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FROM THE EDITOR

The bushfire season is already upon us, so what better time to talk about bushfire mitigation and power quality monitoring? Following the devastating events of 2009, one of the greatest concerns for the Australian power distribution industry is bushfire risk. The lead article in this issue highlights the recent developments in bushfire strategies through the use of pole-mounted automatic circuit reclosers.

Quality is one of the main themes of this issue. The cabling industry has got most of the attention when it comes to poor quality products. But one of the other industries that's rife with substandard products is lighting. According to Lighting Council of Australia CEO Bryan Douglas, the tests conducted by the Australian Government on LED products indicate a wide variation in product efficiency, quality and illumination. In his article on page 39, Douglas provides detailed insights on non-conformance issues in the lighting industry and Australian regulations.

Faulty or non-compliant products not only pose safety and business risks, they can also cause TV interference. To read more about LEDs and TV interference, and who's responsible for ensuring that LEDs don't cause interference, read the article on page 32.

This is the last issue of ***ECD Solutions*** for 2015. However, we'll continue to post content on the website, so make sure you visit www.ECDsolutions.com.au to stay up to date on the latest news and developments.

I hope you have a wonderful Christmas and New Year.

Mansi Gandhi - Editor
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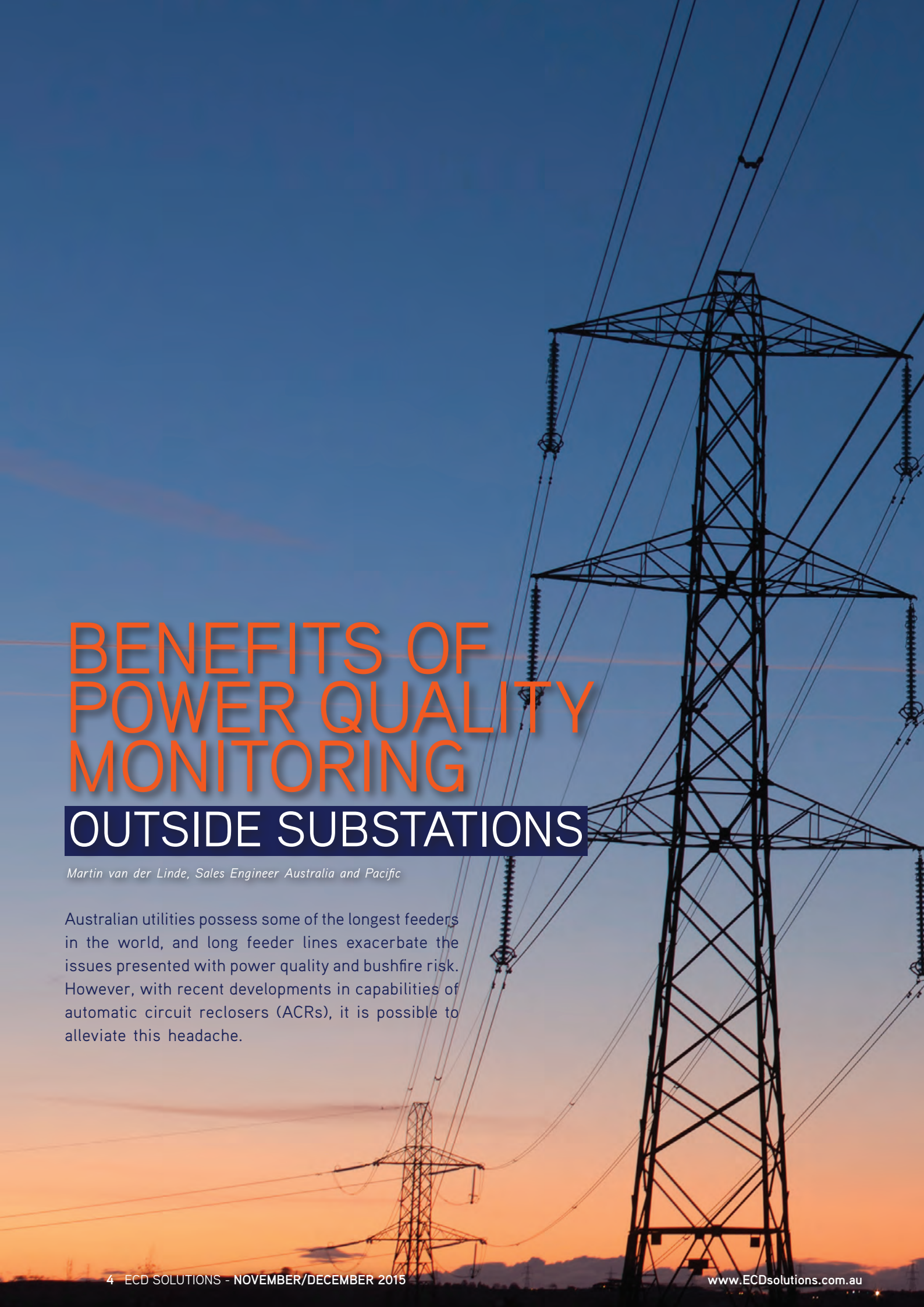

BENEFITS OF POWER QUALITY MONITORING OUTSIDE SUBSTATIONS

Martin van der Linde, Sales Engineer Australia and Pacific

Australian utilities possess some of the longest feeders in the world, and long feeder lines exacerbate the issues presented with power quality and bushfire risk. However, with recent developments in capabilities of automatic circuit reclosers (ACRs), it is possible to alleviate this headache.

Utilities operating in Australia face many adversaries with regards to power distribution; challenges which would drive most international counterparts to alternative markets. Australian utilities are a much more resilient group, and with modern developments in pole-mounted switchgear, the obstacles faced are not quite as insurmountable as they used to be.

Further updates to recloser control capabilities have caused the advent of remote ACR power quality monitoring, and this new capability has opened the door for greater reliability on long feeders as more accurate, local and relevant power quality data can be gathered. All of this information can be remotely interrogated, retrieved and then manipulated to grant utilities unprecedented resources to improve their reliability of supply. Additionally, with new capabilities to control and manipulate reclosing sequences remotely without having to edit settings, along with simple self-diagnosing communications systems to ensure reliable network reporting and awareness, it is possible to reduce and manage the bushfire risk.

This article outlines the recent developments in bushfire mitigation strategies through the use of pole-mounted ACRs.

ACRs' humble beginnings as hydraulic devices in the mid-1900s have evolved greatly through the years through to semiconductor controlled switches. These switches have proliferated across networks all over the globe, driven by the immediate reliability benefits and protection offered on a reasonable budget. Australia itself has had a fair share of manufacturers, including NOJA Power.

NOJA Power's RC10 control system allows users to update and integrate bushfire mitigation strategies using commissioned NOJA Power assets, with a simple firmware update and a network integration strategy. By using the onboard voltage and current sensing capabilities of these reclosers, the RC10 now has the capability to conduct complete power quality monitoring and reporting. This functionality is now available out on the feeders, using the exact same protection devices installed years ago, providing power quality feedback from the shores of the Gold Coast to Uluru.

Reclosers for bushfire safety

Bushfire risk is a fundamental issue of concern for most Australian utilities, with events such as the February 2009 bushfires in Victoria being blamed on a local utility resulting in lengthy court proceedings and fines. As responsible DNSPs (distribution network service providers), all utilities are interested in mitigating their risk of causing fires. Recent developments in recloser technology allow for the simple integration of bushfire risk management strategies using the current install base of NOJA power reclosers.

Recloser strategy for system reliability basically relies on interrupting faults and restoring supply after a specified open time at the recloser. A reclose sequence may have multiple different close attempts, but from a bushfire mitigation standpoint the more reclose operations in a sequence, the greater the risk of ignition at a fault point on the feeder. While for low fire risk days a longer recloser sequence will result in less customer lost minutes, the multiple reclose attempts will each increase risk of ignition.

Previous strategies implemented in recloser schemes involved complete disabling of the reclose functionality on bushfire risk days. This can be achieved by remote SCADA control and toggling of the global control of the recloser converting it essentially to a single short circuit breaker. This practice compromises the economic performance and is a brute force method of addressing the risk of bushfire ignition. It is far more elegant to have a remote capability to modify the reclose sequence, by applying global controls which can be toggled to reduce the length of the reclose sequence in different ways, without completely compromising system performance like using the 'Auto Reclose OFF' method.

NOJA Power has worked closely with utilities to establish global control points for the R10 recloser system which will allow for the mitigation of bushfire risk.

Power quality

Power quality is an important concept to understand in modern electrical service provision. By ignoring this issue, we allow opportunity for devastating harmonics to freely travel through our networks, destroying our assets and interrupting our customer service. Only through protection and monitoring of these issues will it be possible to improve network performance, safety, reliability and economic bottom line.

New developments in reclosers allow for comprehensive power quality monitoring and protection features using the current install base. These reclosers now have the ability to measure harmonic distortion, interruptions, and sags and swells, and it is important to develop an understanding of these features for optimum use of the resource.

Harmonics

Within a power transmission system, all power is delivered at a set frequency, which in Australia is 50 Hz. Harmonics are 'contami-

nants' within the power supply, which have a frequency that is a multiple of the baseline or fundamental frequency. These contaminant harmonics enter the power system through many different means, but ultimately the bottom line is they are a nuisance, and should be protected against.

Harmonics on the network can be devastating. Since these harmonics are essentially carrying unusable superfluous energy across the network, they put excess strain on any devices connected. These harmonics cause damage to insulation and the very power electronics which cause them, along with excess transmission losses. The major issue is that harmonic damage is insidious. There are usually very limited symptoms of harmonic issues, until a catastrophic event such as the loss of a transformer or motor, which is usually accompanied by an inherent fire risk. These risks are something which DNSPs are taking a great interest in, and in Australia the harmonic limit of contamination is limited as low as 8% at the point of common connection. It is our responsibility in the energy industry that harmonics are prevented from travelling through the network. And this in turn means that any responsible DNSP needs to be able to provide protection against these damaging harmonics.

The single greatest source of harmonics within the power system is the semiconductor. Most modern loads which use some sort of power electronics to transform the grid energy to usable energy for the device cause harmonic distortion. This is a result of what is known as nonlinear current draw, meaning that the devices do not take in the full natural sine wave. There are other causes, such as transformer saturation, or large industrial loads such as arc furnaces, or even fluorescent office lighting. Additionally, the large-scale installation of solar photovoltaic arrays and their semiconductor inverters are a notorious source of harmonics. With the proliferation of power electronics into the network, it's easy to see how a minor issue of the past is becoming progressively more prevalent as technology advances.

Simplicity of calculation is lost when starting to consider harmonics, which is the initial challenge of interpreting harmonic content. While these unattractive waves look terribly complicated to understand, there are two major mathematical ideas which make the concept quite simple. These are the principle of superposition and fourier transforms.

The basic idea is that any complex wave can be represented as a sum of individual simple waves. This is the concept of superposition. Fourier transforms are the mathematical method for working out what these individual waves are. The main difference between these waves are their magnitude and their frequency – which just so happens to be the two main features of harmonic identification.

> ONE OF THE GREATEST INDICATORS OF POWER QUALITY ISSUES IS THE MEASURE OF CUSTOMER MINUTES LOST.

Harmonics are waves which have frequency multiples of the fundamental frequency. Since any complex wave can be represented by a combination of these waves, it is then possible to understand what the harmonic content of a power supply is. The RC10 system uses Fast Fourier Transform to analyse the energy flowing through the device and provide exact values for both the harmonic frequency and its magnitude.

Harmonics are measured in two separate methods, known as total harmonic distortion (THD) and total demand distortion (TDD). THD is a ratio between the fundamental voltage wave and all the voltage harmonics. This is expressed as a percentage. Total demand distortion is calculated in a similar way, except the ratio is based on the peak current demand, rather than instantaneous voltage used by THD. TDD is used to calculate current distortion relative to the peak demand.

Interruptions

One of the greatest indicators of power quality issues is the measure of customer minutes lost. This value is obviously of high interest to DNSPs as it directly relates to their economic bottom line. The RC10 allows for user-configurable settings to determine the difference between a short and long interruption and can log all the information relevant to each of these interruptions separately.

Sags/swells

Sags and swells are characteristic of the ebb and flow of a power system as the energy demand shifts through the day. In times of low demand, the end-user voltage can begin to creep up, and vice versa. Just like the interruptions monitoring, sag and swell monitoring fills the data void left by our overvoltage and undervoltage protection. Also, since it evaluates a smaller deviation, data which is usually missed by protection levels is still recorded. Sags and swells can be indicators of greater issues present in the network and also allow utilities to better prepare for the mitigation of ill effects caused by periods of overvoltage and brownout.

Oscillography

The final piece of the monitoring puzzle is to actually capture a direct copy of the current and voltage waveforms passing through the recloser. By directly capturing the waveforms, a wealth of possibilities for analysis, interpretation and network improvement are provided. As the reclosers already possess all measuring devices required as well as the capability to interpret all data at a high sample rate, it is a logical extension to be able to plot this data in the IEEE format of COMTRADE. This oscillography data can then be retrieved and imported into many different software packages for analysis.

In order to capture data that is worthwhile, it is important to be able to trigger the correct capture point. This depends greatly on the installation, but selecting the correct prefault capture and trigger point is paramount in effective use of this technology.

One of the most interesting applications of this technology is to capture fault events at reclosers and import these COMTRADES into relay test sets such as an Omicron or Doble. These test sets allow for simulation of the real faults present on a network, granting the capability for evaluation of performance of network assets, along with the optimisation of network protection.

Remote retrieving of data

All power quality data including oscillography gathered from the NOJA Power RC10 can be gathered remotely. Given the challenges of geographic distribution within Australia, many DNSPs have progressed towards an engineering access approach to managing their smart reclosers. By using this same port on the RC10 reclosers, it is possible to remotely gather the PQDIF and COMTRADE files from the reclosers.

Conclusion

Through bushfire mitigation and power quality monitoring, it is possible to grow the performance and revenues of DNSPs, and in a time where efficient, safe network operation is paramount it is negligent to disregard the capabilities available within the switchgear of choice on distribution networks, the semiconductor controlled ACR.

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AVOID PAYMENT DISPUTES AND SPARK YOUR CASH FLOW

*Roger Mendelson**

One of the most common issues affecting electricians is payment disputes with customers arguing over the cost of the work once the work has already been completed.

The problem with disputes, aside from being time-consuming and costly to a business, is that they are often a tactic used by bad payers to delay or completely avoid paying for the work.

A large portion of Prushka's more than 52,000 SME clients with outstanding debts are electricians, and they have cited this as a growing trend and concern.

In some cases, the disputes are genuine; but in other cases, they aren't — and that is when they negatively affect your bottom line.

When a dispute is raised, it invariably means that your account is either not going to get paid at all or will only get paid after a fight, regardless of who is in the wrong.

There are, however, simple steps you can take to significantly reduce the likelihood of a dispute, enabling you to recognise a genuine dispute from a dubious one.

Have a clear mandate for the work to be completed

One of the most common reasons bills in the electrical industry are disputed is due to a problem arising during the job which needs additional work. In some cases, the customer is not made aware of the changes and is therefore surprised when the final bill arrives.

The nature of the job means, despite quoting a price before commencing work, you never really know exactly what the job will entail until you get into it. You may uncover some unforeseen work that requires urgent attention.

Unfortunately, this situation cannot be avoided; however, it is the worker's or business owner's responsibility to drive the communication.

Firstly, obtain clear and concise information from your customer about the works which are required. This will give you an idea of what they expect to be done and what would be considered 'out of scope' and subject to a dispute.

Furthermore, for immediate or emergency work, it's important not to simply respond to a request for service without first examining the issue and providing a cost estimate. Be proactive in seeking a solution that the customer is happy with.

Provide a detailed quote

Once you have reviewed the job, you'll be able to provide a clear quote which outlines not only the work you will be undertaking but also what won't be covered.

If there are areas of uncertainty which will only be fully understood when the job commences, ensure that your quote fully covers for this eventuality.

Incorporate your trading terms in your quote, clearly detailing the customer's payment obligations. This will protect you from any legal challenges should your customer dispute the payments.

An important clause to include in your trading terms is providing that, in the event of the customer falling into default, they will be liable for all collection costs incurred by you. This enables you to recover unpaid accounts without worrying about additional costs.

The customer must sign your quote before you commence work. This provides you with a written guarantee that the customer agrees with your terms and will adhere to them. If not, they have accepted that they are liable to the consequences. Do not begin work until they have signed.

Know who your customer is

It sounds strange, but it is critical to know who is ultimately responsible for the work being done, as they are the person responsible

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> IF YOU ARE DOING WORK FOR A PRIVATE COMPANY, YOU NEED TO GET GUARANTEES FROM THE DIRECTORS OF THE COMPANY TO MITIGATE YOUR RISKS IF THE BUSINESS COLLAPSES.

for paying you. This is so simple but so easily overlooked. For example, if you are dealing with a real estate agent, ensure they have the authority from the property owner for you to carry out the works. If they don't, you need to get sign-off from the person who does, or you won't have an avenue to pursue if payment isn't made.

The easiest way to understand who is ultimately in charge is to send them a new customer application form to complete. This ensures you are dealing with the correct legal entity.

The form should include several questions in order to fully understand the customer, their business (if applicable) and their background, including contact details, where they work and their address.

If the job is a significant one, call the customer's accountant or request some trade references in order to be reassured that they have the capacity to pay your account.

If you are doing work for a private company, you need to get guarantees from the directors of the company to mitigate your risks if the business collapses.

Constantly communicate

If there is a variation to the job, always obtain concise authority from the customer to proceed with it. Specify what the extra costs will be and always confirm by email to the client so you have written evidence should they refuse to pay.

