient care
- Assess current facility policies and procedures for patient safety and identify areas where additional safety measures are needed
- Prioritise the potential hazards and note any regulatory compliance issues, associated loss of revenue and potential ROI on possible solutions
- Re-evaluate the performance of the system on a regular basis to ensure continuous improvement as well as accommodate future needs, changes or expansion

Building automation and monitoring solutions can optimise a hospital's infrastructure, improve clinical care and support better patient outcomes, thereby decreasing costs. Using ANS as a model for creating an ideal structure can help hospitals save millions of dollars and, most importantly, patient lives.

Schneider Electric Buildings Australia Pty Ltd
www.schneider-electric.com

ECD SOLUTIONS — EFFICIENCY + RENEWABLES

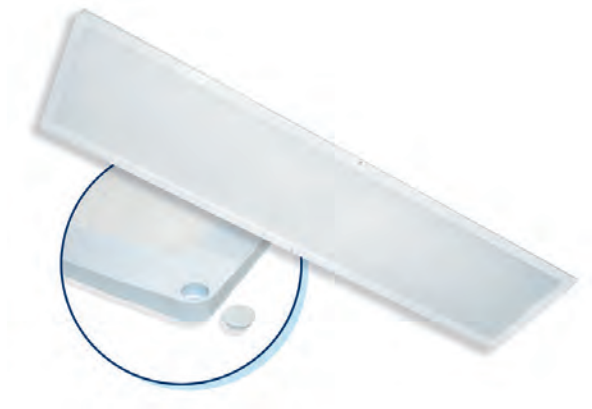
Audiovisual control systems

The CommBox Joey series is a range of customisable, wall-mounted audiovisual control systems with LEDs. The systems can control multiple devices and interface with room movement sensors to shut down devices when the room is empty, thereby saving energy. The systems control equipment via infra-red and RS232.

The Joey Micro6 is pre-programmed to suit all major projector manufacturers. If the users wish to customise the system to suit their application, they can design their own layout in landscape or portrait orientation using the simple drag-and-drop style Joey authoring program. They can then print the result on a colour printer, onto high-res paper, cut it out and install it under the high-gloss, clip-on Perspex cover.

For more demanding applications, Joey Micro6 also directly interfaces to all processors in the CommBox range with full feedback support and will control the multimedia port USB directly.

CommBox
www.commbox.com.au



Panel light

Lumigen LED's 3-in-1 panel light offers recessed, surface mount or suspended options suitable for almost any commercial or industrial application.

Using LED edge-lit technique, the ultra-thin 11 mm design produces a uniform low-glare light to replace traditional fluorescent trough and batten lighting in offices, kitchens, workshops, garages or domestic settings.

The light is available in 1195x295 mm/56 W and 34 W; 695x695 mm/56 W and 34 W and 315x315 mm/19 W and is supplied with wall plugs, screws and caps. All models are available in either 3000K or 5700K colour temperatures with high lumen output. Mean Well drivers are supplied standard with a five-year warranty.

CrispTech Pty Ltd
www.crisptech.com.au

High-sensitivity motion sensor

The mySmart EBDHS-MB is an IP65-rated motion sensor designed specifically for mounting directly to high-bay lighting in factories and warehouses.

Traditionally factories and warehouses have proved to be demanding spaces for efficiently controlling lighting and reducing energy costs. The product overcomes these challenges by utilising a specially developed, highly sensitive passive infrared (PIR) sensor. The sensor can reduce lighting costs by ensuring that lights are only switched on when people are present.

The sensor can be safely mounted at heights of up to 15 m with a detection range of 40 m. To further improve the performance of the EBDHS-MB, each sensor includes a set of customisable masking shields. These shields allow the focus of the detection pattern to be set to a specific area, such as along an aisle or a corridor.

The sensor is available in different variants giving options for daylight harvesting, digital dimming for DALI/DSI ballasts and analog dimming for 1-10 V ballasts. All sensors are manufactured in Europe in an ISO9001 Quality Assurance Certified facility and come with a 5-year warranty.

mySmart Pty Ltd

www.mysmartsensors.com.au

Inverters

The SolarMax P series inverters are specifically designed for private roof-mounted systems of up to 6 kWp. They are said to offer efficiencies of up to 98%, providing the plant operator with maximum energy yields.

The advantages of the P series include: free on-line monitoring with MaxView; direct connection to the internet; smart single and dual tracker concept; safe and comfortable connection module; passive cooling; power factor adjustment options; optional I/O module for load management and power export limitation; plug-and-play installation.

Due to the dual tracker concept, east-west arrangements or an odd number of modules do not constitute any limitations. Even module tolerances can be compensated efficiently. This way, every roof surface can be used ideally for the production of power. Alternatively, a single tracker mode also is available.

The units are 'battery ready' and may be retrofitted at a later stage with the forthcoming P-battery upgrade.

Sputnik Engineering Australia & NZ Pty Ltd

www.solarmax.com/au/en

CASE STUDY

GE prescribes lighting solution for medical school

GE Lighting has installed an energy-efficient LED solution at the Davao Medical School Foundation in the Philippines.

The lighting project, valued at almost US$20,000 ($21,487), entailed the fitting out of about 2000 light points in the school's current building as well as a new four-storey extension.

In the existing school classrooms, fluorescent lights and magnetic ballast system were retrofitted with GE Lighting's LED T8 tubes. LED Eco downlights were then installed for the school's new extension which houses AV lecture rooms and dental laboratories. The retrofit work was completed in July last year, while the lights at the new building were fully implemented in March this year.

"Our client is a non-profit organisation approved by the Commission on Higher Education. All expenditures must therefore be considered carefully and each dollar prudently spent," said Ditas Alipao, Country Product Manager, GE Lighting.

GE Sales Manager Vincent de Veza delivered intensive presentations to the school, with demonstrations of the proposed products to boost the client's understanding and confidence in the solution, said Alipao. A cost analysis showed the benefits of using GE's lights, which offered higher lumens, enhanced product durability and price efficiency in the longer term, Alipao added.

The GE team continues to liaise closely with the school to provide support during and post-implementation.

"We used to spend nearly US$49,000 ($52,645) on electricity bills per annum. Compared to the old fluorescent lights, GE Lighting's new LED solution at the current school building will give us estimated energy savings of about US$31,600 ($33,950). This is a significant benefit for a school like ours. The faculty members and students are also enjoying improved illumination across the school facilities and vastly reduced maintenance downtime," said Carlos Salazar, Chief of the Engineering Department at Davao Medical School Foundation.

GE Lighting's solution comprises:

- LED T8 19 W (289 pieces) and LED T8 18 W (715 pieces) at the current school building. The lights have a life of up to 40,000 h and efficiency of up to 97 lm/W. This is estimated to generate energy savings of 40% compared to traditional fluorescent lamps.
- LED Eco downlight 10 W (898 pieces) and LED Eco downlight 15 W (73 pieces) at the new audio visual Building. The downlights offer 85 lm/W and have a colour rendering index of Ra80+. Its integrated aluminium reflector shade with die-casting aluminium radiator structure enables good heat dissipation. The lights have an average life of 25,000 h, leading to reduced replacement and maintenance costs.

GE Lighting
www.geindustrial.com/asia

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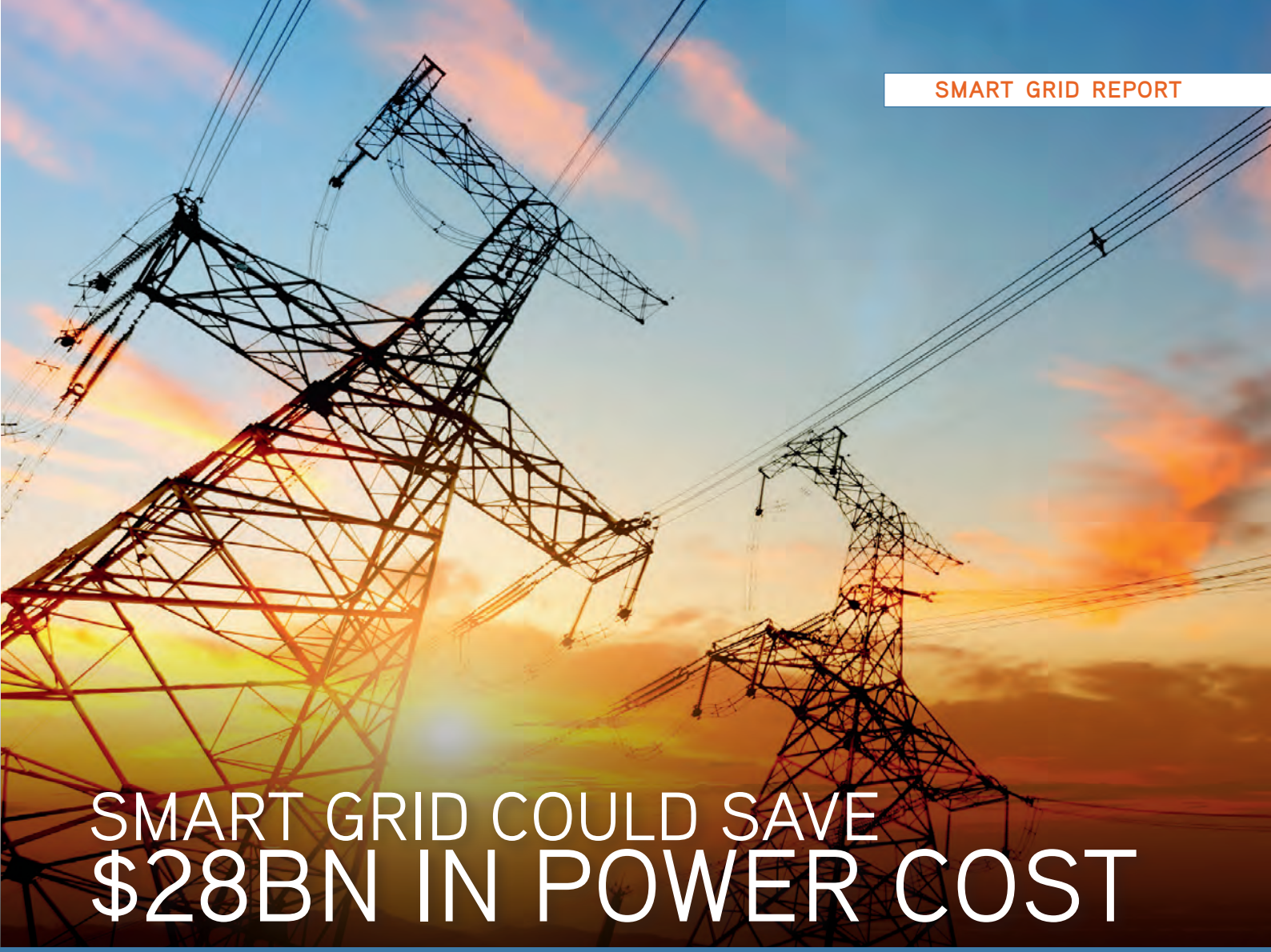
Universal control device for split systems

The inIRt is a universal control device for integrating split-system air conditioners with smart devices and home or building control systems.

