

OMICRON Magazine

Innovative Power System Testing Solutions





20 Circuit breaker testing: The beginning of a new era

4 Integrated expert: Testing solutions of a special kind – 8 Power transformers: Pinpointing a needle in a haystack

12 Tablet controlled: Operate CMC test sets via app



 **We strive for high quality products, detailed knowledge, and innovation.** 

Bernhard Forti,
Managing Editor OMICRON Magazine

Dear readers,

Imagine if today, you had to choose what you wanted to study. Which university would you apply to and why?

In the USA, the most sought-after universities are ones such as Harvard, MIT, and Berkeley. Tokyo, Kyoto, and Singapore are the front runners in Asia, while ETH Zürich, Cambridge, and Oxford top the European list of the most coveted universities.*

These universities are known for being extremely competitive. This is even reflected in some of the well-known events that they host each year, such as the boat-race on the Thames between Oxford and Cambridge University, or the Annual Head Of The Charles Regatta in Boston.

As exciting as these competitions may be, they are certainly not the things that give these universities the educational edge that they are known for. Some of the things that make these schools stand head and shoulders above the rest are the quality of their lectures and scientific research, and their international approach to education.

With our testing solutions we follow a similar doctrine and strive for goals such as: High quality products, detailed knowledge, and innovation. On page 20 we present our newest innovation: the CIBANO 500 circuit breaker test system combines

a micro-ohmmeter, timing analyzer, and a coil and motor supply in a single device. With this device all standard tests on all types of circuit breakers can be carried out.

You can also read about the new CMControl P App on page 12. This allows tablet owners to operate their CMCs via the network.

Finally, take a look at the power grid in South Africa (page 36), marvel at the IEC 61850 in Malaysia (page 17), PDL 650 in Italy (page 8), and many other practical examples.

This edition covers some topics that I'm sure you'll find interesting. So let me know what you think — send your opinions, photos or any entertaining stories involving OMICRON to the address below.

I hope you enjoy studying this current edition of the OMICRON Magazine!

A handwritten signature in black ink that reads "Bernhard Forti". The signature is written in a cursive, slightly slanted style.

Bernhard Forti

Email: magazine@omicron.at
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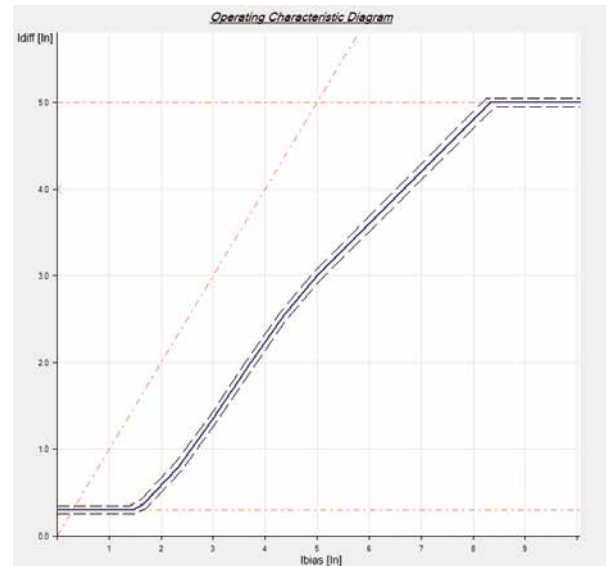
Background

Testing solutions of a special kind

Integrated expert knowledge in the Protection Testing Library



For protection engineers, the increasing complexity of modern protection devices represents a major challenge when preparing automated tests. Defining special distance and differential protection characteristics can turn out to be particularly complex and time consuming. OMICRON recognized this trend many years ago and since then has been offering optimized solutions in its Protection Testing Library (PTL).



T60 testing template in the PTL: easy testing despite complex characteristic.

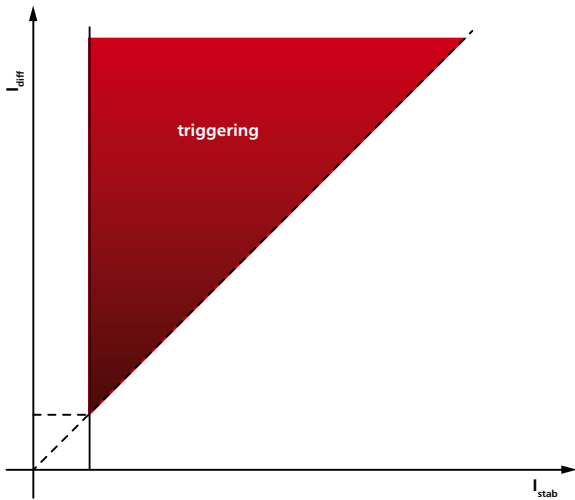
Today, the PTL includes predefined and editable test templates for more than 270 types of protection devices and covers a comprehensive range of topics. Aside from overcurrent protection, distance protection and differential protection applications, it also includes machine protection (generator and motor). Furthermore, it offers solutions for testing grid disconnection protection devices for interconnection (including Q-U protection) or the recloser and sectionalizer controls used by many countries in distribution grids.

At OMICRON, a team of protection experts is responsible for maintaining the library and ensures that it is kept up-to-date. The testing templates include test plans for

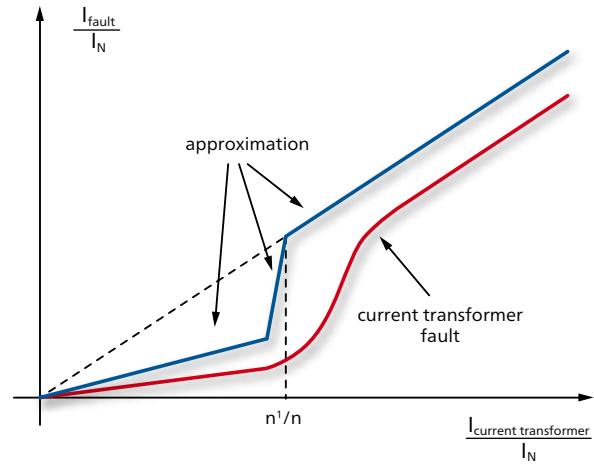
all important protection functions and suitable XRIO converters. The experts constantly face challenging tasks when developing new templates. At a glance, the logical structure of the user-friendly input masks used in the templates may appear to be based on simple background algorithms. However, this would only be an assumption because they actually function at a high level of complexity. Being able to facilitate test solutions which can be adjusted to specific testing tasks and the test equipment at hand is precisely what makes the innovative functions of this library so useful. The following section uses three examples from the world of differential protection to help you learn more about these special functionalities.

1 T60 – Cubic Spline Interpolated Transformer Differential Tripping Characteristic

Differential protection characteristics can represent a major challenge to testers. For example, The GE Multilin T60 transformer differential protection employs an operating characteristic whose progression is determined by using a cubic spline interpolation. In the PTL template, these calculations are performed in the corresponding XRIO converter. Here, they are defined in such a way that the characteristic is displayed for all potential setting values in the differential protection test modules, making it easy to perform tests on a protection device such as this. ▶



7SD610 trigger characteristic: testing complexity not immediately apparent.



Current transformer faults: taking into account approximation with adaptive characteristics.

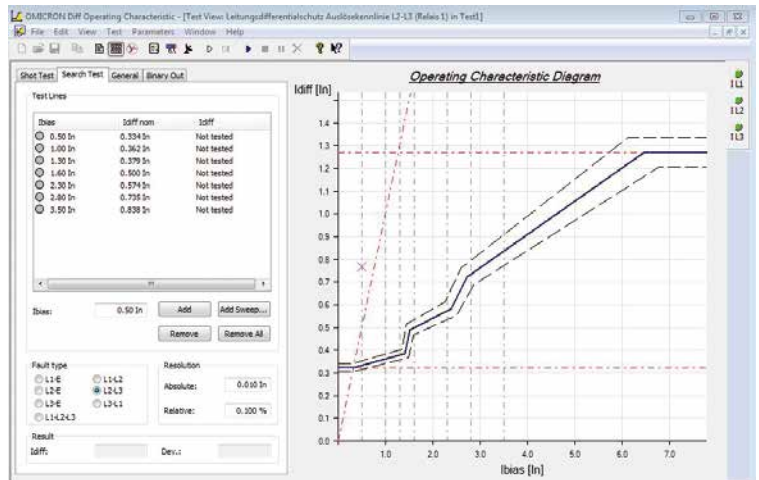
▶ **2 7SD610 (7SD523) –**

Adaptive Tripping Operating Characteristic

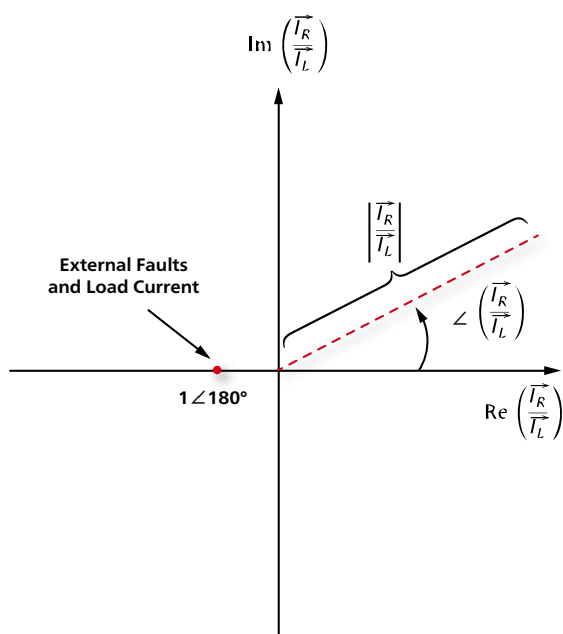
Aside from complex mathematical algorithms, protection devices sometimes employ dynamic and adaptive methods with corresponding complexity for considering current conditions. For example, in Siemens' 7SD610 line differential protection the actual trigger characteristic is represented as a simple straight line.

However, an exceptional type of stabilization is defined for calculating I_{Stab} . Since the coefficients of the stabilization formula also depend on the actual measured values here, this makes determining the test quantities significantly more difficult. Beside the measured line-end currents, the stabilization formula also includes quantities which describe the transmission behavior of the current transformer. These properties and, in particular, the characteristic data of the current transformers (f_1, f_2), strongly depend on the current level.