Don't just take it on without consultation and approval first. Most likely, they have only budgeted for the work you originally quoted and could be unable or unwilling to pay anything extra. I suggest you discuss a payment plan with the customer if the additional work would cause hardship, and have them sign it to ensure they are committed to paying you for it.

On completion of the job, confirm in writing that it is complete and request that they contact you within 24 hours if they have any issues with the work.

Ultimately, it all comes down to clear communication between you and your customer. You would be surprised by the number of accounts that could have been resolved by simply communicating better.

When you do receive disputes, respond to them quickly. If it is genuine, deal with it. If it isn't, treat the debt as a potential bad debt and, if you can't resolve it, refer it to a debt collection agency immediately.

If you diligently follow these steps, you will be better protected and have a solid foothold to obtain judgment and receive payment if a customer raises a dispute. But most importantly, they will dissuade most customers from trying to dispute payments, saving you time and money.

What to include in your quote:

- What work is covered by this quote?
- What work isn't covered?
- How long should the work take to complete?
- What possible issues may arise from this type of work?
- What would need to be done to fix these issues?
- How much would this additional work cost?
- Outline your trading terms — all bills must be paid within 30 days. If the customer refuses to pay, they are liable for all collection costs.
- Have the customer sign this form before work commences.

**Roger Mendelson is CEO of Prushka Fast Debt Recovery and Principal of Mendelsons National Debt Collection Lawyers. Prushka acts for in excess of 53,000 small to medium-sized businesses across Australia and operates on the basis of no recovery — no charge. Roger is also author of 'The Ten Mistakes Businesses Make and How to Avoid Them' and 'Business Survival', both published by New Holland Publishers in 2009.*
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DIAGNOSTIC TESTING OF HV CIRCUIT BREAKERS—PART 2

Roberts Neimanis, Application Specialist

Circuit breakers are complicated, mechanically sophisticated devices that require periodic adjustment. Sometimes a technician can see the need for these adjustments with a visual inspection and the problem can be solved without testing. However, with most circuit breaker issues, testing will be required.

This article, the second in a two-part series on circuit breaker testing, details more test techniques and, in particular, looks at the relatively new approach of resonant frequency testing. The first part of the article covered circuit breaker types and some of the most commonly performed tests.

Coil test

If the current in the operating coil of a circuit breaker is monitored during a trip operation, a curve similar to that shown in Figure 1 will be obtained.

When the trip coil is first energised [1], current flows through its windings. The magnetic lines of force in the coil magnetise the iron core of the armature, in effect inducing a force in the armature.

The current flowing through the trip coil increases to the point where the force exerted on the armature is sufficient to overcome the gravitational and frictional forces that tend to keep the armature at rest. When this point is reached, the armature is pulled [2] through the trip coil core. The magnitude of the initial current [1–2] is proportional to the energy required to move the armature from its initial rest position. The movement of the iron core through the trip coil generates an electromagnetic force in the coil that in turn has an effect on the current flowing through it.

The rate of rise of current depends on the change in the inductance of the coil. The armature operates the trip latch [3–4], which in turn releases the trip mechanism [4–5]. The anomaly at [4] is the point where the armature momentarily stops as contact is made with the prop. More energy is required for the armature to resume motion and overcome the additional loading of the prop. The anomaly may be caused by degradation of the prop bearings,

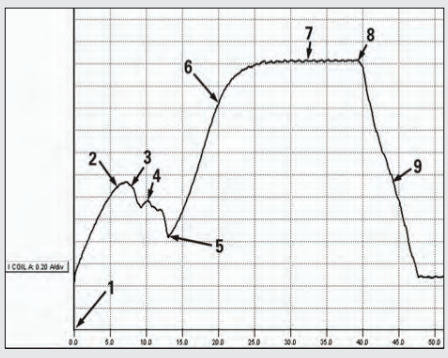

Figure 1: Detail of coil current signature.

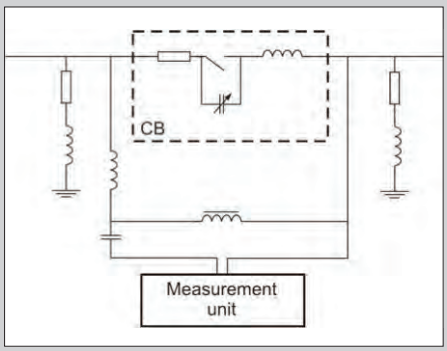

Figure 2: Resonant frequency model of circuit breaker grounded on both sides.

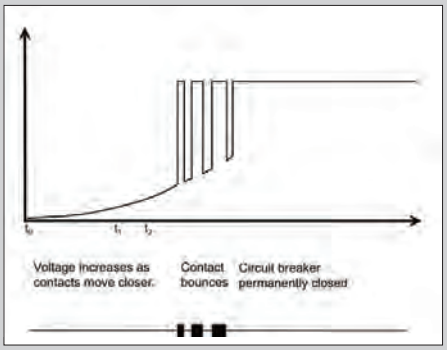

Figure 3: Change of voltage in resonance circuit.

lubrication, changes in temperature, excessive opening spring force or mechanism adjustment. The armature completes its travel [4–5] and hits a stop [5].

Of particular interest is the section of the curve between [4] and [5]. As the armature moves from the point where the trip mechanism is unlatched [4] to the stop [5], the inductance of the coil changes. The curve is an indication of the speed of the armature. The steeper the curve, the faster the armature is moving. After the armature has completed its travel and has hit the stop [5], there is a change in current signature. The magnitude of the current [7] is dependent on the DC resistance of the coil. The 'a' contact opens at [8] to de-energise the trip coil and the current decays to zero.

The interpretation of the circuit breaker operating coil signature often provides useful information about the condition of the latching systems.

Minimum voltage test

This test is often neglected even though it is specified and recommended in international standards. The test objective is to make sure that the breaker can operate at the lowest voltage level provided by the station battery during a power outage. The test is performed by applying the lowest specified operating voltage and verifying that the breaker operates within specified parameters. The standard test voltages are 85% and 70% of nominal voltage for close and open operations respectively.

Minimum voltage required to operate the breaker

This test, which should not be confused with the minimum voltage test just described, determines the minimum voltage at which the breaker is able to operate. It is a measure of how much force is needed to move the coil armature. This test is not concerned with contact timing parameters — only whether the breaker operates or not. The test starts by sending a control pulse at a low voltage to the breaker. If the breaker doesn't operate, the voltage is increased by, say, 5 V and the test is repeated. This procedure is continued, with gradually increasing voltage, until the breaker eventually operates. The voltage at which this occurs is recorded and, if the test is repeated next time the breaker is maintained, a comparison between the old and new figures will indicate whether significant changes have occurred.

Vibration testing

Vibration testing is based on the premise that all mechanical motion in equipment produces vibrations and that, by measuring them and comparing the result with the results of previous tests, the condition of the equipment in question can be evaluated.

The easiest parameter to measure is the total vibration level. If it exceeds a specified value, the equipment is deemed to be in the fault or at-risk zone. For all types of vibration testing, a reference level must have been previously measured on equipment known to be fault free.

All measurements on the equipment tested are then related to this reference signature in order to determine whether the measured vibration level is 'normal' or whether it indicates the presence of faults. Vibration analysis is a non-invasive test technique that uses an acceleration sensor with no moving parts. The breaker can stay in service during the test; an open-close operation is all that is required for the measurement. First-trip operation can be different from the second and third because of corrosion and other metal-to-metal contact issues. Vibration is an excellent method to capture the data about the first operation after the breaker has spent a long time in the same position.

The analysis of vibration data involves comparing the latest results with the reference. Vibration measurement can detect faults that are barely noticeable using other conventional methods. However, if data such as contact timing, travel curve, coil current and voltage are available in addition to the vibration data, even more precise condition assessment is possible.

Vacuum bottle test

Vacuum bottles in vacuum circuit breakers are tested with high-voltage AC or DC to confirm the integrity of the vacuum. The electrical behaviour of the vacuum in the bottle is identical for AC and DC. The main difference in using DC and AC is that AC measurements are influenced by capacitance. The resistive current component is typically between 100 and 1000 times smaller than the capacitive current component; the resistive component is therefore difficult to distinguish when testing with AC. As a result, AC requires much heavier equipment for testing compared to DC test instruments.

Synchronised switching

In order to test the function of a controlled switching device, one or more currents from current transformers and reference voltages from voltage transformers are recorded, along with controller output signals, while issuing an open or close command. Details of the test set-up depend on the test instrumentation, as well as the available voltage and current sources.

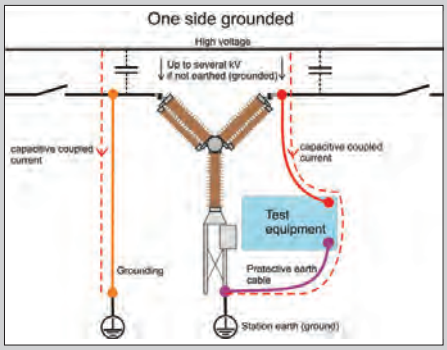

Figure 4a: Connections to breaker using conventional and DualGround technique.

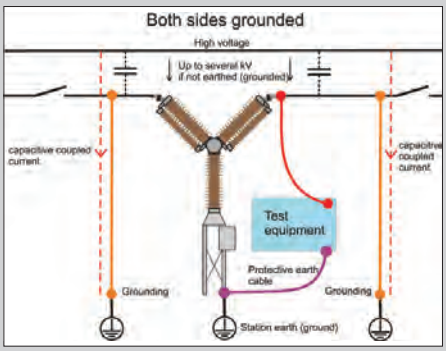

Figure 4b: Connections to breaker using conventional and DualGround technique.

SF6 leakage

SF6 leakage is one of the most common problems with circuit breakers. The leakage can occur in any part of the breaker where two components are joined, such as valve fittings, bushings and flanges. In rare cases, SF6 can also leak straight through the aluminium as a result of poor casting. Leaks can be found by using gas leak detectors (sniffers) or thermal imaging.

Humidity test

As humidity can cause corrosion and flashovers inside a breaker, it is important to verify that the moisture content inside an SF6 breaker is minimal. This is done by venting a small amount of SF6 gas from the breaker through a moisture analyser, which will determine the moisture content of the gas.

Air pressure test

Air pressure testing is carried out on air-blast breakers. Pressure level, pressure drop rate and airflow are measured during various operations. The blocking pressure that will block the operation of the breaker in the event of very low pressure may also be measured.

A new approach: resonant frequency testing

Preparation for testing a circuit breaker involves the safe isolation of previously energised high-voltage equipment. Ground connections are then applied to the isolated equipment, normally leaving breaker grounded on both sides.

Present practice for performing timing tests requires, however, that the ground connections on one side of the breaker are removed during the test to allow correct operation of the test equipment. The potential safety issues with this practice require the adoption of special safety procedures. In most cases, an 'authorised person' will be involved with the test as well as a central office that issues the special work permits required. This means that the test takes longer, tying up equipment and the test engineer unnecessarily. In addition — and most importantly — the network is out of service for longer. Engineers also need more training so that they can deal with the necessarily complex safety procedures. To address these issues, a new technology was introduced in 2006 that allows main contact timing tests to be performed on a circuit breaker with both sides grounded. Dangerous voltages can, therefore, be kept at distance — a safe area around the circuit breaker can be created and clearly marked with security fencing. Accidents with electric arc and electrocution can be avoided. The main contact timing results produced by this new technology are fully compatible with the conventional main contact timing measurement. For field personnel, the new way of working is much faster but is otherwise familiar. This new timing technique is based on the capacitance formed between the parts of the breaker contact, which are separated by an insulating medium — usually oil, air, vacuum or SF6. Any circuit breaker contact can, therefore, be seen as a capacitor. This capacitor is a part of the resonant circuit formed by breaker itself and other surrounding components such as busbars, connections and ground connections, as shown in Figure 2.

The resonant frequency of the circuit depends on the value of the capacitance between circuit breaker contacts. The circuit response will vary with the movement of the contacts, as shown in Figure 3.

Timing of main contacts can be performed using this technique, which is also called the DualGround method. This method allows circuit breakers to be tested more safely and more efficiently than with conventional timing techniques. Safety dictates that both sides of a breaker should be grounded during field tests, but conventional timing methods require ground to be disconnected on one side of the breaker to allow the instrument to sense the change in contact status. This procedure makes the test cables and the instrument part of the induced current path while the test is being performed.

The DualGround method allows for reliable measurements with both sides of the circuit breaker grounded, thus making the test safer, faster and easier. This technique also makes it possible to test circuit breakers in configurations such as GIS applications, generator breakers and transformer applications, where conventional timing methods require the removal of jumpers and busbar connections, which is difficult and inconvenient.

Comparison with other methods

DualGround timing is an excellent solution when ground loop resistance is low, since it has no lower limit for ground loop resistance. The ground loop can even have lower resistance than the main contact/arcing contact path without affecting the results. This is particularly crucial when testing GIS breakers and generator breakers, as well as for AIS breakers having good grounding appliances. The changes in resonant frequency of the whole circuit (breaker and ground loop) can easily be used for close/open status detection.

Often dynamic resistance measurement is proposed as a tool for timing circuit breakers with both sides grounded. In this case, the determination of circuit breaker state is made by evaluating the resistance graph against an adjustable threshold. If the resistance is below the given threshold, the circuit breaker is considered closed; if the resistance is above the threshold, the circuit breaker is considered open.

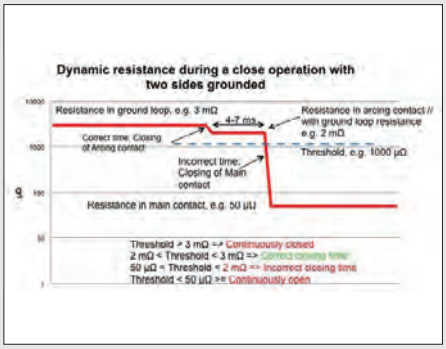

Figure 5: Potential for error when using dynamic resistance measurement for timing a circuit breaker with both sides grounded.

Problems can arise, however, when choosing the threshold, since it must be below the ground loop resistance (which is initially unknown) and above the resulting resistance of the arcing contact (which also is unknown) and the ground loop in parallel. The reason is that, according to the IEC standard, it is the closing/opening of the arcing contact that is considered as the operation time of the circuit breaker, not the main contact, and the difference between main and arcing contact operation time can, depending of contact speed, be as much as 10 ms. For example, a 2 x 10 m copper grounding cable with 95 mm^2 cross-section area has a resistance of about 3.6 mΩ (not counting the resistance of connector devices). An arcing contact is usually also in the mΩ range, from a couple of mΩ up to about 10 mΩ, depending on the type of circuit breaker and on the condition of the arcing contact. All this taken together makes it a near-impossible task to adjust the threshold, as the exact value to use is unknown. It may require several attempts to achieve a reasonable result and may be even more difficult if the resistance graph is not recorded during measurement.

Furthermore, a method that relies on evaluation against thresholds is more sensitive to induced AC currents through the test object. When a circuit breaker is grounded on both sides, a loop is formed with a large area exposed to magnetic fields from surrounding live conductors. The alternating magnetic field will induce a current in the circuit breaker/grounding loop. This current can reach a few tens of amps, which corresponds to a significant proportion of a typical 100 A test current. If the evaluation threshold is at the limit, these induced currents will definitely affect the timing results. The resonant frequency technique is, on the other hand, completely insensitive to 50/60 Hz interference.

Conclusions

When maintaining a circuit breaker, technicians should start with timing and motion measurements. In fact, if that technician only has time for a single measurement, that measurement should be timing.

Electrical power network growth and asset development requires that all available technologies be implemented to ensure reliable electricity supply. New technology for circuit breaker testing offers a more cost-efficient test procedure and, since it allows both sides of the breaker to be grounded during testing, it ensures safety for key employees in accordance to national laws, standards and social partner demands.

Megger Limited
www.megger.com

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Clamp-on power analyser

The Hioki PW3360-21 Power Logger is suitable for monitoring and analysing the power consumption of a variety of facilities. It is available to rent from TechRentals.

The compact device runs off its internal battery (8 h life) or can operate using line voltage from the mains, if required. It supports single- to three-phase, 4-wire circuits and measures up to 780 V with a 1000 V display range. The product also allows harmonic measurement up to the 40th harmonic.

An SD card slot can hold months of data storage and the built-in analysis software allows for simplified trending and graphical manipulation. The device also features a Quick Set function to ensure correct connections. The product is supplied with 3x 500 A CTs and 3x 5000 A flexible CTs.

TechRentals
www.techrentals.com.au

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Milan upgrades its road lighting to energy-efficient LED technology. ©Osram

SAFEGUARDING LED ROAD LUMINAIRES FROM LIGHTNING

Lighting manufacturer Osram has introduced overvoltage protection for LED road luminaires that are vulnerable to lightning strikes, as more cities and local councils around the world upgrade their road lighting to LED.

The company has recently completed LED lighting projects in Milan and Turin in a move to cut power costs, which they said is expected to provide at least a 50% reduction in electricity consumption.

Lightning strikes can cause damage or premature ageing as LED modules are run with lower voltage levels and are therefore susceptible to overvoltage. According to the UN Climate Council's fifth assessment report (IPCC14), the world has seen an increase in lightning in recent years. Around 10% of the several million lightning strikes that occur each day impact on the ground, thereby causing voltage peaks.

To combat this issue, Osram has introduced the Optotronic 4DIM electronic control units, which feature standard overvoltage protection of 8 kilovolts between mains supply and ground in protection classes I and II, to protect LED modules assembled in road luminaires. This means that lightning can impact to proximities of up to 200 m from a luminaire mast without the LED module being damaged.

