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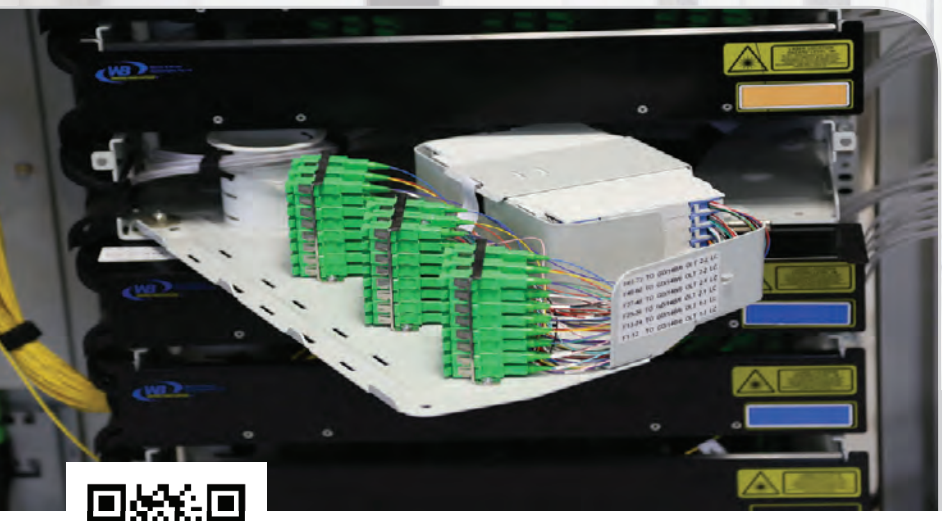

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CONTENTS

FROM THE EDITOR

The holiday season is well and truly over and now it is time to put our noses to the grindstone. 2014 was an eventful year for the Australian electrical, comms and data industry. Two major cable recalls - Infinity/Oslent-branded cables and Ecables' power cables - cast a shadow over the electrical industry.

As most of you may be aware, non-compliant products not only raise serious safety concerns but they could also result in legal ramifications. They also give a bad name to the industry and negatively affect the overall economy. Contractors should always undertake reasonable steps to ensure the products they use and install are compliant and should report non-compliant products to respective regulatory bodies. It is not always easy to identify faulty products and contractors should consider having recall insurance in order to protect their business.

The recent recalls of electrical products highlight the need to improve product compliance and certification systems in Australia. Australian electrical industry body NECA is already pushing for a register of compliant products and compliant manufacturers.

Separately, the ACCC has issued proceedings in the Federal Court against Olex Australia, Prysmian Power Cables and Systems, Rexel, wholesaling business L&H group, Electrical Wholesalers Association of Australia Limited (EWAA) and six individuals for alleged cartel and exclusionary conduct in the supply and acquisition of electrical cable. The matter has been filed in the Federal Court in Melbourne and is listed for a directions hearing on 6 February 2015. However, the ACCC has clarified that the matter is unrelated to the recall by 18 retailers and wholesalers of Infinity electrical cable due to safety concerns.

Mansi Gandhi - Editor
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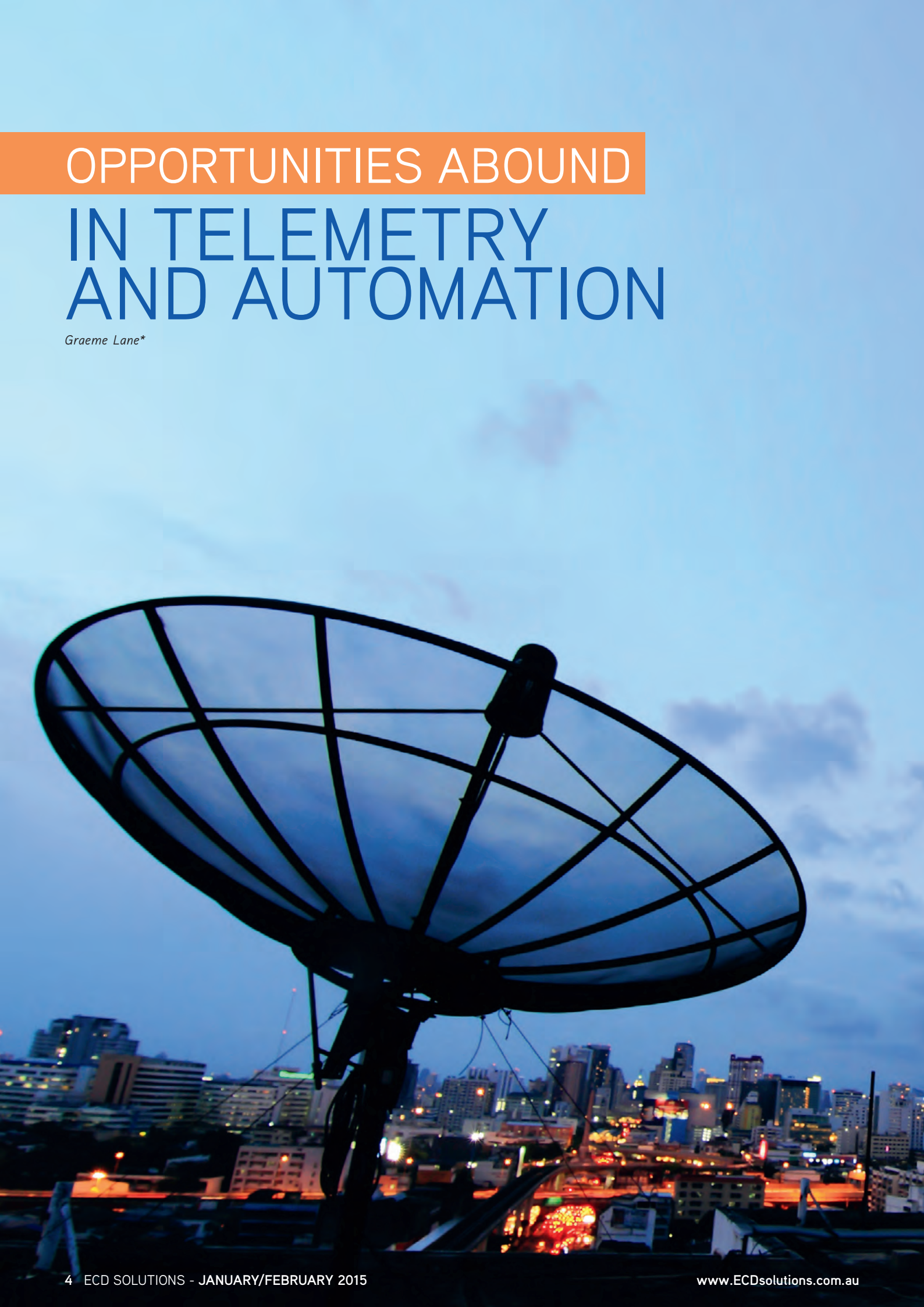
OPPORTUNITIES ABOUND IN TELEMETRY AND AUTOMATION

*Graeme Lane**



Changes and innovations in the world of local and wide area telemetry and automation are providing new opportunities for electrical and communications contractors.

There are opportunities to provide solutions for customers in existing as well as new applications that contractors have traditionally not been able to access. Wireless telemetry and automation product solutions are becoming far more available. They are becoming easier to install and program, and lower costs make them suitable for a far wider range of applications.

Today, it is often far better using wireless devices for lengthy or difficult cable replacement or remote site monitoring and control applications, instead of running miles of conduit or digging the traditional trench.

The availability of off-the-shelf standard wireless products is exposing multiple applications previously deemed either too expensive or not requiring monitoring.

While these new opportunities are real and ongoing, there is also the risk that new contractors in this field apply unsuitable technology that could lead to performance and/or reliability issues. It is important to have a basic understanding of the different technologies and which radio techniques offer the best fit for purpose. This will ensure the best possible chances of a reliable installation.

Contractors new to this field should concentrate on wireless products operating in the free, unlicensed, 900 MHz band frequencies, which are suitable for most industrial applications.

The unlicensed regulations imply responsibilities on the manufacturer, the supplier and the installer to ensure installed equipment has the technology and robustness to co-exist with other nearby systems that are also operating on the same frequency. That means equipment should utilise frequency-hopping techniques. Equipment must also comply with current Australian regulations.

Large existing installations

There are extensive deployments of telemetry and automation technology in the mining, energy, broadcasting, manufacturing, environmental, water and wastewater industries - to name a few.

Twenty years ago, the fixed radio and communications infrastructure used in wide area telemetry for distributed control system (DCS) and SCADA (supervisory control and data acquisition) systems was extremely complex.

It required significant engineering by automation engineers with university degrees and years of practical experience. The equipment was also prohibitively expensive to design, install, commission and maintain.

DCSs that exist in industrial process plants required high-bandwidth, low-latency data networks with everything working in real time.

SCADA's applications in power distribution, natural gas and water pipelines with sites that are widely separated geographically required low-bandwidth/high-latency links.

The DCS and SCADA systems that tie together decentralised facilities such as power, oil and gas pipelines and water distribution and wastewater collection systems have traditionally used combinations of radio and direct wired connections that feed back to centralised control centres.

Technological advances

The RTUs (remote telemetry units) that are used to send supervisory data back to a SCADA system's control centre and the PLCs (programmable logic controllers) used to control machinery have grown more and more capable of handling local controls as technology has advanced.

Today, the boundaries between these systems are blurring while telemetry and automation products are also coming down in price dramatically.

The demand for simplicity with reliability is increasing the requirements for 'plug and play' operation to the point where new wireless cable replacement technologies allow full programming of modules with just a screwdriver. Complex laptop programming is no longer required.

This means that the technology can be deployed in a far greater range of industries and applications. Electrical and communications contractors, with vendor support, can now set up and install these systems themselves.

Many more types of devices can now be connected easily. The latest wireless telemetry technologies allow users to set up the equivalent of a 64 in/out multicore cable in less time than it takes to bake a cake.

Some battery-powered wireless sensors can operate in excess of five years on a single battery. This opens up applications for easily monitoring levels, alarms, flows

> MOST NEW BUILDINGS HAVE ADVANCED BUILDING AUTOMATION SYSTEMS FOR THE CONTROL OF ELECTRICAL, MECHANICAL AND PLUMBING SYSTEMS. INSTALLATION OPPORTUNITIES ALSO EXIST IN OLDER BUILDINGS

and temperatures from plant or equipment many kilometres away.

Users can transmit and receive status data for pumps and motors, turn lights on and off, open and close gates, monitor perimeter security, open and close valves, adjust HVAC systems and measure flow, temperature, pressure and levels.

New installation opportunities

Easy-to-use, plug-and-play, DIN rail-mounted, screwdriver programmable telemetry systems are now the fastest, easiest and most economical method for wirelessly duplicating signal wiring. They can make connecting previously extremely difficult sites as simple as turning a screwdriver.

This opens up new markets and applications where, traditionally, trenching, conduit and control cables were used. Plug-and-play telemetry systems can replace existing hardwired systems or can be used for quickly installing new infrastructure, eliminating costly trenching or the requirement for running conduit. Some contractors are even using this equipment as an emergency backup system when a hardwired system is down for repair or maintenance.

Most new buildings have advanced building automation systems for the control of mechanical, electrical and plumbing systems. Installation opportunities also exist in older buildings. In older factories, buildings and apartments without advanced building automation systems, wireless systems can be retrofitted to control things like HVAC, indoor and outdoor lighting as well as security and fire alarms. Related parameters (eg, temperature) can be sent via wireless telemetry to a central location. The information can be collected and processed, enabling the most efficient use of energy. These systems can also facilitate predictive maintenance.

New installation opportunities exist in many other sectors that would have previously found the technology too expensive, such as agriculture. Telemetry can be used in agricultural water management. Major applications include water level monitoring, tank and trough monitoring, irrigation control and leak detection. Telemetry control allows farmers to intervene with assets such as pumps and allows them to remotely switch pumps on or off depending on the circumstances. No longer is there the need or requirement to physically check the tank level every day. Saving real working hours is now a reality that saves time and money.

Battery-powered wireless sensors

Wireless sensor technologies have significantly evolved in the past few years, giving users across a wide range of industries the ability to create a more efficient and cost-effective way to automate and monitor processes and systems.

The new breed of weatherproof, battery-powered wireless sensors also has integrated wireless transmitters. These sensors can be used for monitoring various conditions including liquid level, pressure, flow and temperature, and triggering setpoint alarms.

These devices are self-contained and battery-powered, eliminating the need for external power or expensive solar systems with the required batteries and charger. This new breed of wireless sensors can operate for many years from a single non-rechargeable lithium battery.

Wireless transmitters can be equipped with local displays for instantly viewing process data as well as using the LCD for configuration. This means no PC, cables or tools are required to program the device.

For electrical and communications contractors, this means that new markets are opening up that were previously controlled by engineering firms.

Contractors can offer installation and support of 'last mile' connectivity solutions in any existing wireless SCADA and telemetry application. These opportunities can be found in general industry, power, oil and gas, refining, petrochemical, utilities, broadcasting, water and environmental industries.

Technology choices

Wireless data communication devices typically utilise wireless transceiver modules that operate in the licence-free Industrial Scientific and Medical (ISM) radio frequency bandwidths of 900 MHz and 2.4 GHz.

Wireless transceiver modules operating in the 900 MHz bandwidth offer up to twice the transmission range and penetrate obstacles (ie, walls, buildings, trees, etc) better than 2.4 GHz transceivers. 2.4 GHz transceivers, however, offer higher data rates.

900 MHz frequency hopping wireless modules can offer extremely good performance in industrial applications - 'noisy' areas can co-exist with other systems on the same frequency band (915-928 MHz).

While 900 MHz signals outperform 2.4 GHz signals, the 900 MHz band is only available in North America, South America, Australia, New Zealand and Israel. Wireless transceivers operating only in the 2.4 GHz band are allowed for licence-free communications throughout most of the rest of the world.

Spread spectrum communications by design carry the added benefit of interference immunity. This occurs due to noise resistance capabilities (as in direct sequence spread spectrum - DSSS) or the frequent changes in the hopping sequence as the signal is moved throughout different frequencies (as in frequency hopping spread spectrum - FHSS).

Some wireless transceiver modules offer additional interference rejection, or blocking, achieved with proprietary filtering and communication across a narrower band of hopping frequencies.

Regardless of the technology used, it is wise to always configure the system and test functionality on the bench before any installation in the field. That way, if there is a problem, you will know quickly whether it is site related to communications.

