

MONITOR

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When the power supply ensures survival

Insulation fault location on board the Polarstern

LINETRAXX® SensorPRO residual current monitors
Smart. Flexible. Future-proof.

Market-driven solutions for modern applications



Power quality

Not all power sources are the same

Practical Page A
Expertise

Insulation fault location in unearthed systems (IT systems)

If a three-phase insulation fault occurs...
...the system continues to operate...
...the fault location is determined...
...the system is not interrupted...



NEW

Additional page "Practical Expertise" at the back of the booklet for collection!
Insulation fault location in unearthed systems (IT systems)

BENDER Group

editorial

EDITORIAL

Dear Readers,

"Against the background of key topics such as Industry 4.0 and the Internet of Things (IoT), Bender is increasingly confronted with the requirements of modern applications," is how our article "Smart. Flexible. Future-proof." about the new LINETRAXX® SensorPro device series in this issue of MONITOR starts. In times of increasing digitisation, it is impossible to imagine our everyday lives without electricity and therefore also electrical safety and availability. Highly flexible solutions and interfaces covering a wide range of needs are usually required. And there is no stopping digitisation, even when it comes to Bender's customer magazine which can now also be browsed online.

We are moving with the times, expanding our series, developing new products and constantly adapting to new challenges. Our reliable and proven technology is undergoing constant development – whether for mechanical and plant engineering, industry and building technology, data centres, road and rail traffic or operating theatres.

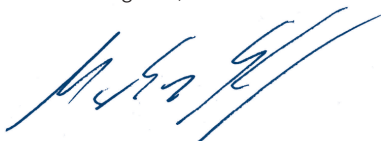
For example, our new SensorPRO residual current monitoring devices with intelligent measurement technology and a modular design provide a smart solution for existing as well as new applications. Or the new CP9xx series alarm indicator and operator panel for hospitals, which meets the latest requirements for modern medical locations.

Our equipment and solutions are used worldwide: in a cement plant located in Northern Italy and on the expedition ship "Polarstern" sailing in Arctic and Antarctic waters. Today more than ever, solutions need to ensure smooth, failure-proof processes, with efficiency and safety increasingly gaining in importance.

Place your trust in reliable, future-proof power supply and visit us at the next conference or user seminar as well as on social media.

Think future!

Best regards,



Markus Schyboll
CEO



SUBSCRIPTION

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IMPRINT

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Photos: Bender archive, SIDesignment archive, Alfred-Wegener-Institut – Mario Hoppmann, Folke Mehrrens, Stefanie Arndt, Elektrotechnik Thimm, Bender Italien, Telefónica, Bender UK, elektrosystembau bender, MES-Engineering Vietnam
AdobeStock: 2013 Andrew Ostrovsky, chungking, urbans78, electriceye, Cathy Yeulet, taa22, Stockwerk-Fotodesign, pixelfreund, WestPic, Robert Kneschke, Andrey Popov
123RF: franz12
iStock: Martin Schuh, beerkoff

Print: JD Druck. Lauterbach



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Specialists in fault-free energy distribution

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FEATURE





Power quality

Not all power sources are the same

Quality fluctuations in the power supply can place a strain on electrical loads. This can cause considerable damage in the commercial sector. Reason enough for effective prevention.

Plug in and simply tap the electricity – this is how we have done it for almost one hundred years. Electric power is somehow always there. Even if, the horror scenario of a total "blackout" has occurred repeatedly in the USA, in Scandinavia, Italy and France in recent years, we feel relatively safe in Germany. This is hardly surprising given that the availability of the German power supply system is on average above 99 percent.

Yet a completely different threat separate from availability exists today: Namely that of quality fluctuations. Quality fluctuations can damage equipment and pose a significant financial threat to industry and trade.

Basics

EN 50160 defines the quality of the electricity based on selected voltage values. It applies both at the point of supply between the public network and the customer as well as at the point of supply of energy generation plants to the public network. Therefore, EN 50160 is a central benchmark for electricity suppliers. It uses this to check the power quality at the grid connection point and in the electricity network. Switching larger loads on and off can

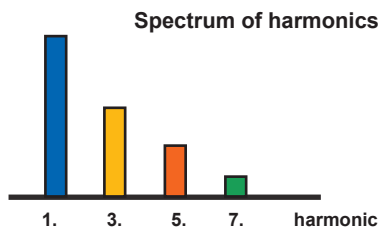
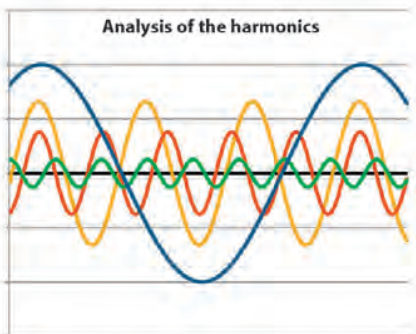
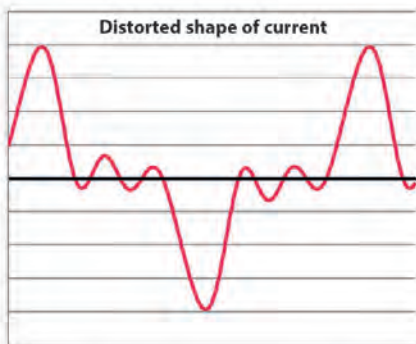
result in frequency fluctuations in the dynamic network so that, for short periods, the required values are not maintained. The changes in the system voltage caused by wind power stations during strong wind are an example of this. However, customers generally can rely on receiving "clean" electricity.

The cause of a quality fluctuation lies much more often with the consumers themselves, so in ones own power quality. A central reason for this is the increasing use of non-linear equipment such as frequency converters, power units and dimmers as well as electrical ballasts. These devices generally use thyristors, bipolar transistors with an insulated gate electrode (so-called IGBTs) or varistors. These change the sinusoidal curve of the electricity and create additional frequencies. And, ultimately, these harmonics "dirty" the electricity. Along with harmonics which are the most common cause of "dirty electricity", classic electrical loads can also cause completely different kinds of damage phenomena. Some of these are described briefly below.





FEATURE



Further causes and effects

Flicker: If equipment is used that briefly requires a particularly high voltage – for example, flash units, X-ray machines or industrial welding installations, electric arc furnaces or drives with an impulse load – that can lead to light fluctuations. This is called flicker. These are mainly only disruptive, but can also quickly lead to fatigue or dizziness.

Voltage fluctuations: Certain machines and systems in the industry often have strong load fluctuations. If these are operated on networks with a low short-circuit capacity, there is a risk of voltage fluctuations. Even if they last for only several milliseconds and are hardly noticeable to a human, they often place a strain on electrical loads.

Voltage drop: High start-up currents are required to start large industrial drive motors – particularly when these must start under a high load. The r.m.s. voltage level can briefly decline by up to 90 percent of the nominal voltage.

Transients: Lightning stroke or short-circuits often cause this type of damage. They generally last for only a few milliseconds and cause overvoltages with voltage peaks of several kV.

Unbalanced: The uneven distribution of single-phase loads as well as the operation of two-phase loads can result in an asymmetrical load on the transformers. The active load of the electrical consumers is responsible for uneven phase voltages. At the same time, the reactive load causes phase shifts that deviate from the ideal 120 degrees.