Osram said it is the first manufacturer to make the 8-kilovolt protection with an EQUI connection (equipotential) for protection class II applications, enabling various components of the lighting system to exhibit the same electric potential and significantly reduce the occurrence of overvoltage on the LED module.

For more information about overvoltage protection for LED street lighting, click here.

SKL ELECTRICAL CABLES PROHIBITION

A prohibition notice has been issued from the Electrical Safety Office for electrical workers and consumers to prevent the sale and/or installation of some SKL brand thermo-plastic sheath (TPS) electrical cables marked 2013. The prohibition affects SKL brand TPS twin and earth cable with marking '2013', sold or distributed by SKL Cables Australia Pty Ltd, of sizes 1 to 16 mm^2 configurations which are PVC sheathed and PVC insulated. An issue has been identified with the insulation and sheathing PVC compound of the electrical cable, which does not comply with Australian standards, and may lead to a reduction in the insulation integrity. This may result in electric shock or fire.

The Electrical Safety Office said these cables were imported and supplied by SKL Cables Australia Pty Ltd.

It has been recommended to remove the product from sale, including display for sale, as well as cease installation of this cable immediately.

It is an offence to supply or continue to install any cable subject to the prohibition order. For further information, go to SKL electrical cables.

COLLEGE CONCERNS REINFORCE NEED FOR VET SECTOR VIGILANCE


© iStockphoto.com/Vadym Volodin

Media reports concerning the reportedly dubious practices of an Australia-wide training provider have prompted the National Electrical and Communications Association (NECA) to affirm its calls for reform to the VET sector.

"Reports claiming that a training provider has used door-to-door salespeople, offering free laptops and fake exam results to target potential students, reinforce the need for vigilance and reform of the vocational education and training sector," said Suresh Manickam, NECA's CEO.

"NECA has previously called upon the federal government to ensure that the Australian Skills Quality Authority (ASQA) provides strict oversight and monitoring of poorly performing training organisations to ensure beneficial teaching outcomes, apprentices meet industry needs and standards, and that confidence in vocational education and training remains high."

Manickam said that while NECA understands that the operations of the college mentioned in the reports are being monitored by the NSW Minister for Skills, further investigation by ASQA is needed for these types of situations and should be done at the direction of the Minister for Vocational Education and Skills, Luke Hartsuyker.

"Australia's electrical contracting sector has one of the highest safety and technical standards in the world," said Manickam.

19” SHOCK RACKS

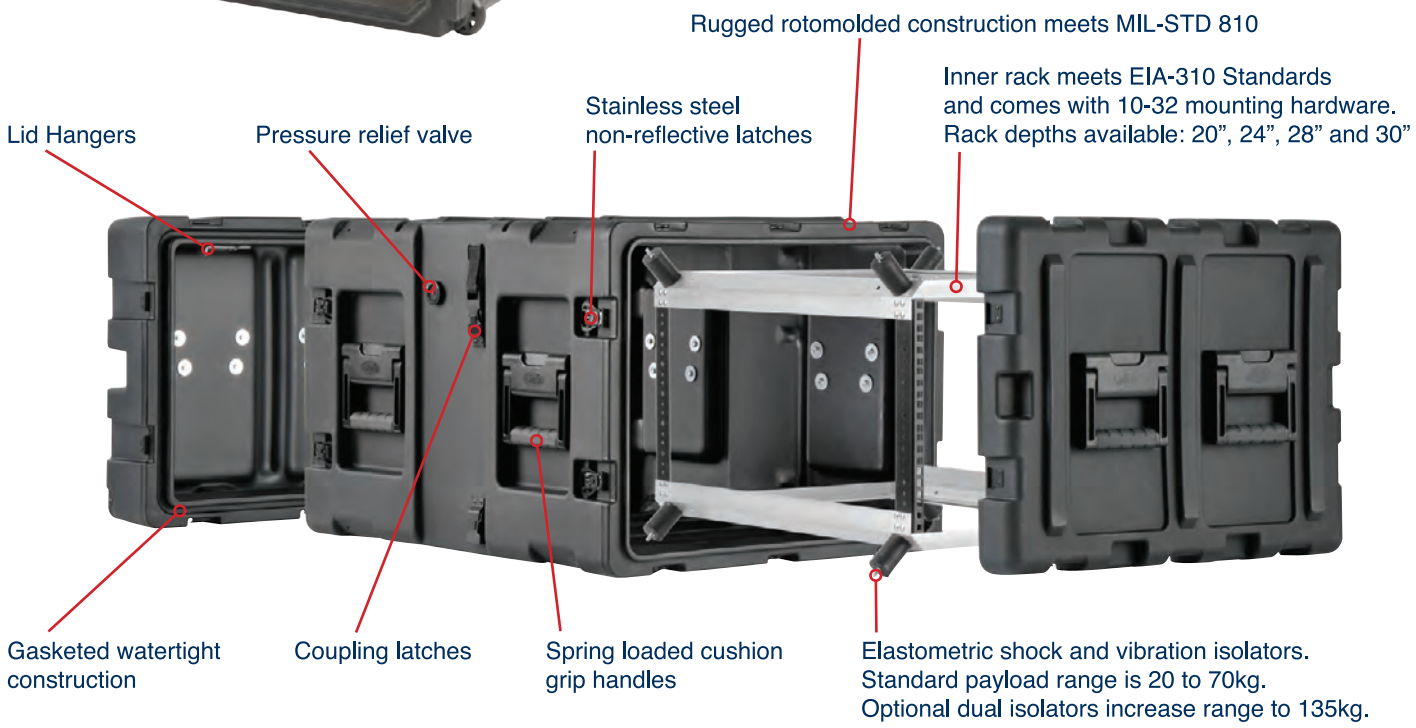
SKB 19” Shock Rack cases are the optimal choice for protecting and transporting valuable and sensitive 19” rack mounted equipment.

Built to meet Military Standards, SKB shock racks have an internal frame mounted on adjustable elastomer shock absorbers on all eight corners to control the effects of shock and vibration on all three axes. The sway space around the internal frame provides natural air flow to keep equipment cool. Easy to transport by way of retractable spring loaded cushion grip handles, SKB shock racks can be supplied with integrated or removable wheels to make for easy handling and storage.

SKB shock racks are used in many applications where equipment must arrive intact and function seamlessly from the moment it’s switched on. Applications include military, aviation, emergency services and rescue organisations, as well as entertainment, communications, marine, surveying, and geotechnical, to name a few.

Made in the USA, SKB shock racks stand the test of time. SKB cases come with a lifetime warranty.

For more information, visit: www.switchesplus.com.au



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MASTER ELECTRICIANS AUSTRALIA

Stopping preventable electrocution

Malcolm Richards, CEO

As the team at Master Electricians Australia reaches the half-way point in its 10-year public advocacy campaign, the association is now launching an updated Switch Thinking report for 2015 to keep the ball rolling on the vital issue of mandating the installation of safety switches.

Six years have now passed since the first Home Insulation Program-related electrocution death; an East Gippsland family buried their 15-year-old son, found by his father clutching a damaged extension lead socket; and a Roebourne toddler was electrocuted while playing during a family party.

Five have passed since MEA first launched its comprehensive report into electrocution deaths, which found that 15 people were dying every year from preventable electrocution.

It's been two years since the electrocution of an 18-year-old trade assistant in Bunbury who was helping an electrician pull cables through conduit into a roof space; and since then Queensland Coroner Michael Barnes handed down his findings into the botched insulation scheme, recommending that new laws regarding safety switches in homes "be actioned as a matter of urgency".

Twelve months have now passed since Commissioner Ian Hanger echoed the recommendations of Coroner Barnes when handing down his findings into the ensuing Royal Commission — outlining a clear path for implementation, including a national promotional campaign and a compliance program which could be enforced when houses were sold (as was the case with swimming pool fences in some states).

And this year, after commissioning further independent research allowing us to update our 2010 Switch Thinking report for 2015, MEA has discovered that despite more than two decades of mandatory fitting and government-sponsored awareness campaigns, around 40% of homes (higher in some states) still have no safety switches at all. A much larger number of homes are protected only on the power circuits.

But in stark contrast, the independent research has also indicated that 82% of people believe safety switches should be made compulsory in all homes. Around 76% of people would be more likely to support this view if there was a government subsidy for safety switches.

However (with the exception of a Queensland Government public awareness campaign on the need for multiple safety switches), little action has actually been taken, and vital electrical safety components have still not been implemented, prompting us to again ask why, almost two decades after safety switches became mandatory on some circuits in new homes, lives can still be lost to electrocutions in Australian homes.

As we begin rolling out our newest safety switch campaign, we realise it's going to take public awareness campaigns, intensive political lobbying, comprehensive contractor support programs and a significant media presence to effect change in this extremely important space.

As such, we are still calling on all contractors across the state to make the installation of safety switches a priority for discussion at every callout. Ensuring that every customer is fully aware of what they are, what they do and why they need them, as well as how many their home actually has, is paramount to tackling this issue. When so many electrocution deaths are those of tradespeople, it may be your own life you save by keeping this important debate going.

Master Electricians Australia
www.masterelectricians.com.au

Industrial routing switch

The Westermo RedFox industrial Ethernet switch range is now fully certified for use in hazardous areas. ATEX/IECEx certification by BASEEFA enables these robust Layer 3 switches to be installed in potentially explosive atmospheres typically found in oil and chemical processing plants, sewage treatment and gas distribution centres, sugar refineries and grain handling locations.

In addition to obtaining EX certification, RedFox has been tested both by Westermo and external test houses to meet many EMC, isolation, vibration and shock standards, all to the highest levels suitable for heavy industrial environments and even rail trackside applications.

RedFox is a key component within Westermo's Edge Network Solutions, which transfer vital data from the edge of data networks where environmental conditions are harsh back to the core of companies' business systems.

By combining Westermo's WeOS network operating software and network tools, with RedFox and other industrial networking hardware, Westermo is able to provide resilient and robust solutions for any mission-critical network.

As a Layer 3 routing switch, RedFox delivers enterprise-type routing functionality, using industry-standard protocols such as OSPF, RIP and VRRP should a failure occur within a ring network. Westermo's FRNT protocol rapidly reconfigures (around 20 ms) the network to ensure the process can continue. This helps to minimise any disruption to operations and ensure resilient networks can be constructed.

RedFox has a wide power range of 19–60 VDC on dual power inputs for resilience and requires 30% less power than the previous generation of products, a significant benefit for lifetime running costs. RedFox has a wide operating temperature range of -40 to +70°C, making it suitable for extreme environmental conditions; and because it has no moving parts or cooling holes in the aluminium enclosure, this the reliability of the product is maximised, providing a mean time between failure of up to 388,000 h for ATEX/IECEx approved models.

Madison Technologies
www.madisontech.com

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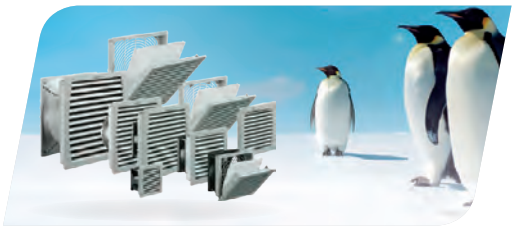

reduced energy consumption

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As the inventors of the 'Filterfan' in 1958, Pfannenberg's continued development, features and energy efficiency technology is unrivalled. The Filterfan 4.0 range features flow optimised fins and rotor blades for high airflow via its fluted filter mat.

With a patented tool-less 4-corner fastening system, the Filterfan enables safe and quick installation which can be replaced in seconds.

Use less power, gain more air and a 300% longer life than conventional filter fans.

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Cordless power drill

Bosch has released the GSR 18-2-LI Plus Professional cordless drill/driver to its lightseries of ultralightweight, all-purpose tools. It is designed to offer power and versatility for challenging drilling and screwdriving applications to finishing trades such as carpenters, joiners, electricians and fitters.

The drill features electronic motor protection (EMP), which automatically shuts off the motor if the tool overheats, to ensure long life. It has a 13 mm auto-lock chuck and offers 63 Nm for hard screwdriving applications and 24 Nm for soft screwdriving applications. The maximum drilling diameter has been increased from previous models to 38 mm in wood and 13 mm in steel, while the maximum screw diameter in wood is 8 mm.

The tool has a battery voltage capacity of 18 V/2 Ah and a no-load speed of 0–500/1.9 rpm. Its anatomically shaped Soft-grip handle, with a grooved texture, is designed for increased comfort when operating. The tool also features an LED light and a belt clip.

Bosch Power Tools
www.bosh.com.au

Compact RCBO

The Voltex Slimline Compact RCBO provides overcurrent and earth leakage protection, suitable for new or existing residential and commercial applications.

Its narrow module design allows for more RCDs/MCBs to be installed in the one enclosure, and it is particularly suitable for retrofit installations where pole space in switchboards is a problem. It is also designed for Class AC, C-curve applications. The device has a two-pole safety feature that allows switching of both active and neutral contacts. It has six current ratings, catering for small and large loads. It is also top and bottom line and load compatible for easy and quick 'either-way-up' installations.

The product is compatible with all major brands' switchboards and switchboard accessories. It has an AS/NZS 61009 compliance rating and comes with the Voltex Lifetime Warranty.

The company claims the product is also available for same-day dispatch from its central warehouse.

Voltex Electrical Accessories
www.voltexelectrical.com.au

Transformer tester

The OMICRON FRAnalyzer is a transformer tester that uses Sweep Frequency Response Analysis (SFRA) to detect mechanical and electrical changes in the core and winding assembly of power transformers. It is available to rent from TechRentals. By identifying a power transformer's unique frequency response, SFRA can be used to diagnose issues without the need for expensive demounting of a transformer's active part. The integrity of the transformer can also be verified after a fault, mechanical shock or transportation. Regular, ongoing analysis can improve reliability and prevent a costly outage.

The product has a frequency range of 10 Hz to 20 MHz (selectable) with dimensions 26 x 5 x 26.5 cm (W x H x D), as well as fully customisable sweep settings.

The device's fault detection applications include: winding deformation — axial and radial, such as hoop buckling, tilting and spiralling; displacements between high- and low-voltage windings; partial winding collapse; shorted or open turns; faulty grounding of core or screens; core movement; broken clamping structures; and problematic internal connections. The package comes with a laptop preloaded with FRAnalyzer software.

TechRentals
www.techrentals.com.au

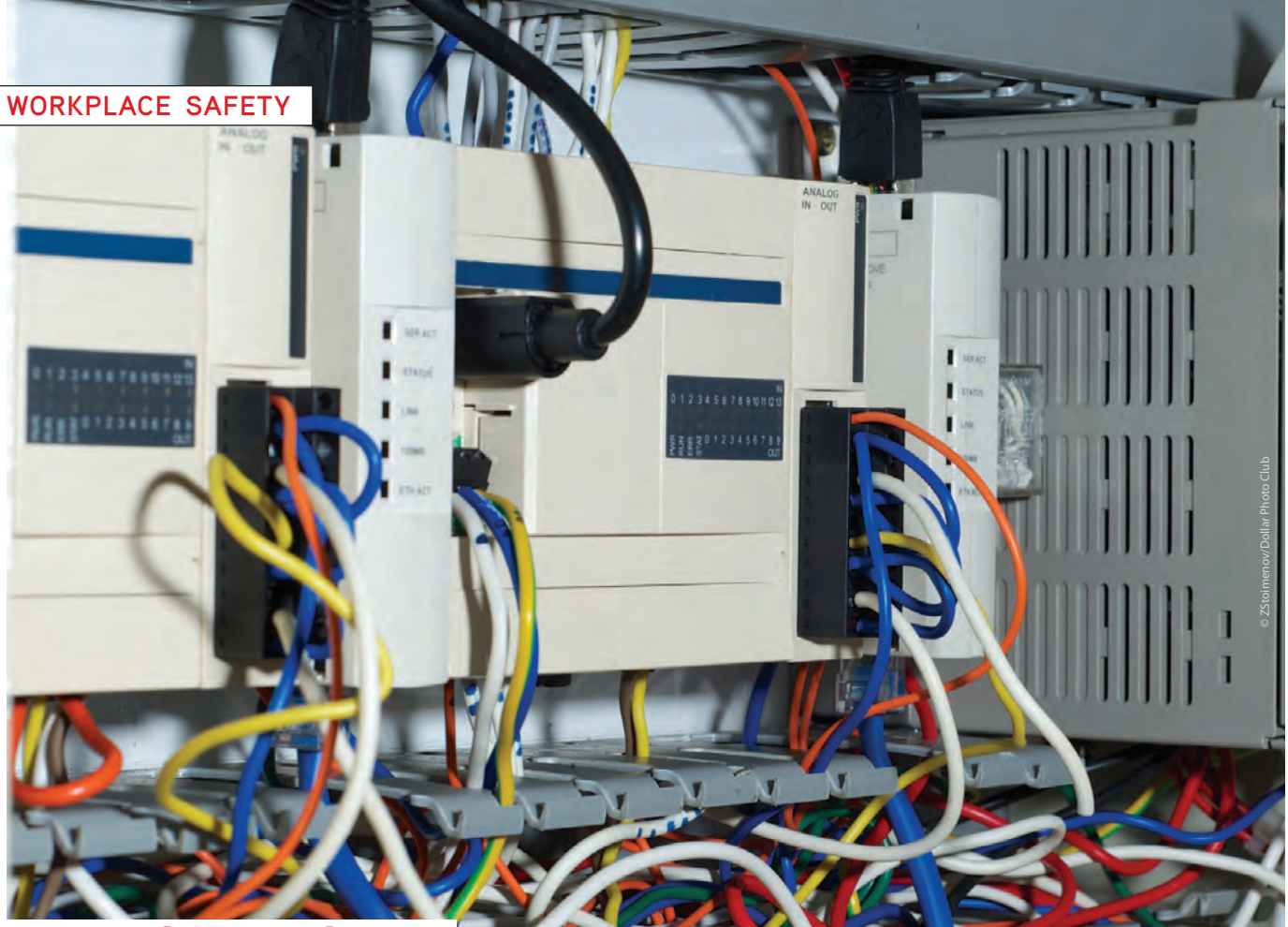
Portable lead stand

Adept Direct has updated its Portable Telescopic Lead Stand, designed to minimise trips, slips and falls on building construction sites and other workplaces that use hoses, leads, pneumatic air lines or power tool cables.