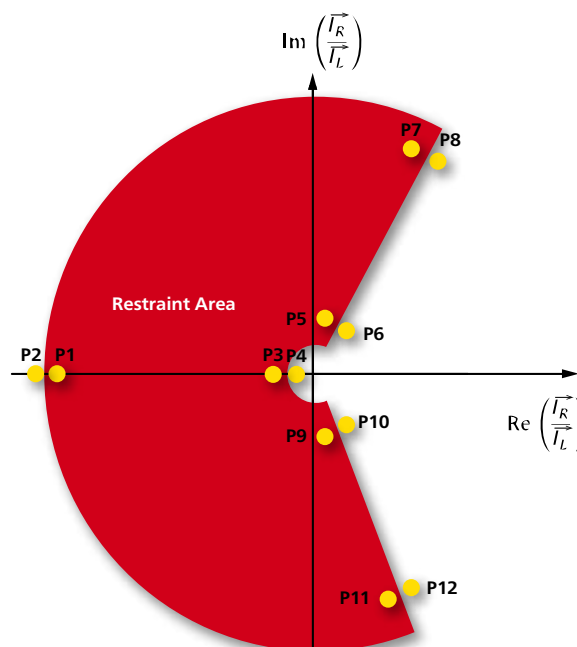
With its graphic support, the 'Advanced Differential' testing module group of the Test Universe software facilitates efficient testing of differential protection relays. Due to its unique nature, the stabilization characteristic for the 7SD610 is defined here in the PTL's XRIO converter and shown with existing stabilization quantities.



Testing 7SD610: display of the transformed characteristic in the 'differential operating characteristic' testing module.



The alpha plane: an alternative display form.



Testing the alpha plane: graphic support provided by the PTL template.

3 SEL 311L –

Alpha Plane Current Differential Algorithm

Algorithms of phase comparison protection relays in particular are often very individual. Therefore, the solutions offered by protection device manufacturers vary accordingly. For example, the SEL 311L protection relay does not determine a differential current in a typical fashion with a protection trip being triggered when a threshold is exceeded. Instead, it continuously calculates the ratio of the complex currents at the two ends of the line. A plane, the so-called alpha plane, is then stretched over the real and imaginary part of this ratio.

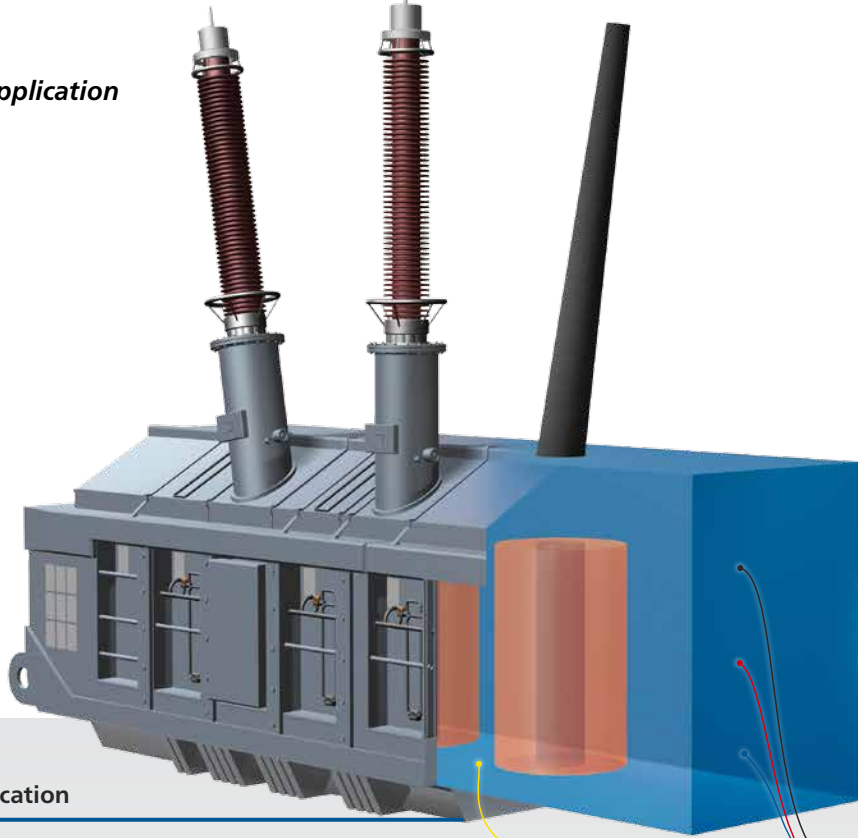
The PTL provides optimum support for efficient testing. The template specially developed for the SEL 311L calculates test points automatically, whereby the automation approach employed is represented in a clear and comprehensible way.

A wealth of knowledge packaged into user-friendly solutions

With the PTL, OMICRON offers integrated expert knowledge in the form of pioneering and practical solutions for automated protective equipment testing. PTL users not only benefit from the extensive range of expertise, but also from the flexibility of the testing templates, which allow predefined approaches to be freely adjusted and extended to cater to individual requirements. In addition to this, the integrated XRIO converters can also be used independently in test plans. Since the import masks used in the templates are based on the parameter setting software of the respective protective relay, this makes them especially easy to use. ❖

Michael Albert
Product manager

8 Application



Application

Pinpointing a needle in a haystack

Acoustic partial discharge localization with PDL 650 and MPD 600

The Italian service company GB Services in Concorezzo has made several successful tests on power transformers using OMICRON's PDL 650 and MPD 600. The combined approach of electrical partial discharge (PD) detection with MPD 600 and acoustic PD localization with PDL 650 allows manufacturers and service and maintenance teams to pinpoint faulty elements and make the right decisions for repairing them in the factory and on site. GB Services examined a new 80 MVA, 240/135/16 kV transformer showing a suspicious discharge noise while it was still in the factory.

Partial discharge in transformers might be observed if the insulation material between different voltage potentials is faulty or inhomogeneous. If PD is not detected soon enough and eliminated by repair, it can increase when voltage is applied. A complete discharge may destroy the insulation and hence the entire transformer. Aside from the obvious risks that go along with the explosion of a transformer, immense repair and replacement costs as well as device outage time can also be consequences.

Tracking down partial discharge

Accurate transformer testing is necessary for detecting PD in its early stages and for taking adequate measures to ensure a long lifetime for the transformer. Due to relevant standards, partial

discharge tests are mandatory in the factory before delivering a new or repaired transformer to site. With modern measurement technology these important tests can even be carried out on site.

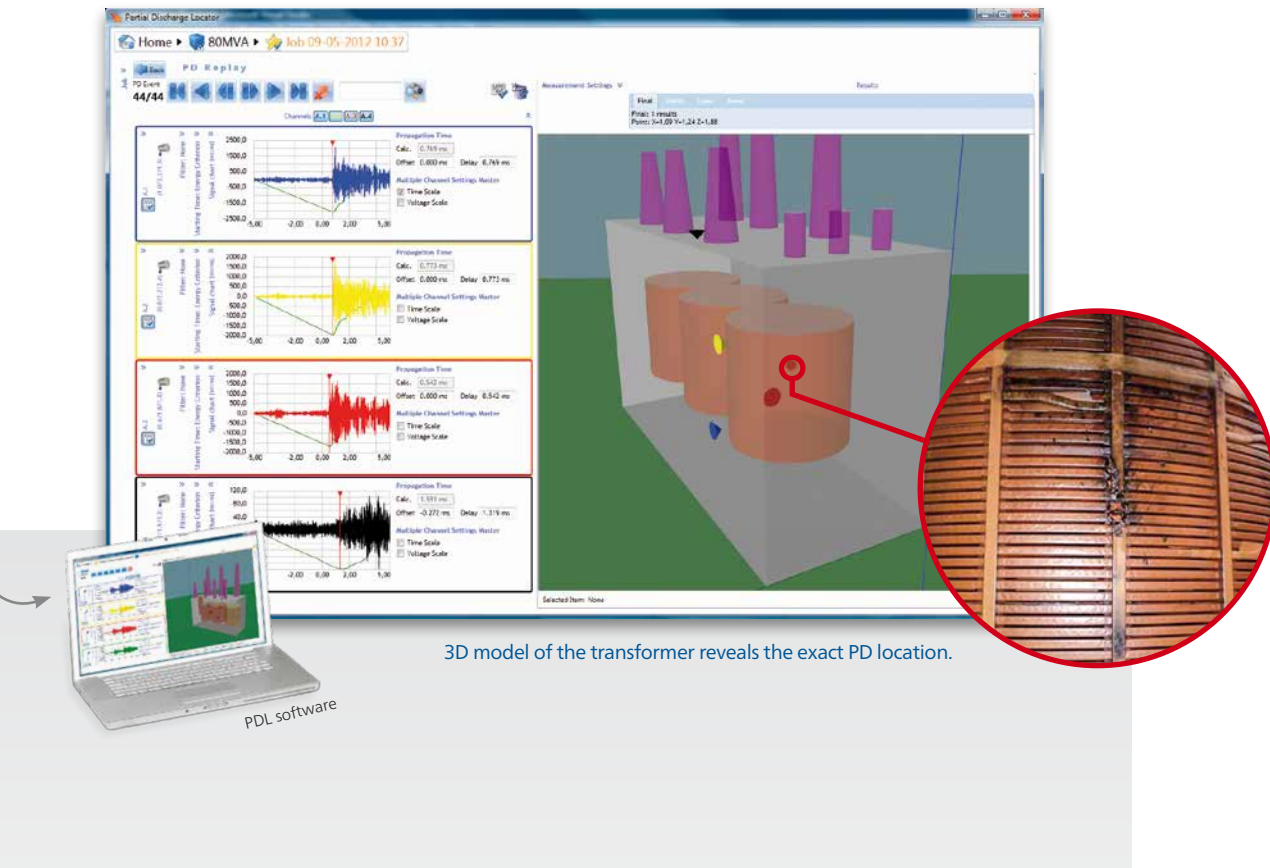
Being able to locate PD sources has many technical, financial, and organizational advantages. Small and hidden faulty zones which are difficult to detect visually can be identified at an earlier stage under voltage. Repairing transformers can be costly and time-consuming and PD localization under on-site conditions helps the user decide if sending the transformer back to the factory is actually necessary. Furthermore it allows repair plans to be optimized by anticipating material sources, tools, repair slots, and resources.

PDL 650

- > Efficient: predictable repairs and spare parts
- > Sustainable: easy creation of reports and records
- > Safe: galvanic separation of operator from high voltage
- > Handy and battery-operated

 www.omicron.at/pdl650





New transformer with discharge noise

A newly manufactured 80 MVA, 240/135/16 kV transformer showed discharge noise while it was still in the factory. Acoustic PD detection was performed with OMICRON's PDL 650, connected to an MPD 600 PD analysis system and a PC. Specific PDL 650 sensors were placed at different positions on the transformer tank. The MPD 600 unit acted as trigger to start the acoustic signal acquisition with the PDL 650.

Discovering the defect

To discover the exact fault location it was necessary to document the precise position of the acoustic sensors. A reference point was defined, and then the distances between all of the sensors in the 3D coordinate system were determined.

PD measurements were performed at different voltage levels. Due to the high PD level on phase U it was assumed that PD was located close to this phase. The PD level on phase V was also measured due to cross talking between phases U and V.