Harmonics: Harmonics are sinusoidal components which overlay the fundamental oscillation of the voltage or the current. Harmonics arise due to non-linear loads in the network. The ordinal number h indicates the ratio of the harmonic frequency to the mains frequency. Integer multiples of the mains frequency are described as harmonic. However, if the multiple is not an integer, then these multiples are called interharmonic.



Bender LINETRAXX® PEM735, 575 and 353 digital universal measuring devices are used to measure and display electrical quantities of a power supply network.

Dangers

It's clear with a lightning stroke: Television sets, computers & co. can be irreparably damaged by a brief surge. Nevertheless, other phenomena described here can cause damage. Many devices in the household cannot withstand harmonics and fail as a result. With other loads, the effects are rather gradual and reduce the service life.



The dangers are more serious for industry. Due to the high investment costs in machines and equipment, failure or early wear is extremely serious. And since they are unplanned, the downtimes are costly. According to estimates, this results in annual costs of 2.5 bn. euros for industry and trade due to poor power quality.

Solutions

The use of a suitable monitoring system that records power quality and energy flows is therefore recommended. Those who monitor their own electricity supply network permanently can avoid production downtimes in a timely manner. This includes the recording of relevant electrical parameters, such as voltage, current and frequency. Power profiles can be created on this basis that provide information about energy consumption and gives you the potential to economise.

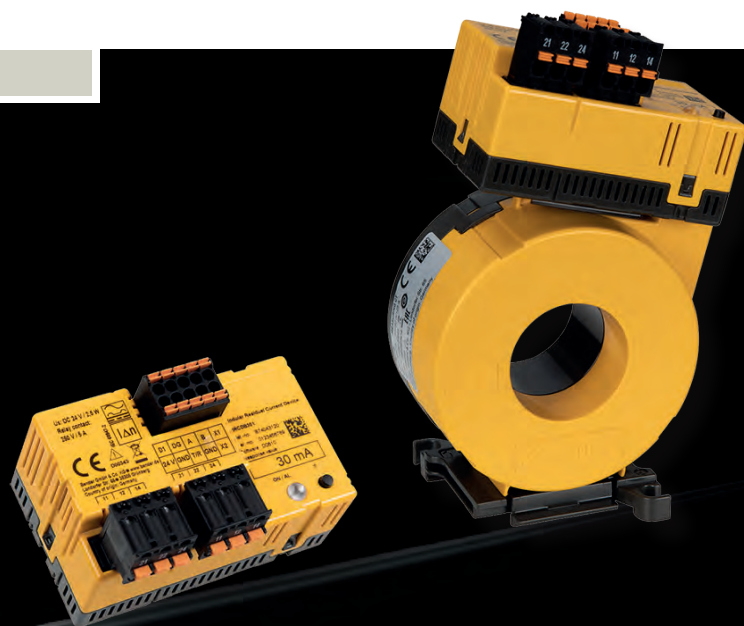
Further benefits for industry and trade: You can position yourself in relation to customers as a prudent partner by monitoring the voltage quality. Many manufacturers even require a corresponding proof of power quality today. ■

Scharif Hafiz
Sonepar Deutschland Technical Solutions GmbH

INNOVATIVE PRODUCTS

**LINETRAXX® SensorPRO
residual current monitors**

**Smart.
Flexible.
Future-proof.**



Market-driven solutions for modern applications

Against the background of key topics such as Industry 4.0 and the Internet of Things (IoT), Bender is increasingly confronted with the requirements of modern applications. As a result, highly flexible solutions that cover a wide performance range are now usually required. Furthermore, there is an increasing demand in the markets for smart sensors¹⁾ that can be easily and quickly integrated into existing installations and systems. An essential requirement for the products is therefore the ability to communicate – if possible via universal interfaces and protocols. To generate added value such as preventive maintenance and high availability from measurement data, the sensors must be able to transfer all values and states to higher-level monitoring solutions in which they are evaluated and interpreted/further processed. Additionally, data granularity is also gaining in importance, so that a large number of sensors that are as small and simple as possible are being frequently used in modern plants.

¹⁾ Smarter sensor: a sensor that combines measured value acquisition, processing and communication in a single enclosure.



In response to these requirements, Bender is launching two new series in the field of residual current monitoring: a modular series for flexible use in industry and building technology, and a compact series for use in final circuits.

Modular devices with new features

The modular series updates and expands Bender's portfolio in the field of residual current monitoring and measuring current transformers with new sensors and devices for measured value acquisition and evaluation. These sensors and devices each consist of two components: a transformer module (without electronic elements) and an electronic module which contains intelligence. The electronic module is located directly on the transformer module and forms a functional unit with it.

The transformer modules, consisting of a wound magnetic core in an enclosure, are available in the diameters 20 mm, 35 mm, 60 mm, 120 mm and 210 mm already familiar from Bender. Each of the sizes are available as both "Type A" and "Type B" residual current transformers. It is also possible to drastically reduce the sensitivity to high load currents with an optional full magnetic shield. "Type A" transformer modules (CTAC) are stand-alone and can be connected directly to an evaluator (e.g. RCMS460 or RCM420); "Type B" transformer modules (CTBC) always require an electronic module.

In the field of electronic modules, a distinction is made between the following two series:

- Simple electronic units (CTUB) for conversion of the measuring signal from the transformer module for evaluators such as RCMS460/490 or RCMA420/423
- Intelligent device modules for direct evaluation of the measuring signal, available for monitoring applications (RCMB) and for switching applications (MRCDB).

In combination with any transformer module, the electronic units form a fully-fledged measuring current transformer which can be connected as a sensor to the Bender evaluators of the RCMS4xx and RCMA42x series. Compared to the previous measuring current transformers, a higher accuracy can be achieved, especially when using the full magnetic shield.

The modularity creates a future-proof system, since an upgrade (e.g. to new interfaces) or a repair can be carried out in a relatively easy way by exchanging the electronic modules, while the transformer core can remain in the installation.



INNOVATIVE PRODUCTS

If the intelligent device modules are used in combination with the transformer modules, versatile devices are created which combine the evaluator and the sensors for measured value acquisition in one device. This saves the need for an external evaluator. The modular devices of the new series offer several new features, such as an AC/DC sensitive residual current measurement up to 100 kHz, extended possibilities for filtering and an RS-485 interface with Modbus RTU for reading out the measured values and parameterising the devices.

Compact devices for final circuits

In addition to the modular series, Bender offers the compact RCMB13x series as an integrated solution for final circuits. The products of this series offer an AC/DC sensitive residual current measurement up to 2 kHz and combine sensor technology (measuring current transformer) and evaluation electronics in one enclosure. They are designed for integration into electrical power distribution systems for example in data centers, such as PDUs (Power Distribution Units) or outgoing boxes of busbar systems, and are used in these systems as intelligent sensors. The compact products are available as a variant with solder pins for PCB mounting and as a variant with plugs and a retaining clip for DIN rail mounting. For easy integration into electrical power distribution systems, the RCMB13x incorporates an RS-485 interface with Modbus RTU, allowing the sensor to communicate with higher-level systems (e.g. the main controller of an intelligent PDU). To enable alternative communication with systems without Modbus RTU, each variant has two additional digital switching outputs. Optionally, a variant with pulse width modulation (PWM) is available.