The product, which is extendable from 1.5 to 2.6 m high using a simple thumb screw adjustment, ensures electrical leads and air hoses are kept up off the ground in work areas and passageways. The robust product features a high-visible safety yellow design and incorporates an injection-moulded insulating cable hanger, which secures up to eight cords and hoses.

The removable telescopic lead stand attachment also makes the stand easy to store and transport.

Adept Direct - Cable Rollers & Lead Stands
www.adeptdirect.com.au



ELECTRICAL SWITCHBOARD MANUFACTURER FINED

A WA manufacturer of electrical switchboards and switch rooms has been fined $180,000 after two workers were seriously injured when they fell from a scissor lift.

HVLV Pty Ltd (in liquidation) was found guilty of failing to provide and maintain a safe working environment in breach of the Occupational Safety and Health Act. The company was ordered to also pay costs of $784 when convicted on 4 August 2015.

In the incident, which occurred on 25 February 2013, two workers were on top of a scissor-type elevated work platform carrying out tests at a height of about 10 m when an overhead crane, being wirelessly controlled by workers in another section of the factory, collided with the platform and tipped it over.

One worker had tied a 46 kg test weight to the handrails of the scissor lift to carry out the test procedure, while the other employee was ordered by a supervisor to stand on the opposite side of the platform to act as a counterbalance.

Both workers fell to the ground and suffered serious injuries during the incident. One worker received numerous fractures, including to his arm, shoulder and ribs, as well as a punctured lung. The other worker also received multiple injuries, including dislocation of his arm and leg, and fractures to his arm, leg, foot, pelvis and lumbar spine.

After the incident, the company's sole director conceded in an interview with WorkSafe that "with hindsight" a job safety analysis or some form of hazard assessment should have been done in these circumstances.

A WorkSafe investigation concluded that the hazard could have been controlled by restricting the use of the crane while the scissor lift was being used, as well as better communication with all staff working in and around the platform and isolating the area around the platform with bunting or a ground spotter.

"Although the company is in liquidation, it was considered important to prosecute the company and have a conviction recorded as a deterrent to others," said WorkSafe WA Acting Executive Director Ian Munns.

"Other employers in the same or similar industries need to appreciate that if safety measures are not taken, they will be liable to prosecution and substantial penalties."

In handing down the penalty, Magistrate Benn from the Midland Magistrates Court said the nature of the hazard was obvious and posed a serious risk of injury or death. He said the practices carried out on the day of the incident displayed a general lack of safety consciousness, including the fact that the test weight was being tied to the platform's handrail, which was against the manufacturer's instructions.

The Magistrate said that there were cost-effective measures that could have been put in place to prevent the hazard, such as proper training, communication and risk assessment.

WorkSafe WA
www.worksafe.wa.gov.au

Antivibration power tool

The FEIN MultiMaster FMM 350 Q is an oscillator power tool designed with antivibration technology. It is said to reduce vibrations by up to 70%, as well as noise levels by 50%, compared to its predecessors.

The tool works with a back-and-forth action at almost 19,500 times a minute, rather than a rotating movement, allowing the user to not only saw and sand surfaces but also to complete rasping, polishing, shaving, cutting, severing, sharpening or filing activities. It has an input of 350 W a sanding pad width of 80 mm and a soft-grip zone for easy handling. The product also features a motor with a high copper content for maximum output, suitable for continuous use and overload. It has a QuickIN quick clamping system designed for fast tool charges without a wrench. The power tool weighs only 1.4 kg and comes with a 5 m cable and plug.

Just Tools
justtools.com.au

Circuit protection range

The Resi MAX range from Clipsal by Schneider Electric offers a variety of consumer switchboards, meter boxes, circuit breakers, surge protectors, safety switches, comb busbars and accessories for circuit protection.

The surface-mounted and recessed switchboards come in both economical and premium versions. They offer generous wiring room, a choice of mounting positions, various sizes and colours with additional accessories such as busbars for simplification of wiring.

Each circuit protection device has lift-up terminals with combination head screws. Additional safety is provided with 'ON' and 'OFF' markings in contrasting colours on toggle mechanisms. The range also includes a SLIM RCBO, suitable for residential applications. It is rated at 4.5 kA and achieves a 6 kA rating when combined with an HRC service fuse. In addition, a compatible busbar is equipped with insulated slots and deep bottom cog-rail terminals, allowing for a quick fit-off.

The Resi MAX range of MCBs, RCDs, RCBOs and isolators complies with the standards AS/NZS60898, AS/NZS61008, AS/NZS61009 and AS/NZS 60947-3 respectively. For added protection, the housing for all devices is made of self-extinguishing material.

Schneider Electric Clipsal Partner
www.clipsal.com

Walking the torque

Having a good set of screwdrivers will help any electrician get a job done well, but how safe is that job and for how long?

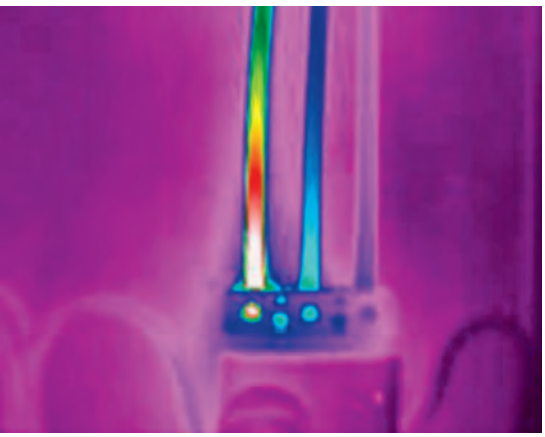
Today, a lot more attention is being paid to the safety of electrical installation work which includes the effectiveness of terminations and how tight they are.
Thermal imaging is showing what the eye cannot see, with hotspots warning of the potential for arc-induced fires.
Problems occur when either terminals are to loose causing a hotspot or too tight resulting in deformity of the terminal connection.
Switchgear manufacturers have long known of these problems and issue instructions on the correct tightness when installing their devices and often imprint the required torque rating in newton metres (Nm) on the fitting itself.
With explicit instructions as to the tightness of main connections and individual MCB and RCD terminals, it's hard to see how boards and panels could be terminated incorrectly, but without a torque screwdriver says Wiha distributor Andrew Cordes, it's hard to see how any termination could be guaranteed 100 percent right.
Cordes says while every electrician knows to tighten screws firmly, many are over-compensating for the risk and tightening too much.
"The far better option is to use a torque screwdriver which will apply the precise amount of pressure required and deliver a perfectly safe termination every time."

Wiha innovation

As director of Premium Tools, the Australian distributor of Wiha products, Cordes says Wiha was the first to develop a 1000 volt VDE torque screwdriver in 2011. He says its success around the world has been aided by electricians' associations wanting to

protect their members from insurance claims where fires were found to have been caused by incorrect switchgear installation.

"All it takes is one loose termination and your reputation could be on the line — but you can safeguard your company and staff in all the work they do with any of the three drivers in the TorqueVario-S VDE range.



"Switchgear manufacturers set different torque values for their equipment so relying on a feel for the right tightness or torque to apply could lead to a costly misjudgement. Habitual over-tightening can also add unnecessarily to daily fatigue."

Secure and reliable

Using a TorqueVario-S and following the manufacturer's instructions for the right torque setting will guarantee the right result and the optimum level of safety for clients.

Cordes says any Wiha screwdriver from its general range will do an excellent job on any installation, but only the TorqueVario-S will deliver guaranteed safety and certainty and is now an essential tool for electricians to reduce risk.

"TorqueVario-S is an investment in quality work and effective risk management, and this is reflected in the premium price of the unique Wiha solution. Consistent with this, Wiha insulated torque screwdrivers are individually tested to 10,000 volts and rated to 1,000 volts.

How tight is tight?

The correct tightness is not a matter of installer discretion, says Cordes, but is determined by the supplier.

Manufacturers generally specify the correct torque values in newton metres (Nm) and the numbers cited in their instructions or on their products are the same as used by the adjustable TorqueVario-S.

"You can set any value in the screwdriver's designed range. If the required torque is '2.0Nm' then all you have to do is insert the black-handled, screwdriver-like, torque-setter tool into the TorqueVario handle and twist it until 2.0Nm shows up in a window on the TorqueVario collar. Then remove the setting tool and insert an insulated bit holder into the handle along with the blade you want to use.

"When your turning pressure on the screw reaches 2.0Nm, a torque limiting clutch emits a noticeable click and disengages the driving force, preventing excessive tightening — no matter how hard you try."

Complete set

Wiha's 9-piece TorqueVario-S (code 36080) screwdriver kit includes bit holders, a torque setting tool, a terminal blade and Slotted Philips and Pozi blades in a range of sizes.

There are three handle options covering different newton metre ranges (0.6 to 2, 1 to 5 & 2 to 8). For heavier duty torque (2 to 8) Wiha has just launched the new T Handle version.

Cordes says in terms of torque values, available slimBits drives, slimTechnology and VDE certification, Wiha kits offer the best package on the market.

"The 1 to 5 Nm version covers 99% of what an electrician will need for torque-sensitive jobs. Wiha offers an exceptionally slim driver up to 33 percent narrower than standard insulated tools.

Wiha VDE torque drivers are distributed through leading electrical wholesalers and industrial suppliers.

wiha
Tools that work for you

Premium Tools Australia
Distributors of Wiha Tools
www.wiha.com.au

AC/DC power supply

The PBI6C Series by Powerbox is a compact AC/DC power supply that has been engineered for a range of applications where real estate and accessibility are limited. Designed with a small and lightweight closed frame, the product enables the power supply to be installed in locations where other systems may not be suitable. It also features remote control, enabling operation to be controlled away from its housing.

The product incorporates an adjustable current limiter from 20 to 100%, allowing precision constant current to the equipment load. Its power output ranges from 50 to 150 W, which includes an adjustable voltage range. It also features overcurrent and overvoltage protection to prevent damages that may be initiated by input power.

The product has been tested to operate at temperatures from -10 to 71°C and is covered by a five-year warranty.

Powerbox Australia Pty Ltd

www.powerbox.com.au

Metal clad switchgear

The Clipsal wilcoRowco metal clad switchgear is a range of metal enclosures which ensure outlets and switches are well protected from impact and heat in a range of environments. The series has been updated with added features and its modular redesign is now in line with the Clipsal by Schneider Electric's 56 Series. This allows for an easy upgrade in areas where the 56 Series product is being used. The updated range includes a patented co-moulded section on the internal bridge which further protects the internal parts of the product from being exposed to dust or water. Another feature includes RCD protection at the point of the socket, which means workers do not need to return to the main switchboard if the power is tripped in a remote location. The RCD can be reset at the socket. To ensure safe work practices, the DIN enclosure is also lockable so that the RCD reset function can be restricted to limited personnel on-site.

The range extension includes both three and four gang enclosures, so that power connection for these configurations can now be performed inside the unit. The product is also compliant with an IP66 rating.

Schneider Electric Clipsal Partner

www.clipsal.com

Micro-ohmmeter

The Megger DLRO 10X micro-ohmmeter is suitable for technicians and electrical engineers looking to perform low resistance measurements. It is available to rent from TechRentals. This fully automated unit selects the most suitable test current up to 10 A DC to measure resistance from 0.1 $\mu\Omega$ to 2000 Ω, on one of seven ranges.

The lightweight and portable instrument uses a menu system controlled by a two-axis paddle, allowing the user to manually select the maximum test current.

The 10X uses the four terminal resistance method, which shows the true resistance of the item under test. It also automatically applies forward and reverse currents that cancel out any standing voltages across the sample under test.

Other features include: auto current reversal cancels standing emfs; protected to 600 V; automatically detects continuity in potential and current connections; multiple operating modes including fully automatic; alphanumeric keypad for entering test notes; user-selectable high and low limits.

TechRentals

www.techrentals.com.au

Thermal imaging camera

The Keysight Technologies U5850 series TrueIR thermal imagers offer predictive maintenance in industrial settings. The cameras identify abnormalities quickly with 320 x 240 pixels of in-camera fine resolution from its detector resolution of 160 x 120 pixels. The series features a manual focus, which can focus on an object as close as 10 cm away. The cameras have a high temperature range of up to 1200°C and can also monitor temperature changes through image logging and temperature trending capabilities.

With the built-in image logging capability, users can track system performance at a specific interval, as well as analyse temperature changes over time with a trending graph. For more in-depth analysis and report generation, users can download the TrueIR Analysis and Reporting Tool PC software.

The thermal imaging cameras also feature a customisable colour palette and come with a 3-year product warranty.

Keysight Technologies Aust Pty Ltd

www.keysight.com

Switched PDUs

The NBB Series vertical-mount switched PDUs now include both single- and dual-input 16/32 A versions.

The high amperage switched PDUs are specifically designed to provide secure, remote power control and reboot capabilities for high-density rack enclosures.

All NBB Series models feature 20 remote switched IEC C13 outlets with four 16 A UL-489 circuit breakers. Each branch circuit breaker protects five IEC C13 outlets. Power to the models with 16 A inputs is supplied through IEC C20 connectors with detachable cables (sold separately) while the models with 32 A inputs feature attached IEC-60320 Commando 10-foot cables.

The metering and reporting features of the NBB Series include True RMS current metering of individual branches or the total system. Reports can specify kWh, kW, amps, volts or temperature.

The NBB Series PDUs can also perform reboots and power shutdowns on individual outlets according to a user-defined schedule. They can also monitor the ping response from critical equipment and if a ping command fails the device can be automatically rebooted.

The NBB Series can be configured and monitored via its convenient IP web browser interface, Secure Telnet, out-of-band dial-up modem or by any SNMP MIB-based enterprise management software.

The NBB Series is built for vertical Zero U (0U) installations where rack space is limited. Mounting kits are available to fit a variety of rack and closet enclosures.

Interworld Electronics and Computer Industries
www.ieci.com.au

Low-voltage switchboard rescue kit

The Low Voltage Switchboard Rescue Kit (LVSBRKIT) from Electrical Factory Outlet is designed to be used by a safety observer for the safe rescue of victims of electrical shock and other injuries when working on low-voltage (LV) switchboards and substations. The weatherproof bag is made from synthetic non-tear material in a high-visibility orange colour and features an emergency strip that glows in the dark.

The kit contains LV rescue crook fibreglass that is 25 mm in diameter and has a double-insulated overmould handle, as well as 1000 V insulated gloves in size 11, a multi-trauma dressing (EO sterilised) and a CPR face mask (CE approved). It also features an 1800 x 1200 mm fire blanket compliant to AS/NZS 3504 standards, a thermal accident shock blanket and two D-size batteries.

The kit comes with an emergency isolation sign, a list of contents and a conformity card. It complies with Australian Standard AS4836 Safe working on low-voltage electrical installations.

Electrical Factory Outlet
www.electricalfactory.com.au

Electrical training module

NHP Electrical has added the Signalling Devices module to its free training program for the electrical industry. The NHP Training University (NTU) course modules are designed to offer industry professionals the opportunity to increase their knowledge in key electrotechnology product areas. Within the latest module, participants will be introduced to the types of sight and sound technologies available on the market, as well as how to select the right emergency or standard signalling device via a simple step-by-step method.

With a structured balance of tutorial videos, supporting documents and around-the-clock support, users can access their training via any device, including desktop, laptop, mobile or tablet.

Some of the other modules on offer from NTU include contractors and overloads, motor starters and controllers, hazardous area equipment, machine safety control systems and relays. Since NTU's beginnings in 2012, over 5000 participants have registered to complete electrical training.

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

Modular DIN-Rail IPC

The APAX-5580 DIN-Rail IPC from Advantech is a modular IPC, designed for serving smart factory applications and for integrating OT and IT.

The product is a PC-based control platform with I/O modules, communication ports and control software. It includes an Intel Celeron 1.6 GHz/Core i3/Core i7 1.7 GHz processor, 4 GB DDR3 memory, 2 x GbE ports, 1 x RS232/485/422 port, 1 x mSATA connector, 2 SD slots, 2 mini PCIe slots, dual power input, UPS support and a 10-year lifetime RTC battery. Operation of up to 2 h is possible in battery mode in the event of a power failure.

The unit is a complete modular system helping developers build according to their needs without complicating the system infrastructure, reducing the amount of time and effort needed in configuration. With the hot-swappable design, all the modules can be swapped in and out without interrupting the operation of the IPC, simplifying maintenance and troubleshooting.

With integrated supporting modules, the product can connect to COM and CANbus devices as well as other third-party industrial devices. An APAX-5430 SATA module allows the addition of another SATA SSD/HDD drive, in addition to the one that comes with the APAX-5580, allowing a RAID 0/1 configuration. The product's iDoor module also allows users to add other functions such as Fieldbus.

The product, having partnered with CODESYS, is also able to provide extra functions such as real-time Ethernet protocol and programming by IEC61131-3, using target visualisation via a connected screen and/or the web visualisation on remote devices via a web browser.

Advantech Australia Pty Ltd
www.advantech.net.au

DODGY LEDs ARE YOUR GLOBES CAUSING INTERFERENCE?