The PDL 650 software offers different possibilities for visualizing possible fault locations: half-spheres, circle lines, and points. A helpful key feature is the 'quick design tool' which allows a virtual 3D transformer model to be created easily for better orientation. The sensor positions are displayed using a color code and the transformer model can be rotated on the screen for an optimal view. ▶



Massimo Saottini

Diagnostic Services Manager, GB Services

«The PDL 650 is an ideal addition to our MPD 600. It allows us to look inside the transformer without having to open it. Since it is so easy to use it is the perfect tool for practical use in the factory and on site.»



In order to allow the large group of attendees to follow the measurement more easily, the PC display was also projected on a pro-
visory screen that was mounted to the transformer tank.

GB Services

GB Services in Italy grew out of the many years of experience of professional experts responsible for measuring instruments for industrial and scientific applications. In addition to selling equipment for medium- and high-voltage laboratories, GB Services provides consulting and specialized technical assistance. Their extensive level of experience spans more than 30 years and allows GB Services to design and implement very complex solutions.

► Decision for repair

A fault was located in the upper part of the phase U winding, near the connection of the low-voltage phases. With the help of the transformer model the origin of the fault was identified quickly and led to the decision to open the transformer and extract the winding for inspection and repair.

The fault was hard to detect visually since the PD source was situated between the windings. The damage was observed in the exact location indicated by the PDL 650 software. Being able to localize the

fault precisely saved a lot of time and costs, since the transformer only had to be opened once and more extensive damage was avoided.

Convincing testing method

For Massimo Saottini, Diagnostic Services Manager of GB Services, PDL 650 provides a wide range of possibilities for the predictive testing of transformer maintenance. Giuseppe Inzirillo, Sales Engineer at GB Services, also sees the many possibilities that the PDL 650 can be used for. "Italy has a large number of transformers, all of a certain age. Beyond this, the country has several factories for producing new transformers, repairs, and maintenance services. The device is very helpful for evaluating risks and saving time and money and it might also be interesting for utilities, larger industries, and companies that handle bigger projects." ▀

«The PDL 650 is very helpful for evaluating risks and saving time and money.»



Giuseppe Inzirillo
Sales Engineer, GB Services

Till Welfonder

Regional Sales Manager Europe and Africa, OMICRON

News

User-friendliness that complies with standards

Thanks to a number of new features, the new MPD software version 1.6 offers a more user-friendly experience and supports partial discharge (PD) testing in compliance with standards.

Additional streaming functions make it easier to send information via e-mail and archive measured data. The user has the option of cutting streams and exporting them as compressed video. Not only this, but it is also possible to change the replay speed so that important results can be identified more efficiently. Thanks to the use of the popular MP4 format, videos can be played without MPD software.

During the process of configuring testing procedures, the software automatically informs the user whether the current settings comply with the relevant standard. The number of 'pass/fail' levels has also been increased. These new features make the testing process much simpler.



Thanks to freely definable polygons in the 3PAR and 3CFRD views, PD clusters can now be separated even more effectively than before. Not only is there a stopwatch feature that assists the user during factory acceptance tests, but it is also possible to freely configure both the content and structure of test reports.

Software version 1.6 is compatible with all MPD systems and is available free of charge in the Customer Area of the OMICRON website.

 www.omicron.at/mpd600

News

Easier than ever

Staying on track and saving time with the maintenance management software ADMO

ADMO provides simple tools that manage asset-related maintenance activities and help keep protection systems in proper working condition.



Save valuable time by importing initial data into ADMO and make use of the new Type Library to store and administer type-specific documents in one central location. This makes maintaining and retrieving documents easier than ever before.

Two editions are now available:

- > **Client-Server edition** for large utilities where several users work on the same database in parallel
- > **Stand-Alone edition** for small utilities where one user manages maintenance activities

ADMO is aligned with NERC PRC-005-02 and is a valuable tool for utilities in the US to pass audits. Due to its high level of flexibility, utilities from all over the world can also benefit from ADMO's functionalities.

 www.omicron.at/admo



Product and technology

Touch and test

Control your CMC test set with your tablet PC and the new CMControl P App

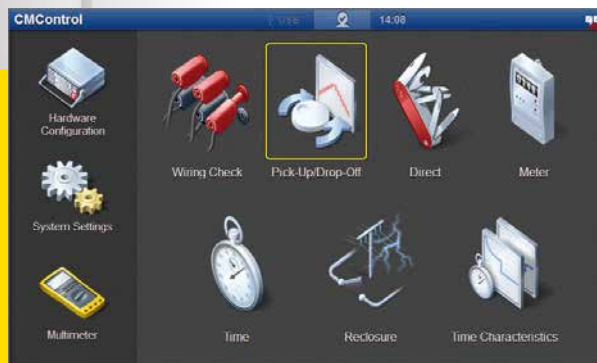
Time does not stand still and we all keep moving along with the development of technology. About five years ago, our customers' needs evolved with the launch of the touchscreen era. We responded to this development with CMControl, the PC-independent control alternative for CMC test sets. CMControl successfully entered the market and since then has been appreciated by our customers across the world. Now — with the increasingly widespread use of tablet computers — some of our customers expressed the wish to also be able to control their CMC test sets with their tablet PCs. This has been the inspiration behind the development of the CMControl P App.

An easy-to-use Android App for quick manual testing

The CMControl P App enables you to control CMC test sets with your tablet PC, using a wireless connection. It offers all functionalities of the approved CMControl P which is dedicated to testing protection and measurement devices.



Fast, easy and convenient: Manual testing with the CMControl and its intuitive touch screen interface.



Simple and clear: Tool selection.



Intuitive and logical: Fault type setting.



Are you curious? – Try out our free App

You can download the free CMControl P App for your tablet PC from the Google Play Store™ and familiarize yourself with all its features:



for Android™

If you are convinced by this App, visit our webpage and learn how you can control your CMC test set with it:

www.omicron.at/cmcontrol-p

All physical operational elements of the CMControl P, such as the control wheel or the push button, have been emulated in the App.

Due to the App's convenient user interface you can easily set up tests. Its test tools and fault models support you in getting quick and reliable results. With the emulated control wheel you can adjust output values.

The App provides maximum convenience since you can choose the Android-based tablet PC that best fits your individual expectations and requirements. No matter, if you prefer a very lightweight tablet computer like Google Nexus 7, a big screen as offered by the Samsung Galaxy Pad 10.1 or a rugged device like Panasonic's ToughPad: The CMControl P App allows you to make your own personal choice.

In addition, you don't need any cable connection to the test set, due to the solution's WiFi operation.

Innovative and user-friendly software

The CMControl P App allows you to set up and perform tests easily. For example, you can start a 'Pick Up/Drop Off' test by simply touching the corresponding icon in the main menu.

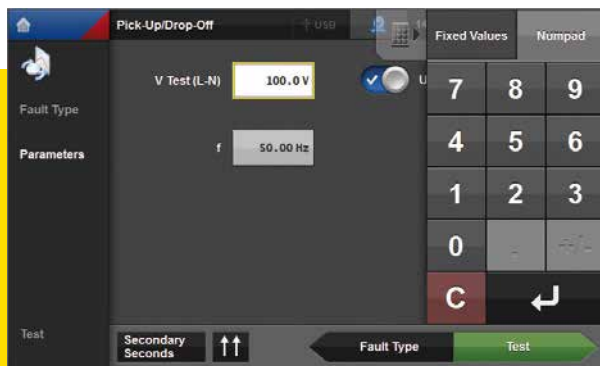
Then you can select the fault type in an intuitive and logical way. You can enter impedances, power values, frequencies, and symmetrical components directly.

In the next step, you can easily set the fault parameters with the numeric keypad. Additionally, it is possible to store and recall preset values.

Finally, you can ramp output quantities either up or down with the control wheel. All of the relevant information is clearly displayed on a test screen:

The output quantities are represented in a table or phasor diagram. ▀

Jakob Siemayr
Product manager



Reliable and easy: Parameter setting.



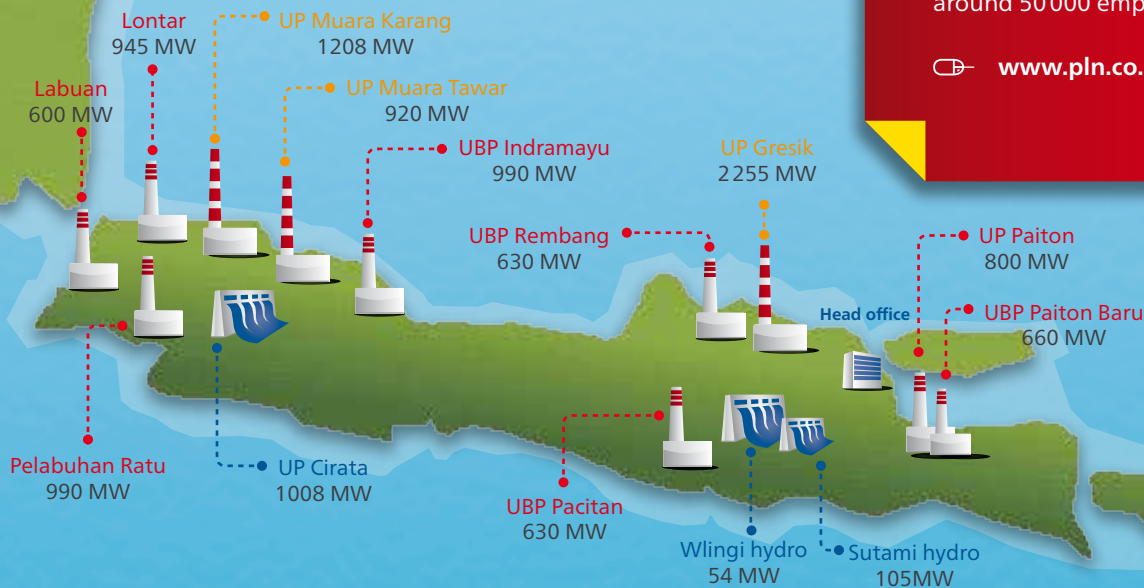
Well-arranged and adjustable: Test screen.

Trust is good, monitoring is better

Systemic monitoring of high-voltage equipment

By deciding to found the 'Monitoring' business area, OMICRON has made a significant step in the direction of project and system business. The monitoring team at the new Berlin site in Germany focuses on the development of innovative solutions for continuous monitoring of high-voltage equipment. These solutions are specially tailored to fulfill the requirements of international customers.

Experts in action around the world



PLN (Indonesia)

PLN is Indonesia's state-owned energy supply company. Around 25 percent of the energy required is produced in oil-fired power stations. However, this should fall considerably in the coming years. In the first half of 2011, 88.2 TWh of energy was produced. PLN has around 50 000 employees.

www.pln.co.id

On islands in the Indian Ocean...

