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Recently I had the privilege, along with some colleagues, of visiting a number of academic institutions in India. Probably because of my personal engineering expertise I have tended only to visit institutions in the USA and Europe – so this visit was of particular interest to me.

In addition, whether we are a big 'S' or a small 's', we are part of BRICS, and it is important to engage with colleagues in those countries to explore what business opportunities may exist, and look to working together and learning from each other in a variety of spheres.

India essentially uses English as the medium of education and, make no mistake, that is remarkably advantageous as regards our ability, as a country, to partner with entities based there. It became increasingly clear, as our visit progressed, that sharing a language is of profound importance.

I can only admire their efficiency with how the institutions we visited are run and managed – and to see where the focus is in terms of how the money is spent.

What intrigues me the most about the three cities we visited – Delhi, Ahmedabad and Mumbai – is the co-existence of the informal and formal economy. India is a massive and rapidly growing economy, much of which is formal in nature. It is world class in most respects.

While our experience was admittedly very limited, and no doubt, tainted in some respects – it left me with a clear sense of some of the interesting things that are happening in that economy.

India has a massive population, and will soon exceed China's count. The fact that Bollywood exceeds, by far, the revenue of Hollywood, is quite obvious in the context of numbers alone. Similarly, the India Premier League (IPL) exceeds by order of magnitude the viewership of the so-called world series. And it is obvious.

It is big – very, very big, and until I walked and drove around there, I had no genuine appreciation of quite how big it is.

The informal economy plays an absolutely critical role. In fact, the informal economy is embedded right within the cities. You can choose a first-class restaurant, or a street seller producing remarkably tasty items.

I must admit to being less inclined to eat food sold on the street – and I suspect most folk would be of the same view. But being privileged to have residents of the cities with us, it was possible to build a confidence that allowed a culinary sensation.

The point is that street food need not make you ill – as is oft the story. Within the informal economy, a street seller making a client ill would be out of business in the twinkling of an eye. And so it is. Even the informal economy effectively regulates itself. Obviously this regulation is nowhere near as robust as that within the formal sector – but it reminds one of where the need for regulation came from in the first place.

Flowing from this, of course, is the need to begin to reflect on what it is that drives the informal economy... and there are a couple of factors.

The first is driven by the need to survive. You need to earn money. To suggest that selling is big is probably the understatement of the century.

The second is the profound sense of an entrepreneurial spirit. That spirit is driven by a sense of needing to succeed.

I wonder how our economy – both formal and informal – would fare if comparisons were made between the commitment of the people to it, and to the spirit that drives it.



Ian Jandrell

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BSc (Eng) GDE PhD,
FSAIEE SMIEEE

Ian





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LS IS

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4



7



26



36

Pressure + level measurement

- 4 Calibrating pressure switches with a DPC *Ron Ainsworth, Fluke Corporation*
- 7 Not a crack: Level measurement for natural gas *Dieter Hägele, KSR Kuebler Niveau-Messtechnik AG, a division of the WIKA Group*
- 10 Round UP

Cables + accessories

- 16 Cable diagnostics in South Africa *Ronald H Goodwin, H.V. Test*
- 20 Round UP

Electrical protection + safety

- 26 Checking ground electrode impedance for commercial, industrial and residential buildings: Part 2 *Technical information supplied by John Wilson on behalf of Comtest for a the Fluke Corporation*
- 29 Protecting buildings and installations from hazardous lightning strikes and surges *Kirk Risch, DEHN Africa*
- 31 Round UP

Plant maintenance, test + measurement

- 32 Analytics and contact centres – add smarts and soar *Andre Deetleefs, Jasco Enterprise*
- 33 Making technology work for you *Neil Cameron, Johnson Controls Building Efficiency*
- 34 Round UP

Energy + enviroFiciency: Focus on Control systems + automation

- 36 Ins and Outs of POE *Brian Roth, Antaira Technologies*
- 39 Round UP

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Cover

KSR Kuebler became part of the **WIK**A Group in 2008. WIK A South Africa set up a local production line in 2014. These quality level measuring instruments are now available to the South African market directly from WIK A SA's production line. *Read more on page 11.*

Regulars

- 1 Comment
- 11 Cover article
- 42 A sense of Africa
- 43 Light+Current
- 45 Bizz Buzz
- 46 Social Engineers
- 48 Clipboard



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Calibrating pressure switches with a DPC

Ron Ainsworth, Fluke Calibration

Pressure switches are used in a wide variety of monitoring and control applications.

Pressure switches are used in HVAC air provers, defrost sensors, filter indicator applications, oil/ hydraulic filter alerts and process break detectors. A pressure switch is triggered by changes in pressure within a system, which can be measured as pressure, vacuum, or differential between two pressure inputs. In every case, the pressure switch will employ a diaphragm, piston, or other pressure-responsive sensors coupled to a switch actuating mechanism. In its most basic form, a pressure switch can monitor air flow in a heating system or control gas pressure in a water heater, acting as the watchdog in many process monitoring applications.

Accurate calibration of pressure switches is a critical step in ensuring process quality and the safe operation of equipment. But even the most savvy process technician may not fully understand the correct method of calibrating pressure switches. Fortunately, the best tool for the job is one many process technicians already own: a documenting process calibrator, like the Fluke 750 Series.

Documenting Process Calibrators

Documenting Process Calibrators (DPCs) are multifunction process tools that eliminate the need for technicians to carry multiple tools with them. Gene Guidry of Chevron Chemical, USA, says that while he was carrying up to four pieces of test equipment plus his hand tools, he now takes the 754, which incorporates calibration and HART communication capability in a single, fast unit. Calibrating a pressure switch using a DPC can be conducted manually or as an embedded task using DPC software. It also requires certain pressure accessories, including a pressure module and hand pump. The steps outlined in this article are specific to the Fluke 750 Series, but the process can be applied to virtually any DPC.

Calibrating pressure limit switches

The first step in the process is to set up the DPC. (Note: A number of the terms in this article apply to both temperature and pressure limit switch calibration and maintenance). The DPC test set-up screens prompt the user for the following information:

- **Set-point:** Main point at which the switch is supposed to take action
- **Set-point type:** Can be 'high' or 'low.' This is the basic call to action. 'Low' means that the action should happen when the Process Variable (PV) is below the set-point. 'High' means that the action should happen if the PV is above the set-point
- **Set state:** State of the switch (set or reset) at the time the action takes place
- **Tolerance:** The allowable deviation from the set-point
- **Deadband min:** Minimum value or size of the deadband. Calibrating pressure switches with a DPC
- **Deadband max:** Maximum value or size of the deadband. (The deadband of a pressure switch is the measured difference in the applied pressure when the switch is changed from set to reset)
- **Trip function:** This can be set for continuity, Vac or Vdc, and refers to what is being measured as the set-point is exercised by the simulated process variable

For example, suppose you want to control the pressure in a vessel set at 12 psi. You do not want the relief valve to be opening and closing constantly, you want it to open at 12 psi and close again at approximately 10 psi, (12 psi – 10 psi = an approximate deadband of 2 psi).

Then set up a test for this pressure switch in which you want the following performance:

DPC – Documenting Process Calibrator
 HVAC – Heat, Ventilation, Air-Conditioning
 PV – Process Variable

Abbreviations/Acronyms

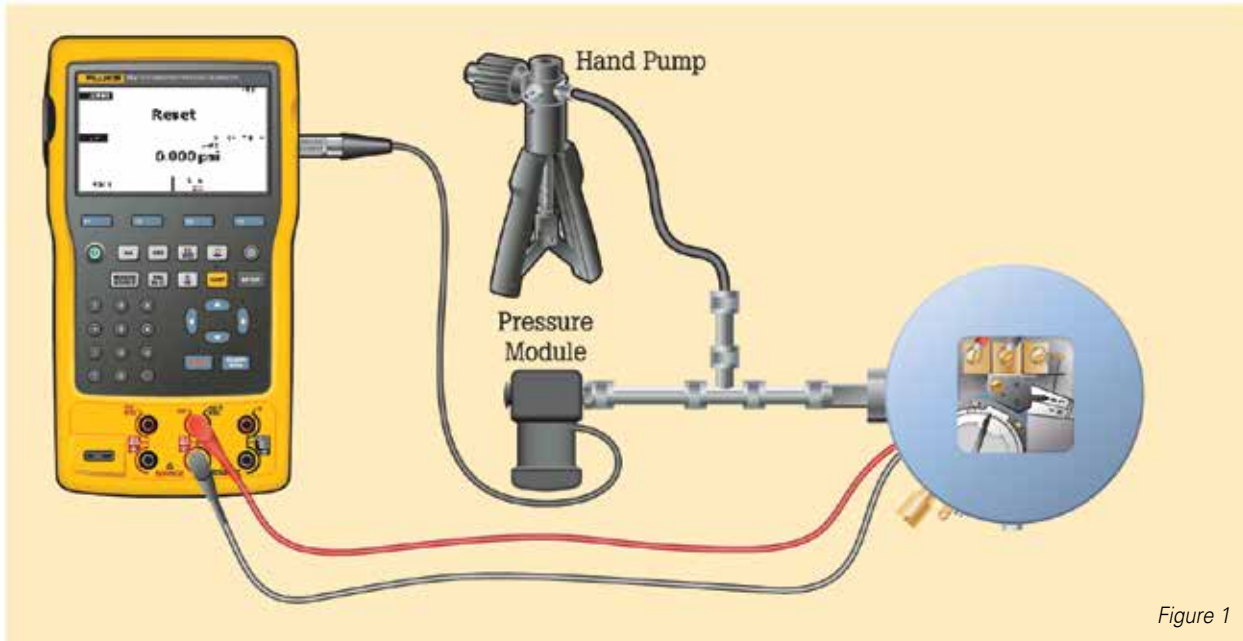


Figure 1

- Set-point variation of +/- 1,0 psi
- Deadband minimum 1,5 and maximum 2,5 psi

Now you are ready to make connections to the pressure switch module. Be sure to:

- Take proper precautions— disconnect the device from the process it controls (both the electrical and pneumatic connections)
- Connect the centre terminals of the DPC across the output contacts of the switch
- Connect a pump to the pneumatic input of the switch with a tee connection into the pressure module, like the Fluke-700 Series pictured in *Figure 1*.

When all connections are complete it should resemble *Figure 1*.

Setting up the DPC

To set up the DPC, first connect the pressure module. In the measure screen, select measure continuity/ohms. Toggle to the source screen with the MEASURE/SOURCE button. Select pressure. Once the pressure module has initialised, make sure the pressure module is vented to atmosphere and select the CLEAR/ZERO button to zero out the offset of the pressure module. Advance to the split screen by depressing the MEASURE/ SOURCE button. Select the AS FOUND softkey and select single point switch test. From there, configure the test per these parameters:

- Set-point: 12 psi
- Set-point type: The contacts need to be closed to actuate the relief valve above 12 psi; in other words, the action happens when the pressure is high; this is a 'high' type set-point
- Set state: When the switch is closed a relief valve is actuated; the set state is 'short'

- Tolerance: 1,0 psi
- Deadband min: 1,5 psi
- Deadband max: 2,5 psi
- Trip function: Trip continuity
- Depress the enter key and enter the set-point value (see *Figure 2*) and depress enter. Configure the SET-POINT TYPE and SET STATE as shown, then fill in the test template as per *Figure 3*. Depress Done.

Performing the switch test

The test can now be performed by selecting the MANUAL TEST softkey (see *Figure 4*). Using the hand pump connected (see *Figure 1*), vary the pressure applied to the pressure switch and pressure module slowly, back and forth across the set-point and reset points. It will be

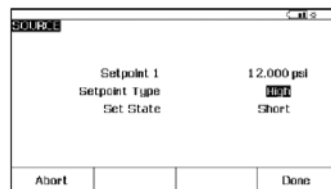


Figure 2

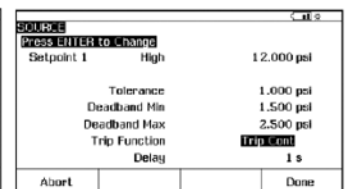


Figure 3

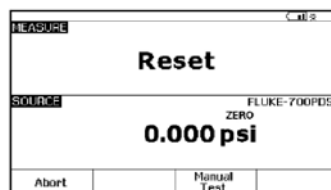


Figure 4

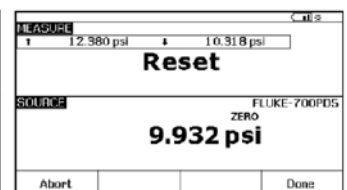


Figure 5

Setpoint 1 High	
Set	12.103 psi
Setpoint Error	0.103 psi
Reset	10.870 psi
Deadband	1.235 psi
Deadband Error	-0.267 psi
Abort	Done

Figure 6

Setpoint 1 High	
Set	12.473 psi
Setpoint Error	0.473 psi
Reset	10.784 psi
Deadband	1.689 psi
Deadband Error	0.000 psi
Abort	Done

Figure 7

Conclusion

Pressure instrumentation is found in virtually every process plant. Periodic calibration of these pressure, level, and flow instruments is required to keep plants operating efficiently and safely. A high-quality DPC, supported by the appropriate pressure accessories, provides an efficient, precise, and safe way to keep pressure instrumentation working properly.

apparent that the set/reset has changed as indicated by the status in the measure screen. As the state changes, the actual set and reset points will be logged during the test (see Figure 5). When the set and reset states are captured (it is a good idea to repeat the testing of set and reset several times to confirm repeatability), depress the DONE softkey. Figure 6 shows the AS FOUND test result. Note that the DEADBAND ERROR is indicated in reversed type. If the AS FOUND set-point was greater than 1 psi from the nominal value of 12 psi, it would also be in reversed type. This reflects that these tests do not meet the tolerances specified in the test set-up (see Figure 3). Input the tag, serial number, and technician ID, and select Done. Vary the pressure across the set-point and make adjustments. Once the adjustments are finished, select the AS LEFT softkey. Repeat the test varying the pressure across the set-point. Once the test is complete, select the DONE softkey. If the adjustment was successful, the results should be similar to Figure 7 with all errors (SET-POINT and DEADBAND) in forward type indicating that the test tolerances as specified are met. If the test fails, re-adjust and repeat the AS LEFT until the test passes.

“
A pressure switch is triggered by changes in pressure within a system.”




Embedded task considerations

If the pressure switch test is performed from a task embedded in either Fluke’s DPC/TRACK or a compatible software package, selecting and performing the task is similar, but a few considerations should be reviewed. First, the embedded task will pre-configure all the setup steps in Figures 2 and 3. It is necessary to perform the zeroing of the pressure module in the Source screen as specified previously under the heading ‘Setting up the DPC.’ You can do this by depressing the MEASURE/ SOURCE button until the Source screen is displayed. Select pressure, vent the connection to atmosphere and select the CLEAR/ZERO button to zero the module. Once this is complete, depress the MORE CHOICES softkey until the Tasks selection is available. Select the TASKS softkey, select the pertinent task, and perform the test as noted previously under the heading ‘Performing the Switch Test.’ Tag and serial number will be automatically filled in the tag entry screen. The user will need to fill in their ID information if it is not pre-configured in the calibrator setup menu. Once the pressure switch is calibrated, it may be rendered tamper-resistant by sealing the threads of the adjustment screw or sealing the openings which were accessed for factory calibration.

- Accurate calibration of pressure switches is critical in ensuring process quality and safe operation of equipment.
- Documenting Process Calibrators (DPCs) are multifunction process tools.
- The best tool for the job is a DPC.



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Not a crack: Level measurement for natural gas

Dieter Hägele, KSR Kuebler Niveau-Messtechnik AG,
a division of the WIKA Group

Local oil production conditions require robust technologies, which also apply to measuring instruments. Level control in gas tanks is particularly challenging.

Natural gas is considered one of the fuels of the future – with the development and extraction of deposits being pushed forward worldwide. Even with oil production, natural gas plays a role. The local production conditions require robust technologies, which also apply to measuring instruments. One particular challenge is level control in gas tanks, in which extreme pressure and low density of the medium occur simultaneously, meaning the measuring instrument must be immensely strong. WIKA provides a special patented design for these requirements: a level indicator with portholes from metal-fused glass.

Five hundred kilometres off the north-west coast of Australia, in the Timor Sea, the two oilfields of Laminaria and Corallina, stretch out. Both were discovered in the 1990s. Their raw-material deposits are broken down on an FPSO (Floating Production, Storage and Off-loading unit) operated by an Australian consortium. Such floating platforms are mainly used for the exploitation of smaller sites, and then towed to the next site.

In the Laminaria and Corallina development area, the 'Northern Endeavour' is moored. This 273 metre long, double-hull platform accepts oil and gas from several wells through its manifolds. It has a daily capacity of 180 000 barrels and a storage capacity of 1,4 million barrels. The 'bunkered'



Photograph courtesy: Woodside Energy Ltd.

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oil is later pumped onto tankers and shipped for further processing. The level monitoring of tanks on an FPSO poses several challenges in view of the harsh conditions. KSR Kuebler, a company within the WIKA Group, was awarded the contract to fit out the 'Northern Endeavour' with the appropriate instrumentation. This covered bypass level indicators from DIN 1.4529 (6Mo) stainless steel, which belongs to the family of super duplex steels. This stainless material features an outstanding resistance to sea water and ensures a service life of up to 20 years. This time span corresponds to the operating cycle of an FPSO.

Measurement technology for drilling platforms is not a standard catalogue item. However, most tasks can be fulfilled with variations of certain models and methods of measurement. This is true for applications in offshore petroleum production. In the case under consideration, however, there was an exceptionally tough nut to crack: the level indicator for the gas reinjection unit. In oil production, crude oil and natural gas are brought from the deep together. In many cases, the gas is simply flared off. On an FPSO, however, one uses it for the recovery process. The gas is separated and fed into the reinjection unit, buffered there and injected back again into the deposit reservoir. This supports the extraction by forcing the oil out. In this way, the pumping power can be reduced.

When reinjecting the gas, a working pressure of 315 bar is used. The medium itself also has a low density. For level measurement, this led to a problem: The task could not be solved with any variation of

existing instruments. Magnetic displays with floats do indeed have a stable housing that could withstand a pressure of 315 bar. However, the float in liquefied gas would have to be very light and therefore would have a limited durability. With sight glass level indicators, the float problem would be removed. The glass front, however, would never withstand the acting pressure.

Since, on all accounts, measurement systems using floats have been excluded, deliberations then focused on an alternative display behind glass. It was shipbuilding that delivered the role model: portholes. Rather than a continuous glass front, the level indicator has metal-fused sight glasses. Here we are talking about Metaglas, which was introduced to the market by the company, Herberts Industrieglas, from Wuppertal in the 1980s. A window is fused into a metal ring, thus eliminating the seal as a risk factor in high-pressure applications. The different coefficients of thermal expansion of glass and metal result in a homogeneous state of compressive stress in the entire glass body. As a result, the sight glass, as an assembly, behaves as a tough material which almost completely eliminates a total failure such as a rupture.