Solutions for new applications

With the modular and compact devices, Bender now offers smart single-channel solutions for mechanical and plant engineering for direct use in the final circuit of the machines. The standard Modbus interface enables connection to higher-level systems, such as a PLC, with which continuous monitoring can be implemented. Extensive frequency filter options for the wide frequency range up to 100 kHz support the analysis of leakage and residual currents in the system. As a result, better conclusions can be drawn about sources of error.

"The Modbus interface offers the possibility of continuously monitoring the **leakage and fault currents of the system** in a higher-level monitoring system and analysing them."

One component of the modular series are new AC/DC sensitive devices for use as modular residual current devices – type B MRCDs – in accordance with the current version of the standard (IEC 60947-2 Annex M). These devices can be used in an industrial environment in conjunction with a suitable disconnecting device for personal, fire or plant protection. They combine measuring current transformers (CTBC) and evaluation electronics (MRCDDB) so that no additional evaluator is required. The integrated relays are used to control the disconnecting device and issue a pre-warning. Furthermore, the Modbus interface offers the possibility of continuously monitoring the leakage and fault currents of the system in a higher-level monitoring system and analysing them. For the application of the fully shielded variants of the current transformer



modules, the new MRCDs are optimally suited for special applications with high and rapidly changing inrush and pulse currents (e.g. various welding applications); false tripping in installations is therefore avoided. The frequency range up to 100 kHz ensures that the requirements of the standard (IEC 60364-4-42) and the VdS (VdS 2033) in the field of fire safety are met in full, so that the devices are also predestined for use in fire-hazard operating facilities such as sawmills.

In data centres, especially the compact series provides a market-driven solution for monitoring final circuits. The compact dimensions, the constructive

features for soldering on PCBs or mounting on DIN rails as well as the possibilities for connection to higher-level systems enable the various manufacturers to easily integrate the system into PDUs and tap-off units.

With the new features, open communication, modular and compact design and compliance with the latest standards, the smart sensors of both series are characterised by a high degree of flexibility and can therefore be used in the enormous variety of modern applications in a future-proof manner. ■

*Jan-Nils Lohrey, M.Sc.
Industrial Solutions Product Management*

INFO

More information: <https://www.bender.de/en/sensorpro>



INNOVATIVE PRODUCTS

isoCHA425HV:

Extension of the device series for DC charging stations



The compact device series for DC charging stations has now been extended by the new isoCHA425HV. It is specially designed for DC charging stations according to the Japanese CHAdeMO (Charge de Move) charging standard for voltages between DC 50 V and max. 1,000 V. All new charging stations can thus be monitored even more reliably in future. The CHAdeMO electrical interface for electric cars was developed in Japan and is now in cross-brand usage and can be found at every third charging station worldwide.

In contrast to conventional monitoring devices, the isoCHA425HV reports single-pole insulation faults with a response time of ≤ 1 second, and two-pole insulation faults within 10 seconds. This is a big advantage when monitoring DC charging stations according to the CHAdeMO standard. Up to now, only single-pole faults that occur at DC+ or DC- have been monitored. Two-pole/symmetrical faults have not been monitored.

Symmetrical faults often occur mainly due to moisture associated with dust, dirt or road salt. These factors lead to aging of the charging lines, which generally results in a consistent drop in the insulation level. So far, no tripping has occurred in the case of symmetrical faults, although the insulation level had already dropped. With the isoCHA425HV and its additional symmetrical fault monitoring, Bender extends monitoring and significantly increases safety in DC charging stations according to the Japanese CHAdeMO charging standard.



"DC charging station is the method of choice for the **fast charging** of electric vehicles."

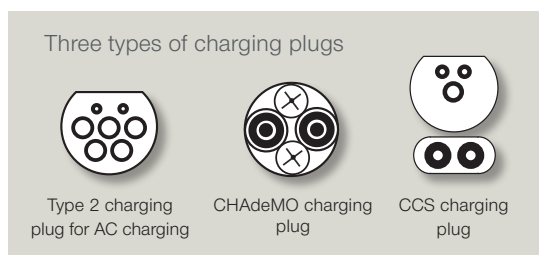


Furthermore, measurement is secure and reliable even under difficult conditions because the separate supply voltage makes it possible to monitor the charging station even if no vehicle is being charged.

The devices can be operated using the voltages typically present in the control cabinets by using a wide-range power supply with AC 100...240 V or DC 24...240 V.

Two separately adjustable response values enable early notification via an alarm relay long before the system reaches a critical status. This is a further advantage over existing monitoring devices, which are equipped with only one switching output that switches off in the event of a fault. Pre-warning when the value falls below a higher threshold is not provided for and therefore not possible. ■

*Dipl.-Ing. Frank Mehling
eMobility Solutions, Business Development*



INFO

More information:

<https://www.bender.de/en/solutions/emobility/charging-infrastructure-sensors#Ladesaeule-DC>



When the power supply ensures survival

The 118-m long research vessel "Polarstern" was commissioned in 1982 and is still one of the most powerful polar research vessels worldwide and the flagship of the Alfred Wegener Institute. Particularly in Arctic and Antarctic waters, a reliable energy supply is vital for survival: Bender ISOMETER® has been responsible for the preventive monitoring of the electrical installations on board ever since the mobile research facility's first journey.



The German research vessel Polarstern in the central Arctic
©Alfred-Wegener-Institut/Mario Hoppmann (CC-BY 4.0)

What happens if the power supply fails?

Even on land, the thought of such a scenario causes nervous eyelid twitching and the creation of emergency plans. For a research vessel that has to withstand temperatures as low as -50 degrees Celsius and sometimes even spends the winter in the ice of the polar oceans, it is the very survival of the people on board that is at stake, as well as the question of whether complex research projects can be carried out or have to be abandoned.

With a double-walled steel hull and a propulsion power of 20,000 h.p., the Polarstern easily breaks ice up to 1.5 metres thick and is at sea for an average of 310 days a year. It offers space for 50 scientists to undertake biolog-

ical, geological, geophysical, glaciological, chemical, oceanographic and meteorological research. The ship's speed drive and the extensive power supply system are fed by four diesel engines from the Klöckner-Deutz RBV 8 M 540 series with an output of 3529 kW at 650 rpm and a total output of 14,116 kW from the main engines. The energy supply is ensured by two coupled, unearthened systems (IT systems). The great advantage of IT systems is that a single insulation fault does not lead to an automatic disconnection of the power supply and thus to the failure of the entire system. Quite the opposite: Systems can continue to operate in a controlled manner without failure and the fault can be rectified later, at a suitable time.



The Polarstern at the Lloydt shipyard Bremerhaven



The Polarstern above Gakkel Ridge
©Alfred-Wegener-Institut/ Stefanie Arndt, CC-BY 4.0

TECHNICAL APPLICATION

▶▶▶ Searching for traces with the ISOSCAN® EDS3090

At the end of 2017, Polarstern was fitted and underwent maintenance by Lloyd Werft Bremerhaven as part of a refit for the next expedition. After the boat had departed, the Bender ISOMETER® installed on board reported that there was an insulation fault in the supply system. Since all systems were functioning smoothly, a defect in the insulation measuring device was initially suspected. However, this turned out to be incorrect - there was in fact an insulation fault, but it could not be localised. Since insulation faults in an unearthed system can traditionally only be found by systematically switching off the individual loads, an action to be avoided wherever possible, the Bender team in Hamburg was consulted and asked for support.