Wireless cable replacement installation for many applications is in easy reach of many electrical and communications contractors. By using the latest 'plug and play' technologies, successful installations can be set up and operating in a fraction of the time it would take to dig trenches and lay conduits.

Automation Group
www.automationgroup.com.au

**Graeme Lane is a telemetry and automation product specialist with Automation Group. Automation Group specialises in providing electrical and automation products to utilities, mining and energy sectors as well as providing comprehensive support and technical services to contractors, integrators and end users.*

Weidmüller

Easy stripping of cables with hard, complex insulation

stripax® ULtimate for risk free processing of halogen - free cables

Cost-efficiency, elevated safety standards and the trend towards application-specific cables are all things that raise the complexity of wire insulation. So when it comes to the task of stripping just these cables, it can become quite a challenge. stripax® ULtimate is our first tool allowing you to strip halogen-free insulation materials and UL or similar cables. Even cables with hard or smooth insulation present no problem for stripax® ULtimate.

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Whether in a cabinet, machine construction, plant manufacture, rail traffic, wind power generation, robotics, explosion protection, marine, offshore or shipbuilding applications - stripax® ULtimate provide's you with a solution to all your stripping problems ... Let's connect.

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MASTER ELECTRICIANS AUSTRALIA

Taking safety into your own hands

Malcolm Richards, CEO

During the inquest into the deaths of three young men electrocuted while installing roof insulation in 2009 and 2010, the issue of safety switches was thrust into the spotlight. At the time of the accidents, there was some legislation in place in just Queensland and Western Australia regarding the retrofit of safety switches.

Sadly, more than four years on, there has been no action whatsoever to upgrade any legislation regarding the retrofit of these lifesaving devices, in any state or territory in the country.

No action is being taken, despite the fact that 15 Australians are killed each year in electrical accidents in the home and as many as 300 are hospitalised with serious electrical injuries and burns. And despite the fact that Commissioner Ian Hanger QC, when handing down his findings into the Royal Commission into the botched home insulation scheme, said they could have saved the lives of 16-year-old Rueben Barnes, 25-year-old Matthew Fuller and 22-year-old Mitchell Sweeney, and that they have the potential to save hundreds of lives in the coming years.

These tragic deaths had two common elements, the first being that in each case, the integrity of the insulation around the electrical circuit had been compromised by a metal object completely unrelated to electrical work - it wasn't a result of working with electricity but as a result of other general activities that these young men lost their lives. The second common element was the flow of electricity through their bodies. It continued long enough for them to suffer fatal harm. There was no mechanism in place to cut the power supply and stop them from dying.

Master Electricians Australia has worked tirelessly over the last four years to effect legislative changes, something reiterated by the commissioner when he handed down his findings on 1 September. Commissioner Hanger called on both state and federal governments to stop sitting on their hands and to take action in relation to mandating the issue.

As contractors, we already know that a safety switch is designed to cut the power to an electrical circuit in as little as 0.03 of a second in such an event, but our clients may not. We know that the benefits far outweigh the costs, but our clients may not. I know the benefits far outweigh the costs as a safety switch saved my life - as a teenager investigating the impact of wires clashing together, I made contact with a bare wire, only to end up flat on the floor. Alive, because the safety switch kicked in.

So in the meantime, while we sit and wait for governments to intensify legislation across the country, we will continue to campaign at a grass roots level to make sure that as many homeowners as possible understand the very serious nature of not having safety switches installed in their home, so we can all contribute to reducing preventable deaths.

ECD SOLUTIONS ELECTRICAL DISTRIBUTION

LED beacon

The Narva Eurotech 12/24 V dual-voltage LED beacon range has been designed for commercial and construction industries. The beacons also meet the heavy vehicle regulation 2013, number 77, making them suitable for on-road use.

Available in a low-profile and standard-height option, both sizes have a flange base which allows alternative and synchronised operation of up to four strobe units. The low-profile option is also available in two additional mounting configurations.

Modern optic technology used in the lamp's design magnifies the light output, creating a powerful, solid and seamless projection of light that meets the SAE Class 1 rating.

The compact, durable beacons can perform two light functions in one - both flash and rotate. Using LED technology, they also have six adjustable flash pattern options.

Other features include: reverse polarity protection, fully sealed (IP65) solid state circuitry, virtually unbreakable polycarbonate lenses, and good shock and vibration resistance.

Brown & Watson International

www.narva.com.au

Multicontact connector

The DXN37C explosion-proof multicontact connector from Marechal is one of a family of multicontact connectors designed for signal and control applications. It complies with the requirements of IEC international standards EN 60079-0, EN 60079-7, EN 61241-0, EN 61241-1 and EN 60079-31, and is IEC Ex certified. These connectors permit the simulations transmission of data, power and low-level control signals. The DXN37C is also backward compatible to its predecessor.

The connectors come with up to 36P+E contact pins which enable either crimping or soldering of wires. The unique design allows the user to populate the connector to suit individual requirements. The DXN37C has a maximum rated current per contact of 10 A and a maximum voltage of 220 V. It has an IP rating of IP66/67, either with the plug connected or with the lid closed. The corrosion-free metal casing provides enhanced resistance to mechanical shock (IK09). For added safety, these connectors can be locked in the connected or disconnected positions.

Marechal

www.marechal.com/en/

THIN IS IN

Marc Doehnert, ANZ Business Development Manager

With the decline in sales of personal computers and the rapid rise of cloud computing, many businesses are turning to thin clients. So what does this mean in terms of connectivity, cabling and power? Read on to find out.

Thin clients rely on a server to provide most of their computational processing, unlike a traditional PC or 'fat client' that processes information by itself. Therefore, all thin clients need to be connected directly to a 'host' computer, usually in the form of a server, a group of servers or an outsourced cloud storage facility. This requires connection from each thin client to the network.

By definition, traditional network architectures will have to change as more and more organisations move towards a virtual desktop environment.

Devices can now move seamlessly from one access point to another without interruption to the session; so, for example, a thin device operating on a forklift can move seamlessly throughout the warehouse, picking up connectivity from each WAP that it encounters.

Migrating to a thin client computing environment can significantly reduce a company's need for bandwidth. However, depending on how the network is set up, it can move the demand on the LAN/WAN infrastructure to the company's intranet infrastructure.

Thin clients reduce the cost of ownership in organisations where traditional computers have more power and functionality than the infrastructure requires. With limited or no onboard storage, thin clients cost less to buy and less to run, and they tend to be more reliable, allowing companies to capitalise on their consolidated storage environment. Security is also simplified, since it now takes place at the server level rather than on each individual device.

A Microsoft study conducted by NEC and Groupe Bull shows that the highest user of bandwidth in a company is a structured task worker, typically performing the same tasks repetitively such as claims processing, handling accounts or customer service. These applications are typical of the type of deployments where a thin client network performs very well for an organisation.

Printing can also spike the amount of bandwidth that a staff member typically uses, up to as much as 200 Kbps, and other network demands such as multimedia and VoIP need to be factored in as well. The complexity of having multiple printer drivers in a virtual solution such as Citrix XenApp can also have a fairly severe impact on the stability of a network. Especially in regional offices where redundant bandwidth is at a premium, printing a document can cause a big spike in the use of the network link, which can impact the experience of other users on the network. Again, the message that needs to go out to end users is clear - carefully consider how much bandwidth the thin-client network is going to need. When allocating bandwidth across a network of thin clients, a fairly universal figure is to budget 100 Kbps for each end user, plus extra for any other daily functions that will place additional demand on the network.

So migrating to thin-client computing (TCC) does not necessarily reduce the need for a sophisticated communications infrastructure. To set up an effective thin-client environment, an organisation will have to invest in or already have servers, routers and high-speed connections, since the user experience will be greatly affected by the state of the network and issues such as latency and packet loss.

From a company's point of view, cost savings will take place in the reduced cost of the hardware itself and the reduced power costs associated with thin clients. Factoring in the additional server infrastructure required to run a thin-client network, on average each device consumes between eight and 14 watts. This compares to a fat client or desktop PC consuming between 60 and 250 watts. The electrical system load is therefore significantly reduced for an environment running thin clients and can be planned and configured accordingly. In cases where a new office is being planned or an existing premises expanded, the number of power points can potentially be reduced by consolidating end-points, since the power draw on any terminal is going to be substantially less than if it were running a fat client.

SINCE THIN CLIENTS CANNOT OPERATE WITHOUT CONNECTIVITY TO THE SERVERS, AN UNINTERRUPTED POWER SUPPLY TO THE NETWORK AND SERVER ROOM IS OF VITAL IMPORTANCE TO A BUSINESS.

Moreover, the fact that thin clients can be remotely administered over a WAN frees up time for IT administrators to focus on other aspects of the network and IT infrastructure.

Another physical benefit of the thin client is the potential for them to operate in harsh environments. Since they have fewer moving parts and tend to be more robust, there is less that can go wrong, so exposing them to hazardous conditions causes fewer risks to business continuity. However, the servers that host applications for the thin-client network will still have to be in a safe, shielded environment, which is another point of consideration when planning data and electrical networks.

Since thin clients cannot operate without connectivity to the servers, an uninterrupted power supply to the network and server room is of vital importance to a business. In remote areas and cases where power is unreliable, connecting to an off-site cloud might be a good option since it removes one risk factor from the equation.

If connectivity between the client and the server is broken, clients cannot continue working, although the current session will remain in the state it was in at the time the link was lost. The same goes for fat clients, of course, in cases where applications are centralised - ERP software, hotel reservations for example.

Therefore, LAN/WAN resilience is vital. In high-availability environments, best-practice recommends alternate path and supplier routing, particularly for WAN links. This may increase initial costs for deployment over a fat-client environment, as it relies on each link being initiated. However, since each network link using a centralised service such as VDI or presentation virtualisation does not need as much bandwidth as traditional PCs, ongoing costs will again generally be lower.

The fact that thin clients are practically plug-and-play makes for very easy installation, so upsizing a network is fairly straightforward. The thin clients provided at IGEL are automatically configured as soon as they are attached to the network, so expanding a premise is a matter of providing a power source and enough bandwidth, then simply connecting the new devices to the network. There are many benefits for companies planning a move to thin clients or a virtual desktop environment, but careful planning of network requirements is vital.

IGEL Technology Pty Ltd
www.igel.com

ECD ELECTRICAL+COMMS+DATA SOLUTIONS ELECTRICAL DISTRIBUTION

Offshore and onshore industrial cables

JT Day's Perth office has expanded supply of special industrial cables supports for the offshore oil and gas facilities operating in the Carnarvon, Browse and Bonaparte basins.

Special consideration has been given to the typical cable construction and compounds used for these facilities. Cable construction is halogen-free, eliminating the potential for halogens such as chlorine to be present should the cables be affected or compromised by extreme heat.

Cable sheathing complies with IEC 60092 part 359, which covers electrical installations in ships.

Flame-retardant, low-smoke and halogen-free compounds are used for sheathing such as SHF2, which is essentially a halogen-free elastomeric or thermosetting polyethylene rubber.

An expanded range of shipboard-style cables which comply with AS/NZS5000.1&3 and AS/NZS3000-2007 is available.

Short cable lengths are available to support module and skid builders supplying equipment onto the projects and for service providers working on existing assets. A full range of Ex and industrial cable glands and accessories is available to support all cable types.

The company's Brisbane facility has an expanded stock of onshore-style industrial cables to support the onshore LNG projects and onshore gas-gathering facilities. The cables stocked are typically power, control and instrumentation and all are standard with steel wire armour for mechanical protection.

JT Day Pty Ltd
www.jtday.com.au

Rental vs Purchase

TR Pty Ltd
ELECTRONIC RENTALS

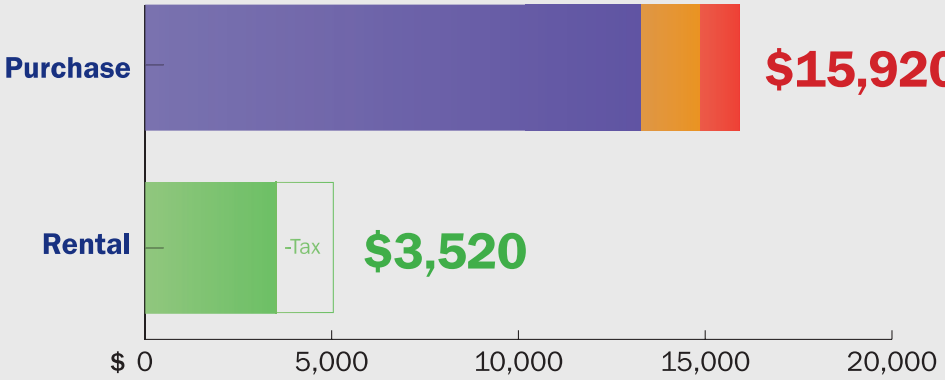
Why rental is more cost effective than ownership

When weighing up whether to purchase or rent, it is clear that the benefits of rental far outweigh the cost of ownership. Not only does rental save you money, but it's the smarter business option, providing you with greater flexibility and control. At the end of your rental period, simply return the equipment and upgrade to a newer version, it's that easy!

- ✓ Rental costs can be 100% tax deductible#
- ✓ Immediate replacement of faulty equipment
- ✓ No capex account process required
- ✓ Avoid obsolescence
- ✓ No depreciating assets
- ✓ Ongoing service and technical support

Please see the chart below which illustrates the benefits of rental over ownership for the Megger MOM2 Micro-ohmeter

Megger MOM2 Micro-ohmeter



*Figures displayed represent costs at the end of the **first year**.*
All rental rates quoted are based on a 3 year period.