As in other parts of the world, the energy market has been deregulated in Indonesia. Therefore, the state electricity company PLN must now compete with private providers. Stability and reliability are important criteria for power grids. In conjunction with OMICRON, the PT PJB subsidiary on Java (Indonesia) planned a

PD monitoring system for 21 generators at four different locations to ensure that these criteria are met. The project was successfully completed in December 2012 and PLN were presented with a modern monitoring system. Since then, 21 generators have been monitored using OMICRON monitoring systems.

Power plants on Java (Indonesia).

OMICRON has been operating a research and development site in the capital since 2006 and in 2012 it was developed into a full service center. The acquisition of the new space created the necessary conditions for the ambitious plans. At the Berlin site, the current team of 35 employees is developing testing systems for the permanent monitoring of generators, transformers, and high-voltage cable systems. These systems aid in the prevention of costly failures and dangerous defects. In order to develop this business area, an entire organization had to be set up in which many different departments had to work together. It included specialists from Development, Project Management, Project Sales, and Customer Project Development all the way through Logistics and Customer Services.

Costly damage due to partial discharge

In order to ensure safe and reliable energy supply, the insulation status of high-voltage equipment must be monitored continuously. Even a small inconsistency in the insulation can lead to partial discharge (PD) and considerably reduce the service life of the asset. The result is often unexpected power failures, which are associated with high costs.

Customized product range

OMICRON PD measuring technology is already used in various fields, such as quality assurance and commissioning of generators, motors, switchgear systems, and high-voltage cable systems. ▶

... and in mountainous Switzerland

The Grande Dixence dam lies in the Swiss canton of Valais. The comprehensive power plant complex also includes the underground Bieudron power station. This was built between 1993 and 1998 at a cost of CHF 1.3 billion (€ 1.1 billion/\$ 1.4 billion) to further increase the production capacity of the plant. The power plant houses three Pelton turbines with a total power of 1 269 MW.

HYDRO Exploitation SA is a service provider that specializes in the operation and maintenance of hydroelectric power plants, and also looks after the Bieudron power plant. OMICRON carried out test measurements on one of the generators at Bieudron. HYDRO Exploitation SA were impressed by the ease with which the measurements were made and the additional advantages of the OMICRON PD monitoring system. The company opted for the mobile OMS 605 PD measuring solution, which has since been successfully implemented for monitoring the power plant generators.

HYDRO Exploitation SA (Switzerland)

HYDRO Exploitation SA is a service provider that specializes in the operation and maintenance of hydroelectric power plants. The company's customers own 22% of the installed power plant capacity in Switzerland, whereby 56% of the energy is produced using hydropower. Today, HYDRO Exploitation SA has more than 500 employees. The Bieudron power plant is particularly impressive as it holds three world records for a head of 1 883 meters, a 423 MW output per Pelton turbine, and a 35.7 MVA output per pole of its AC generators.

 www.hydro-exploitation.ch



Grande Dixence dam (2365 m)

- ▶ The new PD monitoring system solutions can be used to provide important insights into the life expectancy of systems. Damaged areas can be detected before costly secondary damage occurs. This ensures reliable system operation and cost-effective maintenance. The monitoring solutions from OMICRON are optimized for monitoring high-voltage equipment. The systems record partial discharge phenomena and thereby the status of the insulation at the critical points of a high-voltage system in real time. To do this, extremely precise sensors tailored to the system and synchronous data acquisition with several channels is used.

Close to the customers

The proximity to long-standing partners and key clients was a decisive factor in investing in the new Berlin site. In addition, this thriving German metropolis provides OMICRON with excellent opportunities for further development in an outstanding science and technology environment. This also guarantees the development of innovative solutions in the future, such as those already used extensively for monitoring generators, motors, and cables in Europe, Asia, and the USA. 🚩

News

OMS 605

**The robust data acquisition system
OMS 605 is a mobile addition to
OMICRON's fixed monitoring solutions
OMS 600, OMS 800, and OMS 840.**

The system features a variable power supply which thereby enables temporary or periodic, yet long-term observation of partial discharge phenomena in the field. The data obtained can then be analyzed, visualized, evaluated, and managed using modular, adaptable, and user-friendly software solutions. It offers a variety of adjustment options and filters. Data comparison ensures that changes to the condition of the insulation are detected reliably and appropriate measures can be initiated. 🚩

🌐 www.omicron.at/oms605

OMS 605

- > 3 + 1 PD channels for synchronous data acquisition
- > Data processing in real time
- > Robust and mobile for testing in harsh environments (IP65)
- > Unique options for separating sources of interference (3PARD/3CFRD)
- > Numerous filter and gating methods





Application

Seamless communication

Testing the interoperability of IEC 61850 IEDs:
shared knowledge from Malaysia

The open nature of the IEC 61850 standard offers users (e.g. power utilities) the ability to configure various Intelligent Electronic Devices (IEDs) from different vendors so they can communicate with each other seamlessly. Although these IEDs have been tested and certified by third party certification bodies, there are certain services and functions that may not have been tested but are required by power utilities.

Taking this into account, Tenaga Nasional Berhad (TNB), the Malaysian national utility company, has recognized the importance of interoperability testing as part of the IED product acceptance process. Therefore, TNB has set up an in-house lab environment, the IEC 61850 System Verification and Simulation (SVS) Laboratory. It is used to test and confirm the services and functions of IEDs. OMICRON's CMC 256plus, IEDScout and Test Universe Software have played a vital role in two of these testing procedures. ▶



IEC 61850 videos

Additional videos can be found on www.youtube.com/omicronenergy

Testing the interoperability of line differential relays successfully

Testing the communication latency

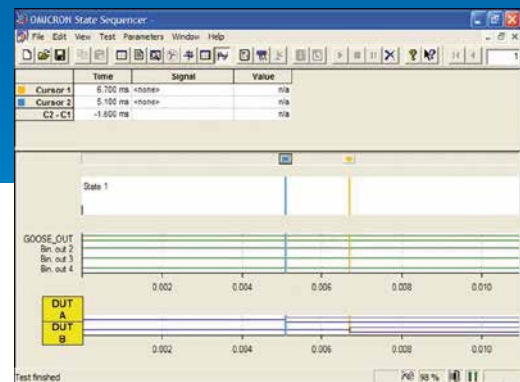
This test aims at testing the performance of the GOOSE communication. It also evaluates the interoperability of the line differential relays NR PCS-931 and GE Multilin L90 in subscribing GOOSE messages, mapping the GOOSE to its internal functions and publishing the GOOSE according to these functions. OMICRON's CMC 256plus, Test Universe Software and interface box CMIRIG-B are used for the latency test. With the CMC 256plus and the GOOSE Configuration Module

in the Test Universe Software, GOOSE messages can be published and subscribed.

After repeating the simulation ten times, the GOOSE message performance of the devices under test is measured. Due to the time synchronization it can be assumed that the GOOSE status change occurred at the same time in all three devices. Both devices meet the compliance criteria defined by TNB.



Time synchronization with CMIRIG-B: CMC 256plus is synchronized with the time server along with the devices under test.



Simulation with the State Sequencer module: GOOSE status change is simulated by changing the binary output status of the CMC 256plus initiated by GPS time.

► Ensuring interoperability: challenges and issues

Despite passing their conformance tests, it is possible that IEDs will not interoperate due to the following reasons:

> One standard – various interpretations:

The interpretation of the standard can vary from one vendor to another. This may result in various methods of configuring and implementing IEDs from different vendors. Data modeling and supported services are strongly affected by these differences in interpretation.

> Procedural issues and different requirements:

Conformance tests only consider testing individual IEDs with pre-existing testing systems and predefined procedures. In addition, during the conformance test, testing laboratories will only perform tests on the functions and services that are requested by IED vendors. These functions and services may not be enough to satisfy the requirements of end users.

The SVS Laboratory at TNB: a platform for research and testing

The laboratory is equipped with IEC 61850 compliant IEDs and a system which simulates the communication of secondary equipment as it occurs in an actual substation. The configuration follows a double bus-bar configuration. This configuration has allowed the SVS

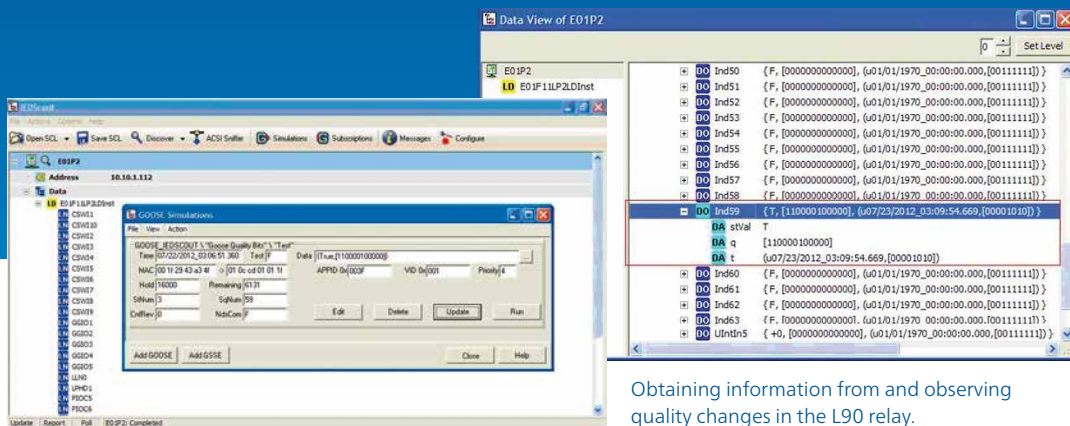


The SVS Laboratory at TNB: a platform for research and testing.

Testing the quality attributes

This test is conducted to observe whether the GE Multilin L90 relay reports via C/S-service in case there are any changes in quality attributes defined in IEC 61850 part 7-2. For this test, IEDScout is used to publish GOOSEs with quality attributes and observe the change of the quality in the L90 relay which has subscribed to the GOOSE.

This test simulates 'bad quality' which is difficult to simulate using existing communication devices in the lab. The test can be further improved, if the L90 relay triggers automatic reports when there is a change in quality.




Obtaining information from and observing quality changes in the L90 relay.

IEDScout configuration.

Testing the quality attributes with a universal client to IEC 61850 servers: OMICRON's IEDScout.

laboratory to emulate the IEC 61850 station bus communication architecture as it is in actual substations. TNB has developed the "TNB IEC 61850 Device Interoperability and Verification Test Procedures", a standardized document for interoperability testing and the IED product acceptance process.

The procedure has been tested and verified using the existing IEDs in SVS laboratory. IEC 61850 services such as client-server (C/S) services (utilizing MMS) and real-time peer-to-peer communication with GOOSE have been implemented. 