The portholes of the level indicator, instead of the usual borosilicate glass, use AR glass, an alkali-resistant fibre. They are fused with a ring made of highly resistant Hastelloy. All porthole sight glasses have a diameter of 22 mm and a thickness of 39 mm. They are screwed into a display body from super duplex stainless steel (solid material), arranged in opposite pairs, offset by 90°. This

“
Within the vessel, liquefied natural gas passes under extreme pressure, the compressor for the recycling, however, transports only gas.



Porthole design glass display.



Metal-fused glasses as a built-in element.

AR – Alkaline Resistant
FPSO – Floating, Production, Storage and Off-loading

Abbreviations/Acronyms

ensures a continuous display that is easily visible from all directions. KSR has delivered three such porthole measuring instruments for use on the 'Northern Endeavour'. Each is 1,20 m long, 200 kg in weight and is attached to the tank through two flanges. Within the vessel, liquefied natural gas passes under extreme pressure, the compressor for the recycling, however, transports only gas. As a result, with the porthole indicator, the condensation of the gas needs to be controlled. The liquid in the tank must not exceed a certain level, so that there is always sufficient gas available to support oil production.

Conclusion

The indicator can also fulfil the same task in natural gas extraction on land. Here, since the attribute of seawater resistance is not applicable, the body and the metal ring of the sight glass can be made of less expensive materials, for example, from 1,4571 or 1,4404 stainless steel. Apart from gas production, sight glass level indicators in a porthole design (in the WIKA portfolio under the model designation LGG-BE) are generally suitable for use in high-pressure systems.

- Level control in gas tanks is a particular challenge.
- The measuring instrument must be immensely strong as extreme pressure and low density of the medium occur simultaneously.
- A special design for these requirements is a level indicator with portholes from metal-fused glass.



Under test, the sight glasses have only shown internal fractures in the glass body from 1,500 bar, but these did not lead to leaks. The instruments can be used with nominal pressures up to 400 bar and test pressures up to 600 bar. This rating has been confirmed by TÜV Südwest. The model has also been proven in practice as the porthole indicators on the 'Northern Endeavour' in the Timor Sea have been in use for the last 15 years without any complaints.



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WIKAI

Part of your business

Commercialisation of South Africa's first onshore Helium and Natural Gas field

On 4 May 2016, The **Linde Group**, gases and engineering company, its African subsidiary **African Oxygen Limited (Afrox)** and alternative energy company **Regergen Limited**, through its subsidiary **TETRA 4 (Pty) Limited**, signed an historic agreement for the commercialisation of the Free State Helium and Natural Gas (NG) field.

The 187 000 hectare Helium/NG field in Virginia, near Welkom, has proven reserves of 25 billion cubic feet of Natural Gas and Helium and is the first and only onshore petroleum (and natural gas) right in South Africa capable of supplying Helium to numerous specialised and industrial markets.

Under the agreement signed, TETRA 4 has contracted the Helium under an offtake agreement with The Linde Group, via its Global Helium business, being assigned distribution rights for substantial reserves of Helium. JSE listed Afrox, a member of The Linde Group, will operate the plant and market the Helium.

"The signing of this agreement marks an historic moment in bolstering South Africa's self-sufficiency in terms of Helium production," said Afrox Managing Director, Schalk Venter.

Relatively scarce on earth

Helium, although the second most abundant gas in the universe, is relatively scarce on earth and tends to be found trapped with NG in relatively low concentrations typically up to 1% by volume of the gas released. The Free State Helium and NG field, however,

enjoys concentrations of up to 3 - 4% by volume.

Linde's high-tech extraction technology will separate Helium from NG through a single system utilising a patented processing plant which purifies, compresses, liquefies and stores the Helium, ready for distribution to customers. The Helium plant will be designed and delivered by Linde Engineering and is expected to commence operations in 2018/19.

The Linde plant reduces the energy needed and cuts CO₂ emissions of traditional Helium from NG extraction processes and represents the latest in engineering technology advances. The plant is of modular design and will be precision manufactured in Europe before being shipped to the Free State for fast and efficient construction.

Commercialisation of Helium

Nick Haines, Head of The Linde Group's Global Source Development, Global Helium & Rare Gases, said: "Linde has worked diligently to commercialise this unique Helium resource together with TETRA4 and looks forward to receiving Helium upon commencement of plant operations."

Utilising the latest in land preservation techniques, TETRA 4 has drilled wells, thousands of feet deep to tap the NG source dome, while ensuring minimal visual and environmental impact on the gas field's landscape. Wells

and well-heads are being interconnected underground via an intricate network of pipes. These pipes will feed directly into the Linde engineered Helium processing plant.

Social regeneration

As part of TETRA 4's commitment to social regeneration, the company has created a number of bursaries for local students in the Virginia/Welkom area and has refitted the local Stilte Primary School with classrooms, furniture, a solar borehole pump, and upgraded the children's play area. TETRA 4 also plans to supply the local operations of MegaBus with compressed natural gas, (CNG) as 'green' fuel for its local bus services.

Regergen Chief Executive Officer, Stefano Marani, said: "Today is indeed an important milestone as we embark on the beneficiation of this important Helium deposit for the benefit of all our stakeholders."

Enquiries:

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Virginia site.



Above: Nick Haines (Head, Linde Global Helium & Rare Gases Source Development), Stefano Marani (Regergen Chief Executive), Dr. Alexander Brandl (Head of Business Development Linde Engineering), and Schalk Venter (Afrox Chief Executive).

WIKA

We operate on your level



WIKA has a comprehensive range of instruments for level measurement available for temperatures from -200°C up to 450°C, densities from 340 kg/m³ and pressure ranges up to 500 bar. The product spectrum includes bypass level indicators, sight glass level indicators, magnetic float transmitters and switches, optoelectronic switches and submersible pressure transmitters. Customer-specific special designs complete the WIKA offering.

A major part of the development is applied to individual solutions for the widest variety of applications in the chemical, pharmaceutical, offshore and petroleum, shipbuilding, and food industries, as well as for machine and plant building, water treatment plants and increasingly for the large environmental engineering sector.

In South Africa, WIKA manufactures a large range of level switches and level transmitters, fast and efficiently on their local production line – with delivery times from as little as one day. They stock a large variety of floats, from plastics to titanium, with options of special coatings, exotic materials and special surface finishes.

WIKA South Africa manufactures internal point, continuous measurement as well as external bypass variants. They are constantly increasing capabilities to high temperatures, horizontal measurement and final assembly of non-metallic sub-assemblies. In the longer term, ATEX approved assemblies will also be undertaken.

Our qualified employees are always dedicated to finding the solution to customer-specific problems. The latest production techniques, no-compromise quality management as well as national and interna-

tional approvals are further prerequisites for our company's good name.

Level measurements in the water and wastewater management are essential for efficient monitoring and control of all process steps in the water cycle. WIKA can provide the solution whenever reliability, water tightness, robustness and long service life are key demands on the measurement technology. WIKA submersible pressure transmitters offer proven design and excellent quality, based on years of experience in countless applications in the industry.

WIKA offers the right solution for level measurement for almost every application in the water and wastewater industry. WIKA submersible pressure transmitters are available in many variants, for tasks ranging from simple monitoring to precise process control in pumping, retention and treatment of water and wastewater.

WIKA offers the right solution, even in harsh environments and aggressive media.



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Radar level measurement – four switch points

KOBOLD Instrumentation, represented in South Africa by **Instrotech** – a Comtest Group company, has on offer the KOBOLD NGR that works on the principle of Time Domain Reflectometry (TDR, also known as guided Microwave or guided Radar) and offers a robust and low-maintenance solution for level measurement and monitoring.

Conventionally, capacitance level meters have been used in small tanks. The disadvantages of capacitance level meters are their dependence on medium dielectric constants and a specific probe calibration in tanks. NGR offers a more cost-effective alternative, eliminating these disadvantages and offering a minimal dead band of just 25 mm at process connection.

The NGR offers a standard reaction time of better than 400 ms and can detect level changes of up to

500 mm/s without any problems. The advantages of NGR in small tanks are unmatched.

Unlike older technologies, TDR offers measurement readings that are independent of chemical or physical properties of the process media and a measuring performance that is not affected by the density or conductivity of the fluid, making it consistently accurate even for deposit-forming and foaming liquids. The NGR offers a cost-saving solution for accurate level measurement and monitoring in oil- and water-based fluids, coolants, grinding and hydraulic oils or blends containing cleansing, degreasing and cleaning agents. The NGR's easy to read display and menu guided operation allows real-time level and status information.

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Compact in its design with a height of just 100 mm in the 3/8 valve, the VXB is the ideal solution for applications pertaining to temperature control, hot water systems, industrial washing machines, sterilising and cleaning equipment. Further design features ensure reduced costs by extending the lifespan and efficiency of the valve through a double protective construction. Foreign particles are also prevented from interfering with the VXB's performance thanks to a protective seal and a resin scraper.

Ernst Smith, Product Manager at SMC comments: "By listening and responding to our customers' needs, we set about creating a multi-purpose solution that delivers on cost savings, minimal maintenance, reliability and space savings. The response to the VXB series has been really positive and we are confident that it will be a popular addition to our comprehensive range."

Available in three port sizes, 3/8, 1/2 and 3/4, the VXB can be ordered in bronze or stainless steel (316L equivalent) with a pilot port location that can be placed in three of its four sides.

Enquiries: Email sales@smcpneumatics.co.za or Visit www.smcpneumatics.co.za



*Ernst Smith, SMC
Product Manager.*

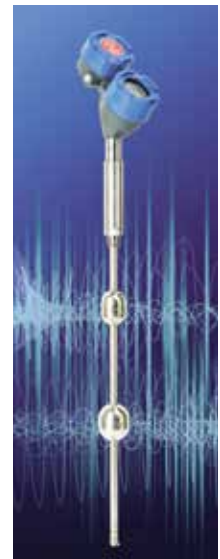


Next generation magnetostrictive level transmitter

Magnetrol International has introduced the Jupiter Model JM4 magnetostrictive level transmitter. The JM4 is available as a direct insertion option, as well as an external mount on any Magnetrol magnetic level indicator (MLI) or modular instrumentation bridge. With an improved design, unparalleled performance, and a collection of new and innovative features, the JM4 provides safer, simpler, and smarter measurement in total and interface level applications.

The JM4 is engineered to be the smartest, most innovative magnetostrictive transmitter available. To this end, numerous enhancements have been introduced, including greater signal-to-noise ratio (SNR), a full graphic local user interface, HART 7.0 (Foundation fieldbus available), local waveform capture, and a more intuitive device type manager (DTM) allowing for remote configuration, trending, and diagnostics. The JM4 is the first magnetostrictive transmitter in the industry to offer a field-removable and rotatable head. The removable head allows for simpler transmitter maintenance and troubleshooting without disrupting the process. 310° of head rotation provides users with greater accessibility to operate the JM4's on-board graphical interface.

**Enquiries: Katrien Geerinckx.
Email kgeerinckx@magnetrol.be**



Continuous level measurement with analogue output and IO-link

The LR9020 reliably resists harsh environmental conditions or high-pressure cleaning. Its small design allows installation in restricted spaces. The digital IO-Link communication prevents disturbance in measured value transfer. The rods can be shortened, or changed, so the LR reduces stock-keeping and simplifies replacement. Even before installation the user can set the sensor parameters via IO-Link on the PC. The data record of parameter setting can be copied to other sensors, e.g. for installations of identical design. The level transmitter has an operating voltage of 18 to 30 Vdc and an ambient temperature of 0...60°C. Applications for LR9020 include aqueous media, coolants, cleaning agents, oils.

Enquiries: Alwyn Skelton. Tel: +27 (0) 12 450 0400 or email info.za@ifm.com



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WIKA's new CTR3000 multi-functional precision thermometer offers a unique 'two-in-one' solution: It can be used to calibrate resistance thermometers and also thermocouples. With up to 44 channels for different sensor types and therefore a wide temperature range, as well as with an accuracy of up to 0,005 K, the CTR3000 is designed for high operational flexibility. A new, intuitive user interface makes all information visible at a glance via eight menu items. Automatic scanning of the channels, the graphical representation with simultaneous calibration, the export of the logged data to Excel and software updates via a USB stick support its time-efficient handling. The new CTR3000 has been developed as a joint-venture project by Automatic Systems Laboratories (ASL) and WIKA and will be sold under the WIKA label. The British company ASL is a market leader in precision instruments for temperature measurement. Since 2013 it has been part of the WIKA Group.

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Extended measuring ranges, large data logger, wireless functionality and streamlined menu operation: With the model CPG1500, **WIKA** has launched an improved precision digital pressure gauge with an appealing price/performance ratio. The new calibration and test instrument has been designed for versatile use. The CPG1500 covers pressure ranges up to 0 ... 1,000 bar and measures with an accuracy of up to 0,05% of span. Its data logger can record up to 50 measured values per second. The data is transmitted wirelessly and can be processed using the WIKACal software. Further functionality, such as min/max

memory or integrated temperature measurement, enhances the performance range. The new menu structure of the CPG1500 enables a quicker intuitive input for all parameters. A 5½-digit display with bargraph and a large text field supports the analysis of measuring points on site. The measuring quality of the CPG1500 is 'packaged' within a robust design. As an intrinsically safe instrument (IECEX, ATEX, CSA approvals) and with IP65 ingress protection, it offers reliability and durability, even with extreme process conditions.

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Launch of locally manufactured globe valve

Mitech Control Valves has launched a locally designed and manufactured High Pressure Globe Stop Valve. High-pressure stop valves are used in the most extreme high pressure and temperature applications. Eskom remains one of the largest consumers of these valve types, with thousands of units required in power plants across the country. Up until now, there has been no local manufacturing capability to produce the valves required to specification. With no local capability available, cost for the purchase and maintenance of these valves remains high. In answer to this challenge, **Mitech** has been working in close consultation with Eskom over the last two years, to conceptualise, design and locally manufacture a high pressure stop globe valve that will fulfil the technical and safety requirements as well as the local content requirements as set out in The Department of Trade and Industry's (the dti) designation Instruction Note for the procurement of valves and actuators.

General Manager for Mitech, Pieter Badenhorst highlights the degree to which the unit is locally produced stating that "although we have to import some of the material used in the manufacturing process such as bar-stock which is not produced in the country at present the valve remains 80 - 90% locally manufactured." Using Mitech's design, locally sourced materials, local castings, machin-

ing, assembly and testing, the valve conforms to all the criteria for local content.

Badenhorst explains that it would be very difficult to simulate the extreme conditions that would be required to test their valve in the laboratory, and therefore, Eskom has agreed to install the valves at appropriate test sites for a trial period at their power plants, to fully evaluate the valve's performance. Mitech has committed to providing technicians working on Eskom's plants with training as well as a full service manual to ensure effective incorporation of the valve into the power plants.

The whole unit comprises 33 components, most of which are easy to maintain. The body of the valve is a one-piece investment cast design, eliminating threaded or bolted pressure retaining parts. The unit has a fully replaceable seat, which can be extracted while the valve remains welded into the line.

Enquiries: Pieter Badenhorst. Tel. +27 (0) 11 657 6000 or
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Mitech's Pieter Badenhorst.

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Cable diagnostics in South Africa

Ronald H Goodwin, H.V. Test

MV electrical cables are the major arteries for electrical power. The higher the voltage the more critical and important they become.

Being so important, why then is no electrical cable maintenance or diagnostics done by the utilities? On transformers and switchgear regular maintenance/ diagnostics is done – oil filtration – gas analysis + dielectric strength of the oil. Cables are buried in the ground, hung down a mine shaft and left there to survive the elements and man. Today it is possible to do on-site cable diagnostics of all types of MV cables. This article concentrates mainly on the MV PILC and XLPE cables.

Background

In the factory Partial Discharge (PD) testing is done in a screened room (Faraday Cage). With the evolution of the computer, PD testing can now be done in the field. Tan Delta (TD) is done on transformers, transformer bushings, motors, alternators and dielectric oil as an excellent indication of the quality of the insulation – it is now possible to do TD on cables and obtain an excellent indication of the reliability of these cables. The author has been involved with TD testing of MV cables since 1999 and PD testing since 2002. When testing a MV cable, the main difficulty to overcome is the capacitance of the cable. A 95 mm², 11 kV XLPE cable capacitance is 300 nF/km. A 14 kV maintenance test at 50 Hz would therefore require a power pack of 20 KVA or 82 amps at 230 V. It is understandable then why 50 Hz testing of cables has not been a success.

Dc testing has, for years been the only form of 'diagnostic' testing on PILC cables and oil filled cables. But then along came the solid dielectrics in the 1970s – so called PEX and now commonly called XLPE. At the same time the joints and terminations have become more convenient with the introduction of the heat and cold solid dielectrics for both PILC, XLPE and VPR cables. The solid dielectrics are here to stay even though some of the pre 1980 XLPE cables have failed with catastrophic consequences. The modern XLPE cables manufactured in South Africa are of excellent quality and provided they are installed correctly and maintained, they should equal or better the life of the PILC cables (this statement will start the tongues wagging!)

Damage the lead sheath of a PILC cable and it is a matter of time before the cable fails. Damage the coaxial copper tape and or semi-conductor screen around the XLPE cable and it could be up to 10 years before the water trees manifest themselves. Once the outer sheath of the XLPE cable is damaged, the copper tape is eroded away and with the advent of a fault, arcing and burning occurs as the fault current struggles to find its way back. Once the semi-conductor tape or screen is damaged, PD starts to occur and with the water ingress

(and 50 Hz) water trees will result which can have disastrous consequences – for which many municipalities can vouch. How then can the MV cable be maintained?

Dielectric breakdown

Solid and PILC dielectric breakdown and dielectric deterioration is generally caused by:

- **PD activity** due to badly terminated or joined cables, surface damage to the semi conductive tape and due to impurities or cavities in the dielectric
- **Thermal Breakdown**, caused by overloading or from cables packed to close together and unable to dissipate the I²R heat and dielectric losses. Hence the importance of Tan Delta – Why?
- **Electrical Conduction** breakdown, where electrons are emitted into the insulation by electrical stress, caused by space charges or stress points
- The **dc voltage** breakdown strength of XLPE is 60 kV/mm
- The **normal** 11 kV cable is 3 mm, resulting a dc strength of 180 kV
- **Dc voltage stress** distribution is only resistive (R), whereas ac (both 0,1 Hz and 50 Hz) voltage stresses the impedance (admittance) where the R, L and C are stressed

Diagnostic methods

At present there are the following diagnostic and maintenance methods available in South Africa.

- Tan Delta or Dielectric Loss Angle
- PD
- Dc leakage current (PILC cables)
- For outer sheath maintenance – the dc sheath test
- Joint PD discharge
- Termination PD discharge

Tan Delta

As the cable ages so the dielectric loss increases, and therefore dielectric loss is an important indication of the dielectric quality. The Tan Delta or dielectric loss angle is a measure of the dielectrics ability to withstand breakdown and a measure of the dielectrics losses.