TRtechrentals

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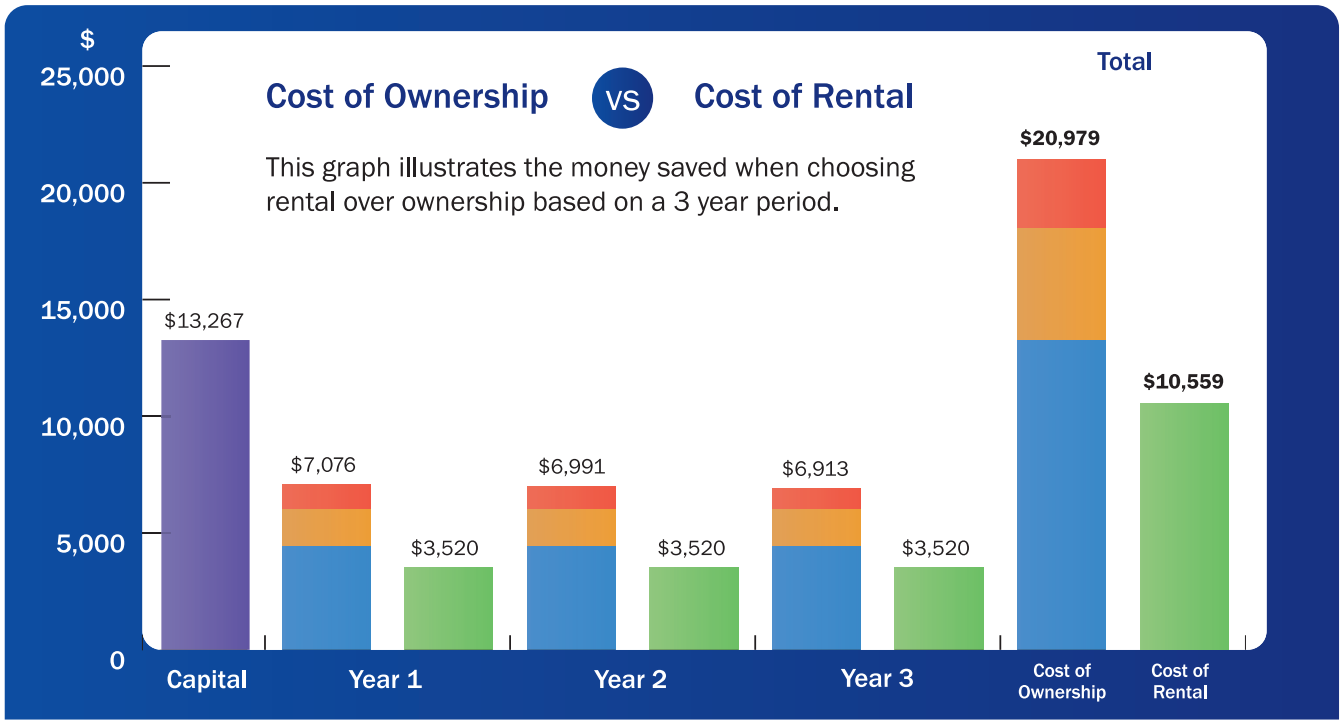
Purchase Price | Service, Repair and Calibration (12%) | Cost of money (8%) | Depreciation | Net Rental (after tax deduction of $1,508 per year)#

Rental vs Ownership for the Megger MOM2 Micro-ohmeter



#Please ensure you obtain independent professional taxation advice. Prices shown are accurate as of date of publication and are subject to change.
Terms and conditions of rental apply as shown on www.techrentals.com.au. Prices exclude GST. Figures shown have been rounded to the nearest dollar.

7/11/2014
TR1262

Power supplies

Delta's Advantage 1 kW is a compact, energy-efficient outdoor power supply for small cell applications. The power supply, equipped with an IP65 case, natural cooling design and an energy conversion efficiency of 96%, is suitable for outdoor small cell applications. Delta's Telecom Power Solutions are currently powering 3G and 4G LTE networks operated by tier-1 telecom carriers worldwide.

The company has also launched the DPR 3000B EnergE single-phase rectifier, which offers energy savings with efficiency of 97.5% and power density of 56.8 W/in^3 for significant space savings. The DPR 3000B rectifier offers an enhanced power level of up to 15 kW in a 19″ x 1U shelf, which is suitable for network base stations, wireless, fixed line and data communications applications, while achieving substantial energy savings.

In regions with limited grid infrastructure, Delta integrates hybrid renewable energy solutions for remote telecom base stations, which reduces clients' OPEX burdens and reliance on fossil fuels.

Delta Electronics Industrial Automation
www.deltaww.com./ia

Power supply

The Quint Power power supply is specifically designed for connection to frequency inverters. It is used as a compact buffer solution in the event of mains failures - it ensures that the machine can be restarted quickly and without errors when the supply voltage returns.

If a mains failure occurs, the DC intermediate circuit voltage of the inverter continues to supply all connected 24 V loads without interruption. To do so, the power supply is connected to two outer conductors of the three-phase system and to a DC voltage. This can be the DC intermediate circuit voltage of a frequency inverter or a supply unit. The controller then continues to be supplied with the kinetic energy of the motors. This enables a controlled machine stop to be performed.

Phoenix Contact Pty Ltd
www.phoenixcontact.com.au

CASE STUDY

ABB commissions 1200 kV circuit breaker

ABB has designed, manufactured, installed and commissioned a 1200-kilovolt (kV) circuit breaker - the highest AC voltage level in the world.

Once the 1200 kV ultrahigh-voltage switchgear is fully operational, it will have a switching capacity of 10,400 MW - a switch capable of turning 'ON' or 'OFF' the electricity generated by 10 large power plants, or the combined average annual electrical load of Switzerland and Denmark, within milliseconds.

The circuit breaker is deployed at the 1200 kV national test station constructed by Power Grid Corporation of India Limited (PGCIL), India's central transmission utility, at Bina in the central Indian state of Madhya Pradesh.

Alongside the circuit breaker, the hybrid switchgear solution comprises a gas-insulated disconnector, current transformers and monitoring and diagnostic equipment. The solution requires only half of the space that would be needed for one with conventional air-insulated designs. The configuration also protects critical components from environmental exposure and makes it more resilient against earthquakes.

India is adding substantial power generation capacity to meet growing demand, which in turn requires an efficient and reliable transmission and distribution infrastructure to deliver the electricity to consumers. Transmitting power at higher voltages increases the amount of electricity that can be transported along a line with significantly lower transmission losses, and at the same time saves space and reduces environmental impact. These are some of the considerations which have prompted India to develop a 1200 kV transmission system.

"ABB has a long track record in India and we are pleased to continue to support the country in the development of an efficient and reliable power grid. Ultrahigh-voltage technologies are especially suitable for large countries such as India where power often has to be transmitted over large distances from generation to load centres in the most efficient way," said Bernhard Jucker, head of ABB's Power Products division.

"PGCIL is fully engaged in developing a robust and integrated national grid along with reliable partners in technology like ABB. This development takes us a step further in the development of our ultrahigh-voltage transmission network," said RN Nayak, chairman and managing director of PGCIL.

ABB Australia Pty Ltd
www.abbaustralia.com.au

PRYSMIAN

At least the cables were cheap.

You think?
We think it's time you got your priorities straight!

There are A-cables, B-cables and evidently also E-cables. For a second time in a matter of months we hear of hazardous, life threatening cables being sold and installed in Australia!
This time it's Ecables' copper clad aluminium RE-110 insulated power cables that are being recalled. Its' poor insulation can be damaged if exposed to heat above 50°C, risking fire and electric shock. So, stop trying to save nickels and dimes and put people's safety first.

Choose thoroughly tested A-cables from Prysmian. Australian made? Yes, of course.

Want to know more:
Ph: 1300 300 304 Fx: 1300 300 307
Email: sales.au@prysmiangroup.com
www.prysmian.com.au

A brand of the
Prysmian Group

Coated power-supply units

Three power supplies and three DC/DC converters in the Quint Power series from Phoenix Contact are now approved for use in potentially explosive areas.

The power-supply units, with coated PCB, are designed for extreme requirements. They conform to standard EN 60079-15 and may be used in hazardous areas. IECEx approval has already been granted and the devices are suitable for use in Class I, Division 2, Groups A to D or A to H. Due to the coating, all modules provide optimum protection in extreme ambient conditions such as dust, corrosive gases or 100% humidity. In addition, they satisfy the requirements of railway standard EN 50155. The single-phase power supplies are designed for 24 VDC output voltage and currents of 5, 10 and 20 A. The DC/DC converters provide a constant voltage of 18 to 32 VDC with output currents of 5, 10 and 20 A, even at the end of very long cables.

For maximum availability of the connected loads, SFB (selective fuse breaking) technology ensures reliable tripping of circuit breakers. Faulty current paths are thereby switched off selectively, the fault is located immediately and important system parts remain in operation. For magnetic tripping of circuit breakers, the 20 A modules supply a peak current of 120 A for 12 ms, for example. Preventive function monitoring of voltage and current visualises critical operating states and indicates them to the controller via the active switching output or the floating relay contact, before errors can occur. This comprehensive range of functions increases the availability of the supplied loads.

Phoenix Contact Pty Ltd
www.phoenixcontact.com.au

Third-generation marking and warning system for offshore platforms

Orga Offshore has developed a third-generation platform marking and warning system for the offshore oil and gas industries.

The system employs smart digital touchscreen technology and LED lighting technology to provide a robust and cost-effective digital nav-aid solution.

A user-friendly touchscreen nav-aids central control panel (digital NCCP) has full alarm, history and remote status-monitoring capabilities.

Currently supplied with an RS485 Modbus interface for digital communications, the company says the system will support TCP/IP and web browser functions in the near future.

The modular design is said to allow easy set-up and maintenance. The touchscreen user interface enables full system interaction to control and monitor all of the company's aids to navigation equipment including its L410 range of LED energy-efficient marine lanterns, foghorns and marine radar beacons (racon) as well as Orga's visibility meters and photocells for automatic control during night-time or poor visibility.

The digital NCCP's design also allows full integration of additional modules including the Orga Circle-H LED helideck touchdown, positioning and marking lighting system as well as the company's smart LED obstruction light system.

JT Day Pty Ltd
www.jtday.com.au

Thermal imaging cameras

FLIR T-Series cameras feature UltraMax, an image processing feature that significantly improves the IR resolution and sensitivity of the cameras. The company says UltraMax images have four times the thermal pixels, twice the resolution, and 50% greater sensitivity than standard unprocessed images. Images are viewed and processed in FLIR Tools software for PCs. UltraMax images allow users to zoom in on smaller heat anomalies, get more accurate measurements and see more detail than with previous unprocessed images.

Select T-Series cameras also come with improved thermal sensitivity - as low as 20 mK - and improved temperature measurement accuracy.

The T460 and the T660 include all of these features plus temperature ranges expanded to 2000°C, continuous autofocus, and onboard recording of real-time radiometric video files. Data can be played back and analysed in FLIR Tools and FLIR Tools+ software so thermal changes over time can be studied in detail.

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

Non-flammable aerosol cleaner and degreaser

The LEXITE NF is a non-flammable aerosol cleaner and degreaser specially designed for electrical equipment. It has a dielectric constant of 5000 V and is non-corrosive.

The cleaner can be applied easily, evaporates quickly and cleans without any residue. Other features include: no flash point, so it cleans without danger of fire or explosion; harmless to silicones, polyesters, nylons, epoxies, paper, rubber, phenolics, most metals and various surface coatings and paints; and harmless to aluminium parts and insulation varnish. The fast evaporation of the cleaner provides effective cleaning and degreasing without the need to wipe dry or pick up residues.

The cleaner and degreaser is recommended for use in the cleaning and repair of electronic cables, relays, motors, starters, controls, commutators, batteries, circuit breakers, alternators, HVAC equipment and more.

Chemsearch Australia

www.chemsearch.net.au

I/O expansion system

The Oleumtech RS485 I/O expansion system is compatible with any Modbus RS485 master device but unlike most other solutions requires no software configuration.

The RS485 expansion module can support up to 16 I/O modules in any combination and can be used with any Oleumtech WIO I/O modules. Customers can choose from digital, 4-20 mA or 0-10 V I/O modules to create a customised solution to suit their application. It can be deployed with tool-free mounting on a 35 mm DIN rail, making it easy and quick to install.

The RS485 I/O is an economical solution for industrial applications in a variety of markets, including water/wastewater, utilities, irrigation systems, mining, oil and gas, utilities and many more. The system provides reliable and scalable I/O expansion to any third-party RS485 Modbus master device.

Automation Group

www.automationgroup.com.au

Mine site light bar

With an IP66 rating, the ACOT500 Assassin mine site light bar has been specifically developed to handle the harsh terrain and conditions found on mine sites, including dust, rain, fog, night and hot days.

Vehicles working in the mining and emergency industry need to be extremely visible yet manoeuvrable, so the light bar has a low-profile design. It is aerodynamically designed to reduce airflow resistance and drag on the vehicle when travelling at high speeds. Its 180° vertical and 360° horizontal light output provides good visibility.

Compared to strobe and rotating lights, the LED bar has a low-current draw to preserve the life of the vehicle's battery. It uses high-quality LEDs and the polycarbonate lens prevents fading of the LEDs and the lens colour.

Available in a variety of lengths, it is waterproof and vibration-resistant. Its modular design allows for customisation to user requirements and easy maintenance.

Other features built into the light bar are warning lights, brake/tail lights, reverse and indicator lights and a reversing alarm.

Vision Safe (PPE)

www.visionsafe.com.au

Revenue meter

The EasyLogic EM1350 revenue meter offers all the basic energy measurement capabilities required to monitor an electrical installation in a single 144 x 144 mm unit. Characterised by their rugged construction and low installation costs, the meters are suitable for tenant metering, sub-billing, control panels, motor control centres and genset panels.

The National Measuring Institute of Australia establishes the framework for the regulation of measuring instruments used for energy trade. NMI requires all measuring instruments used for trade to be pattern approved and verified. The EM1350 meters are fully compliant with NMI M6-1 edition 2 standard and pattern approved.

Other features include: CI 1.0 accuracy meter complying to AS/IEC standards requirements; LCD power and energy meter, CE/C-Tick approved; AC and DC control power; password protected, tamper proof, non-resettable energy registers.

Schneider Electric Clipsal Partner

www.clipsal.com

CASE STUDY

Mount Isa gets new industrial power station

Siemens has recently completed the commissioning of a power station consisting of two of the most efficient combined cycle power units - performing at well in excess of 50% efficiency. The owner and operator of the plant is Diamantina Power Station, a joint venture between APA Group and AGL Energy.

The Diamantina combined cycle power station in Mount Isa in Queensland has been built adjacent to the existing Mica Creek power station. The installed total capacity of 242 MW is sufficient to supply eco-friendly electricity to local mines operated by Glencore and to people living in the region.

Siemens has been responsible for the overall plant design and also provided technical advisory services during the construction and commissioning phases of the project. The Diamantina Power Station is set out in a configuration of two 121 MW power blocks.

The Siemens scope of supply encompassed two power islands each comprising two SGT-800 gas turbines, two heat-recovery steam generators (HRSGs) with diverter dampers - both supplied by NEM Energy b.v. - as well as one SST-400 steam turbine connected to the local grid via 132 kV electrical switchyard.

Siemens will provide maintenance for the SGT-800 gas turbines, SST-400 steam turbines, generators and the related control and auxiliary systems under a long-term services agreement. "Diamantina power station is a great example of our eco-friendly

power generation solutions for island off-grid operation matching the variable power demand of the adjacent copper mine," said Erling Bruun, head of Industrial Power Plant Solutions in Siemens Power and Gas Division.