The system incorporates a built-in scheduler as well as 'set to' and 'set back' control and online recording of temperature and power usage. Control system integration is simple and Control4 and RTI drivers are available.

There is no requirement for installers to learn infrared codes. The system is compatible with leading split-system air-conditioning unit brands that use infrared control and will intuitively adapt to the user's remote commands and features.

Convergent Technologies Pty Ltd
www.control4.com.au



SMART GRID COULD SAVE $28BN IN POWER COST

A four-year trial of smart-grid technologies in NSW has found the potential for a net economic benefit of up to $28 billion over the next 20 years from the deployment of smart-grid technologies in Australia.

The analysis conducted by a consortium led by project design and engineering firm Arup was commissioned to examine the results of the Smart Grid, Smart City project. Backed by $100 million in federal government funding as part of its Energy Efficiency Initiative, Smart Grid, Smart City is one of the largest and most ambitious commercial-scale trial deployments of smart-grid infrastructure and applications ever undertaken in the world.

Centring on the use of information and communications to improve the efficiency of electricity generation, distribution and usage, the trials were led by Ausgrid with support from industry and government partners including IBM Australia, GE Energy Australia, Grid Net, the CSIRO, TransGrid and Energy Australia.

In its cost-benefit analysis, Arup and consortium partners Energeia, Frontier Economics and the Institute of Sustainable Futures (UTS) quantified the potential economic benefits from the mix of smart-grid devices, customer-feedback technologies and dynamic electricity tariffs trialled in the project and developed a business case for implementing the most effective of these at a national level.

They found the largest economic benefits came from technologies that improved the overall reliability of the network. Notably, fault detection isolation and restoration (FDIR) technologies which allowed for rapid detection and repair of network faults was found to have potential to deliver billions of dollars in benefits if used nationally.

The consortium also found the trial of in-home electronic and online tools for monitoring and adjusting electricity usage in near-real time, coupled with smart meters and alternate pricing models, gave households unprecedented control over when and how much electricity they consumed. This led to a smoothing of consumption over the daily cycle and reduced call on the grid at peak times.

The cost-benefit analysis was a rigorous examination of the Smart Grid, Smart City project that would feed into the ongoing reform of regulations governing electricity supply and distribution, said Dr Richard Sharp, Principal and Project Director, Arup.

"We estimate total net benefits across the grid in the order of $28 billion if the most promising smart-grid technologies were to be implemented nationally. That's money that can be applied to other infrastructure and services, or shaved off bills for households or business," Dr Sharp said.

"For example, at the household level, we can use technology to change electricity usage patterns so as to dampen demand at peak periods, reducing capacity requirements over the long term.

"Given the right mix of technologies, a smart grid is achievable. This means we get more out of our existing electricity infrastructure, and can stage investment in new infrastructure over longer periods," he said.

Technologies and applications trialled included:

- **Grid applications** - grid-side monitoring and control technologies to reduce network operating costs and support the future planning and implementation of lower-cost networks;
- **Customer applications** - residential electricity consumption, reliability, customer behaviour and responses to feedback technologies and pricing models. This included an electric vehicle trial

and investigations into the interoperability of electricity metering with gas and water metering;

- **Distributed generation and distributed storage** - distributed generation and distributed storage within electricity grids, at the level of small communities; and
- **Supporting information and communication technology platforms** - integration of various high-speed, reliable and secure data communications network and associated IT systems with the electricity distribution network, including interoperability with the National Broadband Network.

The findings have also underpinned development of a sophisticated set of interfacing models - believed to be the most advanced of their kind in the world - that will be made available to all industry participants to guide implementation of smart-grid technology.

"Industry participants now have at their disposal a suite of proven technologies to make electricity supply more efficient and less costly. The challenge now is for relevant jurisdictions and regulatory authorities to work together so that retailers and distributors and other participants have the flexibility to adapt and deploy these technologies where it is of benefit to consumers," Dr Sharp said.

THE FINDINGS HAVE ALSO UNDERPINNED DEVELOPMENT OF A SOPHISTICATED SET OF INTERFACING MODELS - BELIEVED TO BE THE MOST ADVANCED OF THEIR KIND IN THE WORLD - THAT WILL BE MADE AVAILABLE TO ALL INDUSTRY PARTICIPANTS TO GUIDE IMPLEMENTATION OF SMART-GRID TECHNOLOGY.

ECD SOLUTIONS ELECTRICAL + COMMS + DATA — EFFICIENCY + RENEWABLES

Solar charger

Compliant with international standards, the Eaton ASC48-ES solar charger is designed for communications network operators who are seeking to cut energy costs or are required to meet carbon footprint reduction targets.

The solution uses the company's range of modular power building blocks and power chassis. Key features include a maximum power point tracking (MPPT) function that can extract the maximum possible power from the solar panels. In addition, the solar charger features intelligent digital signal processing for enhanced control, producing peak efficiency in excess of 96% for typical operating loads, while also maintaining a very high minimum operating efficiency of 95 to 96%, over a wide range of loads (from 30 to 100% of the 2 kW capacity).

Users also benefit from combining the ASC48-ES with the Eaton SC200 controller, providing a fully managed solution. Full monitoring includes energy metering and logging on input and output.

The charger is also fully compatible with existing 3G systems, including the Eaton APS3 and APS6 systems. The output may be paralleled with one or two more rectifiers to produce a versatile power solution for both AC or generator power and solar power. This makes it suitable for a fully integrated solar/diesel hybrid solution, or an AC-powered system with solar added to reduce energy consumption.

Intelligent control in the SC200 allows optimal balance of solar energy and back-up fuel. The solar charger is protected against input overvoltage, surges and overtemperature. It is rated for operation in temperatures at up to 70°C.

Eaton Industries Pty Ltd

www.eatonelectric.com.au

Room control devices

The range of native DALI-control 30 Mech devices achieve simple room control quickly and easily. The extended range supports flexible system configuration using DALI broadcast with no programming required, or can be configured for specific operation using simple configuration software. The 30 mechanism platform is an extension to the existing wall-plate range and includes options for occupancy detection and light-level sensing, IR receiver, on/off control and dimming.

Schneider Electric Clipsal Partner

www.clipsal.com

Mini LED house light

The Jands Chroma-Q Inspire Mini LED house light is a powerful and compact, multipurpose creative lighting tool. The fixture has a 65° beam angle and features a shorter housing, designed for venues with low ceilings or balconies.

The light provides a choice of whites, pastels and saturates - all from one fixture. The product is able to integrate with an existing DMX infrastructure and can be controlled by any DMX-supported lighting controller. The light has an energy-efficient maximum current draw of 75 W.

Jands Electronics

www.jands.com.au

Dimmer

The Green i PIR dimmer is a versatile motion sensor and dimmer combined into one stylish square plate with the added feature of being a cost-effective security deterrent for the domestic market.

The dimmer has been designed to provide various options. Simple DIP switch settings behind the front cover allow the home owner to set the time-out period, whether the unit uses the PIR or not. The wall-mounted movement sensor uses infrared technology to automatically turn lights on when an area is occupied and off when it's not.

Just like their ceiling-mounted counterparts, the dimmers react to daylight, keeping lighting off if there's sufficient natural light. Absence sensing is also available on some models. The security mode is a simple way of simulating occupancy while away from the house on holidays etc. When set, the lights will come on 15 minutes after dark and go to the last dimmed level or 50%, whichever is greater.

Standard features include: one- or two-gang PIR dimmer, replaces a light switch or dimmer, can turn on/off automatically, security mode, night light mode via handheld remote sold separately (#GIRC), scene setting and soft on/off via handheld remote sold separately.

CP Electronics Australia

www.cpea.com.au

STREET LIGHTING AND THE INTERNET OF THINGS

Australian councils can leverage Internet of Things (IoT) technology to modernise critical infrastructure such as intelligent and adaptive street lighting, according to networking technologies company Silver Spring Networks.

The company showcased its vision for the future of smart city and smart energy infrastructure in Australia at the Australian Smart Lighting Summit held recently.

"By establishing an open, standards-based IP network underpinning multiple applications, from energy to public lighting to traffic light systems to disaster sensors, cities can leverage network economics to cost-effectively deploy new smart infrastructure services to their citizenry over time," said CJ Boguszewski, Global Commercial Lead for Smart City Applications for Silver Spring.

In his presentation, 'Street Lighting Controls: Why They're Ready Today, Important for Tomorrow and Critical in Australia', Boguszewski highlighted the IoT opportunities for Australian councils.

"With our smart energy networks deployed in Victoria, South Australia and Western Australia, the market has made strides in proving out the critical role technology plays in helping modernise its energy and municipal infrastructure. The next step is advancing to more sophisticated IoT applications, and intelligent street lights are often the on-ramp to smarter cities."

Cities today in Australia are faced with costly, ageing infrastructure. Street lights, for example, can consume as much as 40% of a city's energy budget. Smart public lighting networks can help drive reductions of more than 10% in street light energy consumption and can help lower maintenance costs by up to 30%. When combined with LEDs, Silver Spring's Smart City Solution is said to help deliver up to 60% in energy savings over traditional high-pressure sodium street lights and help reduce maintenance costs by up to 35%.

Silver Spring's Smart City Solution comprises its IPv6 wireless networking platform and management and control software optimised for smart city devices. In addition to smart street lighting, cities can leverage the open network platform for the deployment of additional smart city services over time, greatly lowering long-term costs and accelerating speed of deployment for these new services for their citizens.

Silver Spring's networking platform has connected over two million homes and businesses in Australia to energy providers such as Citipower and PowerCor, Jemena, United Energy and Western Power, helping improve energy efficiency and to empower consumers to make smarter energy decisions. In New Zealand, Silver Spring has been selected by SmartCo, a consortium of electricity lines companies, to deploy an advanced smart grid network across New Zealand, and has already begun deployments with member company WEL Networks. In Asia, the Singapore Power Group is leveraging a countrywide IPv6 smart infrastructure networking platform from Silver Spring to allow eligible customers in Singapore to now choose from a variety of retail energy providers and purchase electricity at wholesale market prices.

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USING DUAL TRACE FOR FAULT LOCATION

A time-domain reflectometer (TDR) is an invaluable tool for finding faults on metallic cabling. Other common tests, such as an insulation test or a 'high-pot', will show that the cable is faulted. However, they do not tell you where the fault is. It could be miles away, or it could be right under your feet.

The time-domain reflectometer sends an energy pulse down two metallic conductors and then analyses the reflected energy. The conductors can be twisted-pair, concentric, hot and neutral, conductor and shield, two phases, or any similar combination. It is important to note that TDR technology will not work on single-conductor cables. For that, you need different technology: a pinpointer. When the pulse encounters a change in impedance of the insulation, a portion of the energy is echoed back, while the remainder continues to travel down the cable. It will eventually echo off the termination.

The tester works essentially the same as a radar gun nailing poor saps on the turnpike, but modified to the application. It measures the time it takes the pulse to travel down the cable, echo and return to the source. It then takes the speed of the signal multiplied by the time it takes to return and divided by half (to the fault and then back), and that gives the distance to the fault. In order for the unit to make this calculation, it must know the speed of the impulse. On the turnpike, the air determines that. On cable, it depends on the type of insulating material.