For more detailed information on the SVS laboratory and the tests, you can download the original paper from our website: www.omicron.at/papers

Mohd Iqbal Ridwan

Mohd Iqbal Ridwan is researcher for TNB Research Pte Ltd (Utility Automation, Transmission Unit) and pursuing his Masters in Electrical Engineering at the Tenaga Nasional University, Malaysia. He graduated with B.Eng. Electrical & Electronic Engineering from Keio University, Tokyo, Japan. His areas of research include IEC 61850 based Substation Protection Automation and Control Systems (SPACS) and Reliability Engineering.



The beginning of a new era

OMICRON develops a unique circuit breaker test system

Even today, extensive circuit breaker testing requires the use of several test devices. Numerous parameters must be recorded and analyzed. For the first time, OMICRON has combined all important testing functions in one system. CIBANO 500 combines micro-ohmmeter, timing analyzer, and circuit breaker supply in just one device, marking a new era in circuit breaker testing.

CIBANO 500

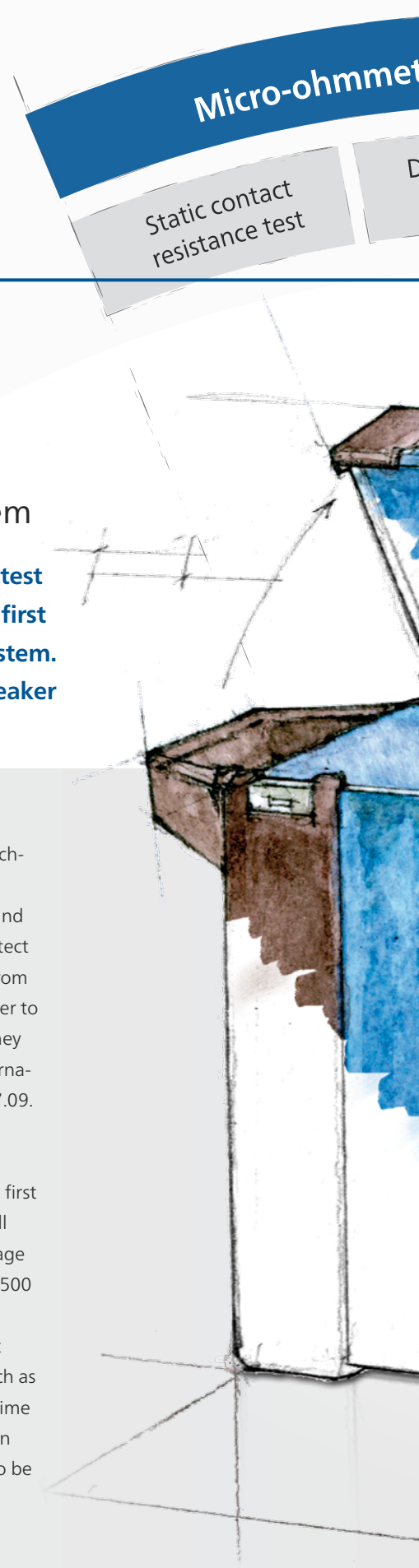
- > 3-in-1 system: micro-ohmmeter, powerful AC/DC supply, and timing analyzer
- > One system for medium- and high-voltage circuit breakers
- > Low wiring effort
- > One combined report for all tests
- > Light-weight test system for on-site testing (20 kg / 44 lbs)



Circuit breakers are specifically designed for switching high currents. In the event of a short circuit, current levels can reach as high as several thousand amps. Therefore circuit breakers are there to protect downstream equipment, such as transformers, from damage due to overloads or short circuits. In order to ensure error-free operation of circuit breakers, they must be tested regularly in accordance with international standards such as IEC 62271 and ANSI C37.09.

Simple yet impressive

With CIBANO 500, OMICRON has introduced the first ever 3-in-1 test system that can be used to test all types of circuit breakers: medium- and high-voltage breakers with live- or dead-tank design. CIBANO 500 is unique in that it combines a micro-ohmmeter, timing analyzer, and circuit breaker supply in just one system. This enables both standard tests, such as contact resistance measurement and switching time analysis, as well as advanced tests, such as motion analysis and dynamic resistance measurement, to be carried out with ease. ▶





CIBANO 500 and accessories: the future of circuit breaker testing.

22 Products and technology

- ▶ Thanks to the integrated circuit breaker supply, the user is able to freely adjust DC voltage with CIBANO 500 as well as simulate a circuit breaker supply with undervoltage without having to change the cabling. Thus it is possible to test the circuit breaker during the commissioning of switchgear systems where no station battery is available.

Despite its extensive range of functions, CIBANO 500 weighs only 20 kg / 44 lbs. The need for using a single device for each test, where the circuit breaker supply alone weighed considerably more than CIBANO 500, is now a thing of the past.

Convenient to use

Since all the testing functions have been included in one system, the initial familiarization period is reduced considerably. CIBANO 500 is operated via OMICRON's well-known Primary Test Manager (PTM) software. The PTM guides the users through the tests and then quickly provides them with a comprehensive test report. Measurement results are presented clearly and can be displayed as either a table or a diagram.

Unique test concept with innovative accessories

With the main contact module CB MC2, you only need to set up and dismantle the equipment once for all tests including micro-ohm measurement. One or more contact modules are connected directly to the test object. Therefore the corresponding connection cables are short. The transmission from the modules to CIBANO 500 is digital, which significantly reduces interference – something that must be considered in a high-voltage environment. In this way, CIBANO 500 reduces the amount of cabling and time required for circuit breaker testing considerably and also minimizes the safety risks for the test engineer. The system can be expanded at any time with additional modules via a real-time interface.

With CIBANO 500 and its unique connection concept, OMICRON has broken new ground in circuit breaker testing. 🚩

 www.omicron.at/cibano500

Unique testing concept:

With CIBANO 500 and the CB MC2 contact modules, all the necessary circuit breaker tests can be carried out with just one test set-up. The contact modules are mounted directly on the test object, which considerably reduces interference, especially in a high-voltage environment.



«By combining several complex tasks in one test system, we are setting new standards in circuit breaker testing.»



Ari Tirroniemi

Ari Tirroniemi is a firmware developer at OMICRON. As project leader, he is currently responsible for the development of CIBANO 500.

Ari Tirroniemi is head of the CIBANO development project. The Finnish engineer has been a firmware developer at OMICRON since 2005. In an interview, he gave us some insights into the origins of this new project.

How did CIBANO 500 come to be developed and what challenges did you face?

The idea was to develop a test system which combines all the required testing functions for circuit breakers. Up until now, at least two and often three or more devices had to be set up for the tests. This is no longer necessary with CIBANO 500.

When I was asked if I would be interested in leading this large project, I was very excited. I already had experience in project management with our Dielectric Response Analyzer DIRANA and was ready for a new challenge.

At OMICRON, a project leader is normally also directly involved in the development work but with CIBANO 500, it was a different story. Due to the size of the project, the leader was fully occupied with the project management tasks. Naturally, I found this challenge very exciting.

How is an extensive project such as CIBANO 500 managed?

At OMICRON we work according to the ATOM process, an implementation of the Stage-Gate® concept (Editor's note: more information on Stage-Gate® can be found in OMICRON Magazine 2/2010 and on our website). ATOM means 'Accelerate TO Market' and is a model which involves predefined gates and stages. It is designed to ensure that projects are handled quickly and in a structured manner. The necessary activities are defined in five clear sections, which can also be carried out in parallel. At the gates, the results of the previous stage are checked and decisions are made regarding the progression of the project. This ensures that only ideas, that lead to progress and have the potential to deliver highly promising results, are pursued.

The developmental period was definitely the most time-consuming stage of them all. My work

- ▶ during this stage focused on managing time and finances. I was in close contact with the entire team. The status of the project, next steps, and our compliance with the objectives that had been defined was monitored continuously.

You all invested a lot of time in the development of CIBANO 500. What was the biggest challenge you faced?

CIBANO 500 is one of the largest projects that OMICRON has ever developed. During the course of the project, there were, of course, numerous challenges that we had to overcome. Thanks to our intensive work, we finally managed to combine all the important test functions in one very light device – a problem that no one has managed to solve until now. By the way, the project was referred to as ChiliBean internally and my team and I felt the heat from time to time, but in the end, we overcame all the hurdles and now we are able to present a globally unique test system.

You mentioned your team: how many people are involved in this type of project?

Our team consists of around 40 people from all different areas of the company. The majority of them are developers, but depending on the project phase, other areas become more involved. For example, as the market launch approaches, Marketing plays an increasingly greater role in the project. Of course, this type of team is not led by one person alone. The entire project is coordinated by a core group. This consists of five people, who work in the areas of Software, Hardware, Quality Assurance, Marketing, and Product Management. Important questions are raised and communicated to the rest of the team during a weekly meeting with the project leader.

What will you work on next?

After this project, I will work in Product Development again and will definitely be involved in the creation of new advanced functions for CIBANO 500. ❏



News

Versatile and compact

ISIO 200 – OMICRON's binary I/O terminal for Substation Automation Systems



ISIO 200 adds binary I/Os to Substation Automation Systems (SAS). As a SAS component, it integrates binary signals that are not handled by other SAS devices. It communicates via GOOSE messages as per IEC 61850, and thus interoperates with a wide range of devices. Its compact design allows you to put it wherever you need additional I/O terminals.

You can configure the device via a built-in web interface and download its description in SCL format. The Power over Ethernet supply of ISIO 200 minimizes wiring efforts.

By using two ISIO 200 devices 'back-to-back', binary status information can be tunneled through the substation Ethernet network. If ordered in pairs, the ISIO 200 devices are preconfigured to subscribe to each other. This works right out of the box without any further setup.

In addition, ISIO 200 enables CMC test sets for testing complex protection schemes with a large number of binary I/Os.

News

Unique and future-proof

Our tools for testing distance relays in compliance with IEC 60255-121

The future standard IEC 60255-121 requires static accuracy and dynamic performance tests for qualifying distance relays. You can fulfill these requirements easily with our Shot Calculator & Analyzer and/or RelayLabTest.

Automated static accuracy tests with Shot Calculator & Analyzer

This new add-on for the Test Universe software offers test templates and is able to adjust to different relay settings. It can generate and perform all tests based on the RIO description of distance protection zones. It also calculates the results for the test report described in the standard.



Dynamic performance tests with RelayLabTest

This unique software simplifies automated type and acceptance testing based on a network simulation. Its flexibility also allows for tests beyond the scope of IEC 60255-121 (e.g. for testing line differential protection).

www.omicron.at/relaylabtest

Application

When requirements change

High-voltage current transformer testing with the CT Analyzer

Planning the requirements of a substation is very complex. It is no surprise that specifications constantly change, often very quickly after the initial design of an asset has been accepted and delivered to the customer. For high-voltage current transformers (HV CTs) where there are expensive bushings and copper work, this can become challenging in terms of design and more importantly, cost. OMICRON's CT Analyzer helps determine the CT classification and can simulate various loads after a design change in no time at all.