Tan Delta is an ac sinusoidal test to evaluate the quality of the dielectric. In theory the Tan Delta (at a fixed frequency) should remain constant as the voltage increases.

MV	– Medium Voltage
PD	– Partial Discharge
PILC	– Paper Insulated Lead Cable
PVC	– Polyvinyl Chloride
TD	– Tan Delta
VPR	– Voltage Protection Rating
XLPE	– Cross Linked Polyethylene

Abbreviations/Acronyms

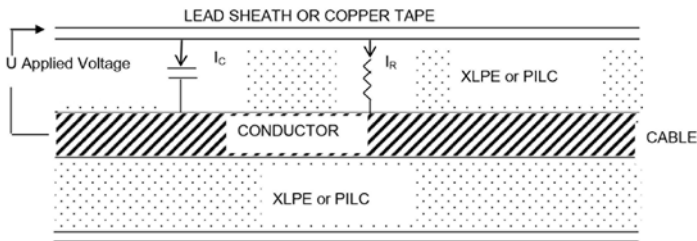
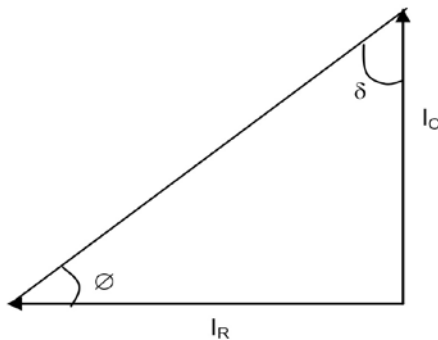


Figure 1: Lead sheath or copper tape.

As mentioned a cable is a large capacitor with a capacitive current. The resistive component is very, very small.



ϕ is power factor angle ($\cos\phi$)

Whereas

$$\begin{aligned} \text{TD} + \text{Tan Delta } (\) &= \frac{\text{True Power}}{\text{Capacitive Reactive Power}} \\ &= \frac{U^2/R}{U^2\omega C} \\ &= \frac{1}{\omega CR} \end{aligned}$$

Figure 2

In an XLPE cable at 0,1 Hz the required Tan Delta is $1,2 \times 10^{-3}$ which equates to an angle of $\pm 0,068$ degrees. This demonstrates how small the resistive component of the current is. The resultant current of the vectors $I_R + I_C$ will lead the applied voltage by $\pm 90^\circ$ (mainly a capacitive load) and by measuring the zero crossings of the voltage wave and current wave the angle Delta can be determined and hence the Tan Delta or Dielectric Loss Angle. With the power of the PC, microprocessors and at 0,1 hz (one cycle every 10 seconds) this is easily achieved. However Tan Delta can only be done with a truly sinusoidal waveform (not square or trapezoidal), and accuracies of $0,2 \times 10^{-4}$ are required.

Partial Discharge

PD is exactly what is implied, a partial breakdown of the insulation,

not a complete flashover: PD is more commonly recognised as Corona (seen on HV overhead line insulators on a misty night). PD can occur in air, in cable dielectric, in transformers, motors etc. The measurement of PD. is normally in pC or pico-coulombs. 1 mA for 1 ms. When XLPE cables are tested in the factory only 5 pC is permitted at 1,7 x rated voltage. In paper cables PD is not even measured in the factory. PD does progressively damage the insulation and it is just a matter of time before the insulation will fail. PD is like a cancer, early diagnosis is critical. PDs emit:

- Electromagnetic energy
- Acoustic energy
- Gases

Today it is possible to energise the PILC or XLPE cable with a sinusoidal wave form to determine the location phase and magnitude of these PDs. With the advent of digital noise rejection techniques and the computer, it is possible to do PD testing on long MV cables (which behave as long 'aerials' to noise). PD Testing is particularly useful for detecting faulty cable accessories, joints and terminations. One of the major disadvantages of PD testing is that the terminations may have to be removed in order to have sufficient clearance and to install corona shields. During PD testing the following levels are recorded:

- Background noise of the site
- PD Inception
- PD at U_0 (rated voltage)
- PD at 1,7 U_0
- PD extinction

PD inception should occur above U_0 but PD extinction should not be below U_0 (with the exception of PILC cables).

Dc leakage current

Dc has been used for years and years to test PILC cables. As a diagnostic tool, dc testing is meaningless. Unless a fingerprint leakage current was recorded during acceptance testing, the test is really a fail/ no fail result. As the oil in the PILC cable drains to one end of a cable the losses increase and the leakage current increases. Dry type terminations (heat shrink and cold shrink) are now used on PILC cables and dc testing is of little use. Dc testing of XLPE cables is similarly meaningless and is destructive in aged water treed cables.

Cable sheath testing

The outer PVC or XLPE sheath of XLPE cables must be maintained. Water must be kept out of the cable jacket for two very good reasons.

- Erosion of the coaxial copper tape and earth fault path
- To avoid the water seeping under the outer semi-conductor tape

One easy and simple method is to do regular sheath tests. This test is described below where the earth tails are lifted from the earth bar

(not easy on PILC wiped terminations) and a 5 kV dc cable sheath test is applied to test the integrity of the sheath. The 5 kV test should be done for two minutes with a rough rule of thumb of 1 mA per KM leakage current being acceptable. This test is applied between the armouring and mother earth (see below). A sheath fault is easily indicated by the dc Voltmeter and Ammeter (current increases and 5 kV is not attainable).

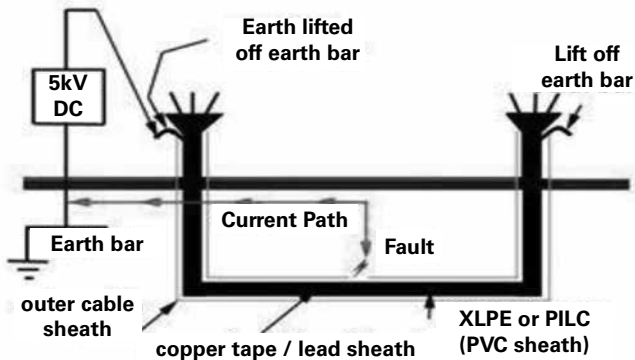


Figure 3: Cable sheath faults.

These cable sheath faults can easily be located using a Sheath fault locator. If a PILC cable has a outer PVC Sheath, the above sheath test can be applied. The normal jute covered PILC cable unfortunately does not allow the lead and steel wire armouring to be lifted from earth.

Joint PD detector

A joint PD detector using an inductive or capacitive coupler is available on the market. The detector has had varying success and relies on the joint not being completely screened by an earth (braided) sock or tube. Traditional methods of PD Testing from the two ends will pick up PD. Discharge travelling waves and is (in the author's opinion) a more effective manner of detecting faulty joints.

Termination of PD detector

At high PD levels, ultra sound energy is emitted and this can be detected with a tuned piezo crystal type detector. A common problem found in terminations is where the termination's phases are crossed over in order to obtain the correct phasing. Unless this cross-over is done below the semi conductor/ stress relieving point PDs will occur, and in time ultra sound and in the more severe cases even normal audio sound is heard. A typical tell-tale result is the white powder found at the heavy discharge points. It is just a matter of time before failure occurs.

Termination ultra sound detectors and PD discharge MV sticks are available on the market to test dry termination under operating conditions. These are relative detectors and do not record the PD levels. They are however a quick and easy test. The normal 50 Hz

and 0,1 Hz TD/PD detection systems can detect PD on terminations, but the cable has to be removed from service. These PD levels are traceable back to a standard and therefore more meaningful.

Cable test and test systems

The following overvoltage and diagnostic test methods are available:

- 0,1 Hz Sinusoidal
- 0,1 Hz Cosinus trapezoid and or square wave } 1 cycle every 10 s
- Oscillating Wave
- 50 Hz Sinusoidal
- Relaxation and recovery
- Dc – negative with respect to earth

Conclusion


0,1 Hz testing was originally developed back in the 1950s to test large turbo alternators. The main reason for the 0,1 Hz was to cope with the capacitance of these large alternators. Cables present a similar problem that is a large capacitive load. 0,1 Hz is now incorporated in most cable standards. (SANS10198 [1], IEEE400 [2], IEC 60060-3 [3] draft form). 0,1 Hz will, in the future (and in the authors opinion) become the standard form of testing for alternators, motors, cables, transformers and switchgear. The electrical stress at 0,1 Hz sinusoidal wave form is similar to that which will occur at 50 Hz.

“
MV electrical cables are the major arteries for electrical power. The higher the voltage the more critical and important they become.”

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- [1] SANS10198. Series. The selection, handling and installation of electric power cables of rating not exceeding 33 kV.
- [2] IEEE400. Series. Shielded power cable systems.
- [3] IEC60060-3. 2006. High-voltage test techniques - Part 3: Definitions and requirements for on-site testing.

- It is possible to do on-site cable diagnostics on all types of MV cables.
- Partial Discharge (PD) cable testing can be carried out in the field.
- Tan Delta (TD) testing on cable provides a good indication of its reliability.



take note



Ronald Goodwin graduated with a B.Sc Electrical Engineering from Natal University in 1964. He spent 10 years in the Ferroalloy industry as Project Engineer and Responsible Engineer Operations. Ronald Goodwin has gained his extensive knowledge and expertise in Electrical Testing and Diagnostics Systems from his 35 years in the electrical industry. Ronald Goodwin established HV Test in 1984. The company specialises in Medium Voltage, High Voltage and High Current Testing, product supply, repairs and training.
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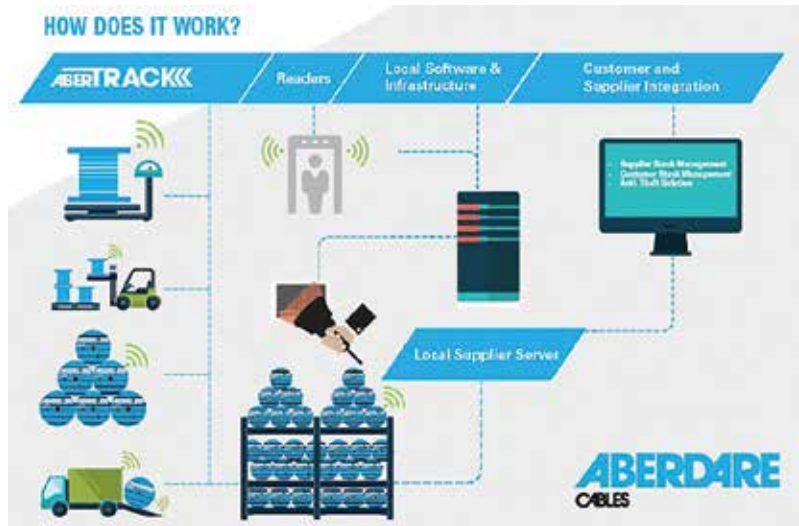
The technology is highly advantageous to both Aberdare and its customers. The positioning of the drums needs to be within a range of an area that is covered by readers. Although the RFID technology has been around for a long time, the ability to use this chip in power cable being sold, is a new concept. This is a cost efficient method for inventory management. This methodology is complementary to and compliant with the ISO standards of stock management.

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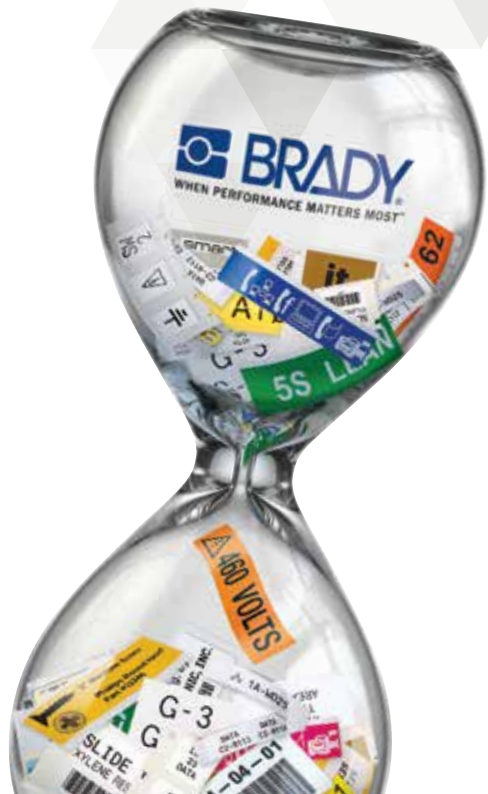
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Electricity theft... shocking figures

According to online publication *The Energy Collective*, electricity theft accounts for 1% of all electricity consumed globally. In its February 2013 edition, the publication stated that India loses up to 33% of all electricity generated and 1% of GDP due to electricity theft. According to the report, the USA was losing an estimated \$6 billion annually due to electricity theft while the UK was losing an estimated £299 M per annum due to gas and electricity theft.

In South Africa, Eskom and municipalities lose an estimated R7,5 billion per annum due to electricity theft. Electricity theft includes illegal connections, meter tampering and bypassing, illegal prepaid power vending, cable/ infrastructure theft, and non-payment. In recent weeks Eskom has arrested a number of culprits who have been found in possession of, amongst others, overhead lines, transformers and pylon support lattices.

The value of material stolen remains a serious concern, as it is indicative of organised, syndicate-driven criminal activity in the conductor theft environment, which

is also experienced by other state-owned enterprises.

The fight against network equipment theft is being addressed by means of intelligence driven investigations by the Hawks, a division of SAPS, which encompasses aggressive policing of the scrap metal market for stolen goods.

The courts are also taking this crime seriously and significant sentences are being handed out to perpetrators. A joint industry working group, formed by Eskom, Transnet, Telkom, SAPS, the National Prosecuting Authority, Business Against Crime and the South African Chamber of Commerce and Industry (SACCI), continues to contribute positively in the fight against this crime.

Some successful policing

On 29 January 2016 a man appeared in the Cullinan Regional court and was found guilty of robbery, with aggravating circumstances, and sentenced to 15 years imprisonment for stealing cable rolls from one of Eskom's depots in Cullinan (three people were involved but only one was arrested).

Two people were recently found guilty of theft and sentenced to seven years imprisonment at the Potchefstroom Regional Court, North-West. A third accused was fined R20 000 or six years imprisonment. The convictions follow an Eskom investigation which led to the three arrests in May last year after a 70 mm wide and 1 km long overhead conductor valued at R126 000 was stolen in Delareyville, North West.

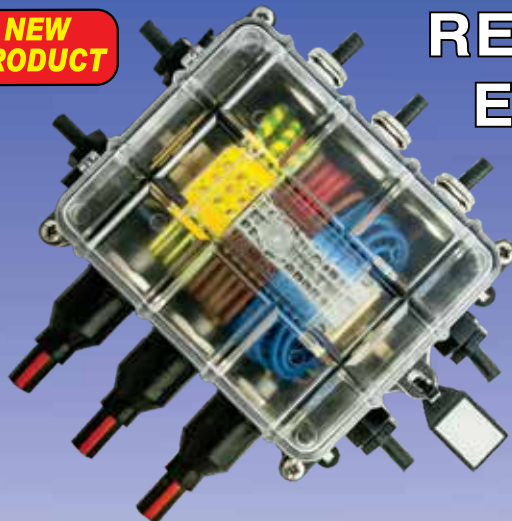
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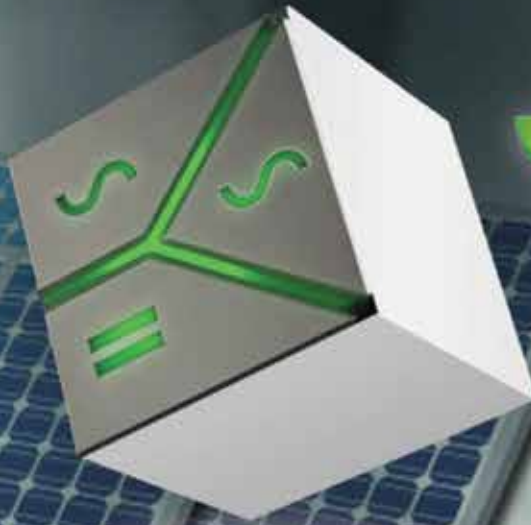
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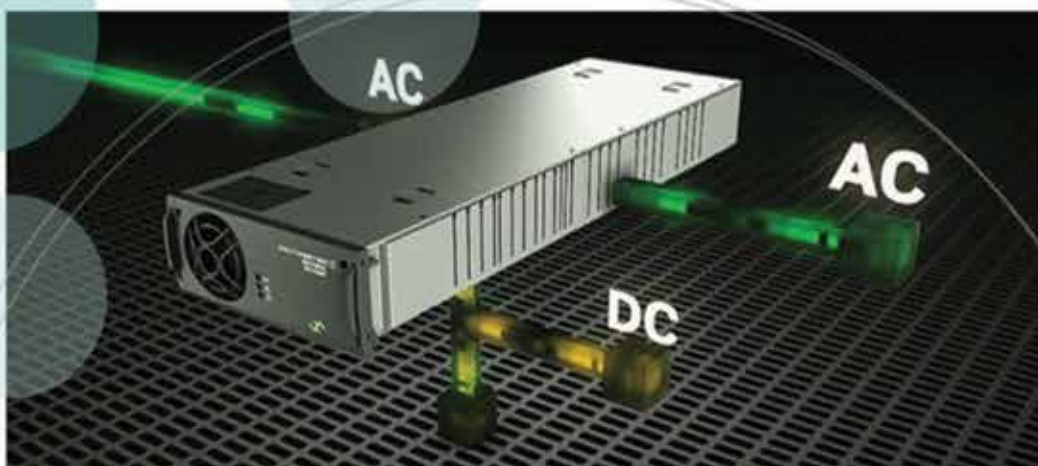
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- Single point of failure
- Built-in transfer technology

HIGHER RELIABILITY

- Less components
- Simpler system architecture
- No switches



Will do wonders for your Total Cost of ownership

Rectifier & Inverter in one box

Built on HE technology from the Flatpack2 HE rectifier family the Rectiverter 230/1500 48/1200 provides backed up power for 230 VAC loads with minimum losses and footprint.

It is a 3 port device capable of charging the 48V battery and simultaneously provides power for the AC and DC loads. During mains outage the Rectiverter feeds AC loads using energy stored in the battery.