Each different kind of insulation (EPR, XLPE, PILC, etc) allows the impulse to travel at a specific speed, called the velocity of propagation (VoP). It can be expressed as percentage of speed of light, or more familiar units such as metres per microsecond, and is usually selectable on the instrument.

The operator finds the VoP on a table, the cable specs or some other source, and enters it in the tester. Many high-quality testers include an on-board library of cable types and VoPs. So far, so good, but, like just about all electrical tests, it rests fundamentally on a laboratory model under ideal conditions. In the case of TDR, ideality means a perfect cable, with two conductors parallel down the length and uniform insulating material of precise thickness between the conductors. Cables are manufactured with varying degrees of quality. The thickness of the insulating layer may not be uniform. The conductors may not be strictly parallel. The material may contain voids and other imperfections. As it serves time in installation, of course it deteriorates under the elements and electrical stresses. This is why we have a fault to begin with. What does this mean in terms of testing it? Only that as the cable deviates from ideality, the test results become less precise. This is where operator experience takes over: the better trained and experienced the operator, the better the outcome.

A 'perfect' cable, tested with a TDR, would show a reflection at the end of the cable (upward for an 'open', downward for a 'short') and a perfectly flat line between. If there is a fault, of course another reflection will appear somewhere along the line, commensurate with its location. Different types of faults give different shapes to their reflections and the operator can

determine the nature of the problem. A splice will give a distinctive shape and, if there is a known splice, that can then be disregarded on the trace and attention focused on another reflection. If the location of the splice is known, it can be used as a landmark to better position the fault. In addition, all the aforementioned imperfections affect the shape of the trace. Many are nothing more than the normal features of the cable and can be disregarded. Determining which reflection is caused by the fault that is affecting operation of the cable can be difficult, and that's where enhanced features of the tester are invaluable.

Most testers offer a single trace, but the most advanced have a dual-trace feature. While single-trace TDRs are fine for most applications, do not ever let anyone try to claim that they will find every fault. No TDR will. For the most demanding applications in the power industry, it may be necessary to go beyond TDR and all the way to a TDR-thumper combination. However, a critical advanced technology that will identify many additional faults is the full-featured dual-trace, or dual-channel, TDR. Dual-trace models have two parallel channels that can be engaged separately or in tandem. This capability provides an enormous advantage in difficult fault location.

As with many technological breakthroughs, dual trace sprang from a simpler concept. Many older TDRs, often still in service, were equipped with plastic overlays so that a second trace could be added and superimposed on the screen during a live test. Modern units now do this electronically, possibly at no more than the push of a button. A second trace can be added either from a live test or from a previously stored result. Furthermore, on sophisticated instruments, the two traces can be at different ranges and have their own setup and zoom capabilities. On multicore cables, a known good pair can be traced simultaneously with the faulted conductor and the difference between the reflections noted. With twisted pair, a suspected faulted pair can be connected to one channel and a known good pair to the other. Even a separate but similar cable can provide the needed comparison, allowing for the natural differences between the two.

A good practice is to provide a historical record. Cables can be tested at the time of installation, during maintenance or during repair, and the trace stored for later comparison. A handy feature is the ability to add and subtract traces. Rather than displaying the entire trace, which may include many inconse-

"AS WITH MANY TECHNOLOGICAL BREAKTHROUGHS, DUAL TRACE SPRANG FROM A SIMPLER CONCEPT. MANY OLDER TDRS, OFTEN STILL IN SERVICE, WERE EQUIPPED WITH PLASTIC OVERLAYS SO THAT A SECOND TRACE COULD BE ADDED AND SUPERIMPOSED ON THE SCREEN DURING A LIVE TEST. MODERN UNITS NOW DO THIS ELECTRONICALLY, POSSIBLY AT NO MORE THAN THE PUSH OF A BUTTON.

quential imperfections, the TDR can subtract one channel from the other and display only the section(s) that differ. This can be a critical time saver in getting to the fault. Also important is to colour code the traces. Advanced testers offer numerous colour choices that can be applied to specific lines. Since dual traces criss-cross each other, combine and then separate, often in complex patterns, the ability to assign distinct colours can be critically effective in interpreting complicated traces.

High-resistance faults (arbitrarily over 100 Ω) are more difficult to identify than bolted faults or open conductors, and sometimes a conditioning step will make them more pronounced and easier to spot. 'Burning' the fault by injecting energy through a high-pot or insulation tester opens the fault and makes it more recognisable. After all, it will be cut out and spliced anyway. A comparison of traces before and after the conditioning step will call attention to the area most affected by the conditioning: the fault. And finally, two separate traces can be run simultaneously.

Once the suspected fault reflection has been identified, additional refinements of the features list will help in finding it precisely. A cursor is moved to the point of reflection on the instrument's display. The position should be at the start of the reflection, not the peak. Sophisticated models may have a feature that finds and positions it automatically. Another useful feature is that of dual cursors. With this feature, one cursor can be set at an identified landmark and the other at the suspected fault and, between them, the delta (Δ) is calculated and displayed; that is, the distance between the landmark and fault. This can be an enormous time saver in tracing and walking the route. Another use of dual cursors and delta calculation is that the first can be positioned at the end of the test cable connecting the TDR to the cable being tested, again making the distance more precise and the fault easier to find.

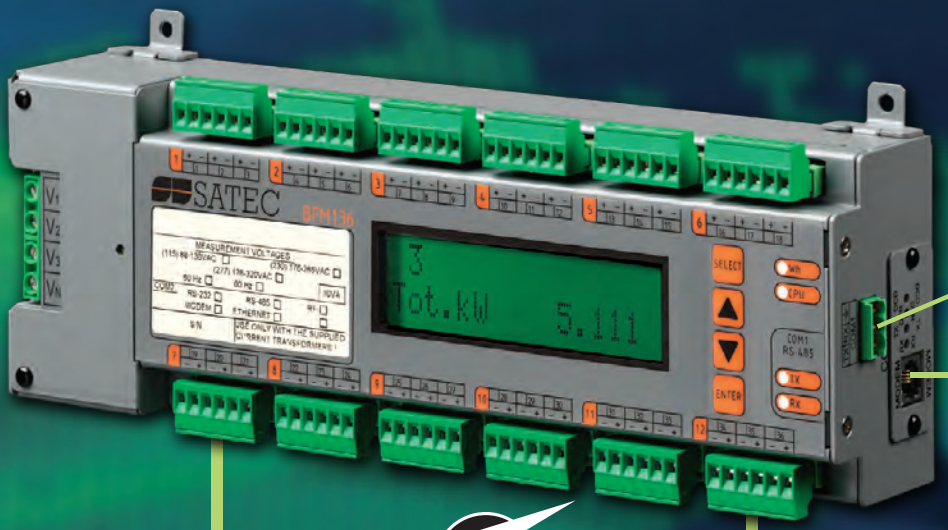
Faults of lesser magnitude can be more difficult to distinguish. This can be aided by use of the 'gain'. This feature magnifies the trace and makes cursor positioning easier and more precise. However, be judicious with its use, lest meaningless anomalies be magnified around it and obscure the fault reflection. Pulse width is also usually adjustable. The longer the pulse width, the greater the energy and the farther the pulse sent. The reverse of this is that a second fault close to the first can be obscured, as well as faults that lie close to the point of contact between the tester and the cable. This is typically about 10 metres. Trimming back the pulse width can separate the reflection of the near-end fault from that of the initial impulse. Once these features have been effectively utilised and the fault found, be sure to identify and save the trace to a file. Next time there is a problem on this line, the action time will be significantly less.

Megger Limited
www.megger.com

SATEC Branch Feeder Monitoring

"Measuring Electricity with space to spare"

36 Single Phase Circuits into 1 = BFM136
12 Three Phase Circuits into 1 = BFM136
Combination of Both for 36 current inputs = BFM136



12KV Impulse Tested

HACS

HACS

System Accuracy BFM136 + HACS = Accuracy Class 1
Dynamic Measuring Range = 0.1% to 100% of HACS
Internal Clock = Date/Time Stamping
Event Logging = Diagnostic Function
Data Logging = Retained Data on Loss of Communications to Network
Time of Use = Tariff Billing
Multifunction Metering = V, A, PF, Freq, KW, KVAR, KVA, KWH, Demand
Current Sensors (HACS) = 100A to 3000A Range = Wiring distance up to 200 metres
Real Time Waveform, Vector & Harmonic Analysis = PAS License Free Software
Compact Din Rail or Wall Mounted Design = 108x331x61mm (HxWxD)

SATEC
Powerful Solutions

www.satec-global.com.au
Telephone (02) 4774 2959

Hazardous area accelerometers

Monitran has added a temperature-measuring capability to its range of IECEx-certified sensors.

Certified to IECEx Group II, the MTN/2285IT and MTN/2200IT series are sealed to IP67, making them suitable for measuring vibration levels and temperatures in areas where explosive gases, liquids or dust may be present. They can be supplied with either integral cables or 4-pin connectors.

The MTN/2285IT series comprises sensors with DC current outputs, in the range 4-20 mA, proportional to RMS velocity (mm/s) and temperature as a voltage, with a sensitivity of 10 mV/°C. In addition, the operating temperature is certified to T6 (-55°C ≤ Ta ≤ +45°C).

The MTN/2200IT series is suitable for analysis applications and features constant current accelerometers with isolated outputs for acceleration, in volts at a standard sensitivity of 100.

ADM Instrument Engineering Group
www.admtech.com.au

Branch feeder monitor

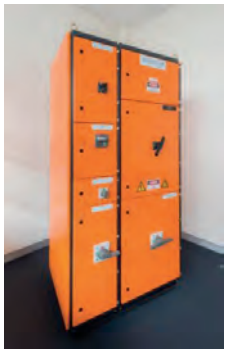
SATEC's EM133 NMI-approved product incorporates many advanced features, with Accuracy Class 0.5S offering extensive capabilities for a DIN-rail smart energy meter compliant to NMI M 6. With the EM133 meter, the company has achieved many challenging requirements of the NMI standard, including 12 kV impulse testing.

Following on from experience gained with the meter, SATEC is developing its branch feeder monitoring technology to meet the requirements of electricity metering for NMI trade measurement. The company's current design BFM136 branch feeder monitor provides for 36 current inputs, configured for 36 single-phase circuits, 12 three-phase circuits or a combination of both for up to 36 current inputs using SATEC-designed current sensors (HACS). The HACS are designed as solid- or split-core for the 3000 A measurement range, providing high performance at low loads.

The branch feeder monitor provides real-time multifunction metering capabilities, tariff energy metering and time of use (TOU) along with event logging, data logging with date/time stamp. Standard communications include RS485 and TCP/IP connection for use with third-party software or the company's energy management, billing and power-quality software eXpertPower.

All SATEC metering hardware is supplied with the free licence software PAS for programming and downloading of log files in either Excel (.xls) or database (.mdb) format.

SATEC (Australia) Pty Ltd
www.satec-global.com.au



Modular switchboards

SMB Harwal has independently verified its iNTELECT G3 switchboard's low level of electromagnetic radiation emissions (EMR).