Manufacturing companies put great effort into perfecting the manufacturing processes in order to create instruments of high accuracy and quality. This is particularly true for the production of HV CTs where manufacturers have a real challenge to ensure the accuracy and quality of such high-value equipment. Where critical specification changes are necessary, manufacturers need to provide quick solutions which create only a minimal impact on the product and its cost, preferably limiting the need to re-design the product.

Changed specifications

This scenario was encountered by a CT manufacturer, where a number of multi-tapped high-accuracy class 0.2S HV CTs had been designed, accepted and purchased by the customer who then altered the specification after it had been manufactured. The challenge for the manufacturer was how to address the customer's needs with minimal impact on the design and cost. A further complication was the requirement for

CT Analyzer — a revolution in current transformer testing

- > Highest measurement accuracy: 0.02% / 1 min.
- > Very small and lightweight (< 8 kg / 17.4 lbs)
- > Automatic evaluation according to standards
- > Short commissioning times
- > Excellent safety: tests run at max. 120 V
- > Integration into testing routines possible



the HV CTs to undergo approval testing in an overseas independent test laboratory. The HV CTs that had already been dispatched overseas were successfully tested to the nameplate specification at the specified tap stage. Due to size and weight quite expensive shipment costs were incurred. The CTs were then returned to the manufacturer. The customer, at this point, re-defined the CT tap and VA rating.

Desired certainty

This change meant that the units, following re-design, would need to be returned to the overseas test laboratory for approval of the new settings. In order to avoid unnecessary shipment costs, and to avoid delay, the manufacturer wanted to be confident that the CTs would meet the new specification prior to re-sending to the laboratory. Undertaking traditional primary injection testing of this type of HV CT requires a powerful source and considerable time and effort to complete the required testing effectively.

Verification in 30 minutes

OMICRON was contacted by the manufacturer who wanted assistance with this testing. It was recommended to use the CT Analyzer, a fast, portable, and easy-to-use test system which provides the user with a broad range of testing options. With this equipment, it is easy to make connections, and more importantly to simulate and test the HV CTs at various simulated loads. The CT Analyzer tests helped to determine the exact classification of the CTs and to verify that the HV CTs would meet the customer's requirements. The CT manufacturer was thus able to return the HV CTs to the independent test laboratory for approval, knowing that the equipment would successfully pass.

The investigation and tests completed with the CT Analyzer took as little as 30 minutes. This would be impossible using traditional testing equipment, particularly given the location of the HV CTs and the time constraints. ❏

Tony Porrelli*Technical Support & Applications***CT Analyzer videos**

Additional videos can be found on
www.youtube.com/omicronenergy

A new shine in blue, red, and yellow

Closer to customers with five new locations

OMICRON continues to expand its global network of offices: Service centers were acquired in both Houston and Berlin last year. New OMICRON offices also opened their doors in Vienna, Basel, and New Zealand.

It's the start of an exciting chapter for the OMICRON USA head office in Houston: New and modern premises in the heart of the city were acquired in mid 2012.

Impressive training center in the USA

In January the Training Center in Houston was completed. The 5 100-square-foot Training Center features an indoor, hands-on training area which houses a 10 MVA power transformer where all of OMICRON's Power Transformer Diagnostic test sets can be performed. It also contains a SF6 circuit breaker and a vacuum circuit breaker. This 'indoor substation' also has an area for partial discharge testing training and an area for training on testing recloser automatic restoration systems. It also has a classroom for up to 60 people.

Core business functions moved into the main building in June, 2012. This structure's 12 000 square feet of space has four meeting/training rooms equipped with state-of-the-art technology. One room was designed especially for hands-on Relay Testing classes for up to 16 people.

OMICRON Energy Solutions business area in Berlin

OMICRON Energy Solutions have found a new home in Tempelhof, Berlin. The thriving metropolis offers OMICRON's partial discharge specialists outstanding opportunities for development in a motivational environment. Thanks to its location close to Berlin's technical universities, it is easier to find exciting new contacts and ideas as well as highly skilled employees. This new office in Berlin takes OMICRON a decisive step closer to long-term partners and key customers.

New offices in Austria, Switzerland, and New Zealand

Three new offices have been established in order to be more accessible to customers in these countries. For example, this means that customers can now regularly obtain urgently required rental equipment more quickly. In addition, one advantage of the Vienna hub, is the quick access it provides to numerous countries in Central and Eastern Europe. ☑

● OMICRON office
● Local contact



HOUSTON

«For young and old explorers alike, the NASA Space Center in Houston is the place to be. It is the only place where you can see the real Apollo command module or training astronauts in person.» *Benton Vandiver*

A must-see for everyone ...

NOW SUPPORTING
CUSTOMERS IN
143 COUNTRIES



BERLIN

«For a unique taste of Berlin, visit the Mauerpark in the center of the city. In good weather, the open-air karaoke every Sunday is particularly interesting.» *Rene Hummel*



WIEN

«The Vienna Ringstraße is beautiful with its imperial flair from bygone centuries. Don't miss the opportunity to try the world-famous Sachertorte at the Café Sacher!» *Predrag Nikolic*



BASEL

«In a cosy pub called "Zum Rostigen Anker" (the rusty anchor) you can sit right next to the water in the harbor. If you tend to be more of the archaeological type, then you should try the Teufelhof, because it's a museum and restaurant in one.» *Thomas Stauffiger*



NEUSEELAND

«I thoroughly recommend the "Classic New Zealand Wine Trail" with its exquisite wines and dishes.» *Maik Ufferhardt*

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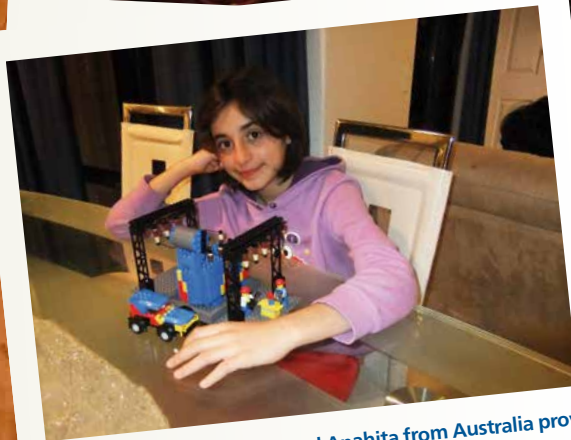
An unusual transport for a CMC: This dugout canoe carries its load across the Senegal river safely, a picture submitted by Jaco Wolmarans.



The OMICRON ginger-bread recipe was used with some extra creativity by Louiza from Algeria and Sarah from Great Britain.



Evan from Massachusetts and Ed from Wyoming present their biggest catches with the OMilure – an OMICRON USA giveaway



Ethan from Massachusetts and Anahita from Australia prove that there will not be a shortage of engineers in the future.

Off topic

Pictures submitted by customers from around the globe

Most people are already aware that OMICRON's heart doesn't just beat for electricity. Many of the pictures submitted by OMICRON customers from around the world display creative ideas that are a testament to that fact. The best of these pictures will be featured in the OMICRON magazine – Here are some examples. 📸

If you have an interesting or humorous picture involving an OMICRON testing device or a giveaway, please send it to us: magazine@omicron.at



An expert guide

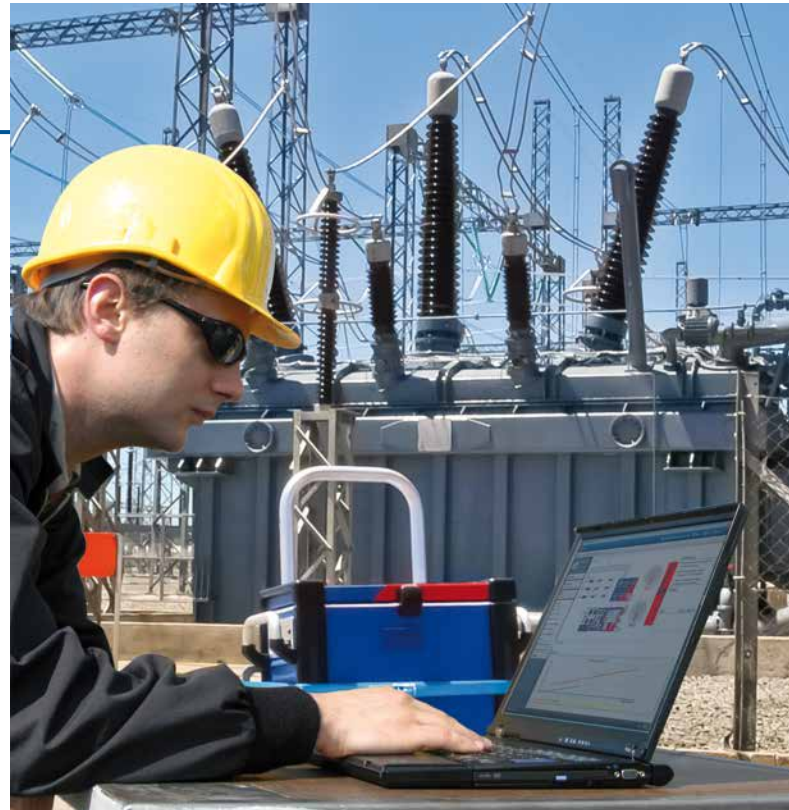
Primary Test Manager saves time and money

Over time, minor damage to equipment can lead to costly errors. But regular testing makes it possible to identify damage like this early on, keeping the likelihood of serious consequences occurring to a minimum. Used in conjunction with OMICRON's CPC 100, Primary Test Manager (PTM) is the perfect tool for performing tests in a way that is both time-saving and cost-effective – and ensures maximum safety for the test engineer.

The PTM software solution makes it possible to perform a multitude of tests on power transformers, circuit breakers, and current transformers. It provides active guidance for the user during the process of testing with the CPC 100, making tests faster, easier, and safer. "It's incredible how much time this tool saves!" says an enthusiastic Morne Nothnagel, Sales Engineer at Maschinenfabrik Reinhausen in South Africa. During all tests, the tool can be relied upon to ensure compliance with international standards such as IEEE 62 (C57.152), IEC 60076-1, or IEC 60076-3.