Faulty or non-compliant LED globes can cause TV interference. And if you're a manufacturer or importer of LED globes, you're responsible for ensuring that they don't cause interference. The Australian Communications and Media Authority suggests suppliers take some simple steps, detailed below, to prevent interference.

Are you a supplier?

Anyone who imports electronic devices, including LED globes, for use by someone other than themselves is a supplier under the Radiocommunications Act 1992.

Even if you're not 'selling' LED globes as a retailer, you still may be considered a supplier if you: are responsible for buying and supplying the lighting for your company's clients; do fit-outs or other contract work where you or your business imports and installs lighting; sell globes online that you drop ship or otherwise source from overseas.

This means you're subject to technical standards compliance requirements.

Why LEDs?

Some models of LED light globes cause interference to TV signals. This interference may consist of a sudden loss of signal or picture quality in a residence or neighbouring house.

In these cases, the Australian Communications and Media Authority (ACMA) needs to be able to quickly contact the supplier of the globes to notify them of the problem. People experiencing TV reception problems may also wish to contact the supplier to arrange an exchange or refund.

The consequences of supplying a device that does not comply with Australian law can be serious and may risk your business's reputation.

How to make sure imported LED globes comply

Some points to consider include:

- **Confirm the product can be legally supplied and used in Australia.** Ask the overseas wholesaler or manufacturer to give you compliance test reports showing that the globes comply with the applicable Australian or international equivalent electromagnetic compatibility (EMC) standards (such as CISPR 15 or EN 55015). If your manufacturer can't provide test reports, you'll need to arrange and pay for testing yourself. While overseas test reports are acceptable, you must provide information explaining how the overseas standards are equivalent to the Australian standards.
- **Check if other standards also apply.** The EMC standards are in addition to electrical safety standards that may also apply.
- **Give your overseas supplier or manufacturer clear specifications.** Make sure your manufacturer or wholesaler understands that globes that are suitable for some markets may not be suitable for Australia and must conform to Australian or equivalent international standards.
- **Be wary of unauthorised changes made by manufacturers.** In several cases, overseas manufacturers appear to have changed components or internal designs of globes without telling Australian suppliers, leaving Australian suppliers holding large quantities of non-standard globes. For example, a manufacturer might remove

an internal filter or alter the components or circuit for efficiency reasons. Such changes may not be visible on the outside of the product and may not be reflected in a change in model number. In reality, such unauthorised changes will constitute a new product, which requires a new test report. When receiving a new batch of what you expect to be the same model, inspect a sample to ensure that there have been no internal product design changes.

- **Check the terms of sale and the wholesaler or manufacturer's reputation.** Make sure you'll be able to return any stock that does not comply with Australian standards. If the globes are found to cause interference in Australia, your customers will have to disconnect them.
- **Carefully scrutinise any test report provided to you by a manufacturer.** The Australian Competition and Consumer Commission (ACCC) has warned that fake (forged or modified) test reports have been uncovered.
- **Check the manufacturer will label the globes with the regulatory compliance mark (RCM).** Make sure you register on the national database before applying the RCM. Registration is free if you only need to register for ACMA compliance purposes (not electrical safety purposes). Many overseas manufacturers will print the RCM and a brand name on bulk orders. If not, you will need to do this yourself.

As a supplier, what must I do to comply?

The ACMA administers a largely self-regulatory regime, which is designed to be low in cost and light on red tape for Australian suppliers. As a supplier, you must:

- **Register as a supplier and label your globes.** There is no fee to register as a supplier for ACMA compliance purposes, which you can do online. You can then affix the RCM symbol (this replaces the old C-tick) to your globes.
- **Keep compliance documentation on file.** You must keep a copy of the declaration of conformity, a description and the test report that demonstrates compliance for each model of globe. If there is an interference complaint about the particular model, the ACMA may audit you by asking you to produce these documents. The ACMA also conducts targeted audits of devices as part of its compliance programs.
- **Be prepared to pay for a local test report.** If the ACMA audits your compliance documentation and it is insufficient, you may be legally required to have an Australian-accredited laboratory to test three samples of your globes at your expense. Remember, continued intentional non-compliance can result in fines or prosecution, so do the right thing — make sure your LED globes comply.

The ACCC's supplier guide includes the following advice for suppliers. To help ascertain whether a report has been forged or tampered with, look for:

- missing elements of the report;
- different fonts throughout the report that could suggest cutting and pasting;
- different background shades that could suggest cutting and pasting, the use of white-out or photocopying;
- an unknown laboratory name or logo that does not appear to exist anywhere else;
- spelling and grammatical errors;
- inconsistencies in codes, identification numbers and page numbers; or
- conclusions that clearly do not match, or seem at odds with, the test results or body of the report.

These days, test laboratories often send reports in PDF format via email. Always ask the test laboratory to send you the test results in PDF format at the same time they are sent to any other party (such as a manufacturer or agent). This limits the potential for alteration of test results.

You can ask for security provisions associated with these files that prevent changes, restrict access and limit recipients to printing only. This reduces the possibility of electronic tampering with original documents. To prevent tampering and forgeries, always ask test companies to activate security measures for electronic reports.

If you feel suspicious about a test report, try to contact the laboratory that has written it and ask them to verify its authenticity in writing. Check the validity of claims to accreditation by contacting the relevant accreditation body and asking for evidence of this. If a supplier or manufacturer cannot verify the authenticity of a report, it should not be relied upon for choosing, buying or selling stock.

Australian Communications and Media Authority
www.acma.gov.au

Industrial unmanaged PoE switches

Antaira Technologies has expanded its industrial networking infrastructure family with the LNP-1202G-SFP and LNP-1204G-SFP series of industrial PoE+ gigabit unmanaged ethernet switches. Designed for security, transportation and solar and wind power industries, the switches are suitable for outdoor applications with an extreme ambient weather environment.

Both 12-port industrial-grade unmanaged ethernet switches have high-power PoE+ capabilities and are IEEE 802.3at/af compliant. The units require a high-voltage power input of 48–55 VDC to support up to 30 W of PoE power output per port. The LNP-1202G-SFP series supports 10*10/100/1000 Tx RJ45 ports and 2*100/1000 SFP slots, whereas the LNP-1204G-SFP series supports 8*10/100/1000 Tx RJ45 ports and 4*100/1000 SFP slots.

The series provides high EFT, surge (2000 VDC) and ESD (6000 VDC) protection. The devices also have a dual power input design with reverse polarity protection, with a built-in relay warning function to signal a power failure.

The series has a five-year warranty with an IP30-rated, compact, fanless, DIN-Rail and wall-mountable design. Each product is built to withstand shock, drop, vibration, electromagnetic interference (EMI) and temperature extremes. Operating temperature version options include a standard -10 to 70°C or an extended -40 to 75°C model range.

Antaira Technologies

www.antaira.com.tw

Dimmable LED downlight

Emerald Planet has released the Downlight Tri-colour Series, a dimmable LED downlight that has three different colour temperatures which can be controlled from the light switch.

The product can alternate between Warm White (3000K), Cool White (4000K) or Daylight (6000K), allowing users to change the lighting colours in a room to suit their preference. It comes in 70 mm cutouts with 10 W and 600–700 lm, as well as either 90 mm at 10 W with 600–700 lm, or 90 mm at 13 W with 800–950 lm.

Other features include: a 90° beam angle; CRI>80; a power factor - 0.94; and 40,000 h lifespan. The product comes with a driver, flex and plug. It is NSW Energy Saving Scheme (ESS) approved and has a 3-year warranty.

Emerald Planet Environmental Pty Ltd
www.emeraldplanet.com.au

Digital tool

Schneider Electric has introduced FlexSelect, a digital tool that enables users to configure, quote and order simple distribution boards the company claims are manufactured and ready for dispatch within 48 h.

The tool uses an automatic process available at any time of the day to provide technical drawings and an immediate quote. The system allows users to select their configurations by creating a new project and selecting and positioning the breakers and options they require for their project. They can then instantly review pricing and receive technical drawings as soon as an order is placed.

The tool can be accessed via a desktop computer or on the go with a tablet or mobile device.

Schneider Electric
www.schneider-electric.com

CONTROLLING HARMONICS AND IMPROVING POWER QUALITY

Sohar Aluminium in Oman, one of the world's largest aluminium smelter facilities, employed a customised power quality solution from ABB to address a harmonics issue during its smelting process.

Sohar Aluminium produces more than 360,000 t of aluminium annually and is also one of the biggest power consumers in Oman. The smelting process was creating high levels of harmonics, and it was crucial these were kept under control in order to adhere to grid codes and stay connected to the Oman power grid. It was also important the harmonics did not affect other customers on the grid.

"As a leading specialist on power factor correction, we contacted ABB to assist with the design and installation of harmonic filters to reduce the amount of harmonics generated by our smelting process," said Edward Hough, electrical engineer at Sohar Aluminium.

Harmonics are similar to electrical pollution created by non-linear loads. If harmonics in a network are too high, it can result in forced ageing as well as overload and tripping of electrical equipment. High harmonics also interfere with the smooth operation of electronic equipment, like computers and UPS systems, and can increase network losses. Many utilities impose penalties for non-compliance with harmonic regulations and grid codes.

ABB delivered a turnkey solution including a study of the harmonics in the plant as well as the design, supply, installation, testing and commissioning of a harmonic filter system. The power quality solution comprises four harmonic filter banks at 55 MVAR and high-voltage switchgear.

The filter system has solved power quality issues with regard to harmonics and reactive power and allows Sohar Aluminium to connect to the Oman grid without any compliance issues. The system has also improved power quality in the smelter facility and reduced electrical losses.

ABB Australia Pty Ltd
www.abbaustralia.com.au

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LEDs — QUALITY AND REGULATIONS MATTER

Bryan Douglas, CEO, Lighting Council Australia

LED technology has improved rapidly in recent years and several excellent products are available in the Australian marketplace. However, tests conducted by the Australian Government on LED products indicate a wide variation in product efficiency, quality and illumination.

Light-emitting diodes (LEDs), with their many advantages — including energy efficiency, longevity, durability and controllability — are now playing a prominent role in most forms of lighting. The large majority of new lighting installations in commercial, industrial and residential buildings are now LEDs.

LEDs are also taking over the public lighting market, particularly street lighting, and they are even appearing in more esoteric applications such as indoor commercial horticulture in and around our cities. They have truly revolutionised illumination and are the most significant technological development in lighting in the past 100 years.

While the technology has improved significantly in the past few years, the market is rife with poor-quality products. Some lower quality LEDs may provide insufficient light, flicker when dimmed, change colour through life or fail prematurely. And that's not all — many products do not comply with the Australian lighting regulations.

Non-conformity with regulations is a major concern for the Lighting Council Australia, lighting suppliers and the entire industry. Non-conformity with electrical safety regulations can result in electric shock and fire. Non-conformity with electromagnetic compatibility regulations can result in serious interference issues with television reception and even compromise emergency service communications in and around buildings.

This article will outline the regulatory requirements for LEDs in Australia for three main areas — electrical safety, EMC and energy efficiency. It will also provide guidance on how to determine whether LED products conform to regulatory requirements. The article will also touch on quality issues and provide some guidance on how to avoid the problems mentioned above.

Electrical safety

Suppliers of in-scope electrical equipment — ie, low-voltage equipment rated at >50 VAC RMS and <1000 VAC RMS — should be registered on a national database established by the Electrical Regulatory Authorities Council (ERAC). This includes LED luminaires.

As part of the registration process, 'responsible suppliers' make a declaration that the equipment they sell meets relevant standards and is electrically safe. Any member of the public may access the database to determine if the supplier is registered — see https://equipment.erac.gov.au/Registration/.

> THE REGULATORY COMPLIANCE MARK (RCM) IS AN IMPORTANT MARK PLACED BY THE SUPPLIER STATING THAT THE PRODUCT IS COMPLIANT TO ALL APPROPRIATE REQUIREMENTS FROM AUSTRALIA'S ELECTRICAL SAFETY AND ELECTROMAGNETIC COMPATIBILITY REGULATORS. THE RCM HAS BEEN MADE MANDATORY SINCE 1 MARCH 2013 AND SHOULD BE VISIBLY PLACED ON THE PRODUCT.

Many LED downlights used in residential developments have LED drivers that are external to the luminaire, and these are considered high-risk items by Australia's electrical safety regulators. Suppliers are required to hold a Certificate of Approval and mark the driver with the Regulatory Compliance Mark and/or a NSW approval number. The ERAC national database lists Certificates of Approval. Users may check whether LED drivers and any other high-risk items, such as a portable luminaires, decorative luminaires, inspection luminaires, fluorescent ballasts, starters and bayonet cap or Edison screw lamp holders, are registered. If there is any doubt, ask the supplier for a copy of the Certificate of Approval for the device.

Electromagnetic compatibility (EMC)

All LED lamps and luminaires must comply with Australia's EMC Framework. Compliance is established by test reports. In addition, all suppliers must be registered on the national database referred to above, hold a Supplier's Declaration of Conformity and mark the product with the Regulatory Compliance Mark.

Product marking

The Regulatory Compliance Mark (RCM) is an important mark placed by the supplier stating that the product is compliant to all appropriate requirements from Australia's electrical safety and electromagnetic compatibility regulators. The RCM has been made mandatory since 1 March 2013 and should be visibly placed on the product. For EMC compliance only, products placed on the market before 1 March 2013 can carry the C-Tick mark until 28 February 2016.

Some suppliers will point to the CE mark on their product and claim that it demonstrates regulatory compliance. However, it is important to note that the CE mark has no legal status in Australia. Only the RCMs (and, for older products, the C-Tick mark) have legal status.

Energy efficiency

There were no regulations for energy efficiency of LEDs at the time of publication. The Australian Government, in conjunction with state, territory and New Zealand energy-efficiency regulators, has issued a lengthy document containing policy options for LEDs. Some of these options include:

- Introduce minimum energy performance standards (MEPS) to remove the lower performing lamps;
- MEPS to include a range of performance parameters that address important quality and performance issues found in market testing to ensure that LED lighting provides an effective as well as efficient lighting alternative;
- MEPS to include a preferred range of rated luminous flux values to be used on lamp packaging, along with a requirement for lm/W to be included on packaging in order to assist consumers in selecting replacement lamps;
- Suppliers to be required to include efficacy and performance information on LED product packaging and/or the LED product to enable customers to choose a suitable and efficient model;
- MEPS to apply to LED luminaires.

The Department of Industry and Science is currently consulting with industry and other stakeholders before providing a clearer direction on future energy-efficiency regulation.

Quality issues and false claims

As mentioned earlier, LED products in the Australian marketplace are beset by quality problems. Many are also subject to false performance claims.

Lighting Council Australia has developed a basic guide intended to assist commercial users make informed decisions when buying or specifying LEDs. 'A Guide to Choosing LED Products and Suppliers' (available at www.lightingcouncil.com.au) provides information on both mandatory compliance and key voluntary aspects, such as product performance.

Assessment of performance is somewhat more subjective than mandatory compliance. In assessing performance, some users may decide brand alone is sufficient, or they may compare the supplier's claims on the product specification sheet or brochure to an increasingly stringent array of available information. The most common method for assessing LED performance is the LM-79, LM-80 and TM-21 methods developed by the Illuminating Engineering Society of North America.

To understand LED performance, it is essential to understand total input power, luminous flux, luminous efficacy, lumen maintenance, correlated colour temperature and colour rendering index.

Total input power (measured in watts)

The energy consumption of an LED is the total input power of

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a luminaire. It is a measurement of all power consumed by the LED, the driver and any internal electronics. It is also known as light circuit power (LCP). To determine energy consumption, refer to the LM-79 report.

Total luminous flux, or light output of a luminaire (measured in lumens)

Not to be confused with the light output of the LED chip or light engine, which invariably is greater than the light output of the luminaire. Refer to the LM-79 report.

Luminous efficacy (measured in lm/W)

Efficacy is a measure of how efficiently a luminaire uses power to produce usable visible light, expressed as lumens per watt (lm/W). The higher the lm/W, the more efficient the luminaire. However, light distribution is also very important in deciding the correct luminaire for an application. For commercial installations in particular, it is best to work with a lighting designer to ensure the product purchased meets the requirements of the space for which it is intended. To determine luminous efficacy, refer to the LM-79 report.

Lumen maintenance

The light output of all light sources depreciates with use. Lumen maintenance is the term used when measuring this decay. For LEDs, the lumen maintenance (L70) value is a prediction of the number of hours an LED light source will operate before its light output falls below the point at which the decay is easily noticed; the value is 70% of initial light output. It corresponds to the practical end of life for the LED chip. The L70 value should not be confused with luminaire life. Luminaire life is determined by the weakest component — perhaps the power supply or failure of waterproofing. Luminaire life may be considerably shorter than the L70 value. Users can verify the lumen maintenance claim by requesting a copy of the TM-21 report.

Correlated colour temperature (CCT)

Colour temperature describes the colour appearance of light and is measured in degrees Kelvin (K). Colour temperatures recommended for different interior lighting applications are shown in AS/NZS 1680.1 — 3000K is considered a 'warm' colour; 4000K is 'neutral' or 'cool white'; 5000K is a 'cold' or daylight colour. The LM-79 test report will show the colour temperature.

Colour rendering index (CRI)

CRI is a measure of the colour appearance of objects. A CRI of 80 or higher is used in most indoor applications. The LM-79 test report will show the CRI.

SSL Quality Scheme label

Lighting Council Australia has a voluntary Solid State Lighting Quality Scheme which validates the supplier's performance claims in the following critical areas: energy efficiency; light output; colour temperature; colour rendering index; and dimmability. Certification of product under Lighting Council Australia's Solid State Lighting Quality Scheme will provide increased confidence, as will registration on a state government rebate scheme.