Benjamin Greiff, a Bender ship specialist, went on board, carrying the ISOSCAN® EDS3090, a measuring unit that was specifically developed for such situations. It is a portable device for locating insulation faults in unearthed systems. As all the components required for the measurement are contained in a stable aluminium case, it is easy to transport.

An insulation fault in the winch system

The insulation fault was detected by gripping the cables with the measuring clamps and its location in the winch system was identified. Winches are the most important installations on board a research vessel, as almost all research activities require measuring devices to be lowered and hoisted with the help of the winches. However, the winches were not used whilst sailing, which was why the insulation fault had been so difficult to find. It was therefore all the more important to locate and repair the damage before beginning a new research project on a tight schedule.



Portable equipment for insulation fault location EDS3090



The FS Polarstern encounters tabular icebergs ©Folke Mehrstens/Alfred-Wegener-Institut

Electrical safety in the Arctic Ocean

Bender ISOMETER® has been providing insulation monitoring devices for demanding applications and extreme working environments around the globe for over 80 years. And they will also be on board the Polarstern when MOSAIC, the largest Arctic expedition ever, starts in September 2019. MOSAIC stands for Multidisciplinary drifting Observatory for the Study of Arctic Climate. As part of this expedition, scientists from 17 nations will explore the Arctic over the course of a year. They will allow themselves to be frozen in the Norwegian Sea with the Polarstern, drift through the Arctic Ocean with the Arctic ice for a year and gain comprehensive knowledge about climate change. This expedition will be a milestone in climate research. The Bender team wishes all the participants a successful outcome to their research and a safe return home.

*Dipl. Oceanographer Hedda Precht, PR consultant, Journalist
Dipl. Ing. Benjamin Greiff, Market Segment Manager Harbours & Vessels*

Info

Trusting in reliable power grids from the North Pole to the South Pole

On board the Polarstern, Bender ISOMETER® instruments are deployed in both the Arctic and Antarctic Oceans. In addition, another Bender product family is used in Antarctica on a stationary basis, under extreme weather conditions: The reliable and proven technology of the residual current measuring devices from the RCMS series for earthed systems provides clear status messages on the status of the power supply system at Neumayer Station III in Antarctica. ■



Fault location with the portable insulation fault locator EDS195P

This was where the phase lay on the housing, causing the insulation fault

Secure cement production with Bender

Speed and air flow must be right

Eletronica Santerno S.p.A. is a company based in Emilia Romagna (Italy) and has been part of the Enertronica Group since 2016. The company, which develops converters and motor starters for industrial applications and renewable energies, has been present on the world market for 40 years with a wide range of products and comprehensive after-sales services.

Solutions for the cement industry

Santerno offers complete solutions for cement production such as high-performance conveyor belts, crushers, kilns, ventilation systems and other products and services for this industry.

Cement production is a complex and energy-intensive process which begins in a quarry. The material obtained there is transported to a crushing plant and crushed into gravel. The raw gravel is transported via conveyor belts or rail vehicles to a cement plant where it is stored in a mixed-bed silo and homogenised. The raw material is then ground to raw meal in mills driven by powerful electric motors and deacidified. In a kiln of around 1,450 degrees, the meal is burned into cement clinker, which is then cooled and ground. The resulting cement is processed with water and additives to make concrete that is mainly used in the construction of buildings.

Quality requires precision

In several production steps, such as crushing, separation or cooling, controlling the speed has a major impact on the quality of the material produced and on operational efficiency. Particularly during the cooling process, the precise control of the fan speed and the resulting air flow significantly contributes to the energy efficiency of the plant.

The application for a cement plant located in northern Italy has four radial fans at the kiln outlet to cool the cement clinker. These are powered by SINUS PENTA regenerative frequency converters. This enables the kinetic energy produced during the braking phase, when the motor is turned into a generator, to be fed back into the mains supply as electrical energy.

The frequency converters are each supplied by a transformer that transforms the voltage from 6 kV to 690 V. The windings are primarily and secondarily wired in a





control system. This enables remote diagnosis of the entire system, thus ensuring availability 365 days a year.

The FP200 display installed in the converter control cabinet door not only displays the alarms but also the insulation values. These can be displayed both numerically and graphically and thus provide ease of use to the operator and service personnel.

triangle and set up as an IT system. The four SINUS PENTA frequency converters have an output of 1 MW to drive the radial fans, which in turn have an output of 1 MW at 3 x AC 690 V/50 Hz.

Monitoring with Bender

After a detailed technical consultation, the company decided to use four iso685S-FP200 insulation monitoring devices connected to a 3 AC 690 V mains supply. These devices monitor the insulation resistance of the frequency inverters and motors at frequencies of < 10 Hz. For Santerno, this not only means fast fault detection, but also ensuring 24-hour operation and avoiding cost-intensive and unscheduled maintenance downtimes.

If an insulation value falls below a set value, an alarm is signalled via an output relay. The converter also uses a digital input to inform the insulation monitoring device whether a motor is running or at a standstill. A PROFIBUS communication has also been established between the insulation monitoring devices and a central



As air-flow speed has a decisive impact on the quality of the product as well as on operating efficiency, controlling it is critical importance. Santerno ensures this by relying on Bender's proven technology. ■

Marco Giglio, Bender Italy



TECHNICAL APPLICATION

High availability is an essential requirement

for telecommunications companies

Telefónica-Core-Sites rely on Bender Technology

Security, maximum availability and cost-effectiveness in telecommunications systems are an absolutely essential requirement for most companies today. A trouble-free power supply has become vitally important. Thanks to the continuous monitoring of electrical installations, disturbances and even failures can be detected and averted well ahead of time.

Telefónica Deutschland offers mobile and fixed network services for private and business customers and is one of the three leading integrated telecommunications providers in Germany. The company is part of the Spanish telecommunications group Telefónica S.A., one of the world's largest telecommunications providers.

The technology managers at Telefónica core sites (data centres) are constantly faced with the challenge of ensuring a highly available power supply. The integration of E-Plus and the various technical plans and designs at the different locations means that consolidation and harmonisation during operation is a great challenge and a major planning task that requires significant time investment.

However, the absolutely indispensable element to ensure the trouble-free operation of modern IT and telecommunications systems and the support systems required for their operation, is an EMC-compatible power supply.

The key for high availability and safety

In accordance with EN 50600-2-2:2014 and DIN VDE 0100 444:2010-10, only TN-S systems (earthed power supplies) may be used. In the publications on the standards and specifications and on the IT baseline protection developed by the Federal Office for Information Security, the importance of an EMC-compliant installation in this context is always stressed in order to avoid disturbances from stray currents and damage to devices and conductive building components. The fundamental basis, without which all further measures are futile, is an earthed power supply system with a central earthing point.

With regards to TN-S systems, DIN VDE 100, Section 444.4.3.2 states: "Systems in new buildings must be set up as TN-S systems from the point of supply. In existing buildings which contain or will probably contain important IT resources and which are supplied by the public low voltage distribution system, a TN-S system should be set up from the start of the installation system."

Older systems (TN-C, TN-C-S) must be converted to a TN-S system (fire risk, protection of material assets, protection of people etc.). Furthermore, it is important to maintain the proper condition of the new installation in the long term, as even an unintended bridge between the N and PE conductors can result in unforeseeable disturbances.