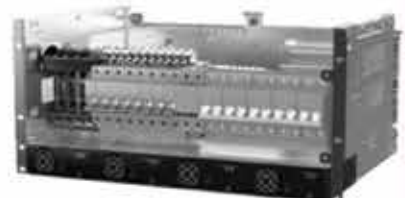


Rectiverter 48V Module

Models / ordering information	230/1500 48/1200	230/1500 48/150	230/1500 48/0	115/750 48/600	115/750 48/75	115/750 48/0
AC OUTPUT DATA						
Voltage (default) / (adjustable range)	230 VAC / 200 - 240 VAC			115 VAC / 100 - 127 VAC		
Frequency (default inverter mode)	50 Hz (adaptive)			60 Hz (adaptive)		
Power maximum (continuous / overload (<15s))	1200 W (1500 VA) / 2000 VA			600 W (750 VA) / 1000 VA		
Protection	Fuse in L and N, Hot pluggable					
DC OUTPUT DATA						
Voltage (default) / (adjustable range)	53.5 VDC / 43 - 58 VDC					
Power (maximum @nominal input)	1200 W	150 W	0 W	600 W	75 W	0 W
Hold up time, maximum output power	>10ms; VOUT > 41 VDC (only in rectifier mode)					
Efficiency	>96% (mains mode (AC/AC and AC/DC)), >94% (inverter mode (DC/AC))					
Electrical safety	UL 60950-1, UL1778, EN 60950-1, EN 62040-1					

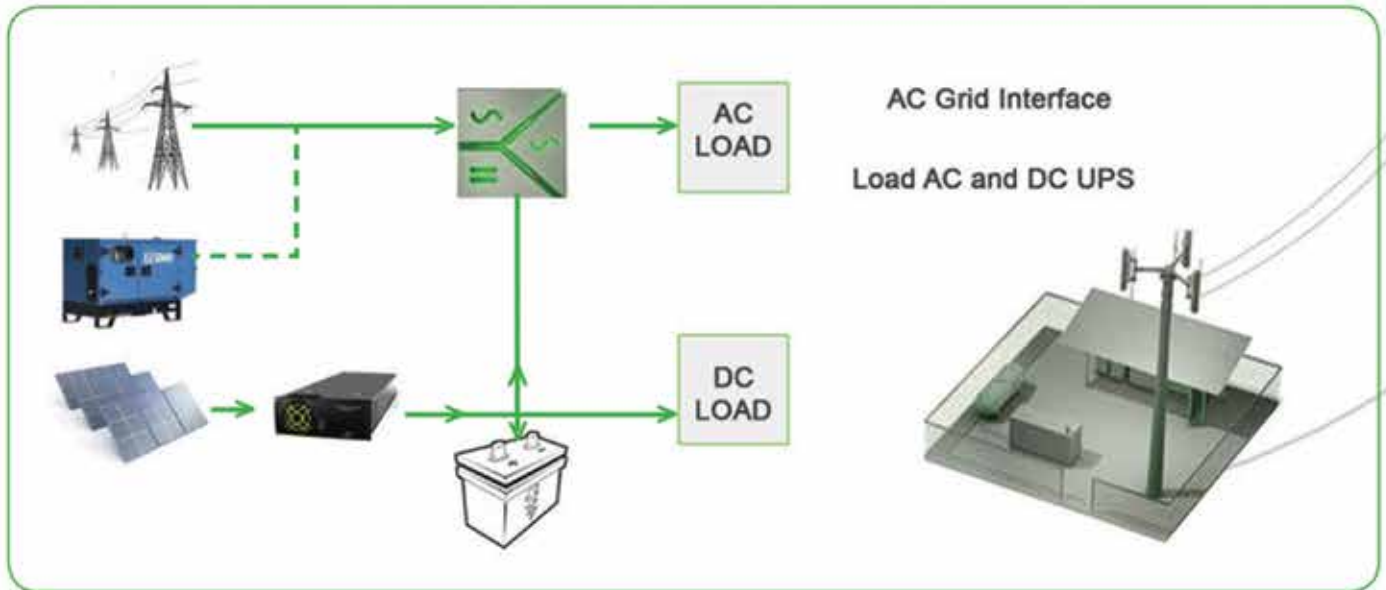
Rectiverter Power Core 6kVA, 1ph Single Phase no Bypass

The 3 port converter simultaneously provides power for AC and DC loads. During mains outage the Rectiverter 48/1200 HE feeds AC loads using energy stored in the battery.



Models / ordering information	8 KW	4 KW
INPUT DATA		
Voltage range AC	185-275 / 95-140 V	
Voltage range DC	40-58 V	
OUTPUT DATA		
Adjustable range AC	200-240 / 100-127 V	
Adjustable range DC	43-58 V	
Max output power AC	6,0 / 3,0 kVA	
Max output power DC	4,8 / 2,4 kW	

Micro Grid Potential application



Rectifier Power Core 6 kVA 1ph MB Single Phase Manual Bypass

The Rectifier power core combines both AC and DC feed into one common unit. Simultaneously it provides AC backup power for 230 VAC or 115 VAC loads, and 48 VDC power for DC loads and battery charging.



Models / ordering information	8 KW	4 KW
INPUT DATA		
Voltage range AC	185-275 / 95-140 V	
Voltage range DC	40-58 V	
OUTPUT DATA		
Adjustable range AC	200-240 / 100-127 V	
Adjustable range DC	43-58 V	
Max output power AC	6,0 / 3,0 kVA	
Max output power DC	4,8 / 2,4 kW	

Rectifier Power Core 18 kVA 3ph MB Three Phase Manual Bypass

The Rectifier power core combines both AC and DC feed into one common unit. Simultaneously it provides AC backup power for 3-phase or single phase AC loads, and 48 VDC power for DC loads and battery charging.



Models / ordering information	24 KW	12 KW
INPUT DATA		
Voltage range AC (3 phase Y)	320-475 / 164-242 V	
Voltage range DC	40-58 V	
OUTPUT DATA		
Adjustable range AC (3 phase Y)	346-415 / 174-220 V	
Adjustable range DC	43-58 V	
Max output power AC	18,0 / 9,0 kVA	
Max output power DC	14,4 / 7,2 kW	

JHB: Tel: 010 591-1713, Fax: 011 462-4310

KZN (Durban): Tel: 031 569-2854, Fax: 031 569-2864

Mbombela (Nelspruit): Tel: +27 (0) 13 004-0012 /

Fax: +27 (0) 13 004-0011

Capetown: Tel: 021 200-5754 / 021 200-8248

Bloemfontein: Tel: 051 011 0158, Fax: 051 444-1996

www.rectifier.co.za / www.power-solutions.co.za / www.currentautomation.co.za

Save time with durable cable and component identification

Imagine that important machinery, power or business systems are down because of one damaged cable hidden in a thick bundle. Singling it out manually would cost a lot of time when time is critical. A simple, yet durable cable identification label at regular intervals helps to have important systems back up a lot faster. **Brady** offers fast label printers that need only a few seconds to print the identification label you need. Built to resist dust, moisture and the occasional bump, these reliable printers help to quickly identify any cable or component with durable identification labels, available in a wide range of label types, sizes and colours.

In the hands of a professional, the right tools always get the job done faster and with greater result. That is why every Brady printer has a wide variety of labels to handle every situation. To fit a lot of information on a tiny label, insert blank flag labels in the printer. To protect a vital barcode on a cable label from abrasion, dirt or moisture, use a self-laminating label or cable sleeve material. Consider different colours to quickly identify every cable in a

cable bundle. All of these identification solutions are available in the right sizes, and in easy to insert printer consumables.

Cable and component labels should stick, stay attached and remain legible. Few things seem more agonising than watching the last label fall to the floor when opening an electrical cabinet during a business emergency.

Brady invests heavily to continuously develop labels, inks and adhesives that really stick and remain legible, even in demanding environments. Brady has captured ten time winners and wasters in cable and component identification.

Enquiries:

Email emea_request@bradycorp.com



Cost-effective protection of cables and hoses

EKD Kolibri energy chain from electrical and mechanical equipment and energy supply systems specialist, **Powermite**, has been delivering high quality, reliable, cost saving solutions for seamless operation of mobile equipment across Southern African industry for more than three decades. Produced in Germany by EKD, the high quality energy chain, also referred to as drag chain, complements Powermite's portfolio which comprises best-in-class product and service solutions.

"Alongside EKD, we share a combined knowledge of over 50 years of drag chain application in industry," affirms Powermite Marketing Director, Donovan Marks. Uniquely engineered



to prevent snags and premature breakdowns, EKD Kolibri energy chain assists in keeping operating costs to an absolute minimum.

The extremely wear resistant chain extends component life, reducing the need for spares. Additionally, this exceptionally reliable chain requires very little maintenance. The energy chain is able to operate long term in extreme temperatures ranging between -20°C and +100°. Subsequently the rugged energy chain finds wide application in industries such as ports, harbours, materials handling, industrial and water treatment plants where the protection of cable, hose or hydraulic supply on a fixed plane over a required distance at a fixed or variable speed is needed on equipment such as cranes, milling and boring machines. The comprehensive EKD range from Powermite includes galvanised steel, stainless steel and carburised (hardened) steel. According to Marks, Powermite's energy chain product portfolio also extends to a plastic range consisting of self-extinguishing, ATEX, Anti-Static, steel-coated and Robotic bi-directional chain.

Enquiries: Donovan Marks. Email donovan@powermite.co.za

New 10 Entry Enviro Box

Having no less than 10 x 20 mm cable entries, **Pratley's** brand new Rectangular Enviro Box, with a hinged lid, is a contractor's dream come true. Ultra-versatile, ever so easy to install and being rectangular, the box can be used to terminate anything from multiple telephone cables to control circuits and power cables. Pratley has been producing cutting-edge cable glands and junction boxes for more than 60 years. The company is well known for their vast range of electrical junction boxes found everywhere from petrochemical plants to rural village houses.

"After extensive research, we identified a need for an innovative rectangular box that is ultra-easy to install, accepts multiple cable entries and importantly, is able to withstand the rigours of harsh environments. The Rectangular Enviro Box forms part of Pratley's ever successful Enviro range of termination products which are specifically designed for corrosive and unforgiving surroundings" says Marketing Director, Eldon Kruger.

Pratley manufactures the Box from an ultra-tough, engineering polymer which means that the Rectangular Enviro Box will not corrode or crack in extreme environments. It is available with a choice of either a black hinged-lid or a transparent Polycarbonate hinged-lid. Being hinged, the lid is fully retained meaning that it can never be left off after inspection of the electrical circuit. Also certified to the most stringent IP (Ingress Protection) level of IP68, the Box is completely dustproof and waterproof, even when submerged up to two meters underwater. To complement the boxes' corrosion resistance and to maintain the IP rating, Pratley recommends the use of their EnviroGland range of cable glands. These are available for both armoured and unarmoured cables. Any unused entries can be blanked off with Pratley's innovative and ultra-easy to install 'clip-retained blanking plug'. Simply press the plug in and clip it into place. The junction box is supplied complete with a specially designed cranked-rail or an optional 35 mm DIN rail which can accommodate a whopping 12 x 6 mm Pratley Kwikkblok terminals. Kwikkblok terminals can be factory fitted to the customer's requirement.

Enquiries: +27 (0) 11 955 2190 or email sales@pratley.co.za
Visit www.pratleyelectrical.com



Schneider Electric launches an innovative app for electricians: EasyQuote



Schneider Electric, the global specialist in energy management, has identified that quotations and bill of materials are time consuming tasks for electricians, based on the knowledge of its partners. In parallel, the capability to quickly answer the end-consumer and send quick quotes are important components of satisfaction, loyalty and word-of-mouth.

Schneider Electric has developed an easy-to-use mobile application for iOS and Android smartphones to help electricians better manage this pain point, generating bill of materials and quickly share quotations with their clients.

The bill of materials and quotations include distribution board and wiring devices for all the residential projects of the electrician.

EasyQuote is a free application available on the Apple App Store and Google Play, that will help electricians to create and send quotations faster.



www.schneider-electric.co.za

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Enviro management and control

Fluke and HART Scientific have revolutionised environmental monitoring for calibration labs with their model 1620A DewK which offers Ethernet and wireless connections and upgraded LogWare III software. The DewK has inputs for two sensors, each measuring both temperature and relative humidity, so that the DewK can monitor two locations simultaneously. Both sensors can be run via extension cables to remote locations up to 100 feet away, or one sensor can be directly mounted to the top of the DewK.

Two types of sensors are available from Hart. The high-accuracy sensor ('H' model) reads temperature to $\pm 0,125^{\circ}\text{C}$ over a calibrated range of 16°C to 24°C . Relative humidity readings are to $\pm 1,5\% \text{RH}$ from $20\% \text{RH}$ to $70\% \text{RH}$. The standard-accuracy sensor ('S' model) reads temperature to $\pm 0,25^{\circ}\text{C}$ over its calibrated range of 15°C to 35°C . Relative humidity readings are to $\pm 2\% \text{RH}$ from $20\% \text{RH}$ to $70\% \text{RH}$. All DewK sensors come with NVLAP accredited certificates of calibration for both temperature and humidity, complete with data and NIST traceability.



The DewK features built-in Ethernet RJ45 jack and multiple DewKs can be monitored from the same screen using the new LogWare III client-server software. Ethernet also allows for the possibility for remote connectivity over the internet, so that critical conditions can be monitored from a remote location and data can be sent to a printer through the RS-232 interface in real time.

Enquiries: Comtest. Tel. 010 595 1821 or email sales@comtest.co.za

High-performance cable festoon systems

Powermite, part of the Hudaco Group, supplies superior quality high-performance cable festoon systems for the efficient feeding of power, data, air, or fluids to keep mobile bulk materials handling and mining machinery moving. Since establishing a partnership with French multinational, Delachaux, and its Conductix-Wampfler operation, Powermite's materials handling division has been distributing Conductix products including Cable Reeling Drums (CRDs), slip-ring housings and festoon systems to the Southern African mining and industry for over 40 years. Open cast and underground mining operations, stockyards, ports and other bulk handling facilities rely on powerful electric machines to do the heavy work. Maximum uptime, fundamental to high production levels, relies on reliable, easy to maintain materials handling machines. "It is therefore essential to install high quality specialised festoon systems to ensure uninterrupted and reliable feeding of energy, data, etc. to these machines even in extremely harsh and arduous environments," states Powermite Marketing Director, Donovan Marks.

The cable carriers used on the Festoon systems are custom made, compact, rugged and reliable in order to protect and manage flat and round power/data cables for electrical energy and data transfer to machinery. These low maintenance feeding systems contribute to maximised uptime and productivity due to easy installation and uncomplicated operation. Available in an array of configurations, these feeding systems are ideally suited for use on virtually any type of moving equipment, such as bulk material conveyors, stackers, reclaimers (including circular), travelling hoppers, rail car dumpers, plating lines, water treatment and car wash systems that operate in industries such as mines, steel mills, ports (container handling and ship-to-shore power supply), power plants, airports, warehouses, automotive facilities, etc. Irrespective of the particular cable or hose package, the running speed or location of the machine (indoors or out), Powermite/Conductix-Wampfler has the appropriate ISO 9001:2008 certified system to keep plants, mine sites, cranes and ports moving. Incorporation of the latest modern technology into the modular design ensures an above-average operational life of the cable festoon systems, even in the harshest of environments.

Enquiries: Donovan Marks. Tel. +27 (0) 11 271 0000 or email donovan@powermite.co.za



Reliable, maintenance-free cable reeling solutions

Available from **Powermite**, a division of Hudaco, are cable reeling systems are responsible for the laying down and retrieval of cable. These are appropriate for applications where a predetermined length of travel and a fixed amount of cable is connected to a fixed point while a moving point travels over a fixed line, rail, ground or height at a set speed. These reeling systems carry a variety of cabling (medium voltage, low voltage and milli power, control, fibre optic/data and composite cables for data and video supply) as well as water, air and hydraulic hosing. The system must keep the correct tension at all times to prevent damage during operation and to keep the cable out of harm's way.

The cable reeling systems, supplied through Powermite's materials handling division, are extremely versatile. "Our cable reeling equipment is manufactured in a variety of materials including, painted steel, stainless steel, and hot dip galvanised surfaces, to suit a wide range of applications such as indoor, outdoor, dusty, corrosive or specific environmental conditions," states Donovan Marks, Marketing and Sales Director. "The length of the systems can be increased or decreased as requirements deem fit and they can be applied to low speeds (5 m/min) or high speeds (120 m/min) over distances ranging from 1 m to over a 1 000 m."

Over the past five years, Powermite has supplemented its renowned spring driven, torque motor and permanent magnet clutch drives with Variable Speed Drive (VSD) technology that enables all the drives to provide a constant torque to ensure the cable is protected and kept out of harm's way during winding and un-winding functions.

By utilising the anti-runback bearing/ braking resistive-based drive systems, Powermite achieves tremendous success with system reliability. "Our systems continue to run regularly over several years in extremely robust environments," says Marks.

Enquiries: Donovan Marks. Tel: +27 11 271 0000 or email donovan@powermite.co.za



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Checking ground electrode impedance for commercial, industrial and residential buildings: *Part 2*

Technical information supplied by John Wilson on behalf of Comtest for the Fluke Corporation

The second of a two part discussion on earth/ground principles covers selective testing, stakeless testing and 2 pole testing. The first part was published in the April 2016 issue of *Electricity+Control*. (Table 1 is available with this article on E+C Spot On).

Tagg Slope technique

Large electrodes or grounding systems require special consideration. If you have plotted resistance readings for nine different P2 locations and there is no clear flattening on your graph, then the Tagg Slope technique (also called the Slope method) can help establish the earth impedance. *Figure 6* shows an example dataset for which there is no obvious flat section. This curve is characteristic of a test in which the current and potential probes never get outside the influence of the electrode under test. There can be a number of reasons for a curve like this:

- For electrode systems that cover large areas it may be difficult to place stakes far enough away
- You may not be able to place the C1 stake at the centre of the electrode
- The area you have to place stakes may be limited

If you have resistance readings at the 20%, 40% and 60% points between E and C2, then you can apply the procedure to the data you have already taken. Calculate the slope coefficient (μ) using three resistance measurements from 20%, 40% and 60% of the distance from the electrode under test to the C2 current stake.

$$\mu = \frac{R_{60\%} - R_{40\%}}{R_{40\%} - R_{20\%}}$$

See Table 1 (online only) and look up the P2/C2 ratio that corresponds to your μ . This will tell you where to look on your graph to ascertain the earth resistance. For the sample data in *Figure 6*:

$$\mu = \frac{6,8 - 5,8}{5,8 - 4,4} = 0,71$$

If we go to Table 1, for $\mu = 0,71$ the corresponding P2/C2 percentage is 59,6%. So the approximate earth resistance would be measured at (59,6% x 300 feet), or at 178 feet.

This is very close to our 60% point at 180 feet, where we read 6,8 ohms. So it would be safe to say the earth resistance for the electrode under test is roughly 7 ohms.

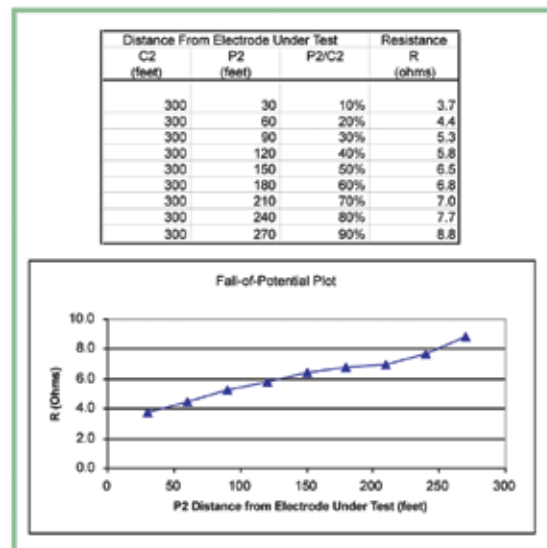


Figure 6: Earth impedance can be found from this curve by using the Tagg Slope technique.