Preparation makes perfect

The testing procedure is based on a four-step concept that covers everything from the preparation stage right through to the test report. The first step involves planning the relevant test. "It's really nice to be able to do this in the office," says Nothnagel happily. "It means we can make thorough preparations for the testing day



Software-based measuring and testing using the CPC 100 and PTM.

and reduce the amount of time spent outside in the field." In this case, one feature that is especially user-friendly is the structured way in which all the equipment is stored in the PTM database. "You can find the transformer you're looking for with just a few clicks – everything is quick and easy. Any minor adjustments you make in the field are transferred to the database, so they're available for the next test too," explains Nothnagel. Not only this, but measured data from previous asset tests can also be accessed during the preparation stage and, further down the line, can be compared with the most recent results. ▶

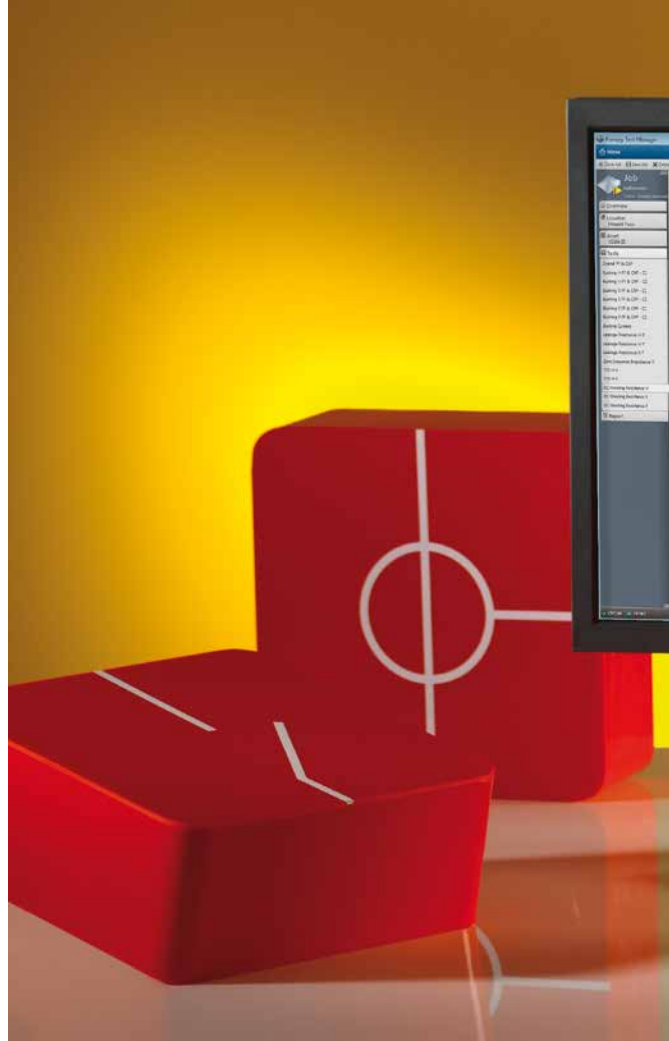
«PTM makes everything easier and faster!»

Morne Nothnagel, Sales Engineer, Reinhausen South Africa

OMICRON Primary Test Manager (PTM)

Software-based workflow support for testing and measuring with the CPC 100

- > High-performance database for managing asset data
- > Dynamic test plan creation
- > Guided test procedures in compliance with industry standards
- > Comprehensive test templates and reports
- > Interfaces for data import and export



► Guided testing

Thanks to the way PTM works and the preparation stage, testing in the field takes place virtually automatically. Clear connection diagrams help the user ensure the test equipment is set up correctly. Not only does this keep errors to a minimum, but it also provides protection for the user.

«We use PTM not only for testing, but also for training purposes.»

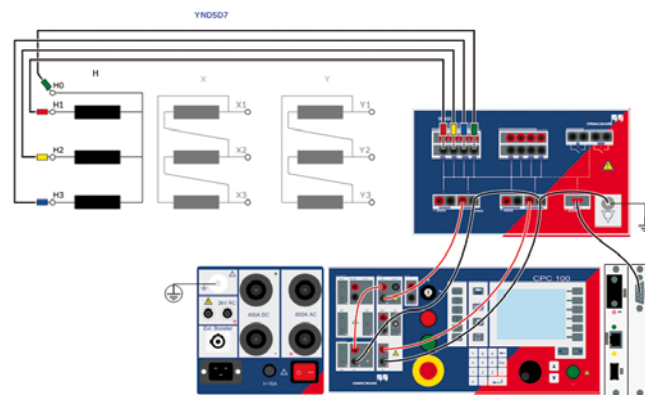
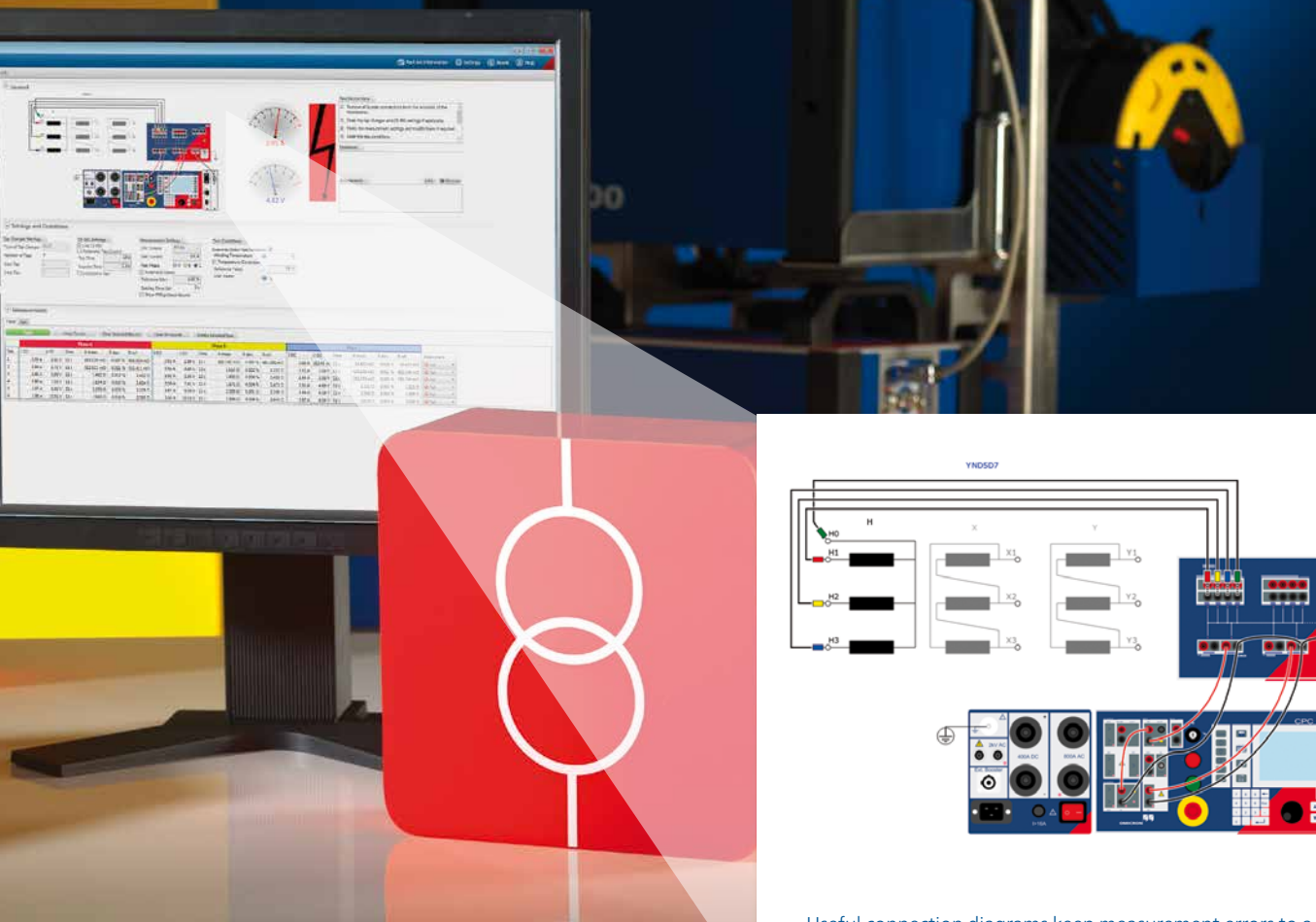


Morne Nothnagel
Sales Engineer, Reinhausen South Africa

The test engineer can make individual settings for each of the tests to be carried out, and adapt them to specific requirements with minimal effort. With PTM, the CPC 100 is controlled directly via a computer. “Something we have found really beneficial is the fact that we no longer have to stay right next to the test device,” states Nothnagel, and adds with a smile: “Now we can just sit in the shade with our laptops and monitor measurements from there!” All results are displayed as diagrams and tables in real time, and the system also shows the progress of the measurements as well as the tasks that are still remaining. The results are evaluated automatically on the basis of limit values that have been entered (such as values conforming to international standards).

Efficient data management

All equipment-related data is stored in the integrated database. This provides guaranteed access to tests that have already been carried out, plus the associated con-



Useful connection diagrams keep measurement errors to a minimum and ensure maximum safety.

nection diagrams and test reports, at any time. Meanwhile, the integrated search function ensures that the user can access specific items of this data quickly and easily. Various interfaces are available for the purpose of exchanging data with other systems or databases.

Individual test reports

While it is possible to have test reports created automatically on the basis of predefined reports, the test engineer is also given the freedom to decide which data he wants the reports to represent. Additional information, such as the company logo, photos, or results from tests that have already been performed, can also be incorporated with ease.

“We don’t just use PTM for testing — we use it for training both established and new employees too,” says Nothnagel. “With the wide variety of applications this software solution can be used in, it has proven an ideal training tool for our needs.”

Reinhausen South Africa (Pty) Ltd.

The Reinhausen-Group is in the power technology business and consists of the Maschinenfabrik Reinhausen in Regensburg as well as 22 subsidiaries around the world. Regulation of power transformers is the company’s core business. Locally Reinhausen South Africa offers a wide range of services and is able to offer not only tap changers and related services as an accredited Premium Service Provider, but also a complete range of MESSKO measuring instruments in and around transformers.

 www.reinhausen.com

Let's make a difference— with enhanced reliability

Expert knowledge exchange at the IPTS and ITMF

The reliability of the electric power grid is endangered more than ever. In keeping with this year's theme, "Enhancing the Reliability of the Grid", methods for ensuring stable and reliable grids are the main focus of this year's IPTS and ITMF. The events will take place from September 24-26, 2013 in Boston, Massachusetts (USA).

Meet international experts in the city of education, research, and innovation

Both events will address ongoing changes in the power industry as well as their impacts on protection and measurement systems. Protection and instrument transformer experts from utilities, vendors and academia around the world will attend the events. An exciting and diverse social program in the vibrant and thriving city of Boston will round off the events and provide an excellent opportunity for everyone to meet and share experiences in an impressive surrounding.