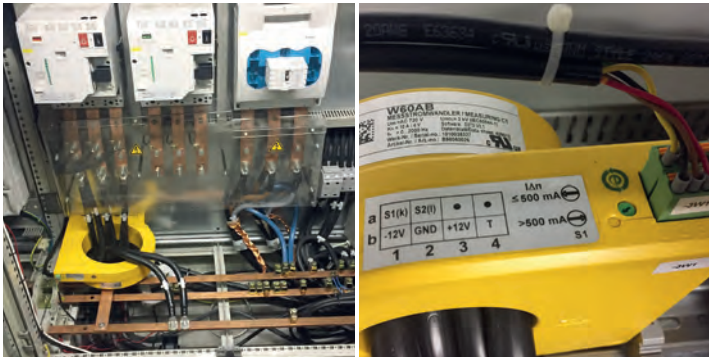
Following the entry into force of the new EMC Directive 2014/30/EU, the stricter specifications have been binding since at least 20 April 2016.

Conversion using residual current monitoring

A truly reliable statement about what is happening in the power supply system is only possible through permanent network monitoring and analysis. This requires different values to be measured at important nodes of the power supply in real time and recorded for later evaluation. When using these measured values, experts can draw additional important conclusions about the operating condition of the TN-S system. Uncontrolled residual currents (leakages or residual currents due to insulation faults) can affect system and operational safety.



TECHNICAL APPLICATION



The technical managers at Telefónica have recognised the challenges and are using Bender technology to detect residual currents in a large number of installations. The goals are:

- Correctly and precisely adjusting, evaluating and tracking changes in leakage currents in the system
- Ensuring electrical availability
- Reducing the cost of periodic inspections in accordance with DGUV Regulation 3
- Standard-compliant operation without RCD and with RCMS residual current monitoring systems and the necessary administrative measures.

None of this happens by itself, as this type of system monitoring represents a complete change in the way an electrical system is operated.

Currently the core site lead engineer Oliver Tananow is in intensive discussions with experts and the Bender company in order to:

- adjust the specific process chain to the demands of continuously effective residual current measurement. Who does what in the event of a fault and by when?
- interpret the measured values more effectively.
- identify where measuring points are and are not useful.

The realisation that the path to the safety of an electrical installation does not only require one step, but many steps of different dimensions, is important for the continuous improvement of safety and verifiability. Downtime is also a step backwards in this area. Telefónica is therefore working with Bender to become ever more secure, efficient and fail-safe in the future.



Telecommunications with very high requirements

For Telefónica, maximum availability is an important success factor, because international daily business activities, constant competitive and cost pressure, and comprehensive operational readiness around the clock require maximum electrical safety in the power supply system. Permanent monitoring of safety-relevant circuits for fault, residual and operating currents as well as stray currents generates information at an early stage about looming critical operating conditions, thus avoiding potential failures.

Despite standard-compliant execution by planners and building owners, modern loads such as servers, routers, switches, cooling systems, fans, etc. are increasingly causing disturbances in data centres.

The installation of a Bender residual current monitoring system in the circuit and at the central earthing point, combined with a gateway solution, enables the implementation of a central system for monitoring and control as well as the simultaneous management of alarms and documentation.

Advantages of residual current monitoring

Firstly, these solutions make it possible for Telefónica to monitor the status of all system components in real time, which enables early fault detection and guarantees very high standards of reliability.

Secondly, they enable Telefónica to monitor the electrical system remotely during operation, assess any changes that occur and detect disturbances in good time. These can then be remedied without having to

shut down the systems and without disturbances affecting performance.

This is the point that has previously caused intensive discussions as to what data should be connected to the central control. What makes sense? Who needs what information? Where are the contact partners based? Do external partners need to be involved? This process of striving for continuous improvement is still in full swing, but is now being driven forward and optimised by constructive contributions from all sides. At the same time, permanent residual current monitoring can lead to an effective reduction in the time and costs involved in monitoring and periodic testing as per the DGUV (German Social Accident Insurance) Regulation 3, as well as to increased availability.

According to DIN VDE 0100-410:2007-06¹⁾, if an RCMS is used on a granular basis, the use of RCDs is not required. The prerequisite here is the development of a reporting chain and timely troubleshooting by an electrician. This, too, is a driving force that further motivates Telefónica's contacts to improve and map their electrical installations more comprehensively.

Conclusion

With the multi-channel RCMS residual current monitoring system, fault currents and residual currents, operating currents, stray currents and currents in N and PE conductors can all be monitored at key points of the power supply with systems sensitive to alternating, pulsating and universal currents. RCMS systems thus make a significant contribution to the high availability of the power supply and reduce effort and maintenance costs. ■

¹⁾ This standard was valid at the time the project was implemented. Please contact us regarding the changes made to the new standard DIN VDE 0100-410:2018-10, valid from October 2018.

*Bernd Häuslein, Application Distribution
Bender GmbH & Co. KG*

*Peter Eckert, Market Segment Manager Critical Infrastructures
Bender GmbH & Co. KG*

*Oliver Tananow, Senior Site Support Engineer and qualified electrician
Telefónica Germany GmbH & Co. OHG*

TECHNICAL APPLICATION



The new alarm indicator and operator panel

proves its efficiency when retrofitting

Complex Connections. Made Simple. Made Safe.

Alarm indicators and operator panels play a decisive role in the interfaces between man and machine. Their task is to visually and acoustically raise an alarm and convert information from the system into understandable operating and handling instructions. This is especially true when critical operating situations arise. The new Bender CP9xx alarm indicator and operator panel offers the user a solution that fulfils the requirements of modern medical locations.

Bender has many decades of experience with alarm indicator and operator panels in medical locations and now, with the new development of the CP9xx series, provides the customer with an interface that satisfies state-of-the-art hygienic and functional requirements.

As a trial in the laboratory cannot replace use in a hospital, field tests were carried out in coordination with two of our customers. Both projects were retrofit measures (retrofits or upgrades) and had to be considered under all existing circumstances. The aim of retrofit measures is to provide users with state-of-the-art technology via technological advancements, but without the operator having to adjust to a completely new user interface, i.e., in principle, with the same elements or visualisations that they are already accustomed to. Both field test projects were accompanied by in-house project managers. This enabled the customers to get experience with the new product's project planning, and made it so that the necessary in-house processes could be checked and adjusted.

Project 1 "Bethanien Krankenhaus" Hospital

A monitoring station for the recovery room of the "Bethanien Krankenhaus" hospital in Frankfurt was selected for the project, which originally contained a TM1000 alarm indicator and operator panel. This indicated the status of the eight IT systems and triggered the daily recommended test of the insulation monitoring devices installed within. In addition, the light groups in the induction room and the recovery room were controlled by it. The planning status of this installation is from 2004.

The new CP915-F alarm indicator and operator panel has been installed as part of the retrofit measure. This panel is equipped with a 15" display and an aluminium frame. The requirements of the hygiene regulations were met by means of an antibacterial coated membrane. In order to be able to use external inputs and outputs, the depth of the flush-mounted casing has been extended, and due to the existing bus structure, the CP915-F has been incorporated into the system as a slave. If required, approximately 90 alarms can be visualised, which are provided with a corresponding handling instruction. The house technician can display real-time readings with a single mouse click. In addition, the test of the insulation monitoring devices is controlled centrally via a button. This has the advantage that it is no longer necessary to trigger each test separately.