Selective method

The Selective method is a variation of the Fall-of-Potential method, available on high-end ground testers like the Fluke 1625. Testers with this capability can measure the ground impedance of a specific ground electrode without disconnecting it from an array or from a structure's distribution system. This means you do not have to wait for a shutdown to test or risk the safety hazards of disconnecting the electrode from a live system. The same rules for current stake and potential stake placement apply as with Fall-of-Potential. If the conditions are met for the 62% rule it can then help reduce the number of measurements. Otherwise it is a good idea to build a complete Fall-of-Potential plot. You can use the Tagg Slope technique if your curve does not flatten out. Both the Fall-of-Potential method and the Selective method use stakes to inject current and measure voltage drop. The big difference is that selective testing can accurately measure the test current in the electrode under test.

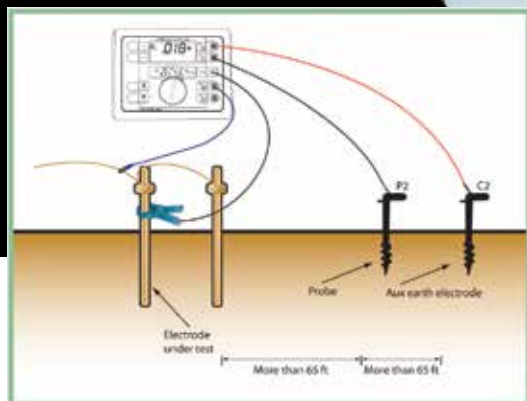


Figure 7: Connections for Selective ground electrode measurement.

The utility neutral, building steel and ground electrode are all bonded and grounded. When you inject a current into this system of parallel ground connections the current will divide. In a traditional Fall-of-Potential test you have no way of knowing how much current is flowing between any particular electrode and the C2 current stake. Selective testing uses an integrated, high sensitivity clamp-on current transformer to measure the test current in the electrode under test. Figure 8 shows how the current transformer fits into the test circuit. The Selective ground tester digitally filters the current measurement to minimise the effects of stray currents. Being able to accurately measure the current in the electrode under test effectively isolates the electrode and allows us to test it without disconnecting it from the system or from other electrodes.

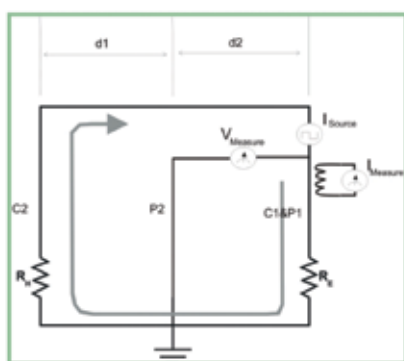


Figure 8: Connections for Selective Electrode Impedance measurement.

Stakeless or Clamp-on method

The 'stakeless' or 'clamp-on' method allows you to measure the impedance of a series loop of ground electrodes. The test is simple and it may be performed on an electrode that is connected to a working electric service. To make the measurement the tester uses a special transformer to generate a voltage on the ground conductor at a unique test frequency. It uses a second transformer to distinguish the test frequency and measure the resulting current through the circuit. This method is available in some Fall-of-Potential testers (like the Fluke 1625) or in a single clamp on unit. Figure 9 shows the connection of the source and measure clamps of the Fluke 1625.

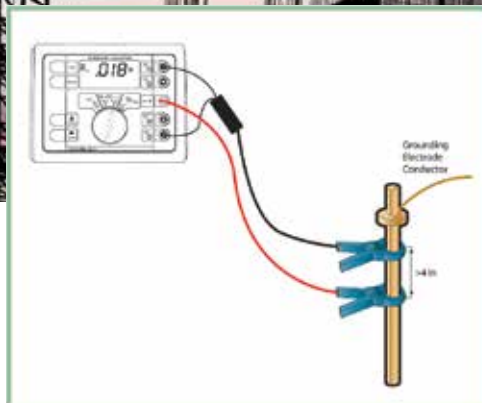


Figure 9: Connecting the Saturn GEO X for a Stakeless measurement.

Figure 10 shows the equivalent test circuit for the Stakeless method. When you test a building ground electrode using this method, you are actually testing a loop including:

- Electrode under test
- Ground electrode conductor
- The main bonding jumper
- The service neutral
- Utility neutral-to-ground bond
- Utility ground conductors (between poles)
- Utility pole grounds

Because this method uses the service as part of the circuit, it may be used only after the service has been completely wired, that is, it cannot be used prior to hook-up to the utility. In this method the clamp checks the continuity of the interconnections of all of the components above. An abnormally high reading or an open circuit indication on the instrument points to a poor connection between two or more of the aforementioned critical components.

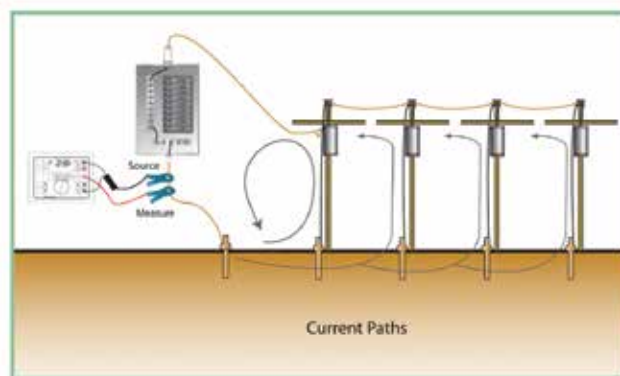


Figure 10: Connections for Selective Electrode Impedance measurement.

This method requires a low-impedance path in parallel with the electrode under test. The ground electrode of most facilities is in parallel with numerous utility ground electrodes. These electrodes can be pole electrodes, pole butt plates or un-insulated neutral conductors.



Ground electrode testing should take place every three years for a system in good condition with average up-time requirements.

The impedance of the utility ground electrodes usually combines into a very low impedance. As an example. Say you have 40 pole electrodes of roughly 20 Ω each, and these electrodes are connected together by a low-impedance ground wire from pole to pole. The equivalent resistance of the 40 electrodes in parallel is:

$$R_{eq} = \frac{1}{40 \times \frac{1}{20} \Omega} = \frac{1}{2} \Omega$$

Since half an ohm is small compared to the resistance we expect for our electrode under test, we can assume that most of the measured resistance is due to the earth resistance of the electrode under test. There are some potential pitfalls for this method:

- If you measure in the wrong place in the system, you might get a hard-wired loop resistance, for example on a ground ring or on a bonded lightning protection system. If you were intending to read earth resistance, measuring the conductive loop would give unexpectedly low resistance readings
- You may get low readings due to the interaction of two very close, bonded electrodes, like buried conduit, water pipes, etc.
- The quality of the measurement depends on the availability of parallel paths. If a building is solely supplied by a generator or transformer that has only a single electrode, the assumption of multiple paths will not work and the measurement will indicate the earth resistance of both electrodes. This method will not measure earth resistance
- A problem with the utility grounding system might interfere with readings

In general, if you get readings below 1 ohm, double-check to make sure you are not measuring a hard-wired conductive loop instead of the earth resistance.

Two-pole method

The two-pole method uses an 'auxiliary electrode' such as a water pipe. *Figure 11* shows the connections. The tester measures the combined earth resistance of the electrode under test, the earth resistance of the auxiliary electrode, and the resistance of the measurement leads. The assumption is that the earth resistance of the auxiliary electrode is very low, which would probably be true for metal pipe without plastic segments or insulated joints. The effect of the measurement leads may be removed by measuring with the leads shorted together and subtracting this reading from the final measurement.

- The impedance from the grounding electrode to the earth varies depending on the resistivity of the surrounding earth and the structure of the electrode.
- Resistivity defines the material's ability to conduct current.
- Since resistivity may decrease with depth, one way to reduce earth impedance is to drive an electrode deeper.

take note

Although it is convenient, be very careful using the two-pole method:

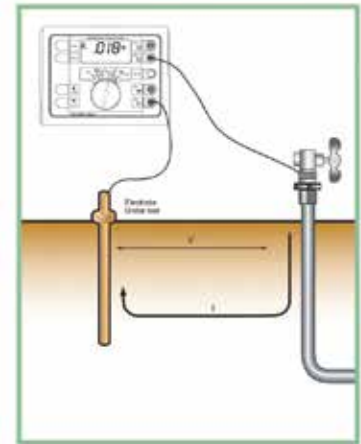


Figure 11: Equivalent circuit for two-point measurement.

- A water pipe may have PVC components, which could greatly increase its earth resistance. In this case the two-point method would give an excessively high reading
- The auxiliary electrode may not be outside the influence of the electrode under test. In this case the reading might be lower than reality

Because of the unknowns involved in this technique, it is recommended only when the grounding system and auxiliary electrode are well known.

	Advantages	Drawbacks
Fall-of-Potential	<ul style="list-style-type: none"> • Widely accepted • When you see the characteristic curve you know you have a good measurement 	<ul style="list-style-type: none"> • You have to disconnect the ground • The stakes may not be easy to drive • There may not be space around the ground electrode to drive the stakes
Selective method	<ul style="list-style-type: none"> • Do not have to disconnect electrode • Widely accepted • When you see the characteristic curve you know you have a good measurement 	<ul style="list-style-type: none"> • The stakes may not be easy to drive • There may not be space around the ground electrode to drive the stakes
Stakeless method	<ul style="list-style-type: none"> • Convenience 	<ul style="list-style-type: none"> • Assumes a low-impedance parallel path • Possible to get very low readings by mistakenly measuring on a hard-wired loop
Two-pole method	<ul style="list-style-type: none"> • Convenience 	<ul style="list-style-type: none"> • Impossible to judge on the integrity of the 'auxiliary electrode' • Cannot be sure if you are outside the area of influence

Summary of Ground Electrode Test methods.



John Wilson specialises in Metrology and Accreditation consultation and training. He is a Senior member of the SA Institute of Electrical Engineers, a Fellow of the Society for Automation, Instrumentation, Measurement and Control. John has over thirty years' experience with Fluke products (including having worked directly for Fluke) and has practical experience in different fields of metrology and electronic design. John has recently presented ECSA CPD Point Approved Seminars on this subject at Comtest's Linbro Park Offices.

Enquiries: John Wilson. Email jgpwilson@xsinet.co.za

Protecting buildings and installations from hazardous lightning strikes and surges

Kirk Risch, DEHN AFRICA,

In this highly technical age, protection from the possible effects of a thunderstorm is indispensable.

Thunderstorms are fascinating and frightening and they do not only indicate a change in weather, but present considerable risks for persons, animals and material assets such as buildings and installations.

Surges are made up of short-time voltage impulses, also referred to as transients, which last less than a second. The following systems may be subjected to the interfering or even destructive effects of these transients:

- Power supply systems
- Information technology and telecommunication systems
- Machine and system controllers
- Heating, air-conditioning and ventilation systems

If no protection measures are taken, this can have fatal consequences for a company. A thunderstorm can put information technology, telecommunication and automation systems out of operation. As a result, customers may not be served for a longer period of time, which is an inconvenience for any company. In highly competitive industries with just-in-time production, this can even threaten the very existence of an organisation.

Electrical and electronic devices and systems

A comprehensive protection concept is indispensable for protecting sensitive electrical and electronic devices and systems. In this context, the coordinate use of surge protective devices (lightning current, surge and combined arresters) is essential.

Lightning current arresters discharge high energies without being destroyed and must be installed as close as possible to the entry point of the electrical system into the building. Surge arresters protect terminal devices and are installed as close as possible to the device they are supposed to protect. Combined arresters bring together the high discharge capacity of lightning current arresters and the low voltage protection level of surge arresters, and are thus capable of protecting terminal devices. Therefore they are used to protect compact installations.

Power supply systems

The modular surge protective devices of the Red/Line product line for power supply systems and the Yellow/Line product line for data and information technology systems allow for the implementation of technically and economically sound, made-to-measure protection concepts.

Protection of information and telecommunication systems

To ensure safe operation, both data and voice transmission require adequate protection elements. Networks are typically designed in the form of universal cabling systems as per EN 50173 [1]. Even if fibre optic cables between building and floor distributors are standard today, copper cables are typically installed between the floor distributor and the terminal device.

Therefore, the hubs, bridges or switches must be protected. To protect the telecommunication system, NET Protector can be installed in the floor distributor to protect the outgoing lines to the system telephones. A data protection module, for example, can be used for the system telephones.

Protection of building automation systems

Failure of building automation systems can have fatal consequences. If the air-conditioning system fails as a result of surges, a data centre may have to be disconnected or a server may have to be shut down. Availability is increased if surge protective devices are installed according to the particular system and concept.

Undisturbed operation in office and administration buildings

Office and administration buildings are at least equipped with PCs, servers, networks and telecommunication systems. Failure of these systems would bring operation to a standstill since all work processes depend on these systems. Moreover, building automation systems linked via bus systems such as KNX and LON are used in these buildings.

Protection of power supply systems

Combined arresters can be used to protect power supply systems, protect terminal devices from surges and reduce induced voltages and switching overvoltages to safe values.

Protection of information and telecommunication systems

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To protect the telecommunication system, NET Protector can be installed in the floor distributor to protect the outgoing lines to the system telephones. A data protection module, for example, can be used for the system telephones.

Increase operational safety in industrial companies

Automation systems are standard in most industrial companies. If the automation system fails, production comes to a halt. This can bring a company to the verge of ruin.

Surge protection increases operational safety. To increase operational safety, lines extending beyond the building should be located and protected.

”

A thunderstorm can put information technology, telecommunication and automation systems out of operation.

Industrial Ethernet

The prospective short-circuit current must be particularly taken into account for the power supply system. Lightning current arresters are tested with short-circuit currents up to 100 kArms and are therefore ideally suited for industrial applications to protect information technology lines, even in case of a direct lightning strike.

Potential islanding

The following applies to PLCs, AS interfaces, sensors, actuators and Ex barriers:

- Surges must be compensated in the device with all connected lines (potential islanding)
- Surge protective devices modular master this task on the power supply side
- Surge arresters for Profibus DP, which are capable of compensating surges within a matter of microseconds, can be used for information technology lines

Conclusion

In conjunction with an intermeshed equipotential bonding and earth-termination system, surge-related downtime and interruption of operations can thus be prevented. Lightning and surge protection is an investment that quickly pays off.

Reference

- [1] EN 50173: Series of standards. Information technology – Generic cabling systems.

- If no protection measures are taken, fatal consequences can result for any business.
- A comprehensive protection concept is indispensable for protecting sensitive electronic and electrical devices and systems.
- Lightning and surge protection is an investment that quickly pays off.



take note



Kirk Risch joined the South African Air Force in 1988 as an apprentice, learning trade skills in radar technologies and electronics. He also holds a diploma in marketing. In 2010, Kirk joined Webb Industries, a specialist ancillary telecommunications company, becoming its lightning and surge protection expert. He joined DEHN Africa as sales and marketing manager in 2013, becoming sales and marketing director the following year. Enquiries: Email kirk.risch@dehn-africa.com

Protection system – synergy and perfect integration

GEWISS is an international leader in the production of systems and components for low voltage electrical installations. The fact that development is seen as a constant management feature has permitted GEWISS to assert itself as a market leader, offering an integrated electrical system with over 20 000 products for Domotics, Energy and Lighting.

Gewiss's protection system is composed of products which have synergy and perfect integration among each other, such as the innovative 90 ReStart range (automatic reclosing devices), the 90 MCB and 90 RCD ranges (modular circuit breaker for circuit and residual current protection) and the 47 CVX range (metal distribution boards). An integrated range of products which can meet every need according to the application type, from residential to the industrial and which can guarantee quality and safety in step with market requirements. The advantages of GEWISS system are several, practical compatibility of homogenous products, simple and quick planning, installation and maintenance of the system, as well as modern and stylish design.

90 ReStart devices restore power supply quickly from automatic circuit breaker trips, but only after checking the system status. In addition, the Autotest function periodically tests the functioning of the residual current circuit breaker protection without disconnecting the system from the power supply.

The range includes two pole and four pole versions. The 90 miniature circuit breaker (MCB) range is made up of three types:

- MTC - Compact miniature circuit breakers, from 2 to 32 A in B and C curve and breaking capacity up to 10 kA
- MT - Traditional miniature circuit breakers, from 1 to 63 A in B, C and D curve and breaking capacity up to 25 kA
- MTHP - High performance miniature circuit breakers, from 20 to 125 A in C and D curve and breaking capacity up to 25 kA

Available from **ACDC Dynamics**, the 90 RCD range includes the MDC monobloc compact residual current circuit breaker with overcurrent protection, the BD and BDHP add-on modular residual current devices for MT and MTHP miniature circuit breakers and the SD residual current circuit breaker.

The 90 AM range consists of auxiliaries for circuit breakers and many modular accessories for protection, command, programming, measurement and signalling in electric systems.

The LST surge protection range guarantees excellent protection of loads and power distribution systems. The range includes:

- LST surge protection devices
- Disconnectable fuse holders
- Residual current relay with separate toroid
- Motor protection switches

The 47 CVX range of Distribution boards are available in both modular and monobloc systems from 160 A to 3 200 A. They are available in both surface or flush mounting types, and in a variety of IP ratings to suit most applications. Thanks to the extractable frame and quick connection of brackets, rails and functional profiles, the 160 A board allows quick assembly. Because the 630 A boards are based on a 'completely open structure', board wiring operations are quick and easy.

Enquiries: Nelen Govender. Tel. +27 (0) 10 202 3300 or email neleng@acdc.co.za



I/O and motion solutions for high-volume applications

EJ-series EtherCAT plug-in modules provide an efficient wiring solution for machines built in large and medium-sized production runs. With new motion modules, space-saving compact drive technology from **Beckhoff** is seamlessly integrated into a plug-in module concept, enabling extremely compact I/O and motion solutions that perfectly match customer requirements.

EJ-series plug-in modules make it easy to implement a platform concept for large-volume production runs without sacrificing customisation capabilities. The modules, with electronics based on the popular EtherCAT I/O system, are directly inserted into an application-specific signal distribution board that transmits signals and power to the individual connectors. Connections via pre-configured cable harnesses replace the expensive installation of individual wires, reducing per-unit costs and minimising the risk of faulty wiring because the EJ components are clearly coded.

Compact drive technology from Beckhoff, already available in a Bus Terminal form factor for years, is now also available as a plug-in module concept. In combination with a broad portfolio of Beckhoff motors and planetary gear units, three new EJ7xxx EtherCAT plug-in modules now enable especially compact and cost-effective drive

solutions. The EJ7047 stepper motor module was designed for applications in the medium performance range. The device features two inputs for limit switches; the second input can alternatively be configured by the user as an output.