The company has subjected the switchboard to independent testing by the NATA-accredited Electrical Testing Company to ensure it achieved industry standards and compliance with ARPANSA EMR guidelines for uses in applications such as public and private infrastructure; commercial and residential apartment buildings; retail, industrial, resources and infrastructure projects; and mission-critical facilities.

The iNTELECT G3 system is the third generation of the iNTELECT system and has been engineered in Australia for Australian conditions. The system is adaptable to various brands of switchgear for different applications and can be custom-engineered to suit the user's individual requirements.

The busbar system is arranged in a matrix pattern in which the main busbars occupy a range of predetermined vertical and horizontal positions arranged for maximum mechanical strength and cooling, with phases fully insulated and segregated from each other. This results in a compact, safe switchboard.

The modular system is engineered for strength, with the frame being sufficiently strong to be lifted from the top (rather than the bottom, as with most systems), adding to ease of installation and maintenance. Access is further enhanced by a stainless steel 180° door hinge, with continuous polyurethane seals machine-applied for protection and long life.

The system has compact flexibility for alteration, expansion and maintenance. The busbar system takes minimal depth within the switchboard yet offers flexibility in switchboard design without departing from type test certification. Busbar connections can be readily accessed for maintenance and system expansion.

SMB Harwal Electric Pty Ltd
www.smbharwal.com.au

The faster, more flexible choice for installing cable.

AUSTRALIAN MADE

Introducing the new Flexible XLPE & Firestop cable range

Created using quality components for long-life performance, Prysmian's new cable options offer:

- Extreme flexibility for fixed applications for general & fire-rated projects
- Easy installation in difficult areas
- The ideal solution where space and time are at a premium

Prysmian Cables & Systems Australia Pty Ltd
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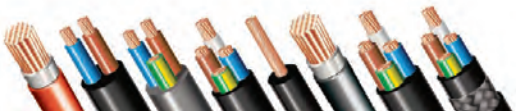
1 Heathcote Road, Liverpool 2170 NSW, Australia
Email: sales.au@prysmiangroup.com
www.prysmian.com.au

PRYSMIAN



Fibre-optic current sensor

ABB's fibre-optic current sensor FOCS-FS is suitable for high-voltage applications. The sensor complies with IEC 61850 open systems communication protocol, enabling interoperability with equipment from other vendors.

The sensor will facilitate the development of digital substations and enable the grid to get smarter, and is suitable for current measurement applications in 245 to 800 kV substations. Conventional current- and voltage-measuring devices in substations are comprised of oil- and SF6-based instrument transformers. However, these devices are heavy, weighing up to several tons. They also consume significant amounts of space.

The device is free of magnetic saturation, making it suitable for capturing fast transient currents, short-circuit currents, and AC with DC offset. It does not use oil or gas and eliminates the risk of explosion.

ABB Australia Pty Ltd

www.abbaustralia.com.au

Power outage insight solution

Schneider Electric's power outage insight (POI) solution protects against electrical downtime. The intuitive crisis prevention and recovery system maximises continuous access to safe electricity across critical power applications.

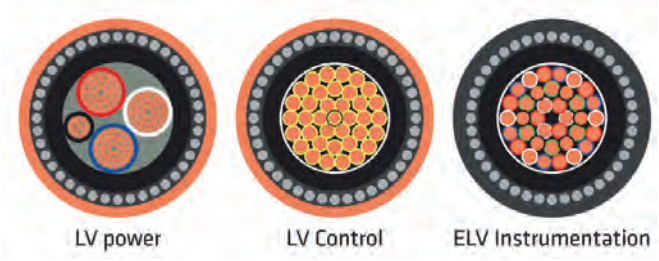
The solution is tailored for a number of sectors where uninterrupted power supply is highly critical, including data centres, mining, oil and gas, and healthcare. As an integrated solution with no additional software required, Schneider Electric's POI monitors low-voltage electrical distribution systems and schedules predictive maintenance for minimising unexpected downtime through its intelligent web-based interfaces.

In case of a power failure, the software performs real-time diagnostics to quickly identify the source of the problem and provides concise and easy-to-follow power restoration instructions. Additionally, the POI solution provides a wireless breaker-closing remote control device that allows users to close breakers from a safe distance.

The POI solution is easy to install in both greenfield and existing sites for immediate improvement in power reliability. Its embedded database provides traceability of repairs, maintenance and changes to device settings and layout for ease of long-term management. The solution acts as a 24/7 in-house electrical expert, supporting staff in daily operations and emergency situations.

Schneider Electric Power Business

www.schneider-electric.com



Flame-barrier cables

Prysmian Power Cables and Systems has released the flame-barrier cables for use with non-barrier type glands.

Until now, proper specification of cable systems for use in hazardous areas was an extremely complex process requiring a great deal of information beforehand, due to the fact that Australia currently has no certification scheme in place for hazardous area cables. For cable entry systems to flameproof enclosures, the usual method was to specify barrier-type flameproof glands while worrying less about the specifics of cable construction. However, this added significant costs to installation due to the high cost of barrier-type glands and their relatively long installation time.

The cables are suitable for use with non-barrier-type flameproof glands and are specifically designed to be used in a variety of hazardous and potentially explosive applications including mine sites, oil and gas platforms, fertiliser plants, chemical installations and by explosive manufacturers.

Prysmian's flameproof cables cover all the requirements for LV power, LV control and ELV instrumentation. The cables offer compact and circular construction, and are evaluated and tested for gas groups IIA and IIB to the requirements of AS/NZS 60079.14-2009 clause 10.4.2 (b) and AS/NZS 60079.1-2007 clause 15.2 utilising already certified Exd-rated, non-barrier-type flameproof glands with sealing rings.

The cables exceed equipment protection level (EPL) Gb for non-energy limited wiring systems, in accordance with AS/NZS 60079.14-2009 table 6. This protection level is generally adequate for Zone 1 and Zone 2. The cables can be specifically engineered to provide reduced flame propagation exceeding the requirements of the IEC 60332-3 category C bunched vertical test.

Prysmian Cables & Systems Australia Pty Ltd

www.prysmian.com.au

5 kV insulation resistance tester

Available to rent, the Megger MIT525 is a 5 kV insulation resistance tester (IRT) capable of resistance measurements up to 10 TΩ.

Testing options include polarisation index (PI), dielectric absorption ratio (DAR), dielectric discharge (DD), stepped voltage (SV) and ramp test. The unit has a CAT IV 600 V safety rating and dedicated voltmeter function (30 to 660 V).

The tester also features a rapid-charge Li-ion battery with the ability to take measurements on a flat battery when connected to mains power.

Features include: noise filter - rejects up to 3 mA noise; advanced memory includes time/date stamping of results; high-altitude operation up to 3000 m; PowerDB Lite software for download of test data to PC.

TechRentals
www.techrentals.com.au

Pendant stations

NHP has available the Mike pendant station range from TER. The pendant stations are suitable for the centralised control of several machines including lifting elevators, hoists, conveyors and other industrial lifting and motion applications.

Available in sizes of 4, 8, 12 or 14 buttons, they can incorporate all standard and auxiliary commands such as slew left/right and hoist up/down. For each button there is a range of interchangeable operator symbol inserts and label/symbol sheets available, to describe every combination of functionality required. Recessed positioning and industry-standard labels make the operator identification resistant to grime, heat and water.

The pendant stations are available as either pre-assembled pendants in standard configurations or custom pendants to meet specific requirements.

NHP Electrical Engineering Products Pty Ltd
www.nhp.com.au

CASE STUDY

Chelsea to use Philips' LED floodlights at Stamford

Philips has provided LED pitch lighting for Chelsea Football Club, making Stamford Bridge the first top flight football club stadium to complete an upgrade to pitch lighting.

The Philips ArenaVision LED floodlighting system is designed to provide footballers, fans and TV broadcasters with the best possible experience and supports the latest Premier League requirements for TV broadcasting. These include lighting standards for high-definition super slow-motion replays, avoiding the flicker synonymous with conventional lamps. Also, unlike the previous metal halide system, the new LED solution can be instantly switched on and off without the need for a warm-up period.

Eric Rondolat, CEO of Philips Lighting, comments, "The world's first ever floodlit football match took place in England, so as sports lighting goes digital it is only right that the lighting standard is again being set there. We are witnessing another technology milestone in the modern football game.

"Our LED pitch lighting meets the new stringent broadcast criteria of the English Premier League in helping to deliver high-definition, flicker-free, super-slow motion images and ensures that Chelsea delivers the best possible viewing experience to the 40,000-plus fans in the stadium as well as those at home."

The solution includes a dedicated user interface and a control system allowing quick, easy and reliable monitoring of the system

and switching between optimal lighting configurations thereby providing complete flexibility and the ability to switch and dim each floodlight individually. The Philips ArenaVision LED control system can also be used to create special entertainment lighting effects that would normally require dedicated stage-lighting, providing the opportunity for the floodlights to be integrated into pre- and post-match light shows to help build the atmosphere and excitement in the stadium.

In addition to supporting better quality broadcast images, the club will also benefit from maintenance savings due to the long life of the LED solution. Typically, metal halide floodlighting lamps should be replaced every three seasons to maintain the lighting levels required. The Philips LED system is expected to last in excess of 10 seasons.

The new lighting was installed during this summer's break, in time for the start of the new football season. In addition, the club is also upgrading its lighting at its training ground, installing the same family of Philips LED floodlighting to deliver a similar lighting performance when training as on match days. With the new system it is possible to light specific areas of the training ground to different illuminance levels to create the ideal practice environment for players.

Philips Lighting Pty Ltd
www.philips.com

ECD ELECTRICAL + COMMS + DATA SOLUTIONS
ELECTRICAL DISTRIBUTION

Respiratory kits

3M has released four convenient respiratory and body protection kits designed to manage varying levels of exposure to asbestos fibres and dust.

The two negative pressure Asbestos/Dust Respirator kits provide a choice of either a 3M full- or half-face re-usable respirator and appropriate filters. The half-face kit also includes a pair of 3M safety glasses.

The positive pressure kits allow a choice between either a ready-to-use face- or belt-mounted full-face respirator system. Both kits also include a 3M disposable coverall.

3M Personal Safety
www.3M.com/au/PPESafety

Smoke alarm safety switch

The Exelgard smoke alarm safety switch automatically switches off a home's power circuits when a smoke alarm detects fire, helping to minimise the spread of fire.

The switch must be installed by a licensed electrician and in accordance with detailed instructions in the unit's manual. It is positioned alongside the switchboard and connected to the hard-wired smoke alarms throughout a home.

If a smoke alarm triggers, the switch automatically cuts off the selected power circuit-breaker in the switchboard and stops the power supply to household appliances. While the safety switch disconnects power to appliances, it does not affect a home's lighting - ensuring householders have complete visibility in an emergency situation.

The switch must be tested and reset at least once a month and must never exceed four test and reset operations per minute. As the switch relies on smoke alarm signals, it is vital that smoke alarms are maintained according to manufacturer's recommendations.

Homeowners must remember to check their smoke alarms once a month by pushing the 'test' button on the unit and change the batteries every 12 months. It is recommended that every household has at least one smoke alarm installed between the bedrooms and remainder of the house, and on any other storey within the home.