Lighting Council Australia
www.lightingcouncil.com.au

ECD ELECTRICAL+COMMS+DATA SOLUTIONS EFFICIENCY + RENEWABLES

Signal tower lights

The Pfannenberg BR50 signal tower lights range has a flexible modular design with a sturdy housing for indoor and outdoor applications.

Up to five modules with six lens colours may be used on the signal tower with any combination of continuous LED, blinking LED and flashing xenon elements. A sounder module can be added for an audible alarm up to 85 dB and an ASi bus module is available for network integration.

A monitored light module in red and yellow is an option for safety-sensitive applications. They have two separate LED circuits integrated within the module so if one circuit were to fail, an alarm contact is activated warning the operator, while the second circuit would continue to operate.

A simple base mount on a flat surface with 100, 250 and 400 mm tube and stand mounting options are also available. The range has standard IP54 protection, while IP65 protection is optional.

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

LED visual warning indicator

JT Day has announced the Wolf Markerlite, a self-contained, high-visibility LED visual warning indicator that highlights the position of personnel and hazards to prevent accidents in dark and reduced visibility environments, is now available and in stock.

The device is suitable for use as personal identification on protective headwear, clothing and site bicycles as well as marking escape routes, exits and equipment. The product is CE marked to the ATEX Directive and IECEx certified for safe use in potentially explosive zone 1 (IIC/T4) gas and zone 21 (IIIB/200°C) dust atmospheres as encountered in oil, gas and petrochemical, industrial, marine, defence, utilities and emergency services sectors. Two replaceable primary coin cells power a bright 'fitted for life' LED light, available in white, red or amber with switchable flashing or static functions. This gives long-lasting light output durations of up to 65 h and 25 h respectively. The product also delivers a wide angle beam of 180° light, meaning it is highly visible and can be seen from over 0.8 km away in clear conditions.

Other features include: a single-handed switching for operation (on/off) and function (static/flashing) selection, making it simple to activate by applying pressure to the lens; a drop- and impact-resistant polycarbonate enclosure and lens; and an IP67 rating ensuring it is dust tight and protected against the effects of immersion up to 1 m under water. The LED indicator is supplied ready to use with integrated clip, re-usable cable tie, batteries and instructions.

JT Day Pty Ltd
www.jtday.com.au

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* Feb 2015 research by Markets and Markets

CASE STUDY

Powering a 10-star home

A new Christchurch home has received New Zealand's first-ever 10-star Homestar rating, an award that recognises its energy-neutral, sustainable footprint. Schneider Electric designed its innovative electrical infrastructure, enabling the home to switch seamlessly between mains and solar power.

The 140 m^2, two-storey home was designed by Christchurch architectural designer Bob Burnett, a leading advocate of sustainable homes. Its thermally efficient design includes solar walls that preheat ventilation air through an energy recovery ventilation system, a dual-heat hot water and hydronic underfloor heating system and fully insulated foundations and slab edges (to reduce heat dissipating from concrete floor slabs).

Complementing these are numerous eco-friendly features: rainwater harvesting, re-usable greywater, water-efficient fittings, solar power and energy-efficient lighting and electrics. The reduced use of heating and electricity should keep the home energy-neutral, leaving it free of power bills.

The 10-star rating was awarded by Homestar, a system run by New Zealand's Green Building Council. It uses a 1–10 scale to measure factors such as energy and water use, waste, materials, ventilation and health and comfort. Homes built to New Zealand's current building codes typically rate three on Homestar's scale.

"Energy efficiency doesn't have to be costly. As this home illustrates, it's actually about using existing technology in a cleverer way — simple, but smart," said Burnett.

The electrical solution

The home's electrical supply is split between conventional 240 VAC from the grid and a 24 VDC system from 18 roof-mounted solar panels. Evening of the demand is met by the batteries — the home automatically switches to 240 V mains when the batteries run low. The overall configuration demanded a relatively simple electrical design, but it came with a caveat.

To meet the architect's energy-efficient, sustainability brief, says Schneider Electric's Dave Chapman (channel manager — residential), "we had to think a little differently. Considering that the home is designed for a family, affordability was key. Energy-efficient technology often carries a cost premium. Bob wanted a solution using standard, off-the-shelf technology."

Chapman's team opted for energy-saving techniques such as motion detectors — sensors which switch off lights if no one in the room. To support that, they enhanced conventional wiring templates.

"For example, we introduced a sunset switch to specific circuits. It automatically renders these circuits active or inactive depending on whether its day or night. By ensuring that specific lighting circuits can't be used, any chance of accidental wastage is eliminated."

The home is equipped with Schneider Electric's Saturn White range of switches. "Again, while this is one of our standard models, we've wired the switches in an unconventional way. Using a relay in the switchboard, we've created an 'all-off' functionality. The home's entire lighting system can be shut down from one switch, again eliminating any possibility of lights being left on."

To help the home owner keep track of electricity consumption and solar power availability, an Ecomind energy monitor has been installed. It gives owners an easy-to-read-and-understand tool for managing and modifying their energy use patterns.

Because mobile technology has become so prevalent in the modern lifestyle, the home has been equipped with multiple USB charging ports

to service devices such as phones and tablets. With a five-star rating, the USB chargers are particularly energy efficient.

"While the technology we've installed doesn't meet the conventional definition of home automation," says Chapman, "in effect the design and the way it's been configured delivers a similar outcome."

Solar

The home's solar component was supplied by one of Schneider Electric's specialist partner companies in Christchurch, Canterbury Power Solutions (CPS). The system's 18 photovoltaic panels are each rated at 260 W and charge two sodium-ion 24 V batteries housed within a wardrobe. The panels' combined output of 4.16 kW is easily sufficient for servicing the two batteries, said CPS owner Murray Marquet.

The DC power is converted to 240 VAC by a Schneider Electric inverter connected to a battery management system (BMS). When the BMS senses that battery power is too low, it switches back to the national grid supply. It does this with the help of a simple DIN rail device mounted in the home's switchboard.

"The switchover is automatic and seamless," says Marquet. "And as a grid-tied system, the solar configuration also feeds electricity back onto the national grid when there is excess battery power. It's clean electricity delivered to the grid at the standard 50 Hz frequency. There are no rogue waveforms."

Schneider Electric Clipsal Partner
www.clipsal.com

SOLAR PV TRAINING AND INSTALLATION CHALLENGES

Several issues can affect solar PV installations. GSES, a renewable energy engineering, training and consultancy organisation, has identified certain areas that prove to be more challenging than others. This article outlines just a few of the challenges that affect installations.

Wind loading requirements

During training, students often express concern regarding who is responsible for the structural safety of PV arrays and mounting systems. Electricians installing PV arrays are typically not also structural engineers or builders experienced in dealing with structural requirements; therefore, they can't be expected to conduct wind loading calculations to guarantee structural safety.

To ensure PV arrays are safely secured, AS/NZS5033:2014 requires that the array framing has engineering certification for wind and mechanical loading. Rather than acquiring site-specific certification for every installation, the most common method of achieving certification is to install mounting systems that are precertified for a range of site parameters. These precertified mounting systems require that the manufacturer's installation instructions are followed for the certification to be valid. However, if the site parameters do not apply — or installation instructions are not strictly followed — then the certification is void and the responsibility of the wind and mechanical loading falls on the installer.

Below are some key installation aspects that installers must consider in order to adhere to manufacturer's instructions:

- Varying requirements for different roof zones: The manufacturer may specify limits or exclusions zones for where the array can or cannot be located on a roof. Also, areas closer to roof edges may require additional fixings.
- Fixing method requirements: The manufacturer may specify the quantity, type, length and gauge of screws. The material and size of roof battens/purlins may also be specified.
- Varying requirements for different wind regions and terrain: Requirements will vary depending on where in Australia the system is located (corresponding to wind regions) and the local terrain (the structures in the area that would affect the wind). Wind regions are designated in AS/NZS1170.2: Section 3.2.

PV array maximum voltage calculation

Grid-connected PV students are expected to have prior training in basic electrical calculations, but PV arrays have unique electrical characteristics that must be understood in order to design and install a safe and efficient system. One of the more complicated calculations associated with PV is one which determines the PV array maximum voltage.

All DC equipment between the PV array and the inverter must be rated to withstand PV array maximum voltage; therefore, it is important that this value is understood and calculated correctly.

The maximum array voltage occurs when the array is at its open circuit voltage and its minimum operating temperature. This is calculated using the formula found in AS/NZS 5033:2014 Section 4.2.

Before the 2012 update of AS/NZS 5033, maximum voltage was approximated using a fixed multiplier of 1.2 of the array voltage at standard test conditions, not accounting for site-specific minimum temperatures.

Calculating the PV array maximum voltage according to AS/NZS 5033:2014 and appropriately applying it to equipment ratings ensures that equipment will be rated correctly for each installation's weather conditions.

THE REQUIREMENTS FOR PV ARRAY DC ISOLATORS TAKE INTO ACCOUNT VARIOUS PRIMARY AND SECONDARY FAULT SCENARIOS; THEREFORE, IT IS VITAL THAT THEY ARE UNDERSTOOD AND FOLLOWED.

Proper signage

PV systems' unique electrical characteristics and safety concerns make appropriate signage crucial for communicating to both emergency workers and contractors. Installations may require over 10 different types of signs in different locations around the system. To help cover the signage requirements, signage packs are readily available. While these packs are useful and some advertise CEC approval, they cannot be assumed to be sufficient for every installation. Furthermore, they may become out of date as new requirements come into effect with standards updates. It is essential that installers check the wording and quality of any signage packs against what is required in AS/NZS 5033:2014. The responsibility of installing signage that has the correct labelling and is indelible falls solely on the installer.

Sizing PV array DC isolators

The requirements for isolation devices on DC systems vary greatly from that of AC systems. Many of the protection and isolation requirements that electricians practice in relation to AC systems do not apply to PV DC systems. For example, in AC systems circuit breakers are used to protect wiring and components; this is not always required in a PV system, as a PV array is current limited — the short circuit current from a string of PV modules is generally less than 10 A. Therefore, PV systems only require (DC rated) isolation devices that do not (necessarily) offer over-current protection.

The requirements for PV array DC isolators take into account various primary and secondary fault scenarios; therefore, it is vital that they are understood and followed. Further information on sizing PV array DC isolators can be found in the GSES technical articles 'DC Isolators: What are the Manufacturer's Specification Sheets Really Telling You?' and 'DC Isolator Sizing requirements'.

Installing systems without accreditation

One question that frequently arises is whether or not CEC accreditation is required to install PV systems. In the past, CEC accreditation was only required if the installer was applying for small-scale technology certificates (STCs). This is a stipulation imposed by the Clean Energy Regulator, which awards STCs for PV systems, and is an effort to ensure quality installations throughout Australia. Therefore, if an installer did not wish to claim STCs on a system, there was no requirement for them to be CEC accredited.

However, today many network providers require CEC accreditation for connections to the grid. As network operators adopt this requirement, the opportunities to install grid-connected PV systems without CEC accreditation are greatly reduced.

Keeping abreast

To assist PV installers and designers in keeping on top of changes in the industry, the CEC has put in place a continuous professional development (CPD) program. In response to this, GSES provides Professional Development Days at locations around Australia, which give installers the opportunity to achieve their yearly required 100 CPD points in a single day. Topics covered in recent GSES Professional Development Days include: Commissioning, Maintenance and Fault Finding; Responding to Solar Tenders: Technical Content; and PV Module Power Conditioning and Control Devices.

Since being established in 1998, GSES has focused on assisting the growth of Australian and international PV industries through providing quality training. For the current topics, schedule and locations, visit www.gses.com.au and follow the links to training.

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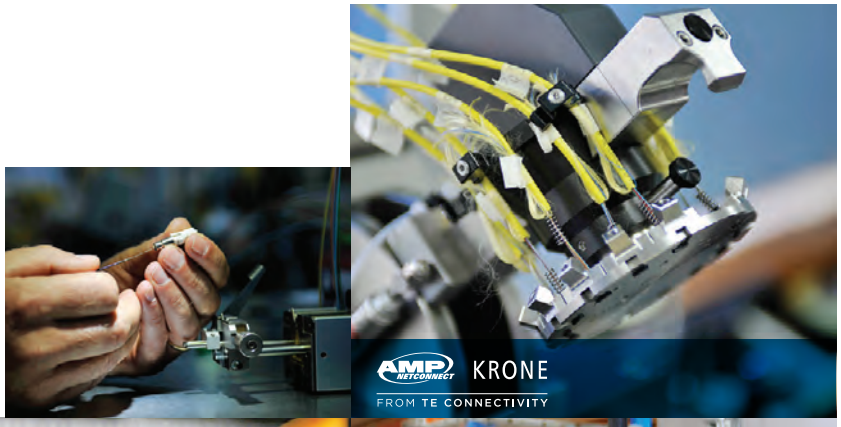

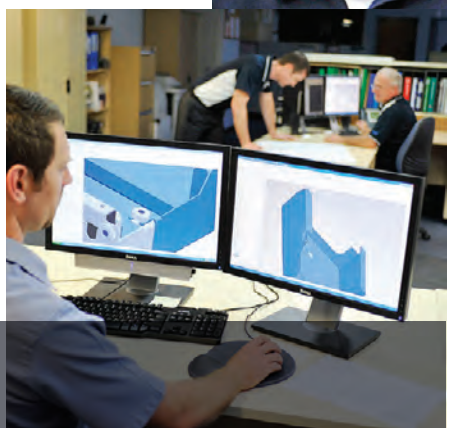

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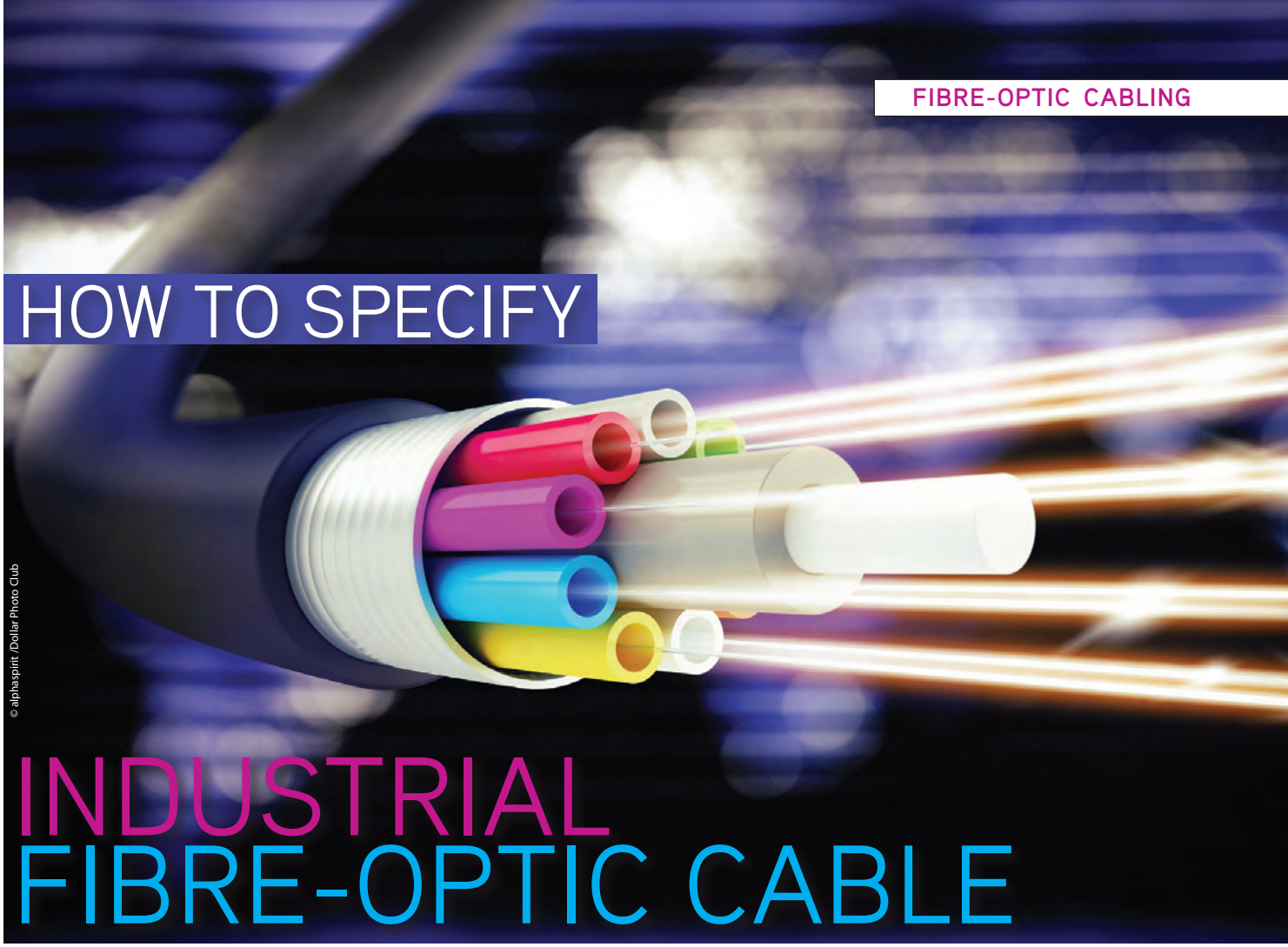


HOW TO SPECIFY INDUSTRIAL FIBRE-OPTIC CABLE

Ensure optimal performance in demanding environments with these tips on how to specify industrial fibre-optic cable, from Kyle Mrkva*.

Fibre-optic cabling is applicable in any industrial environment where high-speed, high-bandwidth data solutions are needed. It can be used for campus and in-building data backbones to anchor an operation's ethernet, and also for point-to-point digital signal transmission. This cabling uses ruggedised jackets, often polyvinyl chloride (PVC) or chlorinated polyethylene (CPE), to ensure optimal performance in the face of extreme temperatures; exposure to UV/sunlight, oil and solvents; and crushing impact.