In 2004: TM1000 with monitoring of eight IT systems and lighting group controllers



In 2018: The new CP915-F alarm indicator and operator panel

TECHNICAL APPLICATION



In 2001: Due to the mounting frame and the installation method of the flush-mounting box, the space for the installation of the new alarm indicator and operator panels was fixed



In 2018: CP915-F integrated into the existing tile sign

▶▶▶ Project 2

"Evangelisches Krankenhaus Köln-Weyertal" Hospital

In the second field test, conducted at the "Evangelisches Krankenhaus Köln-Weyertal" hospital four operating theatres were equipped with identical Bender technology. Since the installation dates back to 2001, an operating theatre was to be equipped with the latest Bender technology. An IT system with the obligatory test of insulation monitoring and a UPS system (special safety power supply source) are also connected here. Critical filling levels of medical gases and the control of the ventilation in the operating theatre were reported via the membrane panel, which was installed in a flush-mounted case with a tile frame. In addition, the room light (on/off, white/green) and two operating lights were also controlled. At the same time, a room warning display and the operating table control had to be taken into account.

Due to the tile frame and the installation method of the flush-mounted case, the space for the installation of the new alarm indicator and operator panel was fixed. As a result, the decision was made to go with the CP915-F.

The visualisation of the user interface of the new panel was based on the user interface of its predecessor. For this reason, the surgical team does not need to familiarise themselves with the operation of the new panel, but can concentrate fully on their patients.

User feedback from both field tests, as well as Bender's design and commissioning experiences, have been used to improve the CP9xx series. Among other things, more compact I/O modules are now supported and the operation of the technology is further improved by the new display and functional elements. ■

*Daniel König B.Sc.,
Hospital Solutions Product Management*

Conclusion

The CP9xx series is a flexible, configurable monitoring and control centre for all technical installations in one room. Thanks to its connection and visualisation options, it offers the ideal interface between man and machine.

Bender customer magazine now digital too

MONITOR 4.0

There's no stopping digitalisation

even with Bender's customer magazine "MONITOR". Since April 2006, the print version has been published twice a year in German, and also in English since April 2010, and has always been available as a PDF file in the download area of Bender's website.

For around a year now, a free subscription to the printed or digital edition of MONITOR has also been available for request online via a form on Bender's homepage.

NEW Interactive browsing

Since the latest issue, MONITOR has had a new feature that provides a flip catalogue download. Readers can now comfortably browse through the magazine page by page from right to left, almost as naturally as using the print version and without having to scroll from top to bottom. In addition to a page flipping sound, folded page corners make the digital MONITOR look almost like a printed magazine when browsing through the pages.

A "responsive" design was chosen to make it as easy as possible for readers to use. The design makes it possible to display and use the magazine on any screen or device. Mobile devices such as smartphones or tablets can now access the structured content just as easily.



BENDER INHOUSE



Clarity and precise searching **NEW**

Page thumbnails are displayed as previews and enable the exact page to be accessed with just one click. This is supported by an option to enter a page number. A high-quality zoom function enlarges pages as required and makes reading much easier. A full text search also guarantees quick and easy searching.

Different views (1-sided, 2-sided or as thumbnails) are also available. Saving as a PDF is possible at any time regardless of whether the reader wishes to archive only the page currently being viewed or the entire publication.

The new files also give readers the option of writing online comments and notes on the texts, which are only visible to the reader and in the reader's own browser.

Last but not least, a share button allows website visitors to share the magazine via social networks such as Facebook, Twitter and the like.

It's almost like having a printed version in your hand, but online and more convenient. Even though it can't offer the touch of a printed edition, we hope you enjoy reading it! ■

*Marita Schwarz-Bierbach,
Marketing Communication*



BENDER INHOUSE

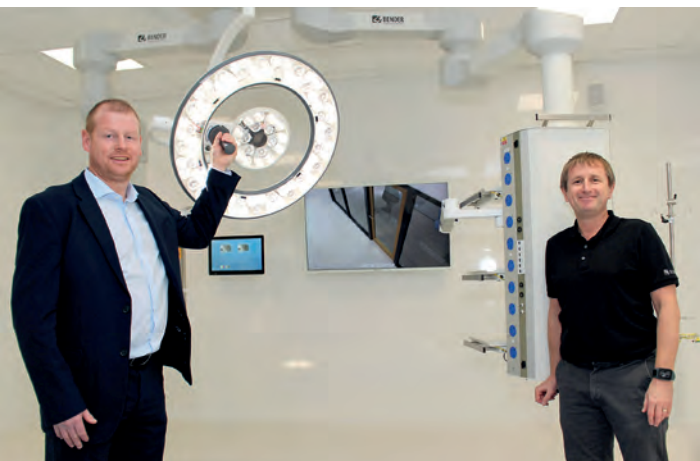
Bender subsidiary in Great Britain (UK)

opens new operating theatre showroom

A new purpose-built operating theatre has been completed to offer **a world-class training** and demonstration base for new and existing customers to experience Bender UK technology first-hand.

The new state-of-the-art theatre showroom was formally opened by Managing Director Gareth Brunton on Monday 5th November, during a first customer visit by Manchester University Hospitals.

The demonstration room showcases theatre and clinical equipment offered by the company as part of its turnkey healthcare solutions for new build and hospital upgrade programmes. It is connected to a plant room with medical IT power systems or isolated power system (IPS) and uninterruptible power supply (UPS) to replicate power for group 2 medical locations, simulating events such as loss of power and shut-down.



Managing Director Gareth Brunton with Hospital Operations Leader Steve Helling in the new operating theatre demonstration room at Bender UK

High specification equipment on display in the showroom includes Merivaara surgical lights and HD camera (exclusively distributed by Bender UK), new Bender clinical pendants delivering safe power, medical gases and data, Bender touch screen theatre control panels with 42" PACS screens, vertical and horizontal aluminium bedhead trunking, AV and video routing system from Jones AV and multiple display screens and monitors from Barco.

Mr Brunton explained: "Our investment in this new demonstration area means that for the first time in our history we can now invite our customers to Ulverston to showcase our full turnkey package. The showroom incorporates the latest technology equipment and whilst impressing prospective customers from across the UK and Ireland, we also intend to utilise the facility to train and develop our own staff. Our team here is absolutely delighted with the finished result and we look forward to continuing to deliver a great service across the healthcare sector".

Bender UK is a leader in the provision of turnkey healthcare solutions incorporating medical IT/IPS power systems and uninterruptible power supplies delivering no-fail power to critical 'group 2' areas, and the supply and installation of clinical equipment for operating theatres.

Bender UK has over 500 private and NHS healthcare customers and provides maintenance support 24/7 365 to more than 350 hospitals in the UK and Ireland to ensure equipment is correctly maintained, repaired - ensuring hospitals meet statutory inspection requirements. ■

*Lisa Hudson
Bender UK*

Convention

BENDER INHOUSE



Electrical safety in hospitals

Risks, legal and special requirements and innovations in technology



In co-operation with TÜV SÜD, Bender GmbH & Co. KG hosted a convention in Munich from 13 to 14 February 2019 focussing on “Reliable power supply for operating theatres and intensive care units”.

The aim of the event, which was attended by more than 100 participants, primarily technical managers, qualified electricians from hospitals, consultants for power supply systems and medical device manufacturers, was to exchange experiences and answer safety and regulatory questions relating to unearthed power supply (IT system) in hospitals and outpatient surgery centres.