Wormald (Tyco/Fire & Security)

www.wormald.com.au

Surveillance solution

VUgarde2 Anywhere, an integral module of Vugarde 2 VMS, enables users to access both live and recorded images from a variety of devices including smart phones, tablets and laptops.

The system automatically adapts the user interface to suit the device being used and has built-in smart bandwidth. The system supports multiple mobile platforms including: Android, iOS, Windows Phone, Blackberry OS 7. It also supports popular desktop browsers including IE, Chrome, Firefox, Opera and Safari.

Other benefits include: platform agnostic; eliminate installation, works within IT policies and reduces bandwith usage; doesn't stream more data than a device can display; control fully functional cameras remotely from any device.

VisioTech

www.360tech.com.au

Protective workwear

The Huski Workwear arc-rated range of protective clothing includes the Blaze jacket and Flame pant. Suitable for those industries working with live power, the range uses a technical combination of a waterproof/breathable fabric with high visibility that is arc-rated, flame-retardant and anti-static, and safety harness.

Over the last couple of years Huski has continued to progress its range and has recently released the improved version of the Blaze jacket. After extensive testing, it developed advanced seam sealing techniques, improved the back harness and reconfigured the garment to produce an even a better level of weather protection.

Blaze and Flame comply with the standards: 1906.4:2010 and 4602.1:2011 Class D/N, Arc rated - ASTM F1959 (ATPV 16.2 cal/cm2), Flame retardant - ISO 14116:2008, and Anti Static - EN 1149-1.

Palazzi (Trading) Pty Ltd
www.huski.net

Thermography cameras

Designed to help streamline thermal inspections for intensive electrical, mechanical and utility predictive maintenance programs, the T-Series cameras include the updated T420 and T440 with 320 x 240 thermal resolution, and T620 and T640, both of which offer thermal detector resolution at 640 x 480 (307,200) pixels.

Every model includes FLIR's patented MSX enhancement that highlights thermal images with key visible details in real time for easier recognition.

Flexible ergonomics, fast communication from the field and a holistic thermal imaging solution for greater workflow efficiency are what set T-Series cameras apart. A major advantage is the rotating optical block that lets users aim overhead, under equipment and from other tough angles while keeping the large LCD in comfortable view. All the new cameras include auto-orientation, which automatically keeps on-screen temperature measurement data upright for easier viewing whether the camera is framed for landscape or portrait imaging.

The T620 and T640 feature a capacitive touchscreen for navigation that's as familiar as a smartphone's. And the keypad buttons on all of the latest models have been optimised to make it easier to activate the interface with gloves on. These advancements complement other benefits that the T-Series cameras already offer, including fast Wi-Fi communication that connects cameras to Apple and Android devices.

Using the free Tools Mobile app, thermographers can import, analyse and share images and reports immediately, directly from the inspection site.

FLIR Systems Australia Pty Ltd
www.flir.com.au

Heavy-duty switchgear

Clipsal has extended the 56 series range switchgear to include a removable, base-mounted switch, giving easy terminal access and making wiring and maintenance simple.

The shallow model is suitable for tight spaces or high-traffic areas, while the deep model has all the space needed to fit larger cables. Both models are housed in spacious 56E2 enclosures and colour options include grey, resistant orange, resistant white and chemical grey; accommodating a wide range of industrial needs.

Other features include: current ratings of 25, 32, 40 and 63 A; deep cover - wiring space for cables up to 50 mm; high-visibility red/yellow switch actuator to improve emergency response time.

Schneider Electric Clipsal Partner
www.clipsal.com

D curve and 100 mA RCBOs

NHP has announced an expansion to its DIN-SAFE range of long body RCBOs (DSRCBH series) to include a D curve trip characteristic and 100 mA RCD sensitivity options.

Standard features of the RCBOs include compliance to AS/NZS 61009, a single module width of 18 mm, 10 kA short circuit breaking capacity in C curve, Type 'A' RCD with 10 or 30 mA trip sensitivity and neutral and earth (PE) flying leads, suitable for installation in NHP's Concept panelboards.

The D curve trip characteristic is suitable for high inrush current loads, while the 100 mA RCD sensitivity is suitable for installation/equipment protection purposes where 30 mA sensitivity is not required.

NHP Electrical Engineering Products Pty Ltd
www.nhp.com.au

Self-regenerating desiccant

Humidisorb plus X-Corrode packets provide moisture and corrosion control in electrical and electronic enclosures. Humidisorb is a self-regenerating desiccant that can absorb and release enormous quantities of moisture from the surrounding air without becoming saturated.

The contents of each packet will not affect or damage non-metal material and can withstand maximum temperatures of 80°C and contact with bulk liquid water without impacting their effectiveness. All packets come with self-adhesive mounting tape, which allows for easy installation into any enclosure, even if the enclosure is frequently opened.

When first placed in service, a packet of granules will rapidly absorb moisture. It is said to absorb at least 5-10 times more moisture than conventional desiccants before coming to equilibrium with the relative humidity of the surrounding air. This will usually take several weeks to occur, even in very humid environments.

During periods when the enclosure RH is drier than its long-term average, the packet releases moisture in vapour form. The moisture 'desorption' process cannot wet the air above its average RH level. When the enclosure humidity rises above the average level maintained by the product, the packet absorbs moisture. By absorbing moisture when the RH rises, and releasing some of the vapour phase moisture (regenerating) when the RH drops, the packet maintains a constant RH within the enclosure equal to the long-term average humidity.

JT Day Pty Ltd
www.jtday.com.au

Ergonomic screwdrivers

Weidmüller's SlimLine screwdrivers are VDE-insulated and feature a slim blade. They allow users to easily access sunken screws and operate the spring of tension clamp terminal blocks.

The screwdriver's ergonomic handle is designed to ensure optimum handling characteristics and comfort when tightening and loosening screws. The protective insulation is sprayed directly onto the blade to ensure electrical safety, even when working on critical applications up to 1500 VDC and 1000 VAC.

The screwdriver is designed for working on live parts up to 1000 VAC and 1500 VDC in accordance with DIN EN 60900, IEC 900. The high-alloy chromium-vanadium-molybdenum steel blades are fully hardened and feature a black gunmetal finish. Each tool is individually tested and carries the GS mark (Tested Safety).

The following SlimLine versions are available for delivery: SDI SL S - VDE-insulated slot-head screwdriver (DIN 7437, ISO 2380/2, blade to DIN 5264, ISO 2380/1); SDIK SL PH - VDE-insulated crosshead Philips-type screwdriver (DIN 7438, ISO 8764/2-PH, blade to ISO 8764-PH); SDIK SL PZ - VDE-insulated crosshead Pozidrive-type screwdriver (DIN 7438, ISO 8764/2-PZ, blade to ISO 8764-PZ); and SDIS SL 2.5-5.5/PH/1/2 - a six-piece VDE-insulated slot-head and PH crosshead screwdriver set.

Weidmuller Pty Ltd
www.weidmuller.com.au

Height strip camera

With high-resolution imagery from a 2 MP sensor in a discrete form factor, the Verint IP height strip camera is designed to capture a person's face upon leaving a facility.

Supplementing a standard IP surveillance camera network, the IP camera is suitable for loss prevention, shrink, inventory control and crime reduction applications. The camera offers up to 30 fps @ 1080p, PoE and 4.3 mm fixed lens, and has both ethernet output and analog video output for connection to a spot monitor.

It offers a reliable option to ensure a high level of security and safety throughout a facility, whether a retail store, financial institution or a government building. The camera can be wall mounted or installed on a door frame. With the addition of an accessory camera, the height strip camera can be placed between two doors to provide full video coverage of both entry and egress points.

Alarmcorp
www.alarmcorp.com.au

@work

Metering Accuracy Class 'S' - there is a difference

Anomalies in measurements can, over a period of time, cost hundreds or thousands of dollars in errors. The accuracy of an energy meter is dependent on multiple factors such as the load of the network (full load conditions will be more accurate than partial load), power factor of the system, accuracy of the meter itself and other factors.

Accuracy

The accuracy depends on the design and build quality of the meter's input channels - a higher quality measuring meter will provide better accuracy but will increase the price of the product. Some major parameters that affect the accuracy measurement of an energy meter are:

1. Fluctuation of the reading value, represented in percentage % from the actual value (reading).
2. A fixed error (noises) normally represented as percentage from full scale (FS) as its constant value.

3. For power and energy measurements, the phase shift between the voltage and the current also affects the accuracy since the power equals voltage multiplied by current multiplied by the cosine of the phase angle.
4. The phase angle accuracy is represented in degrees in current transformers creating additional errors to energy/power meters.

Accuracy metering standards

Since accuracy depends on the load of the system, IEC/as have developed different standards to define accuracy under different load conditions. This is known as 'Accuracy Class'.

IEC/AS Standard 62053-11 covers Accuracy Class 0.5, 1.0 and 2 for electromechanical meters for active energy (watt-hours) - this means the accuracy as a percentage from reading under full load conditions and unity power factor. However, the accuracy deteriorates under lower load conditions when power factor is less than unity.

IEC/AS Standard 62053-21 covers Accuracy Class 1.0 and 2 for static/electronic meters for active energy (watt-hours), which means the accuracy as a percentage from reading based on full load conditions and unity power factor. However, the accuracy deteriorates under lower load conditions, power factor less than unity along with the presence of harmonics.

IEC/AS Standard 62053-22 covers a higher Accuracy Standard of 0.2S and 0.5S for static/electronic for active energy (watt-hours) providing a higher Accuracy Standard under full load conditions and unity power factor, in addition to better accuracy readings at much lower load currents, power factor conditions less than unity along with the presence of harmonics.

System accuracy vs meter accuracy

The accuracy of any energy measurement system is the summary of its components, ie, energy meter plus current transformer (CT). With the exception if a direct connected meter is utilised.

IEC/AS Standard 60044-1 defines the accuracy classes for CTs. Subject to the loading of the CT, accuracy variances will occur from the quoted accuracy class such as errors due to phase errors based on specified load impedance. Current transformers' accuracy is defined as per IEC 60044-1, Classes 0.1, 0.2, 0.5, 1 and 3. In addition, Accuracy Class 0.2S and 0.5S standards for CTs apply for higher performance accuracy. The class designation is the measure of the CT's accuracy. The ratio (primary to secondary current) error of a Class 1 CT is 1% at rated current; the ratio error of a Class 0.5 CT is 0.5% at rated current. Installing an energy meter with Accuracy Class 0.5S as a minimum requirement can assist in ensuring the energy monitoring application has a high degree of accuracy when taking into account the accuracy performance of the CTs involved.

SATEC (Australia) Pty Ltd
www.satec-global.com.au

CASE STUDY

Lighting upgrade for Etihad stadium

Melbourne's Etihad Stadium is a $460 million, multipurpose facility designed to cater for major sporting and entertainment events, as well as social, business and private functions. The stadium has 53,500 seats and standing room for 2000 patrons. In 2012, Etihad Stadium facility manager Honeywell considered that the exit and emergency lighting fittings at the stadium were nearing end of life and becoming more expensive to maintain.

With the stadium receiving such a high level of foot traffic, the quality and performance of the emergency lighting is critical from a life-safety viewpoint. Emergency and exit lighting also represents a major ongoing maintenance cost for the stadium, and another important consideration was the maintenance and energy costs of the products that would be selected. After considering various options, Honeywell installed 2756 Clevertronics L10 exit and emergency lighting fittings as part of a Clevertronics Zoneworks computer monitoring system.