David Jones, general manager development of the APA Group, comments: "We are very satisfied with the plant and with Siemens' performance. This plant meets the challenging demands of island operation and load flexibility, in combination with bringing a high efficiency and state-of-the-art low emission technology and solutions."

Siemens Ltd
www.siemens.com.au

Power quality analyser

AEMC's PowerPad III Model 8333 three-phase power quality analyser is easy to use, compact and shock resistant.

It enables technicians and engineers to measure and carry out diagnostics and power quality work on one-, two- or three-phase networks. Current and voltage input terminals are provided. It is IEC 61000-4-30 Class B and safety rated to 600 V CAT IV.

The Model 8333 has memory available for storing trend data. Additional internal memory is used to let you store alarms, transients and snapshot data. The user can store up to 12 screen snapshots, up to 51 captured transients that contain four cycles for each active input and 4000 alarm events from up to 10 different parameters. Trend data can also be recorded for days, weeks or even months.

Other features include: true RMS single-, two- and three-phase measurements at 256 samples/cycle, plus DC; real-time colour waveforms; automatic current probe recognition and scaling; measures AC and DC volts, amps and power; displays and captures voltage, current and power harmonics to 50th order, including direction, in real time; captures transients down to 1/256th of a cycle; VA, VAR and W per phase and total; kVAh, VARh and kWh per phase and total; neutral current calculated and displayed for three-phase; transformer K-factor display; power factor, displacement PF display; short- and long-term flicker display; harmonic distortion (total and individual) from 1st to 50th; screen snapshot function captures waveforms or other information on the display; and includes free DataView software for configuring data storage, real-time display, analysis and report generation.

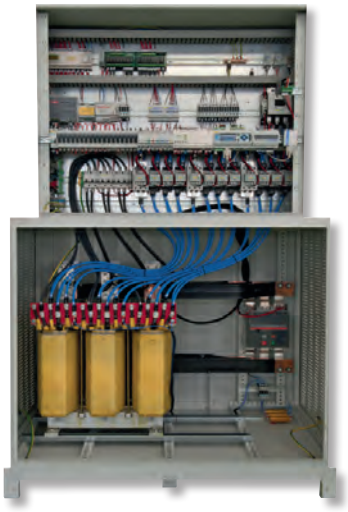
AEMC Instruments
www.aemc.com

Power supplies

With space-saving housing, the updated ifm 24 V power supplies require considerably less space in the control cabinet. They also offer up to 94% efficiency, reducing waste heat and saving energy costs. Instead of using an NTC resistor, a microprocessor controller keeps the inrush current low, making it easier to protect the wiring.

The positioning of the components allows permanent operation even at the limits of the specification. This results in MTBF values ranging from 0.89 to 1.4 million hours. All power supplies in the range offer sufficient power reserves to reliably deal with load-current peaks while the voltage supply is ensured for several milliseconds in the case of short failures of the mains voltage. Depending on the version, output currents range from 3.3 to 20 A.

ifm efector pty ltd
www.ifmefector.com



Switch board optimiser

The E-Power switch board optimiser series 50-3200 can be installed in series with the main electricity supply to systematically optimise, regulate and clean the incoming power supply to bring the voltages, current and power factor in line with the requirements.

The system provides savings of around 4-16% for all types of lighting, heating and air conditioning, ventilation, motors, elevators, industrial coolers. It optimises energy transmission with a reduction in heat losses, rebalances energy transmission on the three phases and reduces the reactive power.

The system can be customised (static, dynamic, remote management, custom-made power size) and helps reduce the emission of harmful gases in the atmosphere, such as CO_2, NO_X, SO_X, PM10.

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www.simonsgreenenergy.com.au

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solar | hydro | wind | refits | eco lighting

LED downlights

The LED Hut LUMiLife 4.5W GU10 bulbs are a suitable energy-saving replacement for traditional spotlights. They are available in dimmable and non-dimmable versions and work seamlessly with the existing light fitting.

The bulbs are made up of 24 surface-mounted diodes (SMDs). The high-power 5 x 5 mm (or 5050) microchips provide 350 lm of light - and with a 120° reach, the bulb is claimed to offer the widest beam of any SMD bulb on the market. The bulbs can be purchased individually or with tilted or fixed fire-rated light fittings.

LUMiLife has upgraded the dimming technology, which improves dimming performance and compatibility with third-party dimmer switches. This means the users do not need to change their existing dimmer switches. The light fittings have been fully tested and certified to BS 476 Part 22 for 30, 60 and 90 min fire rating - a must for multistorey buildings. The bulbs are available in three colours: cool white, warm white and daylight.

The fittings have good thermal management properties and provide savings on cooling and heating costs. The lights come in brushed metal, chrome or a white finish.

LED Hut
www.ledhut.com.au

LED lamps

Suitable for use in hotels, bars, restaurants and residential applications, the Sylvania ToLEDo Retro lamps have efficacy of up to 128 lm/W and a wide beam angle of 300°; and with a 15,000 h lifespan, these lamps offer a quick payback period.

The A++ energy-rated lamps include A60, Globe, ST64 and Candle lamps and the complete range has been designed to keep the look and feel of incandescent lamps while offering up to 90% energy savings. All lamps within the range are non-dimmable and available in Homelight 2700 K, backed by a 3-year warranty. Combining instant light and warm rich colours with energy efficiency and a classical look, these lamps are also an alternative to slow-starting, less aesthetically pleasing, low-energy compact fluorescent lamps.

The new lamps are exactly the same dimensions as traditional incandescent and halogen versions and offer the same sparkling lit effect. They are direct replacements for existing 25, 40 and 50 W incandescent lamps as well as halogen and compact fluorescent lamps and are suitable for retrofit applications. For example, the 4 W LED Virtual Filament lamps will replace a 40 W incandescent version.

Sylvania Lighting Australasia
www.sla.net.au

Solar skylight

The illume Solar Shaftless Skylight system operates and installs without the need of a light shaft, flexible tube or large roof cavity and can be installed practically anywhere.

It comes in a range of sizes and configurations including windows, skylights and manholes. The advantage of the system is that it can be used in locations where traditional natural light conduits cannot be fitted.

Using ambient technology, the product is designed to convert the sun's energy to light and auto-adjust brightness levels to match external conditions, thereby creating harmony in the user's home or office between indoor and outdoor lighting.

The system can be used to introduce additional light where required to any large or small space, including hallways, entrances, walk-in robes, bathrooms, laundries, pantries, restrooms, living rooms, dining rooms and sheds or garages.

It is a suitable alternative to traditional ambient light sources because there is no dust collection, mould build-up, leaks or insect issues to with which to contend. In addition, users don't experience the loss of heat in winter, or additional heat in summer, that comes with a conventional skylight. This means the energy costs of temperature control are lower.

Kimberley Products
www.kimprod.com.au

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GRID ENERGY STORAGE
MARKET MOMENTUM CONTINUES

The momentum for grid storage technologies is building. This article discusses technologies under development and attempts to make some predictions about which of these technologies might affect the residential and commercial energy markets in the short term.

Chris Martell, Principal Engineer

The grid energy storage market is buzzing and many new technologies are being thrust from the research and development realm into the commercial space. The question of which technology is going to be the big winner for the energy storage revolution is a discussion mired in speculation and clouded with preconceptions. However, it may just be possible to make some educated guesses if we read the market road signs and consider each technology independently.

The technologies presented below are some of the more prevalent grid energy storage products that are currently commercially available in one form or another.

Valve-regulated lead-acid (VRLA) batteries

Unlike flooded lead-acid batteries, valve-regulated lead-acid (VRLA) batteries generally do not need to have their electrolyte refilled as it is suspended in a medium and the batteries themselves are sealed.

Absorbed glass matt (AGM), gel and new types of lead-based batteries, such as the Ultrabattery by Ecoult, are examples of VRLA batteries. VRLA batteries are a mature technology, having been used in the telecommunications industry and rural stand-alone systems for decades. Their well-established position and low maintenance costs have made them the preferred choice for grid energy storage at all levels.

Lithium-ion and lithium-ion polymer batteries

Lithium-ion batteries have been commercially available for over 20 years. Rapid improvements in battery chemistry and production quality have led to the universal acceptance of lithium-ion batteries for mobile applications. Lithium-ion and lithium-ion polymer (also known as just lithium-polymer) batteries have very similar chemistries and virtually the same structure, except that lithium-polymer batteries have a porous gelled electrolyte instead of a porous separator. The polymer offers slightly higher energy densities but is more expensive to produce. Some lithium-ion chemistries are: lithium iron phosphate; lithium nickel cobalt aluminium; lithium cobalt oxide; lithium manganese oxide; lithium nickel manganese cobalt oxide; lithium titanate.

These chemistries have different attributes relating to safety, cost, energy, power and cycle life. Owing to their safety attributes, the two most commonly used chemistries are lithium iron phosphate and lithium nickel cobalt aluminium.

Nickel-based batteries

Nickel-based batteries are stable, robust and generally have some of the lowest costs per cycle of any battery type available. Nickel-cadmium was the most popular nickel-based chemistry from the 1950s, but more recently, it has been widely displaced by nickel-metal hydride due to the toxicity of cadmium. Nickel-metal hydride batteries are extensively available for use in consumer products and have been used in many hybrid electric vehicle (HEV) applications. Nickel-based batteries are safer and cheaper than other types of batteries with higher specific energies, such as lithium-ion batteries, but the research and development focus given to technologies such as lithium-ion may quickly change this. As well as having a lower specific energy than other technologies, nickel-based batteries have a high self-discharge rate and a tendency to 'remember' cycle depth unless fully discharged at regular intervals.

Flow (hybrid or redox) batteries

Flow batteries are increasingly being used in the grid energy storage market. The two most popular types of flow batteries are the vanadium

redox battery (also known as the vanadium redox fuel cell) and the zinc bromide battery. Unlike a traditional battery, a flow battery has a decoupled energy-power relationship. Energy is proportional to the amount of electrolyte available, whereas power is proportional to the surface area of the electrode. Flow batteries also have a very long cycle life and, if charge capacity is reduced, the battery's electrolyte can be replaced, which eliminates replacing the battery structure (containment, electrode, pumps, etc). Despite their advantages, flow batteries generally have a very low specific energy and their complexity and maintenance requirements are considerable compared to those of other battery technologies.

Molten-salt batteries

Molten-salt batteries come in various forms, such as sodium sulfur, sodium metal halide and sodium aluminium chloride. In all forms, molten-salt batteries use a high-temperature salt (typically sodium based) as a highly conductive electrolyte. Molten-salt batteries have a very high specific energy and a long cycle life at high depth of discharge, are non-toxic and operate efficiently in most environments. Their key disadvantage is that, for the battery to operate, the sodium-based electrolyte must be fluid or molten. As such, the operating temperature of most molten-salt batteries is above 200°C.

Flywheels

Flywheels have been used for centuries to store energy. The energy stored is proportional to the flywheel's moment of inertia and rotational velocity. As flywheels have been used extensively for intermittent generators (such as the internal combustion engine), it is natural that they be considered for grid energy storage, for which intermittent generation and inconsistent demand are issues. Although flywheels are a simple form of storage, they have low specific energies (about half that of a lead-acid battery) and cannot store energy for long periods of time because of rotational friction losses.

Hydrogen fuel cells

Hydrogen fuel cells combine hydrogen and oxygen to yield water and electrical energy. The hydrogen fuel cell was looked at for some time as the saving grace of the energy storage problem. However, some of the obstacles related to the hydrogen fuel cell are proving difficult to overcome. Hydrogen must be generated through the electrolysis of water and, to be used efficiently as an energy-storage medium, it should be generated using renewables. As renewables have seen a significant uptake only in the past 5-10 years, this has typically not been cost effective. Additionally, hydrogen must be compressed and stored, which requires significant amounts of materials and energy and has safety issues and high costs.

Pumped hydro

Pumped hydropower has been used for years and is easily the most pervasive form of grid energy storage. Pumped hydropower, also known as pumped-storage hydroelectricity, is typically used for demand smoothing, which means that water is pumped to a higher elevation during periods of low electricity demand so that it can be re-used in a hydropower plant during periods of high electricity demand. Although there are losses associated with pumping and evaporation, pumped hydro is a simple and efficient method for storing energy. Despite its advantages, it is limited by location and scale. Pumped hydro needs a storage location at significant elevation and must be done on a large scale owing to equipment and maintenance costs.

Compressed air

Compressed-air energy storage has been used in the manufacturing and transportation industry for many years and is a robust and proven technology. In theory, a compressed-air storage unit with perfect isothermal energy transfer has over twice the specific energy of most lead-acid batteries. However, in practice, this is much harder to achieve and the specific energy is typically half that of a lead-acid battery. Compressed-air storage, like flywheel storage, is a simple and long-life mechanism for storing energy, but this storage medium is challenged by its low specific energy and high maintenance costs.

Grid energy storage applications

Grid energy storage can be used for grid forming, grid support, peak-demand management and load shifting, and self-consumption of renewables.

Grid forming

Grid-forming inverters are used to create microgrids, supplement areas of the national grid and to regulate the grid's voltage and frequency. Energy storage can be a critical part of how a grid-forming power converter or multimode inverter functions. Traditional microgrids use a generator to form the grid but, as fossil fuel prices increase, especially in remote parts of the world, it is becoming more common to power villages and communities with renewable energy power systems. To create a stable grid waveform, the power conversion unit (typically a multimode inverter) must draw from a stable and reliable source. The energy storage unit can then be used as a power sink to store energy in times of peak renewable generation and supply energy when the renewable energy systems are not generating.

Grid support

Increasingly, network providers are choosing grid energy storage in

IF AN ENERGY STORAGE UNIT IS INSTALLED, THE PERIOD OF PEAK DEMAND CAN BE FLATTENED BY CHARGING THE BATTERIES FROM THE GRID (OR A RENEWABLE ENERGY SOURCE) DURING LOW PERIODS OF DEMAND AND USING THAT POWER TO DISPLACE THE TYPICALLY HIGH PERIODS OF DEMAND.

preference to infrastructure development and the associated maintenance and the costs imposed. In many cases, ageing grid infrastructure can be maintained simply by adding energy storage and power conditioning systems. A good example is the single wire earth return (SWER) lines that are part of Ergon's network in Queensland (among others). As infrastructure ages or demand increases, grid quality is potentially reduced. The addition of an energy storage unit can help maintain grid voltage, frequency, power factor, etc. Some of the units are also set up to create islanded grids such that, if the main grid goes down, the portion connected through the energy storage unit stays up.