This makes it possible to install a holding brake, for example. In conjunction with stepper motors from the AS10xx series, the user can optionally implement vector control, delivering enhanced motion dynamics and reduced power consumption.

The EJ7211-0010 servomotor module features high performance in an exceptionally compact design. This is, in large part, enabled by the integrated One Cable Technology (OCT), which combines motor cable and an absolute feedback system into a single cable.

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Analytics and contact centres – add smarts and soar

Andre Deetlefs, Jasco Enterprise

Big data and advanced analytics can provide an advantage – but only if you measure the right things and ask the right questions.

Contact centres are a critical point of contact with customers. For many businesses, providing a seamless experience is the ideal but with multiple channels, achieving this can be challenging. In any situation the answers you get are only going to be as useful as the questions you ask. In a contact centre there are two dimensions to the metrics needed. The first are operations-related. They may include questions like: what is the average time to answer a query or call, how long is the queue, what is the average time to resolution? However, improving on these metrics makes little sense if the contact centre is not also measured on its ability to fulfil its primary purpose, be that sales, debt collection or managing client relationships. Failing to do this may leave the organisation with a very short queue indeed. For example, cutting time to resolution by skipping a few steps in the process may bump up call volume as customers call back in to fully resolve the issue. New technologies and techniques are emerging to help organisations get a more comprehensive understanding of client satisfaction and identify issues as they arise.

New tech for better insight

Voice analytics has advanced considerably. It is now possible to listen not just for specific words but tone, pitch, volume and even context in a recording or live call. Voice to text technologies enable deeper and more granular analysis with identification of trends and

issues. For example, an escalating number of calls about overdue accounts can be flagged, helping organisations better manage the situation as it unfolds.

Voice analytics can also pick up other trends, like rising voices or the customer speaking over the agent (or vice versa). Unlike traditional methods where random calls were selected for assessment, voice analytics solutions can flag only potential problem calls for supervisor assessment. And what can be done with voice can be done with other text-based channels of interaction, like email, SMS and social media posts. In addition, analytics can now increasingly identify sentiment, like sarcasm in a Tweet. This moves into the realm of Big Data. As we deploy more technology, more reporting becomes possible which requires Big Data analytics. With so much data available, deciding what to measure becomes strategic.

”

Technologies are emerging to help organisations acquire a comprehensive understanding of client satisfaction.

Conclusion

For any contact centre the first step is to define issues and problems, and identify goals. Step two is collecting the right metrics and information. The final step is asking the right questions and applying the right technology to extract value from existing data, or identify trends in real time. Many organisations choose to start small and scale as their operations grow. However, improving business outcomes can be as simple as asking the right questions.



- Contact centres are a critical point of contact with customers.
- The answers you get are only as useful as the questions you ask.
- Voice to text technologies enable deeper and more granular analysis, with identification of trends and issues.



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Making technology work for you

Neil Cameron, Johnson Controls Building Efficiency

No one buys technology just for the sake of technology.

If that were the case, we might all have pockets full of silicon chips instead of smartphones. To have value, technology has to help people achieve more. It has to make life easier. Building Management Systems (BMS), such as Metasys by Johnson Controls, do just that. They help facility managers control multiple systems and conditions using one tool, making management of the facility far easier and ensuring the buildings are more efficient. While they are doing all that, they are gathering enormous quantities of performance data.

Yet consider this, from a survey of the industry's facility managers conducted last July: 93% of respondents indicated that they are currently using BMS. The vast majority of them believe that their BMS is keeping pace with other technologies, but only 22% say that they are completely satisfied with their systems. The reason? Many facility managers are not taking advantage of the full capabilities of their BMS. They know the technology is great; they know that a great deal of data is being gathered; they know that there is value in it. However, they do not have the time or the resources to sift, sort and interpret it. So its value has remained locked up and beyond reach.

Local front

On the local front, South African companies are open to new technology and some of the most ambitious projects within this company's portfolio have emanated from South Africa. This is partly due to freeing human intelligence for higher achievements in South Africa and technology can perform the repetitive task of analysing data rather than requiring human intervention with enhanced functionality in the latest iterations of BMS technology.

How do we make data make sense?

How, then, do we make the data make more sense? That is where a new and different kind of technology comes in. The human brain gathers and interprets data through five senses – sight, sound, smell, touch and taste. Of those five, sight is easily the most important. We are hard-wired to process information visually. Those smartphones we carry in our pockets take advantage of that fact every day with icons, simple on-screen tools and intuitive displays that make everything as simple and useful as possible.

Visualisations

Visualisations simplify information, allowing our brains to focus on the important things. They help us see the patterns and connections.

They help us understand, quickly and effortlessly. Visualisations unlock the value of data. In recent years, the building efficiency industry has witnessed the rise of dashboards, which have simplified the process of aggregating data and displaying information like energy use and utility benchmarking, but dashboards are just a starting point.

Cloud-based solutions

Today, applications and cloud-based solutions work in tandem with BMS systems to analyse vast amounts of data, transforming it into visuals that offer a clear picture of what's going on, and a clear path to achieving more. These visualised forms of information help facility managers literally see how building systems are functioning, how they could and should be made to function better, how to make equipment last longer, and how to make everything – including people – work more efficiently. Many applications go beyond what dashboards can do.

Cloud-based solutions often reach beyond their sophisticated visualisation tools. Users also benefit from resources that help them structure, interpret and take action, including technical support, communities where like-minded people can share ideas and forums where industry experts lay out their visions of what the future holds.

”

Visualisations simplify information, allowing our brains to focus on the important things.

Conclusion

Data is becoming the world's most valuable resource, thanks to innovative tools that help us understand it. As new technology makes existing technology work better, it helps people work better and smarter too. It helps us achieve – which is where the real value lies.

- Technology needs to make life easier.
- Visualisations unlock the value of data.
- Visualised forms of information help facility managers see how building systems are functioning and where improvements are necessary.



Neil Cameron is the General Manager of Johnson Controls Building Efficiency. Enquiries: Tel. +27 (0) 11 921 7141

Innovation makes microgrid control smarter

In a world first, **ABB**, the leading power and automation technology group, is making it possible for microgrids to be protected, controlled and managed using smart circuit breakers. A software-based innovation for the company's Emax 2 smart circuit breaker makes microgrid architectures simpler and more cost-effective than ever before.

Microgrids coordinate distributed energy resources, integrating renewables with conventional power sources, networking with the grid or operating self-sufficiently. Low-voltage microgrids are helping accelerate the roll out of renewable energy by integrating small scale wind or solar energy production of up to 4MW with battery energy storage systems.

Giampiero Frisio, Managing Director of ABB's Protection and Connection business, said: "This is another technological first for ABB, building on the first ever combined circuit breaker and power manager Emax 2. Innovation is needed to make microgrid

installations simpler and more cost-effective; and to help end-users get more value from their investment. By embedding all the intelligence needed to manage a small microgrid safely and productively, Emax 2 delivers a game-changing solution."

With the addition of embedded functions such as an automatic transfer switch, Emax 2 is now equipped to manage the different power sources that make up a typical microgrid.

The new upgrades to ABB's Emax 2 circuit breaker will enable it to combine advanced protection, programmable logic, full connectivity, easy integration and comprehensive microgrid energy management in a single device. ABB is working with equipment suppliers and consultants ahead of the technology's roll-out in the second half of 2016.

This all-in-one solution integrates both standard and advanced microgrid functionalities to meet a broad range of on- and

off-grid requirements, improving quality and saving costs. A complete series of protections ensure a single unit can cover all loads and generators, with adaptive protections that recognise network changes and automatically set new thresholds to guarantee coordination in all conditions.

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I/O and motion solutions for high-volume applications

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EJ-series plug-in modules make it easy to implement a platform concept for large-volume production runs without sacrificing customisation capabilities.

The modules, with electronics based on the popular EtherCAT I/O system, are directly inserted into an application-specific signal

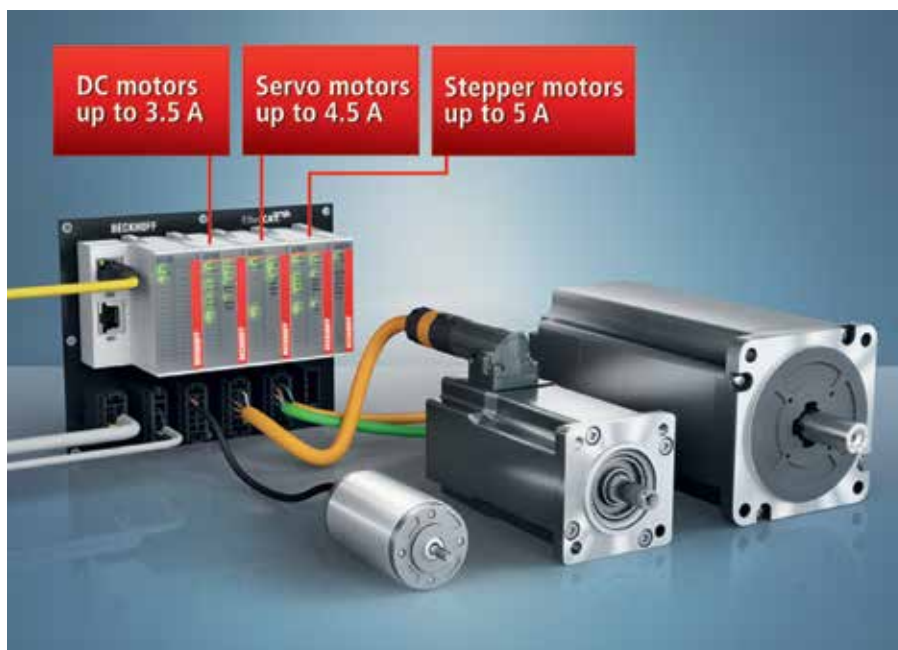
distribution board that transmits signals and power to the individual connectors. Connections via pre-configured cable harnesses replace the expensive installation of individual wires, reducing per-unit costs and minimising the risk of faulty wiring because the EJ components are clearly coded.

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Ins and Outs of PoE

Brian Roth, Antaira Technologies

Power over Ethernet (PoE) – as a basic function – is quite simple! Plug in an Ethernet cord and it can receive both communication and power to the PoE capable device.

Power over Ethernet (PoE) has become a hot term that is frequently referenced but not completely understood. There are many different acronyms and subtle differences used in the PoE arena that can quickly confuse and frustrate even advanced users. Let us go over some of the more common differences such as multiple standards, varying power outputs and standard Ethernet restrictions as well as some more advanced management features available with respect to PoE. Despite all of the naming rules and subtle confusion, PoE has been widely adopted owing to the challenges it has overcome and simplicity it has provided.

Power over Ethernet (PoE)

A new technology, now referred to as PoE, was first developed in the year 2000 by Cisco to reduce noise issues in the emerging VoIP phone system. PoE quickly took off and by 2003 the first PoE standardisation was developed to create uniformity among all PoE device manufacturers. PoE is beneficial over standard Ethernet network communication because of the reduction in both the equipment needed and wired connections to the devices. Why run both an Ethernet wire and a power cord to a unit when one Ethernet wire can work?



PSE Switch.

PoE Naming Rule

To start off, PoE is used as an all-encompassing term for all devices within the PoE market. When in actuality PoE can be split into two broad categories. The main unit is the Power Sourcing Equipment (PSE). This is the device that injects the power into and along the Ethernet cord. The PSE is typically a switch or power injector. The other units are end devices and are classified as the Powered Device (PD); these are the units that require power through the Ethernet cable to turn on. A good example would be an IP camera, VoIP phone or outdoor industrial wireless access point.

Standardisation

When looking to get either a PSE or a PD there are a couple important pieces of information to consider. First, there are two different



PD Camera.

standards of how the power is sent along the Ethernet wire. PoE mode A, which seems to include the majority of PoE devices, uses pins 1, 2, 3 and 6 to send power along the Ethernet cable. Whereas, mode B devices will use pins

4, 5, 7 and 8 for power transmission. Second, how much power is required? PoE PSE sourcing units have multiple different power output levels; mainly standard power and high power or what is referred to as PoE+ are used.

The Institute of Electrical and Electronics Engineers (IEEE) has two different official categories for the different power outputs of a PSE device. The IEEE 802.3af standard [1] states that devices will not output more than 15.4 Watts of power out of each port. The PoE+ or IEEE 802.3at [2] standard allows each port to provide an output power of up to 30 Watts per port. Typically, if a manufacturer's PoE PSE switch supports IEEE 802.3at [2] high power devices capable of up to 30 Watts of power, the switch will also do power auto negotiation. This means that the high power PSE will detect how much power is required by the PD to operate and not provide excess power to a device that only requires 15 Watts or less.

Applications

A great benefit and use of PoE units is when a power source is not available at the end location, such as the side or top of a building for a security camera or Wi-Fi access point. Another benefit of implementing PoE is when installing multiple devices at a location, such as surveillance cameras, a PoE switch and all of the cameras can all use a single power supply.

This can reduce the installation cost because there will be a reduction in the amount of equipment as well as a reduction in the amount of power cables needed to be installed. Although, the user will need to keep in mind the power budget for the power supply that will be used. For example, if connecting three IEEE 802.3af [1] cameras (15 Watts per camera) to a PSE switch, the output wattage of the power supply will need to be able to supply 45 Watts of power for the cameras plus the additional wattage required to power the switch.

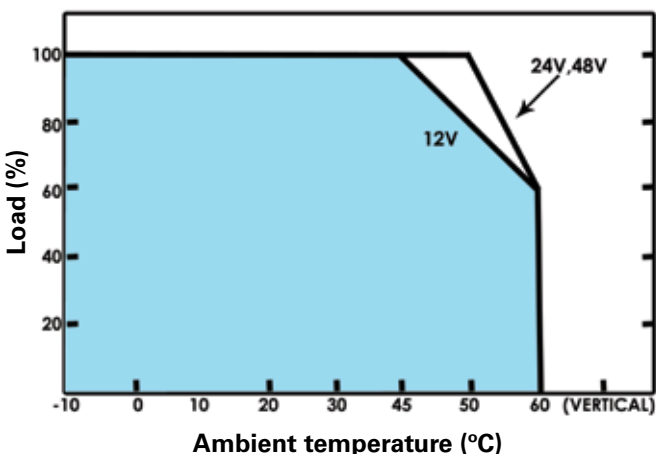


Switch with cameras.

Environment

There is a wide variety of products to choose from when preparing for a project. An additional consideration needs to be made regarding the temperature of the environment the application will be used. In extreme environment conditions, industrial grade equipment is essential and extended temperature range equipment can prove beneficial. This is especially true when selecting PSE switches or a power supply. Proper selection of industrial grade equipment is particularly important when using PSE units for PoE applications. A PSE unit will receive additional thermal activity over non PSE devices, because it will be generating additional heat through the power it is generating and providing to the PDs that are connected to it. Additionally, power supplies have an optimal operating temperature range. In hot environments the power supply will be affected by an operational output derating curve, where the total output wattage of the unit will be reduced by a percentage depending on the ambient temperature of the environment.

The ambient temperature can have a significant effect on the power budget that is being calculated for a specific application. An example of an output derating curve is displayed above showing that at the extreme end the total power supplied by a power supply can be reduced by as much as 60% depending on the environment. Due to the drop off in available power in hot environments, a higher wattage unit might be required to provide adequate power.



Output wattage derating.

- GDA – Group Destination Address
- IGMP – Internet Group Management Protocol
- IP – Internet Protocol
- PD – Powered Device
- PoE – Power over Ethernet
- PSE – Power Sourcing Equipment
- VLAN – Virtual Local Area Network
- VoIP – Voice over Internet Protocol

Abbreviations/Acronyms

Management

Managed switches are capable of providing users with a multitude of advanced features that can improve the management capabilities, performance, security and resilience of a network. The capabilities that a managed switch provides have been proven time and time again why the managed switch is the workhorse of the network. All the standard features a managed switch can provide end users with to enhance network performance are still relevant when using and implementing PoE devices. In fact, PoE switches with management capabilities provide even more function features that can be critical in providing optimum network performance.

IGMP

Management features such as Internet Group Management Protocol (IGMP) are very efficient in handling multicast traffic, such as PoE security camera monitoring, within a network. A typical unmanaged switch tries to send the camera data to all of the devices connected to it, creating unneeded broadcast traffic. Whereas a managed switch capable of IGMP with snooping is able to build a Group Destination Address (GDA) table. The GDA table determines the most effective pathways to all of the devices on the network and thus will only send the data to the units that require the data. The improved flow of data to only devices that require the information reduces the amount of network traffic and improves bandwidth availability.

In *Table 1*, two controlled tests were performed on the same network which consisted of two computers, a managed PSE switch and two PD IP cameras. Packet analysing software was used to view the amount of data that was transmitted in a 10 second time frame. The left table shows the results of running the test without the IGMP management feature enabled. The right table shows the results of the same test being performed but this time with IGMP enabled.