Emergency lighting and exit signage are essential to ensure safe egress by building occupants when the normal lighting fails, including when this arises during a fire or other crises. It provides adequate illumination and signage to allow people to avoid obstacles and move safely to the nearest exit. Its installation is prescribed by the National Construction Code and
also addressed in the three parts of AS/NZ 2293.

The emergency power supply in emergency light fittings, in the event of a power failure, is by way of batteries contained in each exit sign and emergency light fitting. Until recently, lead acid, nickel metal hydride (NiMH) or nickel cadmium (NiCd) offered the only solution for emergency lighting batteries - with serious shortcomings, including relatively short life leading to high maintenance costs. The great challenge for battery life in emergency lighting applications arises due to the batteries being under constant charge under the elevated temperature conditions found inside emergency fittings. These batteries have a short life span, typically between three and six years. They also present a major sustainability issue as they contain toxic-heavy metal contaminants - cadmium, nickel and lead. Cadmium and nickel are also known carcinogens and lead is considered a probable carcinogen.

As well as battery life, lamp life and circuitry life are key determinates of maintenance-free periods. Clevertronics' L10 range is said to address all three elements, incorporating 100,000 h LEDs and enhanced circuitry design, with its lithium battery innovation.

After a 12-month staged upgrade that was specifically focused on emergency lighting, all emergency and exit light fittings throughout Etihad Stadium were replaced with the innovative L10 range. Honeywell Victoria TAM Operations Manager Matthew Parisi estimates that the stadium will have ongoing annual savings of around $129,000 pa in maintenance and electricity costs, as opposed to if they had maintained their previous NiCd emergency lighting fittings, with a greater yearly saving over the first seven years of operation.

The existing emergency and exit light fittings throughout the stadium were at the age where multiple electronic components were nearing the end of their lives and the fittings were becoming expensive to maintain as major components needed replacing, said Parisi. The Clevertronics L10 range was selected as it offered the lowest cost maintenance available, with fewer battery replacements, and provided reduced impact to stadium operations, with greater reliability due to fewer man hours dedicated to maintenance and replacements. The L10 range installed throughout the stadium has a maintenance-free design life of 10 years, which is said to be double that of NiCd or NiMh emergency lighting batteries.

"The use of L10 lithium batteries is the way of the future and I believe the move away from NiCd batteries will be quite swift as building owners and facility managers become aware of the numerous advantages that lithium batteries offer. The added advantage of low environmental impact and also less waste through longer replacement intervals also makes it a far more sustainable technology compared to existing practice. Having no memory effect and being smaller in physical size are also advantageous qualities that attracted us to the product," said Parisi.

The L10 lithium range is supplied with a four-year product warranty. Additionally, when supplied as part of a Clevertronics Zoneworks system - as was the case with the Etihad Stadium upgrade - a significant on-site warranty component is included.

Additional advantages of the Clevertronics L10 range include: good thermal stability, particularly operating under elevated temperatures; good charging performance under elevated temperatures; low self-discharge rate; high current rating; high cycle life - over 1000 cycles; high energy-storage capacity; no memory effect; and high discharge power.

Customised SHDSL surge protection

Phoenix Contact's protection device for SHDSL systems is designed to meet the special requirements of SHDSL data transmission. The protection device is said to guarantee maximum data security with minimum signal attenuation.

The surge protector takes the form of an adapter that can be easily installed between incoming telecommunications cables and a modem. The pluggable connection provides fast, flexible installation. The protection device only needs to be grounded by way of the black cable or DIN-rail base. The device features a sturdy metal housing with space for two SHDSL ports.

Phoenix Contact Pty Ltd
www.phoenixcontact.com.au

Small stepper motors

With the FDM0620 series stepper motors, all components are contained in a housing measuring 9.7 mm in length and 6 mm in diameter. With a holding torque rating of 0.25 mNm and a dynamic torque of up to 0.2 mNm, the stepper motors are suitable for applications in which high power is required in a small space, such as portable devices.

The open-loop operation enables fast and simple implementation. The holding torque rating and the precise angular accuracy make the product suitable for applications with high requirements on angular and linear positioning, particularly in optics, photonics and medical technology.

The flex PCB system is suitable both for LIF plugs with grid dimensions of 0.5 and 1 mm as well as for wiring via lead wires. A wide selection of metric lead screws for linear movements, as well as a planetary gearhead with various reduction ratios, round out the configuration options of the series.

On request, modifications are available with which the motors can withstand special mechanical loads or environmental influences (eg, low temperatures or vacuum). This makes the series a flexible solution for a wide range of application areas.

The product features speed to 20,000 rpm, a standard operating temperature range of -35 to +70°C and a long service life. It is suitable for positioning tasks and can be combined with gear heads or lead screws.

ERNTEC Pty Ltd
www.erntec.net

Compact, lightweight air-conditioning system

The AIRSTAGE J-IIS Series air-conditioning system from Fujitsu General is a compact, lightweight unit suitable for a range of applications from small office buildings and stores to large houses.

At 998 mm tall and 87 kg, the model is 25% shorter and weighs 26% less than conventional 6 HP comparable outdoor units, making it suitable for installation under windows and in tight spaces.

The sound level has been lowered to 54 dB(A) for the 6 HP model when cooling, by using DC twin rotary compressor, inverter technology and advanced airflow structure design, including a large propeller fan and angle optimisation. A miniaturised, low-noise, high-efficiency, multistage DC fan motor is mounted. Heat exchange performance has been improved by mounting of a 3-row large heat exchanger. The smooth airflow grille has been aerodynamically designed for good efficiency with little blow loss.

Efficiency has been improved by mounting of a new active filter module, while a compact and high-performance DC twin rotary compressor offers good performance from low to medium at normal operation. Advanced refrigerant control technology has enabled a total refrigerant piping length of 80 m and the non-stop oil recovery operation maintains a comfortable room condition because the product continues to operate.

Fujitsu Australia
www.fujitsu.com.au

Multicontact connectors

The PN12C multicontact connector provides the user with the option of crimping as an alternative to soldering the wires. In addition, as the pins in the product are now removable, soldering is much simpler. The current rating for the contact pins is 16 A, as opposed to 10 A previously. The maximum voltage is 480 V.

The connector is compatible with its predecessor. It is one of a family of multicontact connectors designed for signal and control applications in aggressive environments and/or frequent use (up to several thousand operations). The connectors permit the simulations transmission of data, power and low-level control signals.

The connector comes with up to 12 contact pins and the design allows the user to populate the connector to suit individual requirements. It has an IP rating of IP66/67, either with the plug connected or the lid closed, making it suitable for washdown areas. The solid sliver-nickel contacts ensure good conductivity, electrical performance and durability.

Marechal
www.marechal.com/en

Automatic circuit reclosers

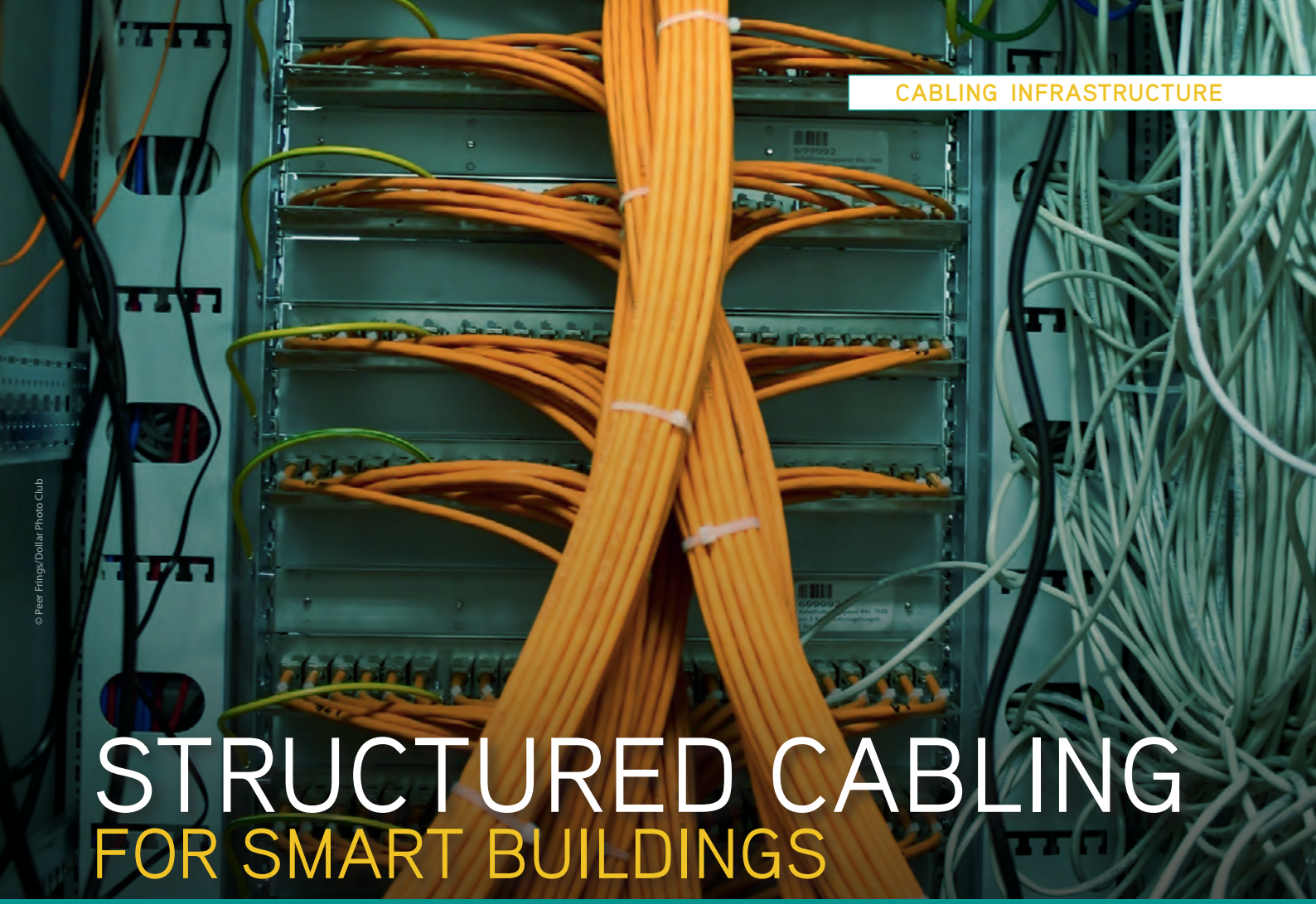
Noja Power has released its 310 series 15 and 27 kV automatic circuit reclosers (ACR). The ACRs extend the company's range of electricity distribution grid protection products by complementing the existing 300 series 38 kV ACR.

The 310 series replace older products which were rated at 630 A with units capable of up to 800 A continuous current operation. The increase in the continuous current rating to 800 A allows utilities to use the ACR in a wider range of electrical network configuration options. The 310 series ACRs also feature a fault make capacity (RMS) of 12.5 kA and an impulse withstand phase-to-earth and phase-to-phase of 110 kV for the 15 kV unit and 150 kV for the 27 kV unit.