Benefits

Fibre-optic cabling is superior in terms of its high bandwidth, low attenuation and complete electrical noise immunity, allowing more information to be carried across the network without interruption. Fibre-optic cables are also smaller and lighter than copper cables, extremely durable and intrinsically safe, with no risk of spark hazards.

Alternatives

Typical alternatives for connecting data networks with fibre-optic cables include copper ethernet or automation cables. While copper cabling is suitable for the majority of industrial data transmission needs, both alternatives can stimulate potential failure points due to electrical noise, such as electromagnetic interference and radio-frequency interference, as well as limit bandwidth capacity and signal transmission distance.

Types of cables

Fibre-optic cabling can be segmented based on design criteria and installation environment:

- Loose-tube cables lay thinly coated fibre strands into unitised thermoplastic tubes, giving the fibre strands the flexibility to move within the tubes and the cable the ability to stand up to outdoor temperatures and harsh environments.
- Tight-buffered cables contain an individual buffer on each fibre stand, allowing for easy handling and quick termination. For common small fibre counts, this design delivers a smaller cable diameter than loose-tube cables and is best suited for indoor environments. The most common designs for tight-buffered cabling are distribution and breakout.

Single-mode fibre strands are designed to interface with laser optic light sources for distances beyond 300 m, while multimode strands are designed to interface with LED and vertical-cavity surface-emitting laser (VCSEL) light sources for short-distance cabling runs.

Installation

For industrial installations, it is critical to consider and evaluate the environment. When fibre cabling is running alongside power and a tray-rated 600 V control and instrumentation cable, a double-jacketed, heavy-duty, all-dielectric cabling design is preferable. If cabling requires extra physical protection or is slated for direct burial, steel-corrugated or aluminium interlocked armour can be applied to protect cabling from the elements, such as jagged rock or rodent chew-through.

Kyle Mrkva is the product line manager at Belden. For more information, please contact Robin Pearce, Bishop & Associates, via email at rpearce@bishopinc.com.

Bishop & Associates
www.connectorindustry.com

UPS systems

Eaton's 93E extended series UPSs, now available in ratings from 15–80 kVA, feature double-conversion technology to provide protection for supported loads. They achieve efficiencies of 98.5% when mains power quality is good.

The 93E UPS system is offered with power ratings of 15, 20, 30, 40, 60 and 80 kVA, with the extended 93E range now covering 15 to 400 kVA power requirements. The units have an input power factor of 0.99 with less than 5% ITHD (total harmonic current distortion), thus eliminating the risk of interference with other critical equipment on the same supply network. In addition, they are optimised for protecting modern 0.9 power factor IT equipment without the need for oversizing.

The compact 15 to 40 kVA models feature optional integral batteries. For particularly demanding applications, up to three 93E series UPSs can be connected in parallel to increase capacity, or up to four can be connected in parallel to provide redundancy.

All Eaton 93E series UPSs include a large graphical LCD panel that shows UPS status and allows easy access to measurements, controls and settings. The units have integral USB and RS232 ports as well as two mini slots that can accommodate optional connectivity cards, including types for use with ethernet and Modbus networks.

Eaton Industries Pty Ltd
www.eatonelectric.com.au

Shock rack cases

The SKB 19″ Shock Rack cases are designed to protect and transport valuable and sensitive 19″ rackmounted equipment that must arrive intact and function seamlessly from the moment it is switched on. The cases are suitable for applications such as military, aviation, emergency services and rescue organisations. Built to meet military standards, the shock racks have an internal frame mounted on adjustable elastomer shock absorbers on all eight corners to control the effects of shock and vibration on all three axes. The sway space around the internal frame provides natural airflow to keep equipment cool.

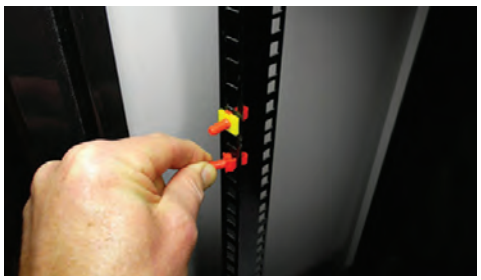
The product allows easy transportation by way of retractable spring-loaded cushion grip handles and can also be supplied with integrated or removable wheels to make for simple handling and storage.

SKB cases come with a lifetime warranty.

Switches Plus Components Pty Ltd
www.switchesplus.com.au

Rack mounting system

Rackstuds are an alternative to cage nuts which are used to mount IT, A/V, security, and telecommunications equipment in 19″ racks. Unlike cage nuts, Rackstuds go in from the front, which is said to simplify installations. They are made from a non-conductive fibre-reinforced thermoplastic and therefore do not pose an electrical threat to the installers or their gear.



Rackstuds are designed to fit EIA square punched vertical rails with 9.5 mm (3/8″) holes. They can accommodate variations in this size between 9.3 mm (0.366″) and 9.8 mm (0.385″). The vertical rail thickness can be up to 2.2 mm (0.086″) with a recommended maximum equipment faceplate thickness of 4 mm (0.157″).

Rackstuds Limited
rackstuds.com

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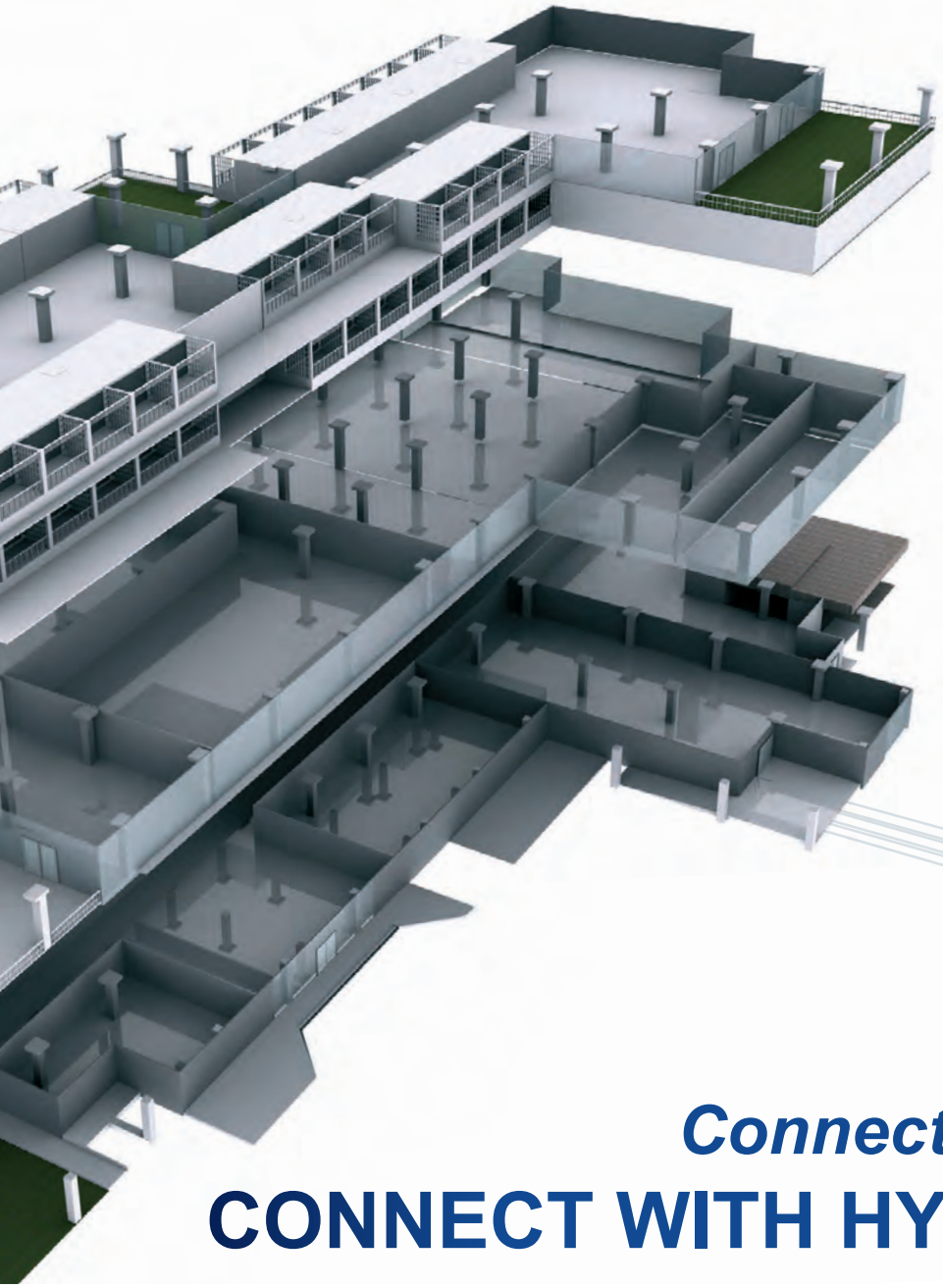

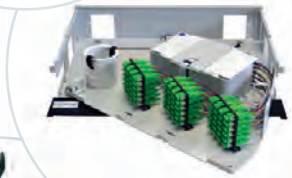

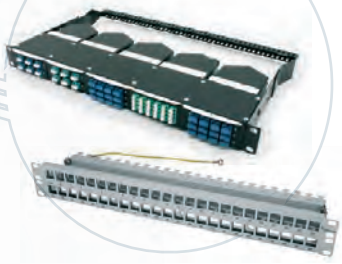

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AUDINATE FINDS SUCCESS IN ASIA-PACIFIC'S GROWING AV INDUSTRY

Audinate, the Sydney-based company behind the Dante networking solution, has dashed past 500 Dante-enabled products thanks to success in Asia-Pacific's growing AV industry.

More than 500 Dante-enabled products are now available from over 225 licensed manufacturers worldwide, including Yamaha, Bose and Shure, a 60% increase in 12 months. 44 new Dante licensees have come from Asia, with nearly half signing on in the last year.

Audinate's Dante technology replaces bundles of audio cables with a single network cable that can be controlled through software, which has become a popular choice for commercial audio installed in stadiums, hotels, theme parks and major live events.

"The 500th Dante-enabled product represents a significant milestone for Audinate and our Dante OEM partners," said Lee Ellison, Audinate CEO.

"Customer research tells us that the single biggest factor when selecting an audio networking solution is the number of available products on the market. With hundreds of products launched in the past 12 months, Dante has reached the tipping point and has become the industry standard for audio over IP networking." Audinate became the first successful company to spin out from NICTA, the government-funded research lab, securing investment from Starfish Ventures and Innovation Capital.

Fuelled by the overall growth of the AV industry in Asia and the widespread adoption of Audinate's Dante media networking technology in the region, the company will open a new Hong Kong office to provide business development, technical sales and customer support for the region.

"The fast adoption of Dante among AV manufacturers in Asia is truly exciting and is proof that Dante has become the de facto standard in audio networking," said Ben Wong, newly appointed director of sales for Asia-Pacific.

"These manufacturers are selecting Dante to ensure their products have guaranteed interoperability with the hundreds of other Dante-enabled products available worldwide."

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CAT5E CABLING TO SOON BECOME OBSOLETE FOR OFFICES

*Matias Peluffo, Vice President for Intelligent Buildings, Asia Pacific**

Category 5e cabling, which is used in many offices around the world, will soon be considered obsolete for new installations following a recent decision by the ISO/IEC cabling standards body.

After careful consideration of technology trends, wired and wireless bandwidth requirements and current market demand for the various cabling types, the ISO/IEC Working Group (JTC1/SC25 WG3) responsible for the development of the 11801 standard recently decided to upgrade the minimum recommendation for horizontal cabling in offices.

At the recent working group meeting in Milan, Italy, the group agreed to raise the minimum horizontal cabling requirement stated in ISO/IEC 11801-2 for offices (expected publication on or before 2017) from Class D (Category 5e) to Class E (Category 6), with a recommendation for Class EA (Category 6A) or better cabling.

Class D cabling is still the minimum requirement in the drafts of 11801-3 (industrial) and 11801-4 (single-tenant homes), but upgrades may be considered in the near future.

In the drafts of 11801-5 (data centres) and 11801-6 (distributed services), the minimum requirement is already Class EA cabling. For new office installations, Class E will now become the minimum requirement, with a recommendation to specifiers and customers to deploy Class EA to support applications with alien cross-talk requirements, enabling the smooth migration to 2.5, 5 and ultimately 10 Gbps.

Published more than 20 years ago, the ISO/IEC 11801 standard was the first international standard for cabling in commercial buildings and helped pave the way for consistent implementation of voice and data cabling on a global basis. It enabled the explosive growth and mass deployment of ethernet and IP communications everywhere in the world. In its first edition, the standard defined Class D balanced cabling — based on Category 5 copper components — to provide an upgrade path from 10 to 100 Mbps up to 100 m. At that time, some experts and industry observers argued that 100 Mbps (100BASE-T) to the desk was overkill for the typical office user.

Fast forward 20 years to today, where many would say that 100BASE-T technology is in rapid market decline. Now 1000BASE-T (1 Gbps) is commonplace for desktop personal computers and laptops, as well as a wide range of other devices such as phones, cameras and wireless access points (WAPs).

The 11801 standard now includes additional cabling classes that were introduced to enable support of up to 10 Gbps, including the addition of Class E (Category 6), Class F (Category 7) and, more recently, Class EA (Category 6A) and Class FA (Category 7A).Today 1000BASE-T is commonplace and, once again, some experts and industry observers argue that 1 Gbps is overkill for the typical office

© iStockphoto.com/russ witherington

user. However, others predict the rapid adoption of speeds beyond one gigabit within horizontal cabling, expecting the increasing bandwidth demand in offices to support applications such as telepresence, video conferencing, high-definition imaging, 3D printing and others.

Additionally, wireless LAN speeds are rapidly increasing due to media-rich user expectations and the explosive growth of smartphones and tablets. Wireless LAN infrastructures are getting upgraded at a rapid pace to IEEE 802.11ac, offering peak speeds of up to 7 Gbps and with backhaul requirements exceeding the 1 Gbp supported by Class D and Class E cabling. As a result, new IEEE specifications are being developed for 2.5GBASE-T — targeted at installed Class D cabling — and 5GBASE-T, targeted at installed Class E cabling. However, the transmission requirements of 2.5 and 5GBASE-T exceed the Class D and Class E specifications.

While it is expected that a sizeable percentage of the installed base will be able to support the faster speeds, the definition of supported configurations and use cases is currently in development. In some cases, the costly and time-consuming alien cross-talk qualification of Class D and Class E installed cabling may be required to verify support of 2.5 and 5GBASE-T, and some mitigation steps may be required.

WHILE IT IS EXPECTED THAT A SIZEABLE PERCENTAGE OF THE INSTALLED BASE WILL BE ABLE TO SUPPORT THE FASTER SPEEDS, THE DEFINITION OF SUPPORTED CONFIGURATIONS AND USE CASES IS CURRENTLY IN DEVELOPMENT. IN SOME CASES, THE COSTLY AND TIME-CONSUMING ALIEN CROSS-TALK QUALIFICATION OF CLASS D AND CLASS E INSTALLED CABLING MAY BE REQUIRED TO VERIFY SUPPORT OF 2.5 AND 5GBASE-T, AND SOME MITIGATION STEPS MAY BE REQUIRED.

The 2.5 and 5G specifications in development are based on 10GBASE-T technology, using scaled-down 10GBASE-T capabilities. As a result, it is also expected that the rapid market growth of 2.5 and 5GBASE-T will result in downward price pressure and efficiency improvements for 10GBASE-T technology. Some industry analysts predict that these developments will accelerate the growth of 10GBASE-T deployments in office applications, supporting even higher speeds for WAPs and enabling other bandwidth-intensive applications.

The working group meeting in Milan was the first meeting attended by the recently combined CommScope and BNS global standards team, made up of experts with a long track record of standards participation. More than 60 cabling experts from 19 countries arrived at the decision to raise the minimum horizontal requirement in offices to Class E. This historic milestone effectively marks the obsolescence of Class D — a full 20 years after its initial introduction in the international standard — and positions Class EA as the optimal horizontal medium for new office installations.

**As Vice President for Intelligent Buildings in the Asia-Pacific region, Matias Peluffo has overall responsibility for CommScope's strategy to deliver breakthrough innovations and customer value in the building segment. Matias plays a leading role in CommScope's contribution to the international organisations that develop standards for cabling systems and contributes to the strategic direction and establishment of industry governing standards. He has participated actively in ISO/IEC JTC1/SC25/WG3 since 1996 and also contributes to the work of CENELEC TC215 and IEC SC46. Matias holds a bachelor's degree from the Eugene Lang College in New York and a certificate in telecommunications management from Columbia University.*

CommScope
www.commscope.com

Wi-Fi test set

The Greenlee AirScout, available from Australian Tel-Tec, allows service providers to replicate and stress test complex Wi-Fi home and office environments to enable Wi-Fi readiness.

The free standing Wi-Fi test set has a frequency range of 2.4 and 5 GHz bands and a data transfer rate of 1 Gbps (wired LAN). It gives an automated solution that surveys the residence from Layer 1 all the way through to the application layer, providing technicians with a tool that distils complex measurements into easy-to-understand metrics. This helps technicians to convey to consumers whether their applications are supported where they need it.

The product has the ability to find problems as well as identify solutions. It can make intelligent channel selections by measuring over time the types and amounts of traffic at Access Points, and after the device has surveyed the site, it will also provide the optimal coverage Access Point location.

The Wi-Fi test set has the capacity to support up to 30 locations over several levels at a site and deliver an accurate analysis, record and a solution validation to complex Wi-Fi environments.