Peak-demand management and load shifting

Peak-demand management is practised most commonly by utilities and commercial energy consumers. In times of low consumption, a utility may choose to store energy, typically through pumped hydro, so that it can be used during periods of high consumption. This practice may become increasingly important to commercial customers because a significant portion of their energy bill is based on peak power demand. Demand charges vary but are typically between $10/kVA and $20/kVA in Australia.

If an energy storage unit is installed, the period of peak demand can be flattened by charging the batteries from the grid (or a renewable energy source) during low periods of demand and using that power to displace the typically high periods of demand.

In residential applications, peak demand charges typically do not apply; however, a time-of-use meter will often be installed when a solar photovoltaic (PV) system is installed (if the residence does not have such a meter already). To avoid high peak or shoulder tariff rates, an energy storage system can be added. In this way, the storage system can be charged during a low-tariff period and used during a high-tariff period.

Self-consumption

To offset and protect against the rising costs of grid-supplied energy, it has become increasingly common for residential consumers to install solar PV systems or other renewable energy systems. Often the generation of the PV system occurs at times of low demand such as during the day when home owners are at work. Instead of exporting that energy to the grid for low or potentially no benefit, many residential consumers choose to store that excess energy to be used during higher periods of demand such as the evening.

Grid energy storage key market movers

The critical caveat to this section is that there is the possibility of a market niche for every battery technology described in this article. However, when specifically targeting the residential and commercial building market, some predictions can be made.

Compressed-air storage has attracted a lot of interest. Companies such as Light Sail Energy have devised a method of heat transfer to improve round-trip efficiency and cost-competitiveness. Although these systems may have a bright future for utility-scale power, they do not fit well to the residential or commercial space. Pumped hydro has much the same issue as compressed air. It is extremely successful in the utility energy storage market but is not being developed for the commercial or residential markets.

Hydrogen fuel cells have long been the hope for the clean energy future. Companies like AREVA have developed turnkey solutions for networks that combine an electrolyser, fuel cell and storage system. Although these systems may at some point suit networks, the safety concerns are still too great for wide-scale use in commercial and residential systems.

Flywheels have been used for centuries for energy storage and are currently being investigated for use as grid energy storage. Companies like Velkess Energy Storage and Power Conversion are developing new types of flywheels for use in the residential and commercial markets; however, the flywheel is still largely untested in this arena and has the inherent issues of low specific energy and retention.

Molten-salt batteries are being developed by some of the major players in the energy industry, such as GE with its Durathon battery. There are enticing benefits available from molten-salt batteries and they represent a great solution for many utility-level and telecommunications applications. However, for commercial and residential usage, the safety and maintenance risks may be too great a hurdle to overcome.

Like molten-salt batteries, flow batteries also have some very enticing benefits. They are generally a lot safer than molten-salt batteries and, as such, they have been used in some commercial and residential applications already (for example, the Redflow battery used in Ausgrid's Smart-Cities campaign and the ZBB battery used in the new UTS Broadway building). However, the complexity of these batteries and their high maintenance costs still do not make this an attractive option beyond the few pilot projects that have gone forward.

Nickel-based batteries have had a resurgence of attention recently because of their safety and stability. Companies like BASF are pushing the limits of nickel-metal hydride technology to increase specific energy and cycle life. Nevertheless, with the strong market focus on the potential of other technologies like lithium-ion, nickel-based batteries may find it hard to compete in the market.

Lithium-ion batteries are the major contenders in the residential and commercial market for grid storage. Major companies like Tesla, Bosch, Samsung and Exide have strongly committed to this technology. As manufacturing costs come down and safety is increased, there may be no stopping this new and exciting technology.

The only thing that could be more attractive than a new energy storage technology is a significant advancement to an existing one. Companies like Ecoult, which developed the CSIRO Ultrabattery, have managed to take the tried and tested VRLA battery and increase its depth of discharge and cycle life substantially.

Energy market disruption timeline

It is difficult to predict when grid energy storage will gain market hold across various sectors, but focusing on a small sample set may provide a guide to when this may happen. Retail energy rates of small commercial and residential energy consumers in New South Wales were reviewed against the levelised cost of energy of solar, solar with lead-acid batteries and solar with lithium-ion batteries. Focus was given to lead-acid and lithium-ion because these two technologies seem to be the front runners in the storage race, as discussed above. Solar with lead-acid batteries will become cost-competitive with retail energy in about 2017 and solar with lithium-ion batteries will achieve parity with retail energy in approximately 2019. If these two sectors are indicators for what will happen globally and are forbearers of the utility and industrial markets, we could see ubiquitous grid energy storage before the end of the decade.

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www.gses.com.au

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Commercial LED lights

littil LED Lights' Troffer ceiling panel is a constant current input LED lamp that is a direct replacement for energy-consuming T8 fluorescents, which typically draw 85 W in a twin tube configuration.

The troffer and driver system consume only 32 W of power. With zero radiation or interference, it is suitable for every clear span suspended or subdivided ceiling, ie, offices, public areas and retail settings.

The lights are maintenance free and long lasting, providing 50,000 hours of service. They contain no lead or mercury and have a unique optical design that delivers high colour rendering to replicate daylight.

The Troffer can easily snap into pre-existing fixtures and comes with the added benefit of being dimmable.

cherryLED
www.cherryled.com.au

LED bunker wall light

The Hardy LED round bunker wall light is made from tough UV-stabilised polycarbonate with an opaque 2 mm-thick diffuser.

The light is IP66 weather-resistant rated and comes with a 2-year warranty. Other features include: available in black/white; 12 W max; 800 lm; colour temperature 4200 K cool white.

Brilliant Lighting (Aust) Pty Ltd
www.brilliant-lighting.com.au

CASE STUDY

Pan-city LED program saves $800K a year

The City of Sydney's LED lighting program to reduce emissions and energy use has been recognised for leadership and innovation at the 2014 Institute of Public Works Engineering Australasia (NSW) annual awards.

"Replacing 6450 conventional lights will save nearly $800,000 a year in electricity bills and maintenance costs," the Lord Mayor Clover Moore said.

The pan-city LED lighting program, supported by GE Lighting and UGL, is expected to significantly reduce carbon emissions and energy use. Since March 2012, more than 4100 energy-efficient LED street- and park-lights have been commissioned as part of a $7 million, three-year project to replace 6450 lights across the City of Sydney. The new lights have saved the City almost $370,000 and reduced energy use by more than 34% since March 2012.

The LED lights, produced by GE Lighting and installed by UGL, emit a light which is whiter and brighter than traditional street- and park-lights. LED lighting produces light over a broader range of the colour spectrum, looking closer to daylight. They use 40% less electricity than conventional bulbs and produce 40% less carbon pollution. The success of the council's smart power-usage program is paving the way for new applications of light to create sustainable and energy-efficient urban environments.

The City of Sydney's LED project is the first of its kind in Australia, with LED lights having been installed across major residential and commercial areas including Newton and new developments at Zetland. This revolution in lighting technology is sweeping across central Sydney to provide brighter park- and street-lighting while drastically reducing electricity costs and greenhouse gas emissions. Following the successful implementation in the City of Sydney, the NSW Government is encouraging other councils across the state to consider implementing similar LED lighting projects.

Ian Killick, managing firector of GE Lighting Australia and New Zealand, said: "Advanced LED technology has transformed the

way we apply light. The technology enables brighter and more uniform illumination that saves up to 75% of energy compared to incandescent light sources, while lasting up to 25 times longer. More cities are appreciating the significant long-term benefits of implementing an energy-efficient LED program for its streets and public spaces. GE Lighting is a committed supporter of such programs and is glad to play a contributing role towards the City of Sydney's drive towards smart energy usage. Feedback about the LED lighting program has been positive from Sydney residents."

Public lighting accounts for a third of the City of Sydney's annual electricity use and 30% of its greenhouse gas emissions. The new LEDs will reduce emissions by 2861 tonnes each year - the equivalent of taking 940 cars off the road. The City of Sydney, as Australia's first carbon-neutral government, has set itself the ambitious target of reducing emissions by 70% below 2006 levels by 2030. New York, London and Hong Kong have since joined Sydney in LED trials.

GE Lighting
www.geindustrial.com/asia

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Surface-mounted luminaires

Eye Lighting's Isthar LED surface-mounted luminaires are suitable for a wide range of general area applications as well as selective applications including facades, displays and signage.

Built from durable and corrosion-resistant materials, the advantages of the range are attributed to its reliable performance and multi-functional usage.

Features include: comfortable 4000 K LED light colour temperature; quality reflector for maximum light output and reduced glare; body - extruded and anodised aluminium; lens - tempered glass diffuser; reflector - high-purity and polished aluminium; IP66; heat sink - aluminium; driver - integral (ETRC); optics - symmetrical medium beam or asymmetrical wide beam; average lifespan - 40,000 hours; EMC compliant.

Eye Lighting Australia Pty Ltd
www.eyelighting.com.au

LED floodlights

The Lumitex Trim Series floodlights are available in 10, 30 and 50 W models. The units are suitable for architecturally sensitive installations given their low profile and compact footprint. All models come in black and the 10 W model also comes in grey to suit residential applications.

The series retains the best features of the Contractor Series that they are replacing, but with significantly less bulk. The warm-white (3000K) colour temperature model is suitable for residential applications and the cool-white (5000K) model is suitable for floodlighting in commercial environments. Users can connect any model to 3-wire motion sensors for instant-on security floodlighting.

Other features include: stainless steel bracket and fixings; instant on - suitable for PIR sensors; low heat emission; IP65 rating; includes 1.5 m flex and plug. All fixings are 316 grade stainless steel, with the brackets on all models having a robust 3 mm thickness.

Lumitex Limited
www.lumitex.com.au

LED troffer

The Cree ZR Series LED troffer portfolio offers 2x2, 1x4 and 2x4 options targeted for both new construction and renovation. The troffer delivers up to 4000 lumens of 90 CRI colour quality with an aesthetic look and includes 0-10 V dimming standard or optional Cree SmartCast technology, and up to 150 LPW which can increase energy savings and helps meet local energy codes.

The series troffer is said to provide a breakthrough in balancing energy savings, visual comfort and payback. The troffer is designed to last up to 75,000 hours (standard) and 100,000 hours (HE). Other features include: Cree TrueWhite Technology; delivered light output - 3200, 4000 lumens; input power - 21 to 44 W; LPW - 90-150; CRI - 90; CCT 3500 K, 4000 K; input voltage 120-277 VAC; dimming 0-10 V (standard); 10-year limited warranty (10 V), five-year limited warranty (SmartCast Technology).

Cree Inc.
www.cree.com

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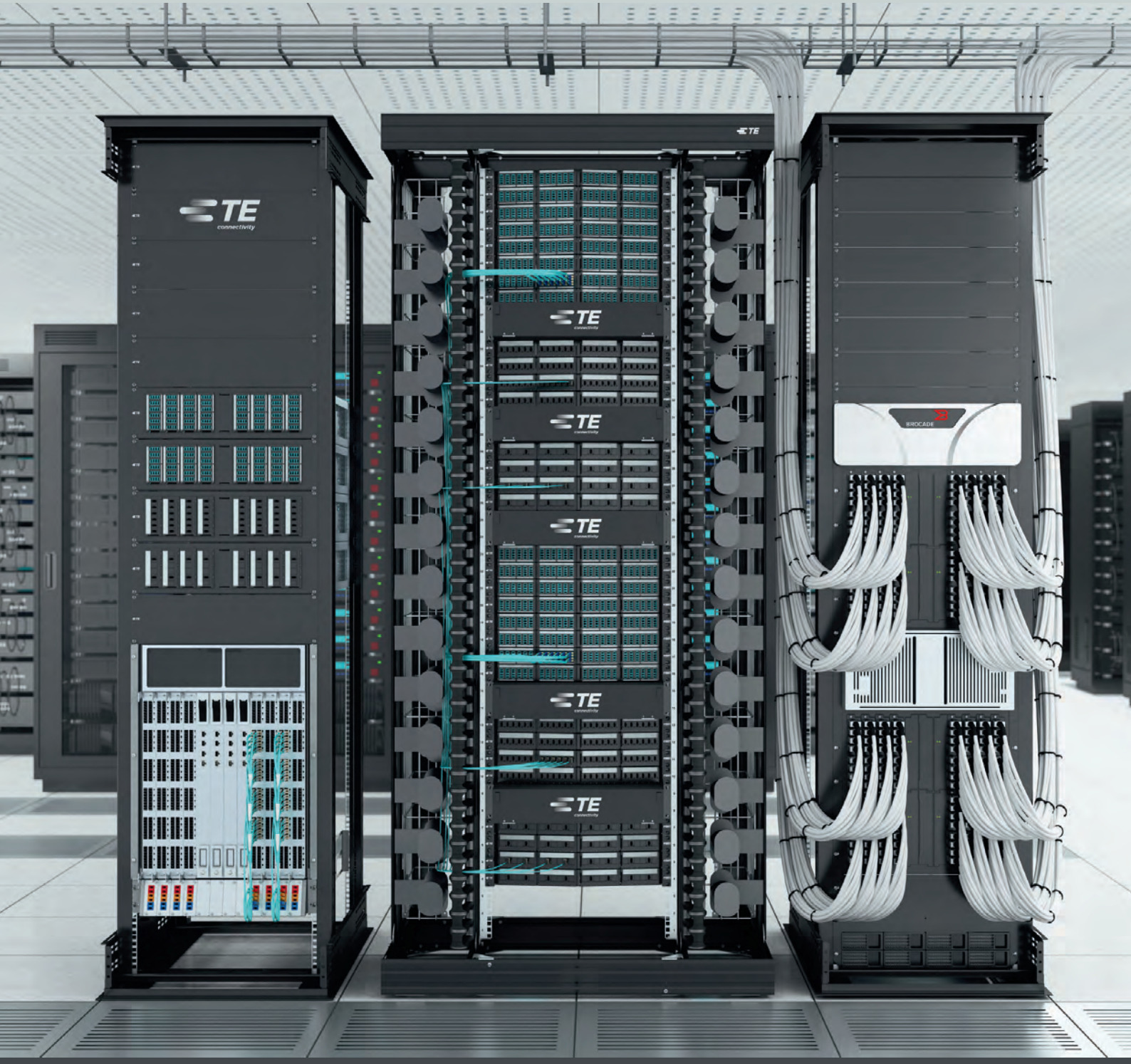

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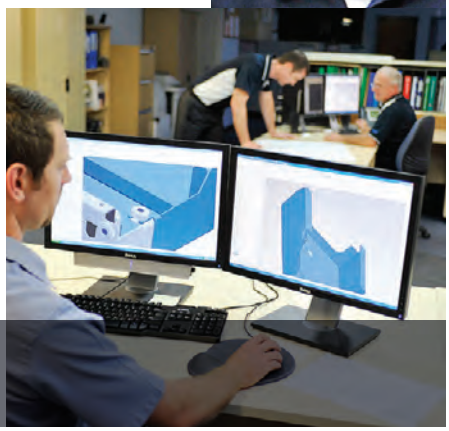

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TE Connectivity is the sole manufacturer in Australia & New Zealand providing ITC solutions from Data Centre to Enterprise buildings. KRONE has been designing and manufacturing products in Australia and New Zealand for more than 30 years. Products such as the ever-lasting disconnect module and the locally-made RJ-45 outlets for Australian faceplates.