The 310 series ACRs have been fully type tested to ensure long life and reliability under the harshest environmental conditions.

Benefits of the series include the use of a vacuum interrupt and solid dielectric insulator instead of the environmentally unfriendly oil or sulfur hexafluoride (SF6) gas used in older products. The stainless steel enclosure is said to form the only solid dielectric unit with controlled arc venting available and the controlled arc venting design meets the requirements of IEC62271-200 Clause 6.106 and Annex A. Another benefit is the RC10 control and communications cubicle, a SCADA-ready controller that provides a directional overcurrent, earth fault and sensitive earth fault relay, auto reclosing relay, instantaneous metering, event log, demand logger and remote terminal unit (RTU) for remote control in a single package.

Noja Power Switchgear Pty Ltd
www.nojapower.com.au



STRUCTURED CABLING FOR SMART BUILDINGS

The secret to a greener future is to get smart and get connected, and the place to start making it happen is staring you right in the face.

Much has been done in the last 30 years to make energy consumption more efficient and to reduce the output of greenhouse gases. While known offenders like the automotive industry and data centres have been heavily targeted, the real villains in the piece - inefficient buildings - have escaped serious scrutiny. Left unchecked, outdated buildings represent a real challenge for the environment. Studies have indicated buildings are responsible worldwide for 40% of final energy consumption and 21% of greenhouse gas production.

Building the right infrastructure

Countries around the world are constructing national broadband networks and today most commercial buildings have a communications infrastructure, either cabled or in combination with a wireless network. Additionally, the data centre construction boom is not yet over and the industry continues to strive to achieve lower energy consumption to meet its power and cooling demands. Previously, such considerations were not factored in for residential and office buildings. However, that is fast changing because for a building, overall efficiency is the sum of all its parts. Germany's energy passport, or energieausweis, provides an example of how it works - the owner of a building has to provide the energy consumption of his or her property, with the calculated or measured consumption in kWh/m^2.

Unlike northern Europe where, for most buildings, heating is the biggest part of an energy bill, in Australia heating, cooling and general electricity consumption are key parameters. This has contributed to a more holistic approach in construction, with building automation processes working in combination with more sophisticated IT and electronic systems to create intelligent or smart buildings.

Getting smarter

The idea of an intelligent building is not new, having been established about 20 years ago with the European Installation Bus (EIB). Today's industry standard is the ISO 14543, which is based on the KNX network communications protocol for intelligent buildings, while the known LonTalk standard is now aligned with the ISO/IEC 14908 standard.

All of these standards relate to a generic cabling infrastructure. For example, ISO 16484 evolved from a couple of proprietary protocols, while the ZigBee Alliance introduced an open interoperable wireless standard based on IEEE 802.15.4.

For North America, TIA provides the 862 Building Automation Systems Cabling Standard for Commercial Buildings, focusing on cabling infrastructure for BAS systems - the next derivation of which is an IP-based model with devices using the IP protocol or using one of the existing protocols over IP. The current situation in Australia is somewhat confusing and the energy balance would improve if all the systems were based on one of these standards. With increasing use of smart meters and Google's recent acquisition of NEST, a manufacturer of smart thermostats and smoke detectors, it is clear that the future is going to be full of IP devices, connected via a local or remote network.

Our connected future

Since all devices use the structured cabling system, the number of systems running in parallel is reduced and design and instal-

> SINCE ALL DEVICES USE THE STRUCTURED CABLING SYSTEM, THE NUMBER OF SYSTEMS RUNNING IN PARALLEL IS REDUCED AND DESIGN AND INSTALLATION IS SIMPLIFIED. WITH THIS IN MIND, THE DESIGN OF STRUCTURED CABLING WILL HAVE TO SUPPORT THE VARIOUS NEW IP DEVICES IN DIFFERENT LOCATIONS.

lation is simplified. With this in mind, the design of structured cabling will have to support the various new IP devices in different locations. As history has shown (since the introduction of the first industry standard in 1995), the key to attaining this goal will always be getting more bandwidth. Put simply, the only way to ensure system longevity is to get the highest available cabling bandwidth - because speeds and applications will change, demanding higher-bandwidth systems - thereby potentially laying the foundations for three more ethernet generations in the future.

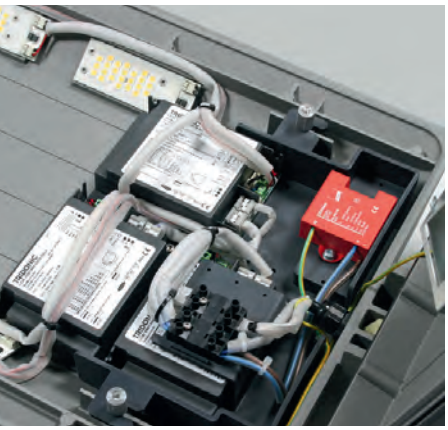
Planning is vital. For example, when the 10 GB ethernet was introduced in 2006, it could only be supported by Class F systems, which were defined in 2002. With an estimated lifetime of 20 to 30 years, they will contribute positively to the overall energy balance.

Looking even further ahead, as all devices are now IP devices, there are opportunities to make use of some alternative designs and concepts. Currently, most buildings in the world use a structured cabling design according to ISO/IEC 11801, with fibre for the campus and backbone and copper for the horizontal area, requiring several switches and higher power consumption. An alternative approach employs an optical fibre network, which uses technologies installed for fibre-to-the-home networks. This reduces the number of active devices and instead distributes the signal with passive splitters, using smaller switches or ONTs close to the user/end device to provide PoE and a media conversion to copper.

This simplified infrastructure consumes less power and the rapid-fire technology employed has the added advantage of making nearly all the components re-usable. The revolutionary idea is based on new bend-insensitive fibres and factory-terminated connectors, with the cable installed like an extension cord. Additionally, as all products have an integrated spool for slack storage, the usual length issue with factory-terminated cable assemblies is eliminated.

By taking a holistic approach encompassing all the advantages of connecting today's advanced IT infrastructures with environmentally friendly materials, smart buildings will be the intelligent way to help reduce global energy consumption for a greener future.

TE Connectivity
www.te.com/enterprise



Surge protection device

The DEHNcord type 2 surge arrester (two-pole, single-pole) can be installed in installation systems such as the terminal compartments of end loads, cable ducts or flush-mounted systems.

The device reliably protects, for example, outdoor LED lights from surges caused by lightning interference. The product can be installed wherever the performance of a standard type 3 surge protective device for terminal equipment reaches its limits. DEHNcord ensures surge protection is in line with the standard wherever space is restricted. According to the standard, DEHNcord is a type 2 surge arrester - it can also be used at the transition from Lightning Protection Zone LPZ 0 B to 1 or higher.

The device meets all normative requirements. It has a short-circuit current withstand capability Isccr of 25 kA rms in case of mains-side overcurrent protection and a total discharge current total of 20 kA (8/20 μs).

The device houses a mechanical operating state/fault indication and a tried and tested disconnector which does not disconnect the connected load as soon as it is tripped. If space is restricted in the cable duct, the installation benefits of DEHNcord resulting from its flexible terminals become evident. DEHNcord can be adapted to existing installation systems.

DEHN + SOHNE GmbH + Co KG
www.dehn.com.au

Miniature network camera series

AXIS F is a flexible, modular network camera series that involves discreet HDTV 1080p cameras with wide dynamic range. The series is suitable for ATMs, banks, stores, hotels and emergency vehicles.

The camera is split into a lens and image sensor unit, to install in tight places, and a larger main unit, which can be placed elsewhere and away from public view.

The small sensor units can be flush-mounted in walls, ceilings, doorways, elevators and behind sheet metal with only the small lens surface visible.

The main unit supports the following features: Wide Dynamic Range (WDR) - Forensic Capture which enables details from both bright and dark areas of a scene to be visible; HDTV 1080p video at up to 50/60 frames per second; two-way audio; input/output ports to external devices for enhanced alarm management; RS232 port for integration of external data to the video; full-sized SD card slot for local storage; power over ethernet, or via an external power supply; intelligent video capabilities such as video motion detection, active tampering alarm and downloadable applications.

The four sensor units consist of: IP66-rated AXIS F1005-E sensor unit with a fixed lens and 113° horizontal field of view; AXIS F1015 sensor unit with a varifocal lens for a 53 to 108° horizontal field of view; AXIS F1025 sensor unit with a pinhole lens and 89° horizontal field of view; IP66-rated AXIS F1035-E sensor unit with a fisheye lens for a 194° horizontal field of view.

Axis Communications (S) Pte Ltd
www.axis.com

Multifunction actuator

MAXinBOX16 is a multifunction actuator for DIN rails that offers multiple configurations of up to eight shutter channels or 16 independent outputs of 16 A , which support capacitive loads. It allows manual control of its outputs thanks to the push-buttons on the cover.

Zennio Australia
www.zennio.com.au

MONITORING LED TEMPERATURE

FLIR Systems has helped Belgian manufacturer Delta Lighting improve the durability of its lighting systems by monitoring the product temperature profiles.

Delta's Light's research and development team is focused on ensuring fire safety as well as improving the durability of its lighting designs. One of the most critical factors of durability is temperature. In order to better monitor the temperature profile of its products, Delta Light decided to purchase a thermal imaging camera from FLIR Systems, said Koen Dequae, Quality and Standards Manager at Delta Light.

Already familiar with the concept of thermal imaging, it didn't take Delta Light very long to conclude that FLIR's E30 handheld camera was a suitable fit for its application in terms of performance and cost-efficiency.

"Monitoring the temperatures of our products is critical in the design, development and qualification phase," said Dequae.

"We now work with LED lights that have a lifetime of up to 100,000 h. If you realise that a temperature raise in the lighting system of a mere 10 degrees can reduce the LED lifetime by half, then you know that keeping the temperatures under control is essential."

Delta Light uses the FLIR E30 camera to look at the LEDs, the electronic power supply of the lighting systems - both proprietary and third-party - and the temperature profile of the lighting system as a whole. The latter is essential to be able to design and manufacture lighting products in accordance with international (IEC-60598) and North-American (UL-1598) standards.

"These safety standards stipulate that a lighting system design cannot exceed a certain temperature," said Dequae. "To make sure that is the case, we look at the entire design and look for the hottest point. If that hottest point does not exceed that temperature, we meet the standard." Thanks to the FLIR E30 camera, Delta Light can now perform these qualification tests in-house; the company no longer needs to rely on external agencies. That saves Delta Light a lot of time and effort in the qualification phase.

The use of thermocouples is still required in order to meet certain international standards. However, these wired sensors have some significant drawbacks which make the work of research and development specialists difficult.

"To meet the required safety standards for our products, we heavily rely on finding the hottest spot on our lighting design," said Dequae. "However, with thermocouples that is not always very simple. Just by moving a thermocouple just a few millimetres on the lighting design, the temperature values can present significant differences. In other words, relying on thermocouples alone for temperature measurement is not sufficient. Only using thermocouples is like groping in the dark."