Australian Tel-Tec Pty Ltd
www.teltec.com.au

4K security cameras

Panasonic Australia has launched the True 4K security camera range designed to offer high image quality and resolution, at both the centre and corners of an image. They are suitable for applications where a large number of cameras are required to provide full coverage, such as stadiums, car parks, intersections, airports, warehouses or port facilities.

The range includes the outdoor vandal-proof WV-SF781L dome camera and WV-SPV781L box camera, which the company claims can cover more distance and a field of view four times larger than 1080p cameras and nine times larger than 720p cameras.

Both cameras include a 12 MP, 4K ultra HD sensor that produces a 12 MP image at 15 fps and a 4K2K image at 30 fps for high resolution at standard frame rates. They have an optimised optical system including a 1/1.7″ high-sensitivity image sensor, a Panasonic large diameter lens (F1.6) and a 6x optical zoom for installation flexibility. They also have a 17 to 96° horizontal angle of view with a 16:9 aspect ratio, and 17 to 100° horizontal angle of view with a 4:3 aspect ratio.

Other features include: low light performance at 0.3 lux in colour or 0.03 lux in black and white mode; smart IR-LED; a rainwash coating to combat raindrops and dust; and an onboard processor which can encode two H.264 streams simultaneously.

Both cameras are weather and impact resistant with IP66, NEMA4x and IK10 ratings.

Panasonic Australia Pty Limited
www.panasonic.com.au

Ruggedised LC fibre adapters

Siemon has launched the Ruggedized G2 LC Fibre Adapters for connectivity in harsh environments.

The adapters feature ceramic alignment sleeves that provide a tighter tolerance for core-to-core alignment when mating as well as durable (IP66/IP67 rated) ruggedised shells to provide good fibre connectivity. The adapters are inserted from the front with the locking nut positioned behind the faceplate, allowing the use of a locking nut that is easier to tighten without using tools.

Compatible with all Siemon Ruggedized Surface Mount Boxes and Ruggedized Stainless Steel Faceplates, the adapters are available in both bulkhead and inline (coupler) options to support installation in a range of environments. An outlet dust cap is also available for protecting unused outlets following installation.

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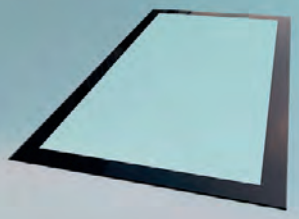

Touch Screens (OEM/ODM)

Size: 7-84 inch, or Customization

Technology: SAW、Zero-bezel SAW, P-Cap, PIT (Projected Infrared Touch)

Dustproof, Waterproof, Anti-vandal, Anti-glare Touch screen is available.

Touch Monitors (Terminal Use/OEM/ODM)

Size: 7-42 inch, or Customization

Technology: SAW, Zero-bezel SAW, P-Cap, Infrared, PIT (Projected Infrared Touch)

Dustproof, Waterproof, Anti-vandal, Anti-glare Touch Monitor is available.

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Risk mitigation

Paul Stathis, CEO

Cabling designers and installers have various insurance policies to militate against potential risks, but what about mitigating risks from insurance companies themselves?

From BICSI's research, not many designers and installers understand the risks from insurance companies and how to address those risks.

The risk is exposure to subrogation — a legal right reserved by insurance companies to pursue a third party that caused an insurance loss to what's insured. The risk is complex but the solution is simple — compliance.

Let's explain this with an example: a contractor who installed cables in an office building. You ran it through a fire-rated wall as per the consultant's specification. The cables were installed in compliance with the specifications, local cabling standards, regulations and Building Code — and the installation was signed off by the consulting engineer. Five years later, another contractor installs additional cabling through the correctly sealed firewall penetration, drilling holes through it and installing fire pillows around the new cables. A year later, a small fire — that wasn't contained by the compromised firewall — engulfs the building. The insurance company dutifully pays the $10 million insurance claim, but then seeks to recover the amount paid using subrogation.

From the fire brigade's report, the insurer discovers the firewall was compromised through the penetration made six years ago and deems the first contractor and the consultant responsible for extensive fire damage, allocating 30% 'proportionate liability' to the contractor and 20% liability to the consultant. After all, the first contractor put the penetration in the firewall in the first place, even though it was in compliance with the rules and regulations.

So how can the contractor protect himself from having to pay millions for something he wasn't responsible for? The answer is: compliance. Not just performing the installation in accordance with codes and regulations, but documenting the installation accurately to validate compliance.

The TCA1 and TCA2 (Telecommunications Cabling Advice) forms are your 'get out of jail' cards. According to the ACMA rules, it's mandatory for cablers to complete, submit and retain these forms as a proof of compliance. More importantly, these forms also show when the installation was carried out, what you did and what you did not do. This will help you distance yourself from installations carried out by another party.

BICSI
www.bicsi.asn.au

Enterprise-grade sled for iPhone 6 and 6 Plus

Honeywell Scanning & Mobility has launched the Captuvo SL42 enterprise-grade sled for retailers, warehouses and field service businesses, designed to transform the Apple iPhone 6 and 6 Plus into an enterprise-ready solution.

The product targets mobile frontline workers who require real-time connectivity to business-critical applications and high barcode scanning performance. Improving productivity and better serving users whether in the office or in the field, the device helps ruggedise consumer devices for everyday operations. It quickly and accurately focuses, illuminates and reads hundreds of barcodes per shift, even when they are damaged, poorly printed or on a mobile screen.

The product is designed to withstand the demands of work in the field with durable specifications that extend the life cycle of the smartphone. It also extends the battery life of the smartphone with the capacity to last a full shift, ensuring mobile users do not lose valuable time with customers when a device loses charge and is out of service.

Honeywell Ltd
www.honeywell.com

Category 6A patch cords

Panduit Corp has added UTP and Shielded Category 6A performance patch cords to its 28-AWG offering for telecommunications rooms and data centres.

With a diameter of only 0.185″ for both UTP and Shielded versions, the Category 6A patch cords are designed to occupy just 45% of the space of standard Category 6A 24-AWG patch cords, bringing higher cabling density and increased pathway capacity to users of 10GBASE-T networks. Due to their smaller size, more than twice as many 28-AWG patch cords can fit within existing pathways compared to typical 24-AWG cords.

The product also allows more open space between cords, providing increased visibility of port numbers and more room for accessing plugs and routing cords. It is therefore suitable for managing high-density rack and panel configurations.

Panduit International Ltd
www.panduit.com/au_nz

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Get Complete Visibility Over Your Fleet

The SX7 plug & play GPS tracker is a full 3G (Telstra Next G) device that plugs into the OBDII diagnostics port (found in the cabin of all post 2006 vehicles) and requires no install, making it easily transferable from one vehicle to another.

1300 139 467 simtrac.com

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Cat6a patch panels

Warren & Brown Cat6A patch panels support 10 Gbps transmission for high-speed (Class Ea) networks.

Available in shielded and unshielded models, the panels come with a 25-year warranty. Due to sufficient space between data terminals and screening contact, the risk of short circuit between screening braid and data leads is minimised.

The panel is designed as a 19″/10″ rack mount unit 1 RU with 12, 16 or 24 RJ45 jacks assembled on one common PCB. The PCB is mounted horizontally and the 360° shielding can be connected directly on the PCB on a large contact spot using screw clamps, without need of twisting the shielding braid (shielded type).

Other features include: no special tooling required for mounting of cover (shielded type); grounding with the enclosed earth connection cable (shielded type); cables are terminated via IDC (LSA Plus) terminals with colour coding according to EIA/TIA 568 A and B; housing is made of steel and powder-laminated in light grey or black; the cover is made of stainless steel.

Warren & Brown Technologies
www.warrenandbrown.com.au

Ethernet barriers

The SOLEXY BXF and BAF series of ethernet barriers allow transmission of ethernet into hazardous areas by incorporating an intrinsically safe barrier circuit and a seal-off fitting into a single package.

The BXF series of ethernet couplers for use in hazardous areas includes an explosion-proof housing without the need of a seal fitting, taking up no internal space. The BAF series of ethernet couplers includes aluminium housing with gasket, suitable for use in purged panels and other non-hazardous areas. They can also be remote mounted up to 70 m away with minimal loss of signal.

A BXF and BAF coupler is required on each end of a cable installation for full protection of both the RX and TX lines. Both series are designed for 10/100 ethernet signals and operate with Cat5e cable. The products are available with UL, ATEX, IECEx or MSHA certifications.

Madison Technologies
www.madisontech.com

Development program for IoT

Legrand has launched Eliot, a developmental program for speeding up the deployment of its connected devices offering and to facilitate the emergence of connected buildings wherever IoT can enhance use value for personal or professional users.

The Eliot program involves a cloud storage system for data gathered via the group's applications. This hosting platform is designed to high security standards, so its architecture and storage mode help to ensure the protection of user data confidentiality. As well as a development program, Eliot is also a label. From September 2015, Legrand-connected devices will be marked with the program logo for easy identification.

HPM Legrand
www.hpmlegrand.com.au

SYDNEY CONTINUES CCTV SECURITY UPGRADES

Some 20 cameras in the northern part of central Sydney will be replaced with new, high-definition (HD) models to help police catch criminals — as they are breaking the law — and later convict them using clearer footage of incidents as evidence.

CCTV operators tipped off police three times a day last year as they viewed footage of incidents about to unfold on screens connected to the cameras via live feeds. Cameras along George Street and around Wynyard Station, Martin Place and Circular Quay will be replaced with more advanced technology over the next two months. "CCTV surveillance by City of Sydney staff helps police get to the scene of incidents faster and later hold people who break the law to account," said Lord Mayor Clover Moore.

"This is vital in areas so important to Sydney's global reputation as an events capital. "Higher-definition footage helps police identify suspects and helps lead to successful prosecutions, so the City is assisting by rolling out these new and improved cameras."

The City upgraded 25 cameras to HD along the George Street entertainment strip, from Park Street to Goulburn Street, and along Liverpool Street, Oxford Street and Hyde Park South to improve security ahead of Mardi Gras earlier this year.

It followed the installation of HD cameras in Kings Cross, Surry Hills and the CBD in 2014. Another 38 cameras in the City's network of 99 will be upgraded over the next two years.

Between July 2013 and June 2014, the team of 18 CCTV operators alerted police 1084 times over criminal activity — an increase of 134 on the previous year.

BIG WIGS JOIN TOGETHER FOR INDUSTRY 4.0

Belden and other big companies in the international electric and automation industries have come together in a new working group to realise the vision of Industry 4.0.

Since 2009, Belden has been involved in the IEEE 802.1 working group task force for time-sensitive networks (TSN), towards the standardisation of a networking solution for applications with high real-time requirements.

Now a new working group has been formed to combine TSN with the open OPC Unified Architecture (OPC UA) specifications, which is anticipated will enable the Industry 4.0 vision of a high-performance, real-time-capable network to be realised without any vendor-specific technology.

It is hoped this will also significantly reduce the cost of ownership of networking sophisticated Industry 4.0 installations.

Others involved in the working group include Bosch Rexroth, General Electric, Kuka, Schneider Electric and National Instruments.

Dr Oliver Kleineberg, advance development manager for Belden's Hirschmann brand, said that all of Belden's network devices use standardised technologies, since they offer users maximum flexibility, cost-effectiveness and are futureproof.

"This is why Belden has been supporting the development of TSN standards from the very beginning," Kleineberg said.

"Unlike proprietary solutions, this open real-time technology does not require any cost-intensive technology-specific chips."

Kleineberg expects this to generate a growing market acceptance and extend the spread of standards-based, real-time Ethernet, which he considers a prerequisite for implementing the sophisticated Industry 4.0 applications.

However, the TSN specification — which is expected to be published between 2016 and 2018 in the form of various IEEE 802.1 specifications — standardises only the communication on Layer 2 and, together with Ethernet transceivers, the underlying physical layer.

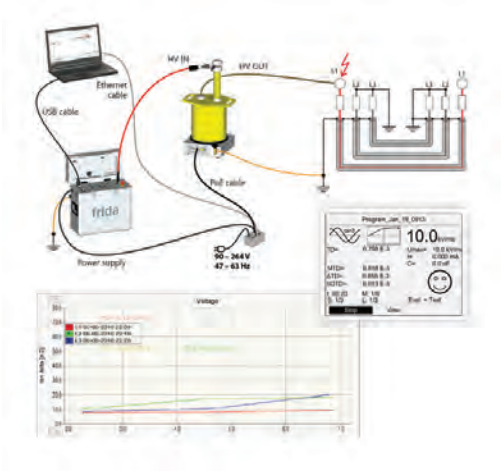
Since OPC UA is already available as an international specification for higher protocol layers that are primarily used for machine to machine communication, the OPC working group now intends to combine this with TSN.

"This will result in an open architecture that can be used to fully network even the most demanding production processes," said Kleineberg. Such processes include modular Industry 4.0 production lines, which have to meet high real-time requirements, either for reasons of safety or to maintain extremely fast control cycles, and which also have varying layouts depending on the order situation.

"OPC UA plus TSN can not only be used to enable the configuration of the participating machinery, but also to guarantee the necessary low end-to-end delay in direct machine-to-machine communication in the Industrial Internet of Things (IIoT)," he added.

This standardised communication solution is believed to be an important step on the path to converting production processes from a rigid, centralised approach into one that is dynamic and decentralised.

Belden
www.belden.com



Monitored withstand tester

The Baur PD-TaD-60 monitored withstand tester provides an accurate picture of cable reliability, permitting parallel observation of partial discharge, measurement of discharge location to 12,800 metres and loss angle measurement. The tester is an HV coupler incorporating an accurate capacitor coupling to the cable under test.

The tester provides the decoupling circuits for accurate partial discharge detection and measurement, and in combination with the Baur FRIDA VLF tester permits testing protocols including in addition to partial discharge: tan delta (loss angle) measurement; mean of tan delta tests; standard deviation of tan delta tests; plus, observation of tan delta change with testing voltage change (0.5, 1.0 and 1.5 of rated voltage up to 60 kV peak) with user-defined periods.

The scope of supply includes a laptop with analysis software, calibrator and power box. An optional phase resolving module is available.

Power Parameters Pty Ltd
www.parameters.com.au

Cloud-based trace storage solution

Anritsu has introduced SkyBridge Tools, a cloud-based trace judgment solution for tower and in-building distributed antenna system (DAS) installations. Serving as a data warehouse for contractors who are installing or modifying equipment for network operators, the storage solution is designed to save time, reduce rework and help ensure timely payments are made by automating the trace judgment process.

The product helps field users more clearly understand their project work, validate their in-building DAS or tower installations and deliver accurate results. A SkyBridge Tools account can also store and judge thousands of line sweep traces, OTDR traces, passive intermodulation (PIM) traces, site photos, construction documents and other electronically formatted deliverables. Users can access an overview of the deliverable status via an easy-to-read dashboard or access full detailed reports, which can be downloaded as PDF or ZIP files to authorised personnel.

The product is also designed to store traces taken by Anritsu's field test solutions. Instruments that can work with SkyBridge Tools include the current generation of Site Master handheld cable and antenna analysers, PIM Master passive intermodulation analyser, OTDRs and video inspection probes. The system is compatible with web-browsing devices using current versions of Chrome and Firefox.

Anritsu Pty Ltd
www.anritsu.com

IS YOUR BUSINESS SUSTAINABLE?

The unstable economy and new leadership could mean a change to government policies, and for many businesses this could mean the difference between continuing to operate and becoming unviable.

According to accounting firm RSM Bird Cameron, a possible change in policies means now is the time for business owners to assess their company's ongoing viability, find opportunities to reduce costs and review their future funding model.

"When changes are likely to unsettle the economic landscape, that assessment is more important than ever. And, if the business is likely to become unviable in the near future, then owners must make that call as soon as possible to minimise the negative repercussions of winding up the business," said Andrew Beck, turnaround and insolvency partner at RSM Bird Cameron.

"There are four factors that indicate a business is sustainable. If these factors are out of balance, then the business should take steps to turn them around."

1. Cash flow

Cash flow refers to the amount of money available to a business for paying suppliers and employees, and investing in growth. If cash flow dries up, a business is unlikely to be able to operate since it cannot access needed resources.

"Businesses can improve their cash flow by encouraging customers to pay promptly, arranging to pay suppliers slowly and finding ways to cut costs throughout the business," said Beck.

2. Working capital

Working capital is a company's assets minus its liabilities, also known as leverage. The more assets a company has in relation to its liabilities, the more viable it is.

"Companies with a strong working capital position are able to remain viable because they have the resources they need to continue operating, even in the lean times. They can improve their position by liquidating assets for cash, exchanging short-term debt for long-term debt, issuing stock for cash and improving their accounts receivable processes," he said.

3. Financiers onside

When financiers are onside, companies are better positioned to borrow funds to continue operating. In a tight economic climate, financiers keep a close eye on debtors.

"An early sign that a company may not be sustainable is that its financiers lose confidence in the organisation. Keep financiers onside by meeting obligations promptly and getting in touch immediately if you need time to pay. Keeping your debt-to-asset ratio in check also gives financiers confidence in your ability to pay."

4. Employees onside

For an organisation to remain sustainable in the long term it needs employees that are engaged, committed and reliable. Employees are usually the first to sense if a company is likely to become unviable. At the same time, employees that aren't committed to the organisation can cause its downfall by offering substandard work.

"Keeping valuable employees onside and removing those that risk your operations is vital for ongoing sustainability. If your employees are leaving in droves, take a look at your operations and management to see where you can improve," said Beck.

"Any company that is concerned about its viability should take immediate action. Most situations can be remedied if they are addressed in a timely fashion; it's what you don't know that could cause the biggest problems."

RSM Bird Cameron
www.rsmi.com.au

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