No.	Time	Source	Destination	No.	Time	Source	Destination
8514	30.228813	192.168.1.112	239.192.0.20	48	6.857746	192.168.1.119	192.168.1.119
8515	30.229330	192.168.1.112	239.192.0.20	49	6.799580	192.168.1.119	192.168.1.119
8516	30.229847	192.168.1.112	239.192.0.20	50	6.800344	192.168.1.119	192.168.1.119
8517	30.230364	192.168.1.112	239.192.0.20	51	6.800594	192.168.1.119	192.168.1.119
8518	30.240613	192.168.1.112	239.192.0.20	52	11.183112	192.168.1.119	192.168.1.119
8519	30.240578	192.168.1.112	239.192.0.20	53	11.858274	0x11:04:15:00:34	Broadcast
8520	30.241195	192.168.1.112	239.192.0.20	54	11.860730	192.168.1.119	192.168.1.119
8521	30.241812	192.168.1.112	239.192.0.20	55	11.860794	192.168.1.119	192.168.1.119
8522	30.242429	192.168.1.112	239.192.0.20	56	11.021411	192.168.1.119	192.168.1.119
8523	30.243046	192.168.1.112	239.192.0.20	57	11.021475	192.168.1.119	192.168.1.119
8524	30.243663	192.168.1.112	239.192.0.20	58	11.021539	192.168.1.119	192.168.1.119
8525	30.244280	192.168.1.112	239.192.0.20	59	11.021603	192.168.1.119	192.168.1.119
8526	30.244897	192.168.1.112	239.192.0.20	60	11.021667	192.168.1.119	192.168.1.119
8527	30.245514	192.168.1.112	239.192.0.20	61	11.021731	192.168.1.119	192.168.1.119
8528	30.246131	192.168.1.112	239.192.0.20	62	11.021795	192.168.1.119	192.168.1.119
8529	30.246748	192.168.1.112	239.192.0.20	63	11.021859	192.168.1.119	192.168.1.119
8530	30.247365	192.168.1.112	239.192.0.20	64	11.021923	192.168.1.119	192.168.1.119
8531	30.247982	192.168.1.112	239.192.0.20	65	11.021987	192.168.1.119	192.168.1.119
8532	30.248599	192.168.1.112	239.192.0.20	66	11.022051	192.168.1.119	192.168.1.119
8533	30.249216	192.168.1.112	239.192.0.20	67	11.022115	192.168.1.119	192.168.1.119
8534	30.249833	192.168.1.112	239.192.0.20	68	11.022179	192.168.1.119	192.168.1.119
8535	30.250450	192.168.1.112	239.192.0.20	69	11.022243	192.168.1.119	192.168.1.119
8536	30.251067	192.168.1.112	239.192.0.20	70	11.022307	192.168.1.119	192.168.1.119
8537	30.251684	192.168.1.112	239.192.0.20	71	11.022371	192.168.1.119	192.168.1.119
8538	30.252301	192.168.1.112	239.192.0.20	72	11.022435	192.168.1.119	192.168.1.119
8539	30.252918	192.168.1.112	239.192.0.20	73	11.022499	192.168.1.119	192.168.1.119
8540	30.253535	192.168.1.112	239.192.0.20	74	11.022563	192.168.1.119	192.168.1.119
8541	30.254152	192.168.1.112	239.192.0.20	75	11.022627	192.168.1.119	192.168.1.119
8542	30.254769	192.168.1.112	239.192.0.20	76	11.022691	192.168.1.119	192.168.1.119
8543	30.255386	192.168.1.112	239.192.0.20	77	11.022755	192.168.1.119	192.168.1.119
8544	30.256003	192.168.1.112	239.192.0.20	78	11.022819	192.168.1.119	192.168.1.119
8545	30.256620	192.168.1.112	239.192.0.20	79	11.022883	192.168.1.119	192.168.1.119
8546	30.257237	192.168.1.112	239.192.0.20	80	11.022947	192.168.1.119	192.168.1.119
8547	30.257854	192.168.1.112	239.192.0.20	81	11.023011	192.168.1.119	192.168.1.119
8548	30.258471	192.168.1.112	239.192.0.20	82	11.023075	192.168.1.119	192.168.1.119
8549	30.259088	192.168.1.112	239.192.0.20	83	11.023139	192.168.1.119	192.168.1.119
8550	30.259705	192.168.1.112	239.192.0.20	84	11.023203	192.168.1.119	192.168.1.119

From the results, there was a drastic amount of traffic reduction from 8 500 packets when no management features were used down to 62 packets when IGMP management was enabled for the same

10 second time period. The benefits from implementing IGMP on managed switches only increases as a network size becomes larger.

VLAN

Management features such as VLANs are used to create separate segments within the main network. By preventing access from one VLAN group to another, it is possible to keep different departments such as accounting, customer service and product development on the same main network without being able to access the others departments files.



A flexible feature of VLAN implementation is that the devices can be located anywhere on the network and be connected to any VLAN within the network. There are no physical restrictions of units being too close to one another to be on the same VLAN as shown to the right.

Another useful VLAN application would be a PoE Wi-Fi unit that allows guests visiting an office to get an internet connection. For security reasons it would not be wise to allow guests to go through the main network to access the internet; although a private guest VLAN could be implemented to allow connectivity and ensure network security.

Managed PoE features

Managed PoE switches also include some additional features that can provide information specifically for PoE devices. Within the management features, a user is capable of setting and viewing the exact power being supplied to each port as well as setting power priority levels. A very useful feature is the ability of the user to cycle power to specific ports.

PoE power cycling can be done either manually through the web console or automatically with an auto-ping tool. The auto-ping tool can be used to periodically ping an IP address associated to one of the ports of the managed switch. If there is not a response from the IP address after a certain number of attempts, then the managed switch

will cycle power to the port. Being able to cycle the power to a specific port can be used to re-establish communication to a device that might have become unresponsive in a remote or hard to reach location.

Conclusion

The major points that require attention when using PoE devices are:

- The mode of wiring (Mode A or B) used for the power being sent along the Ethernet cable
- The standard PD that is being used (IEEE 802.3af [1] or 802.3at [2])
- The wattage that the power supply needs to provide

Knowing and avoiding the causes of potential issues can save time and money. Being able to offer advanced management features that provide key solutions will demonstrate knowledge and increase reputation. Due to the cost saving benefits from utilising PoE devices, and an increased organisation with a reduction in the amount of wiring and devices used in the facility, PoE applications will only be increasing in quantity due to its ability to provide easier flexibility during installation, maintenance and facility expansion.


References

[1] IEEE 802.3af. 2003. Data Terminal Equipment (DTE) Power via Media Dependent Interface (MDI) and defines the characteristics of the Powered Device (PD) and the Power Sourcing Equipment (PSE).
 [2] IEEE 802.3at. 2005. PoE Plus.

“
 Power over Ethernet (PoE) is used as an all-encompassing term for all devices within the PoE market.”

take note

- Power over Ethernet (PoE) is a hot term that is not entirely understood.
- PoE is used for all devices within the PoE market when it should only be used for Power Sourcing Equipment (PSE) and Powered Devices (PDs).
- PSE is a switch or power injector and a PD is the unit that requires power through the Ethernet cable to turn on.



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INTERNATIONAL CONFERENCE

TOWARDS SUSTAINABLE ENERGY SOLUTIONS FOR THE DEVELOPING WORLD

INDUSTRIAL & COMMERCIAL USE OF ENERGY

15 - 17 August 2016

Conference Venue:

Vineyard Hotel
Colinton Road, Newlands
Cape Town, South Africa

Conference Topics:

- Demand-side Management: Energy management
- Energy use in Mines and Industry, including crushers, pumps, hoists, ice storage, etc.
- Heating Ventilation and Air-Conditioning Africampus: Energy used on campus
- Climate change, Environmental Issues and Clean Development Mechanisms
- Lighting Transport
- Energy Audits and M&V Energy Strategies
- Power Generation, Transmission and Distribution, Renewable Energy (Solar, Wind, Biogas, Hydro etc) Tariffs, Metering and Cost of Electricity

Conference Workshop: Variable Speed Drives (VSDs)

- System efficiency improvements and cost savings
- Reducing maintenance and downtime of equipment
- The impact of harmonics on the grid system when using VSDs

Social Functions:

15 August: 10:00 Industrial Visit.
18:00 Meet and Greet Function
16 August: Conference dinner
16 - 17 August: Conference presentations



The organisers can be contacted at
Industrial & Commercial Use of Energy Secretariat

Tel: +27 21 959-4330

Fax: +27 86 778 0257

Email: icue@cput.ac.za

Website: <http://energyuse.org.za/icue/>

Plug-and-Cloud with IoT bus coupler

The EK9160 IoT bus coupler transmits all control data simply, safely and cost-effectively to all common cloud systems in plug-and-play mode. Neither a controller nor programming is required through the implementation as a bus coupler -based



solution. Simple configuration is all that is necessary for the I/O terminals, cloud services and security functions used. The EK9160 establishes a direct connection without any special control program between **Beckhoff** EtherCAT I/O and the Internet of Things (IoT). As a result, the coupler enables simple and standardised integration of I/O data with cloud-based communication and data services.

Via an integrated web server, the I/O data can be parameterised, such as in data processing and timing, through a simple configuration dialog. No special engineering tools are needed. The EK9160 IoT bus coupler then autonomously transmits the data, including time stamp, to the cloud service. Apart from that, extended mechanisms are available, including local buffering of I/O data on a microSD card (2 GB) to protect against data loss

when the Internet connection is interrupted. The cloud services and security functions (encryption, firewall) can be configured via the web server in the same convenient way. All major cloud systems are supported via the IoT protocols AMQP, MQTT and OPC UA (over AMQP): Microsoft Azure, Amazon Web Services (AWS), SAP HANA, as well as and private cloud systems in company networks. The EK9160 is Microsoft Azure Certified and enables communication with clouds based on advanced multi-cloud capabilities.

For data communication, the IoT bus coupler uses the publisher/subscriber communication principle. As a publisher, the EK9160 sends data to the cloud, enabling other applications to access the information as a subscriber. This application can then publish data itself if required, which in turn can be accessed by the IoT bus coupler.

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Efficient condition monitoring for cabinets and protective housings

The IMX12-CCM can be installed and also retrofitted in virtually any control cabinet or protective housing in order to continuously monitor the actual degree of protection. The rail-mounted device uses a simple switch signal to indicate to the control system any incorrect closing of doors or the exceeding of limit values for temperature and interior humidity. The 12 mm wide IMX12-CCM comes with an intrinsically safe 2-wire isolating transducer interface, thus enabling it to be used also in explosion hazardous areas. The simple teach-in process can be carried out directly on the device without the need for a computer or any additional tools. The standard HART interface is provided for additional diagnostic options, such as for reading out the absolute measured values. Besides the interface technology, Turk's control cabinet guard offers a range of sensors which monitor the actual status of the environment: a temperature sensor, an absolute humidity sensor



and a triangulation sensor. This last sensor measures the distance to the cover or door and thus monitors correct closing. In order to detect humidity problems, the IMX12-CCM monitors these long-term trends and compares them with the taught safe condition. As soon as defined limit values have been exceeded, this is indicated to the control level via a potential-free contact. The IMX12-CCM is IEC-Ex and ATEX approved.

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Compact power supply for industries with high requirements

Siemens is offering the PSU8200, a new 24 volt power supply from the modular Sitop product line for single phase networks. The 40 ampere technology power supply has a narrow design of just 145 mm, which saves a lot of space on a standard mounting rail. The high efficiency of up to 93% ensures very low energy consumption and minimal heat generation inside the control cabinet. It contributes toward high system availability by supplying up to three times the rated current for 25 ms or 1,5 times the rated current for 5 s/min in the event of a short-time overload. The device has a rugged metal enclosure and a wide-range single-phase input (85 to 132/170 to 264 Vac), with automatic range switchover between 120 V and 230 Vac. Users can employ the device in a wide range of applications in production and processing industries all over the world. The power supply also features an integrated 24 V OK signalling contact, an output voltage variable from 24 to 28 V to compensate for voltage drops, a wide ambient temperature range from -25 to +70°C, as well as UL, CSA, GL, ATEX or IECEx international certifications. To help with the design and planning, 2D/3D data, circuit diagram macros, operating instructions and certificates are available free of charge in the Internet.

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Robust LED strip lights

RET is expanding its LED lighting portfolio with the new versatile WLS27 series from Banner Engineering. Featuring a shatterproof, UV-stabilized, polycarbonate shell, WLS27 LED strip lights are ideal for machinery and workplace lighting in harsh indoor and outdoor applications. Designed with the same durable, low-profile design and efficiency as Banner's work light strip family, WLS27 LED strip lights are optimal for mounting even in narrow installation situations. The hygienic design in a robust round housing meets the high requirements in the food industry, as well as in the machine tool or in the area of mobile machinery. The WLS27 LED strip lights are suitable even for applications in the semiconductor industry, requiring a laminar air flow.

The WLS27 LED strip lights resist exposure to high-pressure, high-temperature water, solvents, cutting oils and a broad range of chemicals. They are available in rugged, water resistant IP67 and IP69K construction. An internal temperature monitoring circuit

protects the device in extreme conditions, ensuring the light does not overheat. To satisfy diverse applications, the WLS27 is available in eight lengths from 145 mm to 1130 mm and multiple colour illumination options, including single, dual, dimmable and cascaded configurations. Colour options include cool white, warm white, red, green, blue and yellow. WLS27 LED strip lights are offered with flexible mounting options, allowing users to deploy them in areas and applications where other lights may not fit.

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Entry of mechanics into the digital world

Siemens unveiled its digital measurement technology for gears, Flender Gearlog, for the first time at Hannover Messe 2016 held in April. This new technology entails the capture of values relating to rotational speed, torque, temperature and in the future also vibration by special sensors. The system adds up these readings in parallel with



machine capacity utilisation. The measurement results are logged, saved and digitally depicted in compressed form. Operators are able to visualise the results at any time or read them out in the form of a dataset.

The measurements enable conclusions to be drawn about the applied load and loading capacity of gears when used in specific applications. The full transparency of operating data means it can be used to identify possible sources of damage, capacity reserves and overloading in the measured gear. Flender Gearlog allows application-specific load collectives, which often vary for operational reasons, to be matched against the operational stability of individual gear components and also other elements of the drive train. In this way, customers can find an optimum standard gear working machine match.

Flender Gearlog comprises a software

solution linked to a hardware component and sensor equipment coordinated in line with the gear. Siemens also offers services such as installation and commissioning, secure access to all data, regular evaluation of data and status reports. Special algorithms are used to compress the time signals and depict wide-ranging information relating to operating data on a digital basis. If threshold values are exceeded, Flender Gearlog also records time signals, allowing any detected overloads, for instance, to be additionally analysed. The measurements can be performed on all available Flender gears, both catalogue and non-standard types, for instance for the mining, cement or oil and gas industry, for wind turbines and cranes.

Flender Gearlog represents the first entry of a mechanical component into the digital world of industry.

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RFID antennas for automation and conveying

The new robust RFID antennas have been developed especially for the requirements in automation and conveying technology. In combination with the antenna adapters, they ensure excellent operating distances for more reading reliability even under adverse installation conditions. Data access to the transponders is fast and simple, via the provided function blocks as well as directly via the process image of the controller. All evaluation units have an integrated web server. Users can log in via an HTTP address to fully access the device. Each evaluation unit offers four sockets to connect up to four RFID antennas. Optionally, unused RFID antenna inputs can also be used for the control of outputs or the detection of digital input signals. Two digital sensors can be connected to each socket set as an input; and an actuator to each output. The ifm RFID evaluation units offer a wide range of industrial fieldbus interfaces. RFID-based identification tasks can easily be integrated into SAP/ERP systems. The industrially compatible connection technology 'ecolink' ensures quick and reliable connection of antennas and sensors to the RFID evaluation units.

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2016 Budget speech by South Africa's Minister of Energy

We extract highlights of South Africa's Minister of Energy, Ms Tina Joemat-Pettersson's 2016 budget speech. The full speech is available on the Electricity+Control website.

This year South Africa will continue to focus on its chosen path towards a diversified energy mix especially as it relates to renewable energy, regional energy integration, gas development and the Independent Power Producers (IPPP) programme. These initiatives support the economic growth strategy outlined in the 9 Point Plan, the 2014 and 2016 ANC Election manifestos and the National Development Plan.



South Africa's Minister of Energy, Ms Tina Joemat-Pettersson.

Integrated Energy Plan (IEP): This represents South Africa's overarching energy policy and strategy statement that has been under development since 2012, when Cabinet approved the commencement of the public consultation process. The Ministerial Advisory Council has given comprehensive comments on the document. The IEP will provide answers to questions about our energy future and the development of the **Energy Master Plan**. Arising from the development of the IEP, will be plans for electricity, gas and liquid fuels sectors (which should be ready for scrutiny in the second quarter of this financial year).

The **Gas Infrastructure Plan** will take its lead from the IEP regarding gas pipelines, storage and necessary infrastructure. The future energy demand will be a mix of electricity, gas and liquid fuels – cost competitiveness will determine an equilibrium among the three.

Renewable Energy IPPP has become the globally recognised most progressive and successful alternative energy programme. Since their introduction, solar, wind, biomass, small hydro and landfill gas power plants have been going up across the country feeding clean energy into the national grid. By December 2015 the department had procured 6 377 MW of renewable energy. It has connected 44 projects with a capacity of 2 021 MW to the national grid with many more under construction. The energy contribution of IPPs is expected to grow to approximately 7 000 MW with the first 47 renewable energy IPPs fully operational by mid-2016. Private investment in the programme exceeds R194 M. **Bid Window 4 Expedited Round** could bring an additional 1 800 MW. Bid Window 4 (including investments made through the small projects programme) will increase the investment to R255 billion. (**Bid Window 5**, when released, will further fast-track investment in the sector).

South Africa is on track to meet the national commit-

ment to transition to a **low carbon** economy with a target of 17 800 MW of renewable energy power by 2030.

The current renewable energy operational portfolio is contributing an increasing percentage of the buffer between the available supply and projected demand for electricity. A 16% contribution is made to the total energy produced during the morning and evening system peak periods in a 24 hour period. As the energy mix diversifies with the inclusion of Concentrated Solar Power (CSP) which includes a storage element, biomass and landfill gas, the share of energy available during peak periods will increase. In addition, the Northern Cape Solar Park will boost renewable energy development in the country, generating 1 500 MW.

The **Nuclear Energy Expansion Programme** is a central feature of the future energy mix, and the country stands at a crossroad of a nuclear new build programme procurement process having worked towards deploying 9 600 MW of nuclear power fleet by 2030. The Department of Energy (DoE) will issue a Request For Proposal (RFP) to confirm the market sentiment regarding the nuclear programme. The RFP phase will ensure that the country secures binding commercial and financial information to fully appraise the Cabinet to be able to take a final decision on the best arrangement to implement the nuclear new build programme. To quote the Minister: *"We will ensure that the process is above board and free of any potential for corruption."*

Skills – A Workplace Skills Development Plan (WSP) has been developed by the DoE based on the training needs of employees and managers.

The **DoE budget** for 2016/2017 is R7,5 billion.

The minister concluded by saying: *"We must put aside our individual preferences and gripes and pull together to achieve the collective goals that will ensure that we get our country firing on all cylinders again."*

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50 years in business

South African prepayment electricity meter specialist, **Conlog**, has celebrated 50 years in business. During the last five decades, the Durban-based business, which today is part of **Schneider Electric**, has founded groundbreaking technology, and made notable advancements in both the leadership position it holds within prepaid solutions and the systems its deploys to service the needs of utilities around the globe. "Since the inception of the South African prepayment industry in the late 1980s, Conlog has been at the forefront of innovative solutions that meet the needs of utilities across the world. In fact, the majority of our revenue comes from outside South Africa's borders," said Conlog General Manager, Dudley Miller. Established in 1965 as an electronics design company, Conlog specialises in providing prepayment solutions for the delivery of electricity services. Its broad product offering encompasses prepayment meters, vending, revenue management, maintenance, support and consultation, as well as a dedicated and accredited training facility for all aspects of prepayment.

"This comprehensive and holistic approach enables customers to reap the full benefit of their investment and ensures sustained

success, into the future," emphasised Miller. He highlighted that at present, Conlog has the world's largest installed base of prepaid meters, spanning more than 20 countries on four continents.

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Dudley Miller (Conlog General Manager), Kim Terblanche (Marketing Coordinator), Don Archery (Manufacturing Manager), Nancy Naidu (HR Assistant), Eric Leger (CEO, Schneider Electric) and Viven Perumal (Conlog Marketing Manager).