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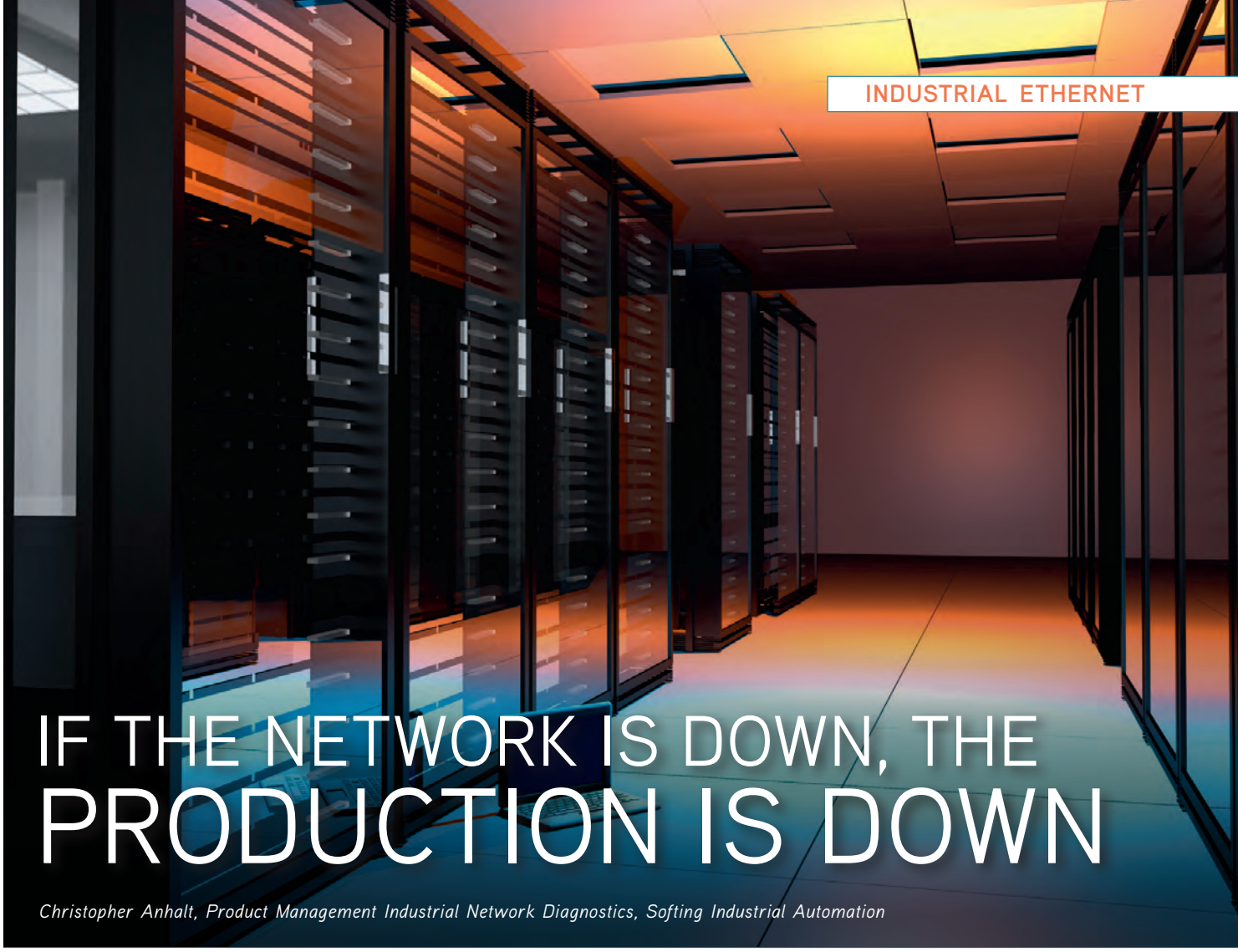

IF THE NETWORK IS DOWN, THE PRODUCTION IS DOWN

Christopher Anhalt, Product Management Industrial Network Diagnostics, Softing Industrial Automation

With the growing use of Industrial Ethernet, in particular Profinet, in modern production facilities, operators are faced with a technology that opens up a host of new possibilities.

To fully exploit Profinet's advantages, long-established commissioning and operation practices must be reviewed and adapted to the new conditions. General standards and rules for acceptance testing, monitoring and diagnostics of Profinet networks are currently still being discussed.

One thing will not change, even with Profinet: production facilities must run economically and cost-effectively to ensure competitive production. However, this is only possible if the plant networks work properly and are always available. One of Profinet's advantages over previous Profibus installations is that much larger network architectures are possible. While a typical Profibus network consists of up to 50 devices, Profinet supports up to 2000 devices and more per network. Profinet also offers more flexibility, making installations much easier to expand or modify. The integration of additional devices into an existing network is simpler and takes less effort than with Profibus.

Predictive monitoring

The dynamic development of Profinet is also reflected in increasing requirements for network availability. Statements like "once or twice a year, our network breaks down and then our production stands still" or "we're aware that we've got network problems, but we can't find the cause", are quite common when talking about today's Profibus installations. In Profinet networks with up to 2000 nodes in one network, issues like these have become unacceptable. While error diagnostics in Profibus installations are often only performed sporadically or in the case of failure, it is advisable to preventively and continuously monitor Profinet networks. This involves keeping an eye on impending failures, changes in network load and potential error sources. In state-of-the-art production, the facilities must be available 24/7 - similar to search engines such as Google that today are expected to provide access from anywhere in the world at any time.

Playing it safe and keeping track of all devices in the network

Users appreciate Profinet's flexibility, but for this same reason they should always know which devices are connected to the network and where faults may occur. It can easily happen that more devices are added to the installation than specified in the original configuration. State-of-the-art monitoring software like the TH SCOPE make it possible to query the current topology, the number and status of nodes, the current network load, the firmware versions of devices and the order numbers at any time. The software also detects standard ethernet devices, such as servers or video cameras, that are not specified in the network configuration but may often affect network security and stability. This is achieved using standards like SNMP and additional protocol-specific extensions like DCP. Reliability of the communication is another reason why maintenance engineers should always keep track of all the devices in the network, because even regular ethernet devices can cause a high network load and adversely affect the real-time behaviour. State-of-the-art monitoring even goes a step further: in addition to Profinet and standard ethernet, the TH SCOPE also monitors other leading Industrial Ethernet standards, such as EtherNet/IP and Modbus TCP, and all that in a single application.

WHEN USING FIBRE-OPTIC CABLES, ADDITIONAL DETAILS ARE ALSO SIGNIFICANT, SUCH AS CABLE LENGTHS, TRANSMISSION QUALITY AND CONNECTION QUALITY - IN OTHER WORDS, THE NUMBER OF LOST PACKETS, DEVIATIONS FROM THE SEND CYCLE, THE NUMBER OF BROADCAST AND MULTICAST FRAMES, ETC.

Rapid commissioning and automated acceptance testing

When using ethernet, there are various tools that facilitate commissioning and acceptance testing, which is quite essential in view of the large number of potential devices in the network. An important step in the commissioning of installations is the automatic determination of the topology, which can be done completely without engineering tools. As many different specialists, from equipment manufacturers to service providers, often work simultaneously on the same network when a plant is being set up, the topology is an ideal way to get an up-to-date overview of all the devices connected to the network. Powerful systems make it easy to automatically generate information about error messages from individual devices, about performance, protocol distribution or inventories of complete device sets, and to document the difference between actual and planned configuration. As a result, they can significantly speed up commissioning and acceptance testing. In the automotive industry, automated diagnostics today are also used to gather further information like network parameters (such as IP address, subnet mask and default gateway) and device parameters. The acquired data can then be compared with the planned configuration created using engineering tools.

When using fibre-optic cables, additional details are also significant, such as cable lengths, transmission quality and connection quality - in other words, the number of lost packets, deviations from the send cycle, the number of broadcast and multicast frames, etc. All these criteria are then included in the commissioning process.

Choosing the right tool

Reading out network parameters with suitable tools is only one factor in keeping Profinet networks up and running. Diagnostics and monitoring tools also have to be easy to use and ready to run immediately when a network problem occurs. Maintenance engineers can then quickly decide whether they can solve the problem themselves or need the services of an IT specialist. Maintenance engineers need simple-to-use tools that do not require additional engineering. When using high-performance software tools, the network monitors itself, so to speak. If problems occur, the system automatically sends an email or initiates malfunction messages by relay contact, if required, and provides useful troubleshooting tips. The obtained network, line and device diagnostics are available for up to a month after running the diagnostics. Device logs provide valuable information that helps to correct the problem. Diagnostic information is also available centrally and web-based, allowing access from anywhere in the world.

Monitoring pays off

A survey by Softing shows that 76% of users have no experience with commissioning and monitoring tools yet and 37% still use unmanaged devices that do not support diagnostics and topology scans. This means: consulting and training in diagnostics and monitoring remain on the agenda, particularly because the principles of best practice develop slowly in the field. Softing has recognised this demand and offers independent network services providing comprehensive support for plant operators, system integrators and manufacturers across all industries. As part of a standardised network check, an initial assessment of the condition of a Profinet network can often be made within 10 minutes of installing the devices.

The automotive industry plays a pioneering role in using Profinet technology and today already applies cutting-edge methods and tools for the commissioning and diagnostics of Profinet networks - for good reasons: already today it is possible to cost-effectively monitor Profinet networks. The additional costs of network monitoring amount to a maximum 1% of the device costs, while giving peace of mind that the plant is running. In other words: investing in network diagnostics has already paid for itself when the availability of the plant through its life cycle is increased by one hour or when the commissioning phase is reduced by one hour.

CrispTech Pty Ltd
www.crisptech.com.au

ECD SOLUTIONS COMMS + DATA

Mobile surveillance apps

Axis has introduced mobile apps for Apple iPhone and Android devices for use with AXIS Camera Companion and hosted video solutions.

The mobile surveillance apps allow the user to switch from live view to recorded videos from any location within their surveillance system. The integrated timeline notifies about triggered events and allows the user to take immediate action. Single images and video of interest can easily be stored to the user's mobile device and shared when needed.

The company has also launched the mobile apps with the updated AXIS Camera Companion 2.2, with support for Axis Mobile Streaming. This technology is specially designed to give quick and easy access to live and recorded high-definition videos even for installations where bandwidth is limited. The apps are available for download free of charge and compatible with iOS and Android devices.

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

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Enclosures

The Takachi AW series are robust, aluminium, profile-based enclosures with an IP67 waterproof seal and external mounting flanges. The enclosures are suitable for applications where moisture and dust are an issue, including power supply and data communication, test and measurement, data acquisition and logging, telemetry and machinery control.

The series can also be supplied in an EMI-screened IP67 version. Complete with die-cast end caps and silicon seals, the series are suitable for harsh operating conditions in temperatures from -40 to +105°C. Ribbed sides assist in heat dissipation.

The series is available in five different profile sizes and standard and custom lengths to over 2 m. Standard body colours are black or silver and end caps are available in grey or black. Custom colours are available.

Internal mounting slots mean equipment can be direct mounted into the slots or onto carrier plates. External mounting flanges simplify fit-outs.

ERNTEC Pty Ltd

www.erntec.net

Optical software application

AFC has released the intelligent SLM software to suit the JDSU MTS OTDR family. This software helps technicians to use an OTDR more effectively, without the need to understand or interpret OTDR results. Each event is displayed as an icon giving users a schematic view of the entire link known as a SmartLink.

SLM provides a linear graphical representation of an OTDR trace, making it easier to understand fibre fault impairments and locations of these impairments. The product has applications specifically designed for fibre-to-the home and fibre-to-the-antenna network testing.

In addition to the results SmartLink displays, both applications offer a customised user interface for both FTTA and FTTH networks testing. The FTTH-SLM's specific algorithm can conduct OTDR measurements through PON splitters, enabling it to detect events on either side of splitters. SLM eliminates OTDR results interpretation, simplifying complexity and allowing immediate diagnosis of problems. It also reduces human interpretation error, OTDR testing time, truck rolls and cable waste. Combining with the SmartOTDR, SLM eliminates the need for OTDR expertise. It is enabled on the MTS2000, 4000, 6000, 6000A and 8000 OTDR platforms.

When using SLM with StrataSync - a cloud-based solution providing asset management, configuration and test data management - an entire test fleet can be managed holistically. With StrataSync, collecting, analysing and storing test results from the entire network is simplified.

AFC Group Pty Ltd

www.afcgroup.com.au

Singlemode light source

The Kingfisher KI-28010 is a singlemode, handheld light source and comes with a KI-2600 power meter. The large LCD display is sunlight readable and backlit, while the unit itself is rugged and lightweight, making it suitable for all field applications.

The product is compatible with APC and PC singlemode networks. Other applications include encircled flux compliant testing, and as a tone source for fibre identifiers.

Other features include: optical power stability and reconnection repeatability; memory with text, timestamp and USB dump; real-time PC reporting software; autotest provides fast, easy and automatic multiwavelength loss testing; wavelengths 1310, 1550 and 1625 nm.

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Instrumentation cables

Available in its Brisbane warehouse, JT Day has instrumentation cables that are standardised on a niche construction. The company has utilised XLPE insulation for all cable conductors across all sizes, including power cables, because of the superior characteristics XLPE has over PVC.

The instrumentation cable voltage range is 450/750 V to cover most applications and the company stocks screened and individual screened for those stringent applications.

In addition to standard black sheath cables, they also have a blue outer sheath for intrinsically safe circuits.

All Ex cable glands in stock are suitable for armoured and non-armoured cables. There is also a full range of industrial glands for safe areas.