IPTS 2013

Changing grid structures, aging infrastructure, and increasing fluctuation in the balance between supply and demand challenge the reliability of the electrical power grid. New, more advanced protection and automation systems are possible answers, as well as new kinds of equipment and also special know-how of the workforce that has to master it. With the IPTS 2013 OMICRON provides a truly international platform for identifying and discussing problems, solutions and the related testing methods.




International Protection Testing Symposium

September 24-25, 2013, Boston, USA

Instrument Transformer Measurement Forum

September 26, 2013, Boston, USA

 www.omicron.at/ipts-itmf2013**ITMF 2013**

Sustainable accuracy and the proper operation of secondary equipment highly rely on correct data input. This is what the instrument transformer is responsible for as the interface for providing a precise and real-time image of the grid status. In line with the focus of the ITMF 2013, testing and diagnostics of instrument transformers and topics like remanence, aging, transient behavior, and power quality will be primary issues. 



For the past IPTS and ITMF we have had more than 120 presentations including topics such as:

- > Condition Based Assessment of Protection Assets [Craig Munro, BC Hydro, Canada]
- > Smart Testing for Complex IEC 61850 Automation Logic [Daniel Mulholland, Transpower New Zealand, New Zealand]
- > Best Practices in System Simulation for Relay Testing [Charles Henville, Henville Consulting, Canada]
- > New Relay Testing Philosophies Evolving from Government Mandated Requirements in the USA and their Impact on the Reliability of Protection Systems [Dr. Alexander Apostolov, PAC World, USA / Benton A. Vandiver III, OMICRON, USA]
- > Efficient Current Transformer Testing – Moving on from Conventional Methods (a Utility's Perspective) [Dean Sharafi, Western Power, Australia]
- > Residual Magnetism of Current Transformers [Yvo Langnese, OMICRON Austria]



The power transmission network in South Africa mainly consists of overhead lines.

Region

On location: OMICRON in South Africa

Alectrix, a successful OMICRON partner

Each country has its own special characteristics, especially when it comes to power supply. In a new series, we will be interviewing selected sales partners in regard to power supply in their region. The series kicks off with Alexander Dierks, who has been the exclusive OMICRON sales partner in South Africa for 15 years with his company Alectrix.

Power supply in South Africa

- > Africa's largest energy supplier: Eskom
- > Peak load: Approx. 36 000 MW
- > Mainly coal-fired power plants
- > The Koeberg power plant is the only nuclear power plant in Africa



The team at Alectrix (Pty) Ltd: Alexander Dierks (2nd from left), worked for OMICRON in Austria between 1993 and 1997 and his company Alectrix is currently a successful sales partner.

Long lines are particularly critical in regard to reactive power. The installation of reactive loads is intended to compensate for this. The longer the lines, the more loads are installed. In addition, the long extra-high voltage lines are series-compensated to reduce the line impedance. As a result, there are stability and overvoltage issues to deal with.

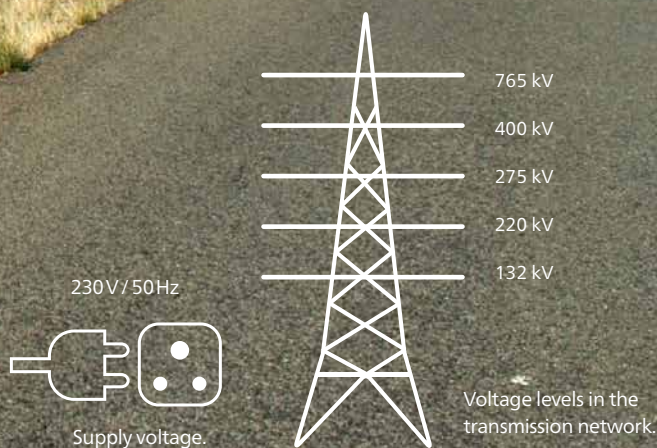
OM: In South Africa, there is a wide gap between rich and poor. Does this also result in difficulties for energy supply companies, for example with electricity theft?

AD: Theft of electricity on the low-voltage level is, of course, an issue. However, many municipalities already provide basic electricity and water requirements free of charge. This covers the consumption of a typical shack (a corrugated-iron hut) for lighting, a small TV and charging of a mobile phone. If more electricity is needed, for a refrigerator or more lighting, for example, a 'pre-payment' meter is installed.

The much bigger issue, though, is the theft of the lines themselves, as is the case practically worldwide with the rising cost of raw materials. Many people, however, are not aware of the lethal danger of electricity, and this continues to result in tragic deaths. ▶

OM: Alexander, what are the key characteristics of the power grid in South Africa?

AD: South Africa is relatively sparsely populated. Although there are areas that are densely populated, there are often several hundred kilometers between them: For example, the distance from Cape Town to Johannesburg is 930 mi / 1 500 km. As a result, long high-voltage lines are required for the transmission network and distance protection is a key issue.





13th OMICRON South African User Conference 2013
November 11-12, 2013 in Johannesburg, South Africa
(Registration opens in June 2013).

The Kendal coal-fired power plant is the world's largest with 6 x 686MW. The even bigger Medupi coal-fired power plant with 6 x 800MW is being constructed at present.

► **OM: What are the hot topics for the energy supply market in South Africa?**

AD: The new IEC 61850 standard, which defines the communication networks and systems in substations as well as within a whole power utility automation system, is certainly leading to changes. At Alectrix, we've mainly noticed this in the fact that customers are upgrading their CMCs and updating software. There is also an increased need for introductory training. This is not a sudden change, but a process lasting several years.

OM: Alexander, you are OMICRON's sales partner in South Africa. Which products do your customers request the most there?

AD: As a sales partner, we cover the entire OMICRON product range. There is an increasing demand for monitoring systems for transformers, which OMICRON is currently actively working on. The MPD series devices, i.e., partial discharge measurement systems, are rarely requested. One of the reasons for this is that South Africa predominantly uses overhead lines, so there are no extra-high voltage cables in use.

OM: What services does Alectrix offer its customers?

AD: As mentioned, Alectrix is OMICRON's exclusive sales partner in South Africa. In addition to selling devices, we also show customers how to operate them. Last year more than 500 people took part in our courses. Our own, local repair service is another convincing argument for many customers.

One particular highlight is the OMICRON South African User Conference, which we have organized since 2000. For some years now, it has been the second largest event in the worldwide OMICRON calendar. 📌

Alectrix

Alectrix (Pty) Ltd was founded in 1997 by Alexander Dierks in Hout Bay, South Africa. The company is OMICRON's exclusive sales partner in South Africa. In addition to product sales, they also offer local training and an OMICRON-certified repair services as well as technical support.

 www.alectrix.co.za



Seminars held at Nuclear Power Plants in Russia included Smolenskaja, Voronezhskaja, Rostovskaja. These events were spread out over a week with our technical experts driving more than 2 000 km...



Seminars in the CIS countries have included several in Kazakhstan, Azerbaijan and Baku.



The Nordic region featured highly with visits to Iceland, Sweden and Finland



Many seminars have taken place in Africa including Algeria, Angola, Ghana, Nigeria, Mali and the Ivory Coast.

Region

Technically speaking

Around in EMEA

Technical Seminars are a well-established element of OMICRON's event programme. They provide a perfect opportunity for exchanging information with key engineers on a wide range of subjects. Often these events are done in collaboration with major customers or sales partners and can hold anywhere from 10 to 300 plus attendees.

This principle has been with OMICRON ever since its beginnings when the founder, Rainer Aberer, undertook a Roadshow together with Herwig Ferstl in Austria and Germany to explain the fledgling technology of computer-based protection testing.

Since then seminars in EMEA alone have taken place from the Arctic Circle to Cape Town, and from Iceland in the west to Vladivostok in the Far East. Event titles like 'OMICRON Power System Testing', 'Diagnostics, testing, maintenance, repair and modernization of power equipment' and 'Transformer Diagnosis' give you an idea of the wide variety of topics being covered. 📌



In the Middle East Abu Dhabi, Qatar and Egypt provided venues for seminars.

If you are interested in attending one of the many technical seminars please contact your local Area Sales Manager.

Ribbon-Cutting Ceremony

Building Dedication for the New OMICRON Training Center in Houston

In an ongoing effort to improve the quality of our service and training to customers in North and Latin America, OMICRON recently celebrated the opening of its new, state-of-the-art Training Center in Houston, marking the final phase of its recent move and expansion.

The official dedication of the facility was held on January 15, 2013, and featured a ribbon-cutting ceremony followed by a reception and dinner for OMICRON team members and Sales Partners. A local jazz ensemble provided live entertainment during the festivities.

During the event, David Marble, Senior Application Engineer, was honored with a retirement ceremony acknowledging his 14 years of service with OMICRON and given a special award for his significant contributions in the development of Recloser Testing. 📌



OMICRON Academy

April 2013

Basics of Conducting Partial Discharge Measurements Using the MPD 600

Houston, TX | United States

02 April 2013

Power System Protection Testing with the OMICRON Test Universe

Waltham, MA | United States

22 April 2013 - 25 April 2013

Measurements of Power Transformers with the CPC 100 and the CP TD1

Houston, TX | United States

23 April 2013 - 24 April 2013

IEC 61850 Protection Testing with OMICRON CMC Test Equipment

Waltham, MA | United States

26 April 2013

June 2013

Power System Protection Testing with the OMICRON Test Universe

Chattanooga, TN | United States

03 Jun 2013 - 06 Jun 2013

August 2013

Power System Protection Testing with the OMICRON Test Universe

Houston, TX | United States

05 Aug 2013 - 08 Aug 2013

Introduction to Differential Protection Testing

Houston, TX | United States

13 Aug 2013

Introduction to Distance Protection Testing

Houston, TX | United States

14 Aug 2013

Testing Recloser Controllers and Relays

Houston, TX | United States

15 Aug 2013

November 2013

Power System Protection Testing with the OMICRON Test Universe

Houston, TX | United States

18 Nov 2013 - 21 Nov 2013

IEC 61850 Protection Testing with OMICRON CMC Test Equipment

Houston, TX | United States

22 Nov 2013

Region

Protection Testing Week

Protection Testing Week is organised by OMICRON Academy which is dedicated to providing excellent know-how in power system engineering. In this one-week intensive training programme, the participants are going to learn a wide range of protection testing topics:

- > Generator and Motor Protection Testing
- > Transformer Protection Testing
- > Distance Protection Testing
- > IEC 61850 Testing

OMICRON CMC test set users will especially find this Protection Testing Week beneficial as they will learn how to efficiently use the OMICRON Test Universe and test sets to testing different relays. For enquiry or registration, please send an email to training.hongkong@omicron.at or call +852 3767 5500.



Protection Testing Week

Date: 27 May – 31 May, 2013

Venue: Concorde Hotel Singapore,
100 Orchard Road, Singapore 238840