A thermal imaging camera, on the other hand, provides more confidence. By using the camera, Delta's research and development specialists have an immediate overview of the temperature values of the total lighting system design in the blink of an eye. This saves valuable time.

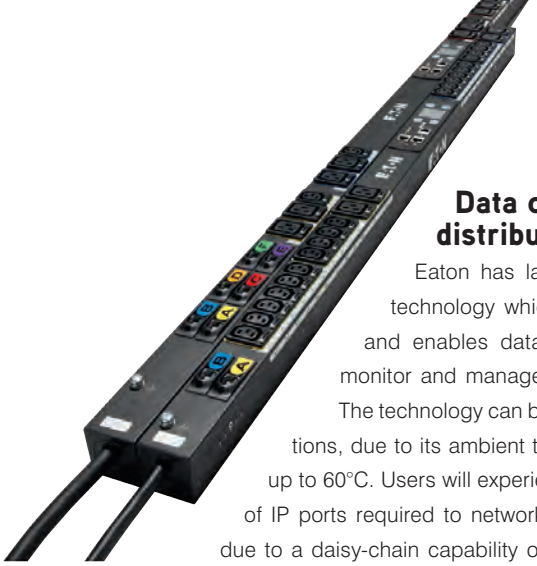
"We also use the FLIR camera to look at our electronics designs," said Dequae. "This helps us see overheated components and prevent bigger component failures. Try and put a thermocouple on certain SMD board components … It's just not possible due to their small size. With a FLIR camera, we can see these temperature differences, also on the smallest printed circuit board components."

The FLIR E30 has quickly become an invaluable tool for Delta Light's R&D team. Since its purchase, the camera has been used in the prototyping phase, the qualification phase and practically in any phase in between.

"The camera gives us the speed and flexibility boost we need," said Dequae. "When we are in the design phase of a lighting system, we can quickly use the FLIR camera to see whether a certain approach is feasible in terms of temperature build-up. But also in the qualification phase, the FLIR E30 allows us to see temperature profiles instantly, which would take hours with thermocouples."

An increasing number of research and development specialists are discovering the benefits that thermal imaging has to offer. FLIR Systems can offer them a benchtop thermal kit (BTTK) that can help them with their research and design work. Each BTTK contains an entry-model thermal imaging camera, fixed-mount or handheld, and software.

FLIR Systems Australia Pty Ltd
www.flir.com.au



Data centre power distribution units

Eaton has launched the ePDU G3 series, technology which provides power distribution and enables data centre and IT managers to monitor and manage their rack environments.

The technology can be deployed in demanding locations, due to its ambient temperature operation rating of up to 60°C. Users will experience a reduction in the number of IP ports required to network administer intelligent models due to a daisy-chain capability of up to four ePDUs, which the company says will reduce the cost of network infrastructure by 75%.

Features include: simplified colour coding and laser-engraved chassis linking breakers to outlet groups; IEC class 1 billing grade accuracy enabling users to monitor energy consumption (kWh) plus V, W and A; integrated IEC outlet locking on every outlet; hot-swappable eNMC module, user replaceable without power interruption to the load equipment; central monitoring and management interface; low-profile form factor meaning the ePDU does not protrude into the active IT equipment space of the rack causing airflow and cable management obstructions; multiple mounting options available through a variable mounting system.

Eaton Industries Pty Ltd
www.eatonelectric.com.au

Industrial and marine cables

JT Day's industrial and marine cables are designed for extreme conditions and environments. The range includes power and control cables; instrumentation cables (inc IS blue); variable speed drive cables; medium- and high-voltage cables.

The marine cables are fire-resistant/flame-retardant; low-smoke/zero-halogen; have braided armour; and meet the IEC shipboard specification. Features of the industrial cables include XLPE insulation on all cables sizes; 5V-90 temperature/V-90HT (UV) sheath; steel wire armour; flame-retardant; nylon 12 anti-termite (optional).

The cables can be made to a range of Australian and international standards to suit any project requirement. JT Day has total cable management capabilities and up to six-tonne cable winding and drumming equipment in its Perth and Brisbane warehouses.

JT Day Pty Ltd
www.jtday.com.au

Camera configuration app for Android devices

FLIR has launched an Android version of its FLIR Mobile Nexus client app.The FLIR Mobile Android version offers discovery, video display and control of any Nexus-enabled FLIR camera. The app, already available in the Apple App Store, has been used to monitor or configure Nexus-enabled FLIR cameras such as PT, F, FC or D-Series, A310pt or HRC Multisensors.

The version can be downloaded from the Google Play Store at no cost.

FLIR Mobile allows security personnel and other thermal camera users to remotely access and control Nexus-enabled FLIR cameras from their Android devices. The client app turns an Android device into a portable surveillance station.

Features include: discover all Nexus Enabled FLIR cameras with one click (requires uPnP support in a network); live video and PTZ control of Nexus Enabled FLIR cameras to monitor remote locations, using mobile connectivity (camera zoom can be modified using simple controls); quick browsing through multiple FLIR camera connections with finger scroll gesture; active camera toggle in multisensor products, with a single touch of a button.

Supported FLIR camera models and minimum firmware requirements are as follows: F-Series, D-Series, PT-Series (WW1.4 firmware); MV/MU-Series (WW1.4 firmware); A310pt (WW1.4.1 firmware); FC Series (BU1.1 firmware); MD-Series (2013 versions); HRC/JPC3 G Multisensor (CF 2.1 firmware).

FLIR Systems Australia Pty Ltd

www.flir.com.au

Electrical power source

The 6003A electrical power source provides three independent phases of precise voltage and current in one compact device.

The source is accurate enough for calibration laboratories, with specifications of ±0.038% for power and ±0.01° for phase. Its compact form factor also makes it easy to transport and maintain in manufacturing companies, electric utility meter shops and other organisations that manufacture, maintain and calibrate power meters, energy meters, power quality analysers and similar tools.

It also sources power quality phenomena, including harmonics, interharmonics and dip/swell variations. It includes measurement capabilities for DC voltage, DC resistance and frequency for measuring outputs from power and energy transducers.

Because it's a single instrument, the 6003A is easier to transport to test workloads in situ, takes up less bench space and is more cost effective to maintain than multipiece units. Its graphical user interface enables users to set up complex harmonic signals quickly and easily. It also makes the instrument remarkably easy to learn and use, so new users become productive quickly.

Specialised capabilities can be added, including an energy option, which adds a pulse counter and pulse output; a power quality option that enables the 6003A to calibrate power quality instrumentation by generating up to 63 harmonics, an interharmonic, modulation (flicker), and dips and swells on all three channels; and a 90 A adapter with high-current leads that generates up to 90 A from a single current phase to manage high-current workloads.

Fluke Australia Pty Ltd

www.fluke.com.au

Panel boards

Hager's invicta panel boards have been designed to accommodate the 6 kA onekombo single module RCBOs and 6 kA MCBs to guarantee safety and simplicity.

The panel boards are suitable for small to medium commercial installations and large home projects. The invicta range also comes fitted with 2 x 6 poles of DIN space for mounting additional modular devices such as emergency lighting test kits, contactors or submetering devices. If more DIN space is required, an optional extension box that provides an additional 2 x 18 poles is available.

Other features include: reversible door, large connection points for earth and neutral links or ease of fixing to the wall.

Hager Electro Pty Ltd

www.hagerelectro.com.au

Triangular channels

The Mekano 50-2T and 100-2T channels have torsional strength and the triangular design with small perforations at the front and large perforations at the back secures a lightweight, flexible and easily installed support solution.

The channels, suitable for HVAC and EI&T installations, are part of Oglaend System's multidisciplinary support system, MultiGrid.

The new triangular design is expected to replace the older UNO channel systems in new installations because it offers greater strength, but most importantly, it is significantly lighter - approximately half the weight and many fewer parts to install, thus reducing installation time by half. These sections are easier to install having lots of perforations to accommodate bolting and the creation of a wide range of framing designs.

JT Day Pty Ltd
www.jtday.com.au

Harsh environment power supply

Mean Well's HLG series power supply features a sealed aluminium housing with an IP rating of up to IP67.

The series is suitable for harsh environments, where moisture and dust can be a problem. It is designed to be air cooled, requiring no fans. This eliminates the need for any moving parts, giving reliability and an ambient operating temperature range of -40~+70°C, subject to de-rating. The series has also been designed to resist vibration of up to 5 G, making it suitable for use in applications such as mining and minerals processing.

It features Mean Well's built-in active power factor correction (PFC) and is said to give an efficiency rating of up to 95%. It also has an anti-surge capability of 4 kV. It is suitable for LED lighting applications. The company has also developed a specific version that can be dimmed with either a resistance, 1-10 V or PWM signal input.

ADM Instrument Engineering Group
www.admtech.com.au

MASTER ELECTRICIANS AUSTRALIA

Consequences of overlamping

Malcolm Richards CEO

The inquest into Australia's deadliest house fire has highlighted the role of the electrical industry in guiding public safety.

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Every Australian wants their family to be safe, but the issue of 'overlamping' has been in the spotlight after it was raised during an inquest into the nation's worst house fire tragedy - named as a possible cause behind a shocking blaze that killed 11 people near Brisbane three years ago.

Former scientific police officer Brad Bardell reportedly told the inquest that a desk lamp could have been a viable ignition point for the 2011 inferno. Those of us in the industry may be amused at the invention of a new term, 'overlamping', to describe putting a bulb with wattage that is too high into a lamp that cannot provide the required electrical output. The heat can melt the socket and the wiring insulation - greatly increasing the risk of arcing.

Bardell had discovered during his investigations into the fire, that at the time the family bought the desk lamp they would also have been able to buy 60 W bulbs for it. But the lamp was only rated to use a bulb for up to 40 W. The 60 W bulbs, suitable for that particular lamp, have since been removed from sale. However, Bardell reportedly tested the same model lamp with a 60 W bulb he'd managed to get from importers and was able to ignite standard printer paper 'within minutes'.

But it is rare - this is the first time I've heard of it being the possible cause behind a fire. It is so uncommon it piqued the interest of the media, and I was invited onto ABC radio to discuss the issue with Brisbane breakfast presenter Spencer Howsen and onto 4BC's Drive program with Ben Davis the following day. An ABC listener had texted an interesting comment, "I would think it's getting harder to overlamp now that low-wattage bulbs are just about all you can buy these days". It is a valid point, but unfortunately it isn't that cut and dried just yet. Many older appliances in people's homes can be used so infrequently that they could still be fitted with bulbs with wattage that's too high.

While many safety hazards are glaringly obvious, the concept of 'overlamping' may be quite easy for everyday people to overlook. But they could be violating Australian standards - putting their property and the lives of their loved ones at risk.

A tragedy such as this has again focussed attention on how important it is for industry professionals to guide the community when it comes to electrical safety. While the possible ramifications of 'overlamping' have been a topic of discussion this week, hundreds more fires are caused by dichroic downlights every year.

While the 2012 phase-out of incandescent lamps was initiated as an energy efficiency measure, the side benefit is that the new bulbs are much cooler, and far less likely to overheat. Contractors should take this opportunity to encourage discussion, and to direct customers to change over to new, efficient and energy-saving LED bulbs, and substantially reduce the risk of house fires.

www.masterelectricians.com.au

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