JT Day and its UK-based group company member Noskab provide access to a large number of cable manufacturers worldwide, which allows the company to source and give necessary support for cables made to a wide range of international standards.

JT Day Pty Ltd

www.jtday.com.au

WLAN solution

The Moxa AWK-1131A 802.11n wireless AP/client features a smaller housing with advanced protection technology, making continuous wireless connections a reality for industrial applications. The solution is designed with galvanic isolation technology to protect devices from the electrical disturbances commonly found in industrial environments. In addition, it supports 802.11n MIMO technology to reduce multipath effects and increase data rates up to 300 Mbps for bandwidth-hungry applications, and features millisecond-level roaming to minimise packet loss for seamless connections with mobile applications.

Industrial wireless devices require a rugged design that includes advanced EMS protection against the electrical disturbances found in harsh industrial environments and seamless WLAN roaming to increase network availability for rolling stock industrial applications. The AWK-1131A series can meet these requirements.

The solution features 802.11n technology, which is suitable for video surveillance applications that require up to a 300 Mbps data rate and gigabit wired transmissions. With the release of the AWK-1131A, Moxa now offers a comprehensive portfolio with both single- and dual-radio IEEE 802.11n industrial wireless solutions for the bandwidth-hungry systems found in industrial applications.

Features include: advanced EMS protection against electromagnetic interference; galvanic isolation technology on all interfaces for device reliability and longevity; 802.11n MIMO technology reduces multipath effects and increases data rates up to 300 Mbps.

MOXA Inc

www.moxa.com

Patching and termination solutions

Belden's industrial-strength Modular Industrial Patch Panel (MIPP) products are suitable for harsh industrial applications. With three termination panel options available, engineers and installers can easily connect both fibre and copper cables from operating environments to active equipment.

The MIPP Fiber Splice Box is designed to efficiently terminate various types of fibre cabling in a wide range of industrial applications. A single box allows for termination and patching of up to 72 fibre cables, saving users both space and costs - especially in closed cabinets where space is a premium.

The MIPP Copper Patch Panel ensures reliability for both industrial ethernet and Profinet networks. Together, through Belden's MIPP and DataTuff patch cords, copper cables can be terminated and linked to active equipment in an organised and structured manner. One patch panel can terminate and patch up to 24 copper cables.

For networks using both fibre and copper cabling in place, the MIPP Mix integrates the connection of both cabling infrastructures in one single solution. With high port density and flexibility, the combination of copper and fibre ports can include up to six modules per device.

Each MIPP is constructed of lightweight, high-strength aluminium in order to securely protect the cabling connections under harsh industrial conditions. The products' design and UL 1863 certification deliver peace of mind to network engineers and system installers in environments like power transmission and distribution, transportation, alternative power generation, machine building and automation.

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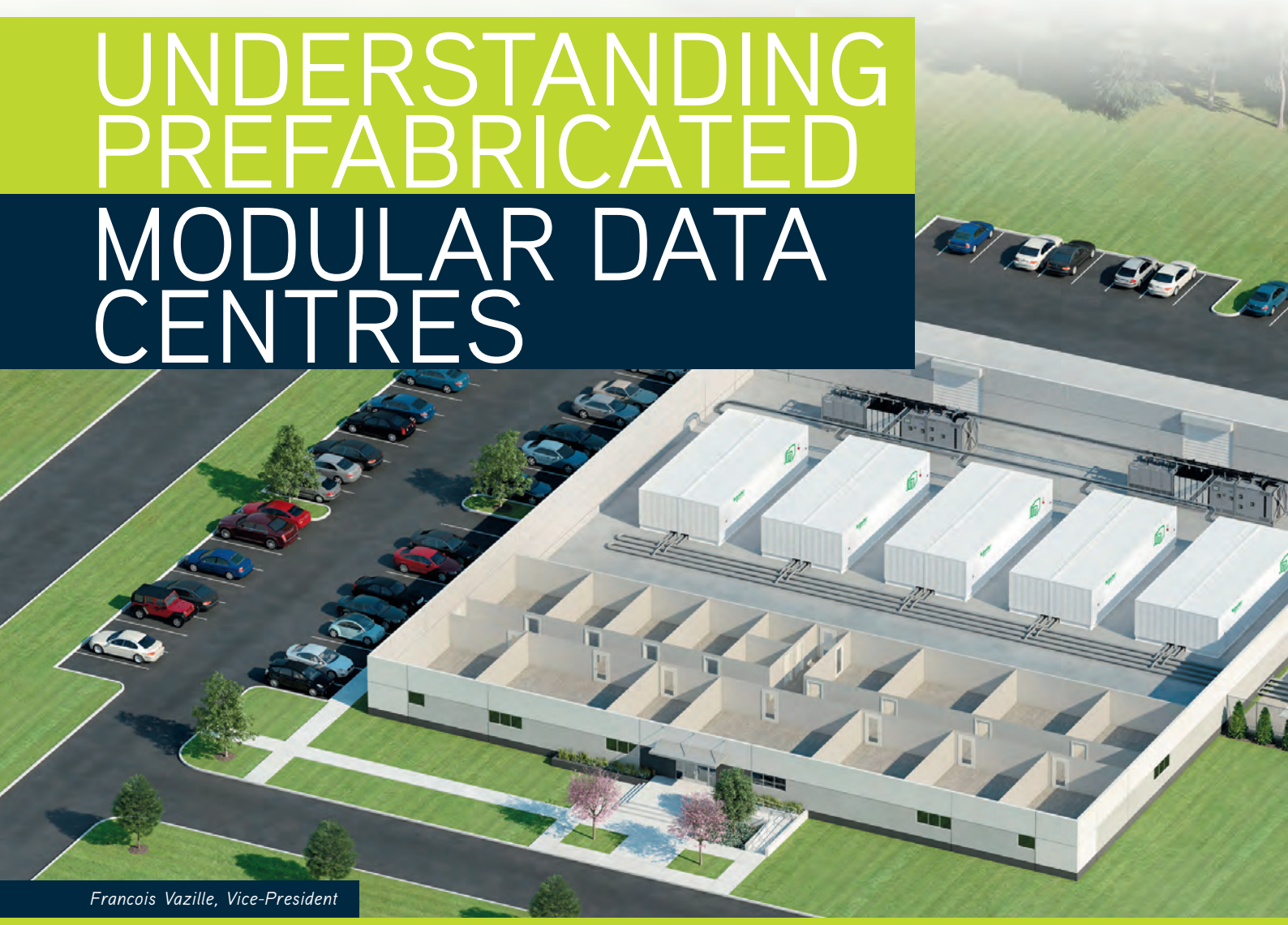
UNDERSTANDING PREFABRICATED MODULAR DATA CENTRES



Francois Vazille, Vice-President

It is no secret that prefab data centres offer a number of advantages, when compared to 'stick built' data centres, such as speed of deployment, predictability, scalability and life cycle cost. While the benefits of prefab data centres are well documented, there is a lack of common language and classification for prefabricated solutions - this has created confusion.

There are many approaches to implementing prefab modular data centres, so without a standard terminology for describing them, selecting the best type for an organisation becomes difficult. So too does choosing and integrating the most appropriate data centre management software system.

In order to alleviate some of the ambiguity around prefab data centres and ensure that the optimal prefab solution is selected to meet business needs, managers need to gain an understanding of the attributes, limitations and benefits of each form of prefab data centre and the associated data centre management technologies.

What is a prefabricated modular data centre?

In order for data centre managers to understand the many approaches to prefab data centre solutions, they must first understand the different terms for various types of prefab data centres. A prefabricated modular data centre can be described as prefabricated, containerised, modular, skid-based, pod-based, mobile, portable, self-contained, all-in-one and more. However, these terms all refer to the same basic definition that a prefabricated modular data centre is a data centre system or subsystem that is preassembled in a factory.

In simple terms, a prefab data centre is the following:

- Made up of at least one pre-engineered, factory-integrated and pretested assembly of subsystems that have traditionally been installed separately on-site.
- Mounted on a skid or in an enclosure.

The prefabricated modular data centre framework

The most common framework for classifying the various types of prefab data centres is based on three attributes:

- Functional block, which includes power, cooling and IT.
- Form factor, which includes ISO module, enclosure and skid-mounted.
- Configuration - a fully prefabricated data centre, a semi-prefabricated data centre, or an all-in-one data centre.

In the first instance, prefab data centres are distinguished by functional blocks primarily because some prefab data centres only require a specific resource, such as power or cooling. Different personnel with different skill sets are also needed to operate and maintain each element, for example, facilities staff vs IT staff, and mechanical operators vs electrical operators. The second key attribute, form factor, is distinguishable on application. For example, a

prefab data centre may be permanently mobile, ie, on wheels, or it may be constrained by its capacity. The final element, ie configuration, explains how the prefabricated functional blocks are deployed.

When selecting the optimal prefab data centre solution, all three components must be considered as outlined in detail below.

Functional block

The functions of a data centre can be broken down into three major categories - the power plant, the cooling plant and the IT space.

The prefabricated data centre can provide all three functions but in most cases will provide only one, due to data centre requirements. For example, if a data centre has stranded capacity in its facility, which is often the case, a prefabricated module is only needed for a specific resource. This is also the case where greater IT capacity is needed and a single IT space is required, or if IT, mechanical and electrical personnel need to be separated to reduce human error and risks.

- Power - A prefabricated power module is designed to provide power to the data centre. The typical subsystems within a power facility module are switchgear, ATS, UPSs with batteries, transformers and panel boards. Lighting and security may also be integrated within the power module.
- Cooling - Prefabricated data centres use a range of cooling systems to support the IT space, primarily based on cost, efficiency and reliability.
- IT Space - A prefabricated IT space is one that houses the IT equipment and also the support for the infrastructure to distribute power and air to the systems.

Form factor

Prefabricated data centres are known to take on different form factors, or types of structures, size and shapes. The form of a particular prefab data centre solution impacts its flexibility, whether it can be transported or moved, its location (inside or outside) and its placement, for example, whether it is inside or on a rooftop. There are three general forms of prefabricated data centre modules including ISO module, enclosure and skid-mounted.

ISO Module - ISO modules are standardised re-usable steel shipping enclosures, designed for safe, efficient and secure storage and movement of materials from one type of transportation to another. Often, this form factor also requires lighting and security as they are used for operation and maintenance.

Enclosure - Enclosures are less standard in terms of dimensions and do not necessarily meet specific shipping standards like ISO modules. Enclosures can also be referred to as shells, metal houses and pods. Enclosures are flexible in terms of the IT and layout of equipment.

Skid-mounted - A skid-mount is a method of distributing and storing machinery where the machinery is permanently mounted in a frame or onto rails or a metal pallet. The equipment can then be easily and securely transported and used as a full unit.

The form factor or combination of form factors which is best for any given prefab data centre is based on what is needed from the data centre manager, such as whether it needs to be transported, whether it has stranded capacity and its scalability.

Configuration

There are many different ways functional blocks can be implemented in a prefab data centre and the approaches fall under three main categories: semi-prefabricated, full prefabricated and all-in-one.

A semi-prefabricated data centre is made up of a combination of prefabricated functional blocks and traditional 'stick-built' systems. Semi-prefabricated data centres are most commonly implemented when an existing data centre is out of bulk power, cooling or IT space or if space is already constrained.

A fully prefabricated data centre is made up of completely prefabricated IT, power and cooling modules and is typically implemented when the scale of the data centre is vital to the success of the project.

An all-in-one data centre is a self-contained, single-enclosure data centre with IT, power and cooling systems and is most often mobile and therefore most commonly used when movability and location are key.

> THE OPTIMAL APPROACH TO PREFABRICATED DATA CENTRES, INCLUDING THE MOST APPROPRIATE CONFIGURATION, FUNCTIONAL BLOCKS AND FORM FACTORS, WILL DEPEND ON THE SPECIFIC BUSINESS NEED OF THE OPERATION.

Integrating DCIM with prefabricated models

To consider prefabricated data centre models also means the managers must rethink the way management systems are written for prefabricated modules, whether they include IT, or simply power or cooling.

Data centre infrastructure management (DCIM) software provides a complete picture of the health of a data centre and is designed to identify and resolve data centre issues. It increases understanding of capacity and utilisation in the environment through monitoring and controlling data centre physical infrastructure (DCPI) in real time and based on changing loads. DCIM can also help identify unused or stranded capacity by coordinating assets more efficiently and conducting predictive analysis of what will happen to the physical infrastructure before loads are moved.

However, as prefabrication simplifies physical infrastructure, when a prefab data centre model is used in conjunction with DCIM, the DCIM software is best utilised as a 'plug and play' in order to make its integration as simple as possible. This means that any data centre management system or software should automatically subscribe to the key data from any new module and populate this to the DCIM application without a lot of custom engineering, design or programming input.

When considering prefabricated data centre solutions, data centre managers should also be looking for management systems that can be absorbed and integrated into DCIM seamlessly, and deliver data automatically such as Schneider Electric's StruxureWare software.

Selecting the best data centre solution

There are many approaches to implementing prefabricated modular data centres; however, a lack of common terminology for describing and explaining them has led to confusion across the industry and hesitation from data centre managers in selecting the best solution for their organisation.

The optimal approach to prefabricated data centres, including the most appropriate configuration, functional blocks and form factors, will depend on the specific business need of the operation. However, understanding the terminology and benefits of each type will help the data centre manager to classify and analyse the available solutions and, ultimately, select the most appropriate form.

When considering prefabricated data centre solutions, the data centre manager must also consider the approach to data centre management and software, and how DCIM solutions will be best integrated with the data centre system in order to achieve optimal results throughout the project.

Schneider Electric IT Business
www.apc.com

ECD SOLUTIONS COMMS + DATA

Vector network analyser

The Rohde & Schwarz ZND vector network analyser features two test ports, and the base unit is designed for unidirectional measurements from 100 kHz to 4.5 GHz. Its easy-to-use options provide for flexible upgrades. The frequency range can be extended to 8.5 GHz, plus the instrument can be equipped for bidirectional measurements up to 4.5 or 8.5 GHz. These functions can be locally activated. The analyser is suitable for production-line measurements such as characterisation of passive mobile phone components, enabling users to easily measure S-parameters such as S11 on antennas or S21 on filters. The device offers a specified dynamic range of up to 120 dB and a specified power sweep range of up to 48 dB. Options for time domain measurements, general-purpose interface bus and a parts handler interface are also available.