The event was moderated by Dipl.-Ing. Michael Ulman from TÜV SÜD Industrie Service GmbH and Dipl.-Ing Hans-Joachim Feigl from Bender GmbH & Co KG.

Comprehensive programme

The convention opened with the topic “Risk assessment of operational technology in clinics and hospitals”, considering both technical and legal aspects. First and foremost, the presentations clarified how important it is to carry out a risk assessment and what protective measures must be taken. In particular, compliance with operator obligations was stressed and possible consequences and liability risks were demonstrated using various examples.

Further topics on the first day were innovations in the field of technology in clinics, focusing on the interfaces between medical devices and humans, the electrical supply of medical devices and the associated challenges from the point of view of a medical device manufacturer. The special requirements of hybrid operating theatres were a subject of discussion. In particular, planning aides for construction, expansion or retrofitting were presented, and the requirements of the electrical supply were specifically addressed.

On the second day there were further presentations on electrical safety in medical locations, including talks on “Emergency power systems in practice” and in particular the presentation of battery-supported central power supply systems (BSV) as well as “Software-supported maintenance, repair and testing management” for locations used for medical purposes. The convention finished off with the topics “Voltage quality: an issue also for hospitals” and “Special hardship case: emergency power supply”.



Active exchange

The exchange of experiences and intensive discussions with other consultants, technical managers and electricians was also seen as particularly valuable. “You often face the same challenges, or have similar experiences, so you can talk about and help each other with them. We’re all in the same boat,” was one participant’s opinion. In general, many participants found the information in innovations on the market, new technologies in hospitals as well as seeing new ways of thinking very important.

Ultimately it becomes clear that co-operation at an early stage between consultants, technical managers, electricians and experts is important, as it is thus possible to plan in advance and avoid potential errors during the construction phase. It also helps to develop a better understanding of the respective jobs. ■

Stephanie Meyer
Marketing



Positive feedback

The wide range of topics, expert contributions, user reports, practical examples and expert tips received lots of positive feedback from the participants. For example, one participant said: “Often there is only one speaker for the entire seminar. I really liked the different backgrounds of the speakers and, as technical manager in a hospital, I take a lot of knowledge with me from the convention”. Many participants appreciated the insight into the legal situation: “Once again, I realised just how great my responsibility as an electrician is. This is why I registered for the convention, to find out what innovations and regulations there are on the market so that we are always up-to-date,” summarised one participant. “For me, it was good to be introduced to the legal principles,” said another.

Interested? – We look forward to seeing you at the next seminar.

CONTACT:

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Conferences and Congresses

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Bender and the IFHE "Down Under"

In October 2018, the **25th Congress of the International Federation of Hospital Engineering (IFHE)** took place at the Brisbane Convention Centre in Brisbane, Australia under the motto "Healthcare Engineering – Building on Sustainable Foundations". Bender was present at the five-day event and its participation was varied and prominent.

The biennial congress, held alternately in Europe and other parts of the world, offers an excellent opportunity for networking among IFHE members and hospitals. Dirk Christian Bender (partner and former managing director), his wife Heidi, and Matthias Schwabe (Regional Management China, India, Czech Republic, Baltic States) were at the congress together with CAPTECH, the local Bender representative, as an exhibitor and Silver Partner. Their congress stand was an excellent platform to present Bender healthcare technologies directly to the Australian market for the first time.

The LIM2010AU was presented, a specially developed solution that complies with the Australian/New Zealand hospital standards AS/NZS 3003 and AS/NZS 4510. For the first time on the Australian continent, the capabilities of insulation fault location (IFLS) in the power supplies of operating theatres and intensive care units were demon-

strated using a demo case. The ability to locate faulty electrical medical devices during ongoing hospital operations attracted a great deal of attention.

The new alarm indicator and operator panel of the CP9xx series was also presented for the first time at an exhibition. Visitors showed keen interest and highly praised the easy operation and ability to display additional information for technical and medical personnel as well as the CP9xx's adaptability to specific needs.

The solutions were also demonstrated in more detail by Matthias Schwabe and George Kotenko (employee of the Australian representative CAPTECH) in their presentation "International Standards for Electrical Safety in Healthcare – IEC60364-7-710, AS/NZS 3003 and AS/NZS 4510" as part of the "Safety" series of presentations.

This was an opportunity for Matthias Schwabe to report on his activities within the international standards committee MT40 "Low voltage electrical installations – Part 7-710: Requirements for special installations or locations – Medical locations" and to establish links to Bender solutions.

Parallel to the congress, other internal and public events by various IFHE committees took place. Bender has been supporting these events for a very long time. Dirk Christian Bender has represented the German association of the Scientific Society of Hospital Engineering (WGKT, whose president he was a few years ago) on the international IFHE Council since 2002. His connections in various regions of the world and his professional competence led to him being appointed to the Executive Committee of the global organisation in 2010. He has held various positions there, most recently heading Working Group 5 "Electrical Standardisation & Regulations for Healthcare".



At the Council Meeting held in Brisbane, delegations from more than 30 national associations from all continents came together to report on events and activities carried out by the local associations and to discuss innovations and developments in healthcare engineering. Cooperation with organisations such as WHO is also being promoted. The two German associations WGKT and the Federation of Hospital Engineering (FKT) were represented by Dirk Christian Bender and Matthias Schwabe.

During the Council Meeting, Dirk Christian Bender announced his resignation from both committees after many years of active involvement. His work was honoured in a speech by Daryl Pitcher, President of IFHE, with great applause from all national associations.



Matthias Schwabe was then appointed to the 11-member Executive Committee as an Officer by President Daryl Pitcher.

The visit to Brisbane was rounded off by trips to the surrounding area and traditional national performances during the congress including an animal show with a variety of snakes, crocodiles and koalas, dancing and singing performances by an Aboriginal group, and an excursion to the "Australian Outback Spectacular" show.



In addition, five differently themed tours were offered to the visitors. A closer look at the technology and architecture of several top-rated hospitals in Brisbane and on the Gold Coast (including Gold Coast University Hospital, Royal Brisbane & Women's Hospital) could then be taken.



BENDER INHOUSE



A closing anecdote

After riding on the 60 m high Ferris wheel (The Wheel of Brisbane) in the centre of Brisbane, Matthias Schwabe took the opportunity to examine the wheel's technology and was able to quickly recognise something familiar: the wheel was being monitored using the RCMA420's AC/DC sensitive technology.

The technical manager was delighted that a Bender employee was on site and confirmed the good and reliable performance of Bender's technology. ■

The upcoming IFHE events have already been scheduled and are being planned. The agenda includes 2019 Manchester, 2020 Rome and 2021 Mexico City.

Bender will also be at these international events to present its worldwide leading position in the field of electrical safety in hospital engineering and to establish further international contacts.