Lapp Southern Africa with new management

The **Lapp Group** is strengthening its commitment in South Africa. With the recently completed full acquisition of all shares in Lapp Southern Africa and a new management team headed by the well-known sales professional Chad Andrews, the world's leading provider of industrial connectivity solutions invests in South Africa. The Lapp Group, which was founded in 1957 has remained in continuous family ownership and is based on strong corporate culture principles: customer orientation, family orientation and innovation, amongst others.

With Chad Andrews, Managing Director, Alan Liebenberg, Head of Sales and Marketing and Head of Finance and HR, Venessa Botha, Lapp brings in a powerful management team which is keen to implement the values of the long-established family business in South Africa. The policy of company founders Ursula Ida and Oskar Lapp has always been to put the customer first, and to work very closely with them in order to make sure they always get the best possible solution. "Customers can rest assured that they will always get the best solution from Lapp," says Chad Andrews who has 28 years of experience in the distribution of electrical products in South Africa, including many years in the cable industry. He has opted to take up this challenge for Lapp to build the local business of a global market leader.

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Lapp Southern Africa: Alan Liebenberg, Head of Sales and Marketing (left) and Chad Andrews, Managing Director. (Image: Lapp).

Breaking new ground in Nesselwang, Germany

Endress+Hauser is expanding its centre of competence for temperature measurement technology in Nesselwang, Germany. The global market for high-end products is constantly growing, making the expansion necessary. "We wish to continue our investment and production in Germany," underlined Managing Director, Harald Hertweck. The new building is required due to the introduction of new products, the overall optimisation of production and the continuously growing workforce. "Expansion of our production and office space will help secure long-term growth," explained Harald Hertweck. Endress+Hauser Wetzlar GmbH+Co. KG is going to invest a total of €10 M in the new building with a total floor space of 4 800 square metres. Plans for the new building also involved the optimisation of production processes. Operations were restructured and modernised based on the 'one-piece flow' principle, making them significantly more efficient. This makes it possible to increase the efficiency and transparency of production processes. As a result, expensive machinery and equipment can be used far more economically in the future.

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Literally breaking ground are Endress+Hauser's Managing Director, Harald Hertweck, Project Manager and Director of Operations; Rainer Kühnel, Peer Gollnick and Josef Pfefferle of Dobler Consult engineering; Mayor, Franz Erhart, and Deputy District Administrator, Wolfgang Hannig.



Mobile Tech Day drives growth in South Africa

Power Management Company **Eaton** has launched its first ever South Africa Mobile Tech Day. This exhibition showcases the company's solutions in commercial construction in various parts of the country. The Eaton Mobile Tech Day is an innovative concept that combines expert analysis and demonstrative exhibitions to address customers' power management needs. Seasoned industry specialists and thought leaders travel the country and demonstrate Eaton solutions, which are designed and built for functionality, sustainability and aesthetics.

Eaton launched the Dumeco dc switch-disconnectors which are industry leading innovations helping solar PV equipment manufacturers and installers gain a competitive edge within the increasing signifi-

cant solar power market. These innovative products stand alone as cost-effective, reliable and safe solutions; they also integrate efficiently and easily with matched Eaton components into a continuous channel that transports energy safely from the solar module to the power grid.

"The Eaton Mobile Technology Day represents another key milestone in Eaton's 89 year history in Africa. Technology Days are one of the most important platforms Eaton uses to raise market awareness of the company's extensive power management capabilities," said Neil Primrose, Head of Sales, Eaton Southern Africa.

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Neil Primrose, Head of Sales, Eaton SA.



Eskom Group Chief Executive Champion of the Year 2016

Eskom's Group Chief Executive, Brian Molefe, has received the Ai Infrastructure Investment Champion of the Year 2016 award for his role in driving infrastructure investment into critical sectors, stimulating economic and private sector growth in the country in particular and the African continent in general. The awards are held alongside the annual Ai CEO Infrastructure and Sovereign Investment Summit (Johannesburg).

The Africa investor Awards (Ai Awards) are unique pan-African business and capital market investment awards that recognize and reward the achievements of the private sector across wide-ranging sectors and disciplines. These awards attract the market leaders from across the continent and salute their achievements. They also celebrate the work of institutional investors, governments and non-governmental organisations (NGOs). Eskom is currently executing the biggest infrastructure development project in its history, aimed at building new generating capacity to meet South Africa's rising electricity demand. Once completed in the next five years, Eskom's capacity expansion programme, which is the largest in the company's history, will increase our generation capacity by 17 384 MW, transmission lines by 9 756 km and substation capacity by 42 470 MVA. The capacity expansion programme will enable Eskom to provide security of electricity supply to South African homes and businesses, powering economic expansion and extending electricity to millions of households who currently rely on other fuel sources for domestic cooking and heating.

Since inception in 2005, the capacity expansion programme so far added 7 031 MW of generation capacity, 6 048 km of transmission lines and 31 590 MVA of substation capacity.

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Pneumatics expert officially opens doors in South Africa

SMC Pneumatics has officially launched in South Africa with further prospects of expansion into Africa in future. Having opened its doors in 2015, 21 April 2016 marked the prestigious official opening of SMC Pneumatics' South Africa's head office in Midrand, Johannesburg. Established in Japan in 1959, and available in 84 countries including USA, Brazil, Germany and more recently, South Africa, SMC prides itself in researching and developing, and has been voted one of the world's most innovative companies in Forbes Magazine Top 100 for three consecutive years.

SMC Pneumatics South Africa's General Manager, Adrian Buddingh spear-headed the local launch of pneumatic giant SMC under the guidance of the United Kingdom team. Says Buddingh, "SMC has invested heavily in our market and our production lines are equipped with the latest technology. Our production facilities will be fully operational as of July 2016 and looks to enable shorter delivery times and availability of non-standard stock items of certain items in our range."

SMC's national training schedule developed by National Training Manager, Riaan van Eck offers Basic Pneumatics, Electro-Pneumatics, Basic Hydraulics, Electro-Hydraulics and Mechatronic courses.

Enquiries: Visit www.smc Pneumatics.co.za



*Adrian Buddingh –
SMC Pneumatics
South Africa
General Manager.*



Emalahleni (meaning place of coal) (previously known as Witbank) is situated on the Highveld of Mpumalanga in South Africa. The majority of the country's coal deposits is found in this area.

'Break free from coal'

Communities, farmers and individuals have spoken out on the daily realities of living in a town with the most polluted air in the world.

Emalahleni is part of the escalated and peaceful actions organised by Break Free South Africa. Affected communities and farmers represented by South African Food Sovereignty Coalition (SAFSC) and the Mining Affected Communities United in Action (MACUA), came in numbers to have their voices heard. Communities spoke out on climate change, and its impact on the food water energy nexus.

In the people's words, 'Emalahleni is rotten to the core'. People are suffering from illnesses such as sinuses, lung cancer and Tuberculosis (TB). The TB hospital is unable to handle the numbers of sickly people walking through their doors every day. The people want transparency in the energy sector. Communities are being undermined by giant mining corporations. They are not consulted on new mining projects and their ancestral land is being grabbed.

To harness the moment, activists, concerned citizens, and affected communities have united to put pressure on energy providers, as well as local and national governments, to implement the policies and additional investments needed to completely break free from coal.

Quotes from key stakeholders

The voiceless and invisible exposed the destructiveness of coal extraction, the link with climate change and food profiteering. Moreover society is invited to join this conversation so we secure just and transformative alternative to sustain life. (Professor Vishwas Satgar - Cooperative and Policy Alternative Centre).

It is up to us, the people, to stop corruption and dirty deals prevalent in the coal mining industry. The people in Emalahleni are living with the impacts of dirty coal every day. Eskom's deadly expansive plans will lock South Africa into a future characterised by millions of tonnes of CO₂ emissions. (Matthews Hlabane, MACUA).

The devastating daily reality for the people living in Emalahleni is a clear indication that the true cost of coal is destruction at every step. We cannot afford to let the impacts of coal continue to poison our people, when renewable energy is affordable, clean and ready-to-go. (Melita Steele, Senior Climate and Energy Campaign Manager, Greenpeace Africa).

Enquiries: Visit www.breakfree2016.org

Bizz Buzz

COMTEST Solutions to represent PICO technology in South Africa

COMTEST Solutions, local distributor of test and measurement instrumentation to industry, will represent UK-based Pico Technology a design, development and manufacturer of PC Oscilloscopes and data loggers. Pico has a comprehensive portfolio of products, including the PicoScope PC Oscilloscope range with bandwidths up to 20 GHz, resolutions up to 16 bits and mixed-signal and flexible-resolution models; the TC-08 and PT-104 temperature data loggers; and the multi-award-winning Automotive Oscilloscope Kit. Pico Technology offers innovative, high quality and affordable alternatives to traditional bench-top test and measurement equipment, designed and built under the ISO9001:2008 quality system.

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Top ranking global Smart Cities in 2016

Juniper Research has revealed the top ranking Smart Cities globally for 2016:

1. Singapore
2. Barcelona
3. London
4. San Francisco
5. Oslo

Juniper's Smart City Rankings have been compiled following an extensive study of cities around the globe as published in Worldwide Smart Cities: Energy, Transport and Lighting 2016 - 2021. Some 40 metrics have been evaluated, covering technology, transport, energy, open data and economy. Singapore is a world leader in applying smart mobility policies and technology. Meanwhile, the city's fixed and cellular broadband services, city apps and strong open data policy led to it taking the top spot for 2016. Global Smart City in 2015, Barcelona, is particularly strong with regards to its energy and sustainability policies. London's score suffered as a result.

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New regional office

BMG has recently opened a regional service centre (RSC) in Riverhorse Valley, one of Durban's rapidly growing industrial hubs. "The consolidation of BMG's KwaZulu-Natal workshop facilities and field services into a centralised hub, enhances the company's service to a diverse customer base throughout the region," says Donovan Scott, general manager for BMG's KwaZulu-Natal's Regional Service Centre (RSC). "This 2 600 m² dedicated service centre, which focuses on our core KZN divisions, including drives, gaskets, hydraulics and materials handling, works closely with 13 dedicated BMG branches in the region."

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On the road with Siemens Process Automation

The Process Automation (PA) Mobile unit launched on 20 April 2016 features a broad base of technology with seamless wired and wireless communication between the DCS and Process Instrumentation offering complete solutions across the portfolio as part of Digitalisation. The intention is to take this integrated spectrum of technology to their customer's where they can benefit from this first hand exposure and experience with Siemens Process Automation platforms. Customers can engage with the various technologies which also include screens for presentations, demonstrations and skills technology transfer. The mobile unit is equipped with the latest and upgraded technology to customers enabling them to keep abreast of Siemens innovations.

Enquiries: Email Jennifer.naidoo@siemens.com



Robert Esterhuizen (Lindsay Saker) hands over the van keys to Mikhail Vakhutinskiy (Head of Siemens Process Automation, Process Industries and Drives at Siemens).



Greg Smook (Siemens) demonstrates inside the van.



From Siemens: Thaven Govender, Kavi Naicker, Greg Smook, Linda Xulu, Mapula Lekota, Archie Cenenda, Mikhail Vakhutinskiy, Raj Krishanduth, Tyrone Naidoo, Siyanda Dlamini.



Opening of Yokogawa South Africa Office

Yokogawa Middle East & Africa is proud to announce the official opening of brand new offices of Yokogawa South Africa that oversees Yokogawa's Southern African business in Cresta, Randburg.

The new office space is a major step forward in the growth and expansion of Yokogawa on the African Continent.

The event coincided with a visit from President and Chief Executive Officer of Yokogawa Middle East and Africa, Hideki Matsubayashi, and members of the Senior Management team. "Our new office is a major step forward in our plans to grow our footprint in Southern Africa and specifically in target industries including the oil and gas, refining, mining and power sectors," comments Johan Louw, managing director.

A fully integrated and interactive demonstration area displays Pressure, Flow and Wireless Field Instrumentation, Analyser Field Instrumentation, Recorders and Controllers and a 'plant in a box' simulator. All instruments connect to Yokogawa's CENTUM VP R6 integrated production control system to simulate real process values.

Enquiries: Tel. 27 (0) 11 831 6300 or email Christie.cronje@za.yokogawa.com



At the official opening of new offices of Yokogawa South Africa are Hideki Matsubayashi, President and CEO (Yokogawa Middle East & Africa), Dr Ben Ngubane, (Chairman, Board of Directors, Eskom SOC Holdings), Johan Louw, Managing Director, Yokogawa South Africa.

SMC Pneumatics opens in South Africa

What can the South African market expect from recent locally launched SMC? "Cost effective, exceptional quality, customised offerings and superior service from our team. We strive to work tirelessly to meet your needs and objectives, and believe that our innovation and drive sets us apart currently. The possibilities are endless," says SMC Pneumatics South Africa's General Manager, Adrian Buddingh. (Read more on page 44).

Enquiries: Visit www.smc Pneumatics.co.za



Staff at the brand new offices of SMC Pneumatics South Africa.

Kevin O' Carroll (Managing Director of SMC UK and Director of SMC South Africa), Steve Bangs (SMC UK and SA Director), Adrian Buddingh (SMC South Africa General Manager).



Rockwell Automation



Leadership change at Rockwell Automation

Rockwell Automation has elected Blake D Moret, a 30 year veteran of the company, as president and chief executive officer, effective 1 July 2016. Keith D. Nosbusch, 65, who has been president and chief executive officer since 2004, will transition from those roles while continuing as chairman of the board. Moret, 53, is currently senior vice president of the company's Control Products & Solutions segment.

Aberdare Cables.....	19	Industrial & Commercial Use of Energy (ICUE) Conference.....	39	SMC Pneumatics.....	IBC
ACDC Dynamics.....	OBC	KROHNE.....	13	Trans Electron.....	2
Brady.....	20	Powermite.....	25	VEGA.....	15
Current Automation.....	Insert	Pratley.....	21	WIKA.....	OFC, 9
Endress+Hauser.....	35	RET Automation Controls.....	IFC	World Power Products.....	7
Helukabel.....	24	Schneider Electric.....	23		

INDEX TO ADVERTISERS

SAITEX 2016

19 – 21 June 2016, Midrand, Johannesburg

In its 23rd year, SAITEX remains the largest business trade show of its kind in Africa. SAITEX plays host to hundreds of exhibitors showcasing a diverse range of products, services, and economic opportunities from all over the world.

Email: aninahough@dmgeventsme.com or saitex@exhibitionsafrica.com

Manufacturing Indaba

28 June 2016 Emperors Palace Ekurhuleni

Minister of Trade and Industry, Dr Rob Davies will address the third annual Manufacturing Indaba. He will address manufacturing stakeholders and business leaders as part of the dti's strategic objective to facilitate transformation of the economy through the promotion of industrial development, investment, competitiveness and employment creation.

Enquiries: Email info@manufacturingindaba.co.za

POWER-GEN Africa 2016 & DistribuTECH Africa

19 – 21 July 2016, Sandton Convention Centre

POWER-GEN Africa and its sister event, DistribuTECH Africa, will once again provide comprehensive coverage of the power needs, resources and issues facing the electricity generation industries across sub-Saharan Africa.

Enquiries: Email registration@pennwell.com

ICUE Conference 2016

2 – 4 August 2016,

Belmont Square Conference Centre

The Industrial and Commercial Use of Energy conference provides all there is to know on effective and efficient energy production and management. Enquiries: Professor Nico Beute.

CPUT. Email icue@cput.ac.za

Electra Mining Africa

12 – 16 September 2016, Expo Centre, Johannesburg.

The biggest mining, industrial, machine tools and electrical trade show in Southern Africa. Benefit from on site sales, plenty of sales leads and brand visibility, all major advantages of being part of this amazing show.

Enquiries: Email leatitiavs@specialised.com

SAEEC 2016 - 11th Annual Southern African Energy Efficiency Convention

8 – 9 November 2016, Gauteng, South Africa

Bringing together energy management/engineering, environmental, facilities building upgrades, cogeneration, power generation, efficiency improvement industries to discuss RE, power generation, lighting efficiency, thermal storage and more.

Enquiries: Email marketing@saeec.org.za



Meet the sleek SY series from SMC Pneumatics

The SY series of Valve Manifolds (Valve Terminals) is manufactured on-site at SMC South Africa's brand new production facilities.

The unique, all-purpose valve is available in three sizes, namely the SY3000, SY5000 and SY7000. Thanks to its innovative redesign and smaller size, a reduction of 29% is achieved in installation space offering greater flexibility, increased flow rates and a more economical operation. With flowrates of up to 1500 litres per minute, most industry applications can benefit from this manifold. Units can be hard wired or are compatible with most industrial field bus types.

Customers can achieve air savings as a result of driving bigger cylinders with reduced cycle times without the need to use larger, more expensive solenoid valves.

Contact us for a free consultation on +27 11 568 2407 or sales@smcpneumatics.co.za

#SMCRaisesTheBar

Join the conversation [in](#) SMC Pneumatics (South Africa) [f](#) SMC Pneumatics – South Africa



www.smcpneumatics.co.za

90 MCB RANGE INNOVATIVE & COMPACT



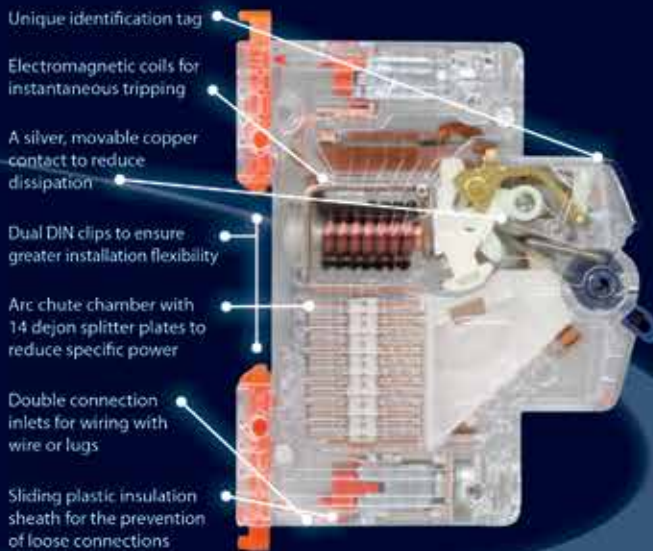
Complete solution of quality circuit breakers for all installations



Easy installation - wire, busbar & quick connect



47CVX Range: an elegant and modern designed distribution board range.



A full MCB solution from Gewiss: the 1st company to develop the Compact Miniature Circuit Breaker occupying only 50% of the space but still providing 100% of the protection.

The innovative 90 MCB range boasts a breaking capacity from 4,5 to 25kA with nominal currents from 1A to 125A all offered in a DIN rail MCB, with SABS Certification on all ranges. Residual-current devices are available, addressing all IEC required sensitivity ratings, from 10mA to 500mA combining overloads and short circuit protection.

The offer is completed by a full range of Isolators, Auxiliaries and all din rail accessories to address any requirement. These components are all complimented by a superior GEWISS Range of modern and sophisticated distribution boards. A truly world class Italian designed solution offering.