The analyser's 30 cm touch screen and intuitive user interface make it easy to configure measurements and analyse results. All instrument functions are accessible in no more than three operating steps via the soft panel. A toolbar and drag-and-drop functionality allow users to configure the unit very quickly, and touch-screen tabs make it simple to switch between instrument set-ups. Traces and channels can be arranged in any desired combination, enabling users to display results in a clear and straightforward manner, even for complex measurements.

Rohde & Schwarz (Australia) Pty Ltd
www.rohde-schwarz.com

Wiring ducts

Ergonomically designed and now locally stocked, Klemsan's range of wiring ducts provides durability and efficiency for wire management.

Easily mounted and dismounted, the duct covers provide upper and lower scorelines for easy breaking/splitting. A bottom rail provides easy mounting of wiring duct accessories inside the duct, and its special rib pattern design allows flexible wire placement.

Control Logic Pty Ltd
www.control-logic.com.au

Network Testing Redefined

All-in-one field tester with full OTN mapping

The NEW MT1000A Network Master Pro - All-in-one field tester redefines the direction of future test platforms by bringing all your network test requirements to a portable device.

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Network Master Pro

Sales Office: Australia 1800 689 685

www.anritsu.com

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Modular test platform

The RXT-1200 combines multiple technologies into a rugged modular platform that increases the productivity of technicians who are responsible for the installation, verification and maintenance of complex services including Access, Business, Metro, Transport and Core services. Its intuitive user interface boosts productivity by helping technicians and field engineers make their job easier, accelerating the learning curve and reducing training requirements.

An integrated toolkit for field technicians, it combines advanced multiservice testing capabilities, built in a single, high-performance, compact format.

Benefits include: application-oriented GUI; GUI familiarity across different test modules and other VeEX products reduces the learning curve; view test results and create detailed reports by region, area, system and technician; enables all jobs to be completed correctly the first time; optional RXT-1200 carrier module brings forward compatibility to Sunrise Telecom's popular MTT test modules; multitechnology - DSL, Fiber Optics, DSn/PDH, SONET/SDH, OTN, Ethernet, Fibre Channel, CPRI/OBSAI; expand test functions with a growing list of test modules; futureproof, cost-effective platform; test set connectivity via Ethernet Management interface, Wi-Fi, Bluetooth or Data Card for back office applications and workflow optimisation; user-defined test profiles and thresholds; fast and efficient test result transfer to USB memory stick.

Other features include: ultrahigh-capacity field-exchangeable Li-ion battery pack; dedicated navigation buttons for non-touch screen operation; rugged design with integrated dual-shot rubber; flexible hand and shoulder straps configurations; dual hand straps for right- and left-handed operations; integrated adjustable rubberised kick.

TelecomTest Solutions

www.telecomtest.com.au

CASE STUDY

Alcatel and Ooredoo deploy 400G backbone network in Africa

Alcatel-Lucent and Ooredoo Algeria have built a high-capacity optical transport network to connect Algeria's main cities of Algiers, Constantine and Oran - as well as smaller cities - with high-speed ultra-broadband mobile access.

The agile optical network is Africa's first Alcatel-Lucent 400G (gigabits-per-second) 'backbone'. It will provide dramatically increased speed and capacity compared to previous Algerian mobile networks.

The network will be based on Alcatel-Lucent's dense wave division multiplexing (DWDM) optical transport technology using the 1830 Photonic Service Switch platform, which is now the mainstay of the company's terrestrial optical business.

Building the first 400G-based backbone in Africa for Ooredoo Algeria comes weeks after being one of the first operators in the world reaching the highest speed of 63 MBps over its 3G network. This advanced technological strategy will help meet the rising demand from residential and business customers for high-quality service on their smartphones, tablets and other connected devices. The 400 G-based backbone will also be leveraged to support the emergence of a strong Algerian new tech ecosystem.

Joseph Ged, chief executive officer at Ooredoo Algeria, said: "Ooredoo Algeria has the fastest growing 3G network in the country and in north Africa. Our 400G network will be instrumental to support the best quality of experience (QoE) for our customers as well as to increase our market share in Algeria. Through this game-changing achievement we intend to consolidate our technology leadership within the Maghreb region but also in Algeria in order to offer to our clients best-in-class network in terms of capacity and speed. We are proud of our team, who has been able to successfully implement cutting-edge projects to meet the highest standard of the industry with the support of our partner Alcatel-Lucent. One again, Ooredoo demonstrates the Algerian telecoms leadership not only in the Maghreb but also in Africa."

Ooredoo Algeria will use Alcatel-Lucent's 1830 Photonic Service Switch (PSS) with high-capacity OTN (optical transport network) switching capacity and 400G technology to address the booming demand for high-bandwidth mobile data services such as high-definition video streaming, next-generation mobile broadband applications and cloud services. The 1830 PSS is now Alcatel-Lucent's primary terrestrial optics platform, in use with over 500 customers.

Alcatel-Lucent is supplying Ooredoo Algeria with its soft decision forward error correction (SD-FEC)-based 100G coherent optical technology developed using the company's 400G Photonic Service Engine (PSE). SD-FEC increases the performance and reach of 400G signals.

Pierre Chaume, vice-president, Alcatel-Lucent Middle East & North Africa, said: "Thanks to 400G and the efficiency of OTN sub-wavelength grooming, Ooredoo Algeria's new network will support the booming explosion of data traffic generated by the proliferation of mobile devices such as smartphones and tablets and do so in the most economical way. As Alcatel-Lucent, we are proud to be Ooredoo's partner in the transport area and to enable Ooredoo Algeria to be the first service provider to deploy our 400G solution in Africa. It will enable Ooredoo Algeria to take and maintain the lead in providing robust service in Algeria for the foreseeable future."

Alcatel-Lucent
www.alcatel-lucent.com.au

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Transport tester

The MT1100A Network Master Flex is a full-function, easy-to-use, multi-protocol transport tester. Combining light weight and portability with high performance - including support up to 400G (4 x 100G) - the tester is equally adept in the field during installation and maintenance of optical networks, as well as in the research and development lab and on the manufacturing floor to test transport equipment.

The all-in-one modular platform of the tester supports bit rates from 1.5M to 100G, and allows for easy configuration to meet current test requirements with a cost-effective upgrade path as measurement needs change. It supports testing of emerging OTN networks, including ODU0, ODU2e, ODU4 and ODUflex, as well as legacy ethernet, fibre channel, SDH/SONET, and PDH/DSn systems. Wide varieties of interfaces are also supported without the need to reconfigure modules for added flexibility, and time and cost efficiencies.

Three dual-port modules are compatible with the MT1100A platform. The MU110010A is a multi-rate module for up to 2 x 10G ports, the MU110011A supports 10M to 100G, and the 40/100G MU110012A module supports CFP2/CXP for 2 x 100G ports. Up to two modules can be configured in a single MT1100A mainframe, allowing the tester to accommodate as many as four fully independent ports at all rates, including 100G.

A 25 cm touch-screen display coupled with an easy and intuitive GUI simplify operation and allow all results to be clearly seen in any environment. The GUI also supports a variety of languages other than English.

Anritsu Pty Ltd

www.anritsu.com

Ethernet networking products

Wenglor has expanded its product range for industrial communication to include EtherNet/IP and EtherCAT protocols. The OCP high-performance distance sensors now provide for consistent communication right on down to the field level with two further protocols in addition to Profinet.

The product comprises a compact housing (50 x 50 x 30 mm), IP67 protection, an integrated web server, a graphic display and functions based on Profinet, which are all now supplemented with EtherNet/IP and EtherCAT protocols. The range is equipped with RS-232 or Profinet and will now be furnished with an additional standardised communications interface by adding the real-time EtherCAT protocol in combination with Power over Ethernet (PoE) and distributed clock technology. The time stamp function is important when spatially distributed processes are coordinated with each other and precise synchronisation of all ethernet users is required.

Treotham Automation Pty Ltd

www.treotham.com.au

Enclosures

Built Boards has added BBNBNXL enclosures to its NBN Enclosure range. The enclosures have the same features as the smaller model, including a solid steel construction, knockouts and rear cable entry.

The benefit of the enclosure is the additional 300 mm of space for consumer wiring and components. The enclosure fully complies with the NBN Co guidelines, with more than adequate ventilation.

Built Boards

www.builtboards.com.au

Two-way loss test set with ORL

The Kingfisher KI73410 is a two-way loss test set with optical return loss (ORL). Both instruments in the set display fibre-optic link loss and ORL in real time at multitude wavelengths (1310, 1550 and 1625 nm). The test set is available to rent.

Featuring zero warm-up, high speed and accuracy, results can either be stored in the internal memory or into a customised report.

Users can choose between a one- or two-way Autotest, which is available on both Test and Meter ports, and compatible with all other Autotest instruments.

Features include: full feature ORL testing; 1% traceable accuracy; LED sources CPR complaint for 50 μm fibre; instant pass/fail indication.

TechRentals

www.techrentals.com.au

CONNECT 2015

What: CONNECT 2015
When: 21-22 April 2015
Where: Melbourne Convention and Exhibition Centre
Website: www.con-nect.com.au

CONNECT 2015, an annual business, ICT and emerging tech trade show trade show to be held in Melbourne, will showcase the latest solutions in cloud, big data, social, Internet of Things, information management, wearable tech, 3D printing and much more.

The event will feature 170 exhibitors and attract thousands of technology decision-makers and senior-level executives from across enterprise and government. It will provide a buyer/seller environment where relationships can be developed and deals can be signed. The event will feature 10 business summits - including the Next Big Thing Summit and Slush Down Under - designed for business people to understand how the convergence of a number of technology megatrends is creating a perfect storm of disruption which will impact the way we live and do business in the future. The conference will be of interest to CEOs and business owners, business function managers and leaders, technologists, technology providers, investors.

In order to remain competitive in the 21st-century global economy, Australia needs to be a leader in both the development and use of connected digital technology. CONNECT 2015 is where business leaders will come to understand how 'third platform and connected digital technologies' are transforming the future of work and life, disrupting industries and creating new opportunities for business innovation, product development and customer engagement.

Multiple high-profile conferences (including the massive Next Big Thing Summit) will attract a senior audience - the entire C suite. In addition, the tradeshow with interactive seminar sessions will attract senior management, product teams, designers, digital strategy teams, research and development departments, data analytics and marketing. The Next Big Thing Summit is for business leaders who want to understand how ICT and emerging digital technologies are transforming the future of work and life, disrupting industries and creating massive new opportunities for business innovation, product development and customer engagement.

Total Facilities 2015

25 March 2015 - 26 March 2015
Sydney Exhibition Centre

Total Facilities is a dedicated industry event for the facility professional and building team. Featuring the latest innovation across 70+ product categories for use in the management, maintenance and sustainability of the built environment, and with a focus on education and professional development, TFX will offer solutions to run smarter, more efficient buildings.

In 2015 the event will connect over 200 suppliers with 2500 clients and end users, making it a suitable destination for the entire FM supply chain.

www.totalfacilities.com.au

22nd International Conference on Telecommunications

27 April 2015 - 29 April 2015
Shangri-La Hotel, Sydney

Telecommunications networks are advancing to a new era to support the unprecedented growth of the internet and cellular network usage for communications and information services. Therefore, the aim of ICT 2015 is to gather researchers to share their ideas and progress on solving the future challenges that the telecommunication networks face.

The event will feature plenary speakers, tutorials and regular and special technical sessions from academia, research laboratories, government and industry to discuss and exchange ideas in the field of wireless and cable telecommunications network, services and applications.

www.engineersaustralia.org.au/ict2015-conference

CeBIT 2015

5 May 2015 - 7 May 2015
Sydney Showground, Sydney Olympic Park

Over the years, CeBIT has featured a stellar line-up of inspiring international and local keynote speakers from the spheres of industry, government and technology. Plus, over 450 exhibitors from Australia and around the world - from start-ups to multinationals - showcase their innovations and technologies on the CeBIT Expo showfloor.

www.cebit.com.au

Solar 2015 Conference & Exhibition

7 May 2015 - 8 May 2015
Melbourne Convention & Exhibition Centre

Solar 2015 will showcase the latest technologies from solar and renewable, energy efficiency and the energy storage industries. The event is free to attend and a good opportunity to network and meet all of the critical players in Australia's solar industry.

The Electrical Energy Storage Exhibition will take place in conjunction with Solar 2015. The event will present energy storage technology, including rechargeable batteries, energy storage solutions and applications, recycling technology, automation and electric vehicles, etc.

solarexhibition.com.au

Vivid Sydney 2015

22 May 2015 - 8 June 2015
Sydney

Vivid Sydney is an annual event of light, music and ideas, featuring an outdoor 'gallery' of extraordinary lighting sculptures, a cutting-edge contemporary music program, creative industry forums and the spectacular illumination of the Sydney Opera House sails. The event is open to creative practitioners, corporate professionals, families and people of all generations.

www.vividsydney.com

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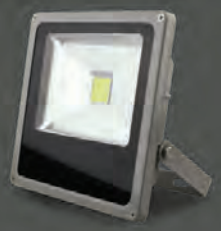

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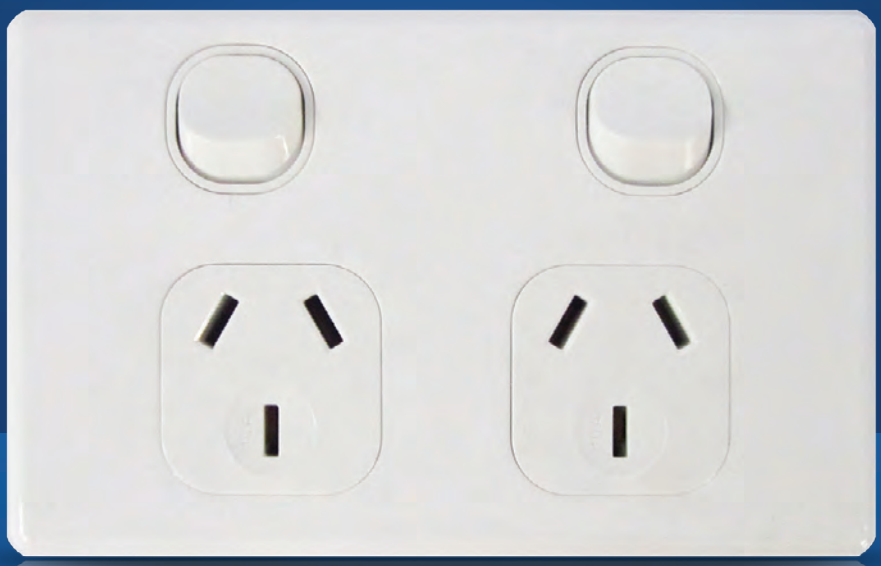

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