The next national event attended by Bender is the "4th Hospital Technology Trade Fair and Conference on Hospital Engineering" taking place on 17 and 18 September 2019 in the Wissenschaftspark in Gelsenkirchen, Germany. It is being organised for the first time by the partner associations FKT and WGKT and thereby merges the traditional events of the FKT's federal conference and the WGKT's conference "TK-Technik im Krankenhaus". ■

*Dipl.-Ing. Matthias Schwabe,
Regional Management China, India, Czech Republic, Baltic States*

Further information:

International Federation of Hospital Engineering (IFHE):
www.ifhe.info

Scientific Society of Hospital Engineering (WGKT):
www.wgkt.de

Federation of Hospital Engineering (FKT):
www.fkt.de

IFHE Congress Report "Healthcare Engineering – Building on Sustainable Foundations" of October 2018:
<https://event.icebergevents.com.au/ifhe-2018>

Announcement of the 4th Hospital Technology Trade Fair and Conference on Hospital Engineering, Gelsenkirchen, September 2019:
<https://www.fachmesse-krankenhaus-technologie.de/home.html>

MES-Engineering Viet Nam JSC Co.

The specialist for complete solutions for electrical safety and power quality

MES-Engineering in Vietnam was established in October 2010 to provide electrical safety products, technical solutions, power quality management and automation for hospitals and industrial plants.

As Vietnam’s economy has developed, so too have the requirements concerning electrical safety. Since the beginning of 2011, MES-Engineering has been working with Bender’s electrical safety solutions for the mining industry in Vietnam and has been Bender’s official partner since July 2011. Since 2018, the company officially represents Bender in the hospital and industrial sector throughout Vietnam, becoming its sole representative in Vietnam.

With a team of young, dynamic and enthusiastic engineers, MES-Engineering offers its customers reliable and cost-effective solutions.

Promotion

MES-Engineering has exhibited its products at numerous specialised exhibitions and seminars in the healthcare and industrial sectors in Vietnam. In 2018, the company participated in the Electric & Power Vietnam exhibition in Ho Chi Minh City. Bender’s electrical safety solutions for hospitals as well as for the electricity, oil and gas industries attracted a lot of attention and resulted in new orders.



Bùi Sỹ Giang, CEO of MES-Engineering and Bender leaders and engineers

AGENTS CORNER



MES-Engineering and Bender's solutions at an exhibition

▶▶▶ In addition, technical articles about electrical safety for hospitals, a 500/220/110 kV substation, solar power plants, etc. published on the company's website and printed in specialised journals in Vietnam are in great demand among customers and are highly appreciated for their professional quality.

Project and success story

Perhaps the biggest success of MES-Engineering in distributing Bender's solutions to the Vietnamese market is how it has created an awareness of the necessity and value of Bender's electrical equipment and solutions for both unearthed (IT system) and earthed (TN system) systems.

To illustrate this, here are some examples of successful projects:

Petroleum sector

The upgrading project from the IRDH275 and IRDH1575 insulation monitoring devices (IMDs) for an AC 480 V distribution system on a PetroVietnam Drilling (PVD) rig into a ground-breaking monitoring and location system using an IRDH575 IMD, and EDS460 and EDS190P insulation fault locators as well as many types of current transformers.



MES-Engineering with solutions from Bender in PVD rig project

Healthcare sector

More than 40 hospitals in Vietnam now use isolated power systems (IPS) supplied by MES-Engineering/Bender and this number looks set to increase. Two of our most successful projects include:

- The Orthopedic Trauma Hospital 175
– Ministry of Defense (500 beds).
- The Basic Oncology Hospital 2
– Ho Chi Minh City (1000 beds).

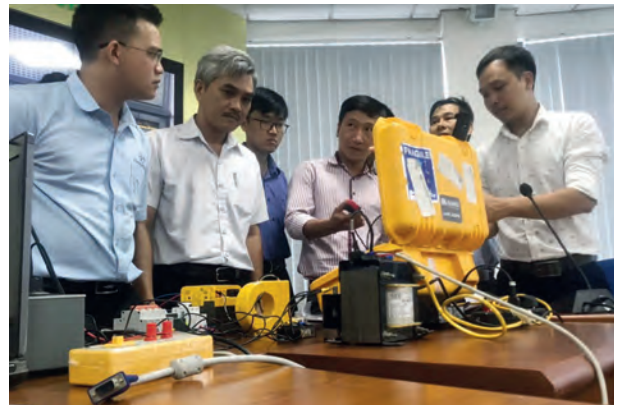
In 2019, more than 200 IPS and more than 50 touch control panels (TCPs) will be installed in the two largest and most prestigious hospitals in Vietnam, Viet Duc Hospital 2 (1000 beds) and Bach Mai Hospital Facility 2 (1000 beds).

Electricity sector:

MES-Engineering has introduced a solution for monitoring and locating earth faults in 500/220/110 kV substations all over the country. Bender devices were mounted in control cabinets to monitor the control circuits with DC 220 V. We are also expanding our operations to solar power plants, electric charging stations, and Energy Storage Systems (ESS) in Vietnam.

The success of MES-Engineering would not have been possible without the high-quality and reliable Bender products, and the continued and competent support of Bender. ■

*Bùi Sỹ Giang, CEO
MES-Engineering Viet Nam JSC Co., Vietnam*



MES-Engineering introduced solutions from Bender in a seminar with EVNNPT (National Power Transmission Corporation)



Specialist in
fault-free energy distribution

Elektrotechnik Thimm GmbH



Elektrotechnik Thimm, located in Mülheim an der Ruhr, was founded by Joachim Thimm in 1985. The current managing partners Thomas Budéus and Arnold Roden – both with the company since 1985 – each took over 50 % of the company in 2009. Since then, the company has continued to grow and currently employs 35 people in its new location, the fourth in the company's history. Since 1985, it has had a good history of successful apprenticeships: there are currently eight apprentices, three of whom are in their first year.

"A **partnership** with Bender started as early as the beginning of the 1980s."



The business' focus lies on energy distribution, manufacturing high-quality switchgear, control cabinets and controllers in accordance with the current technical design regulations, in particular the new standard DIN EN 61439 for building technology. The company develops cost-effective solutions for energy transfer and distribution – especially for the medical sector, in clinics or hospitals.

Company founder Joachim Thimm has worked with hospital technology since 1979. During his previous employment as a workshop manager of an electrical installation company, more than 500 installations for the large project Klinikum Aachen were manufactured under his leadership.

A partnership with Bender started as early as the beginning of the 1980s. The company has not used any other system in the field of hospital engineering.

By now, installations with full redundancy for medical locations are being manufactured. Various hospitals nearby, such as those in Essen, Bochum, Dortmund or Oberhausen, are either served by Elektrotechnik Thimm directly, or in co-operation with partners and local electricians.

The customer base includes medium-sized and small companies, as well as well-known large companies: public services, transport companies, elderly care institutions, security companies and large retailers, such as H&M and Peek&Cloppenburg. Metro, ESPRIT or ALDI, data centres, banks and credit institutes, schools and operators and owners of commercial real estate from the Ruhr District to Hesse and into south Germany and elsewhere in Europe.





►►► Overview of the manufacturing portfolio:

- Power distribution systems in accordance with the new switchgear standard DIN EN 61439
- Installations for redundant power supply in medical locations according to DIN VDE 0100 part 710
- Low-voltage main distribution boards up to 3200 A
- Distribution boards for use in data centres/plug systems for load-free snapping on of circuit breakers, RCD and overvoltage protection systems
- Batch production of electro-pneumatic control systems
- Weather-resistant outdoor distribution boards
- Meter units according to the energy supplier's specifications
- Fault monitoring systems and indicator panels for building control systems
- EIB (European Installation Bus) distribution boards.

In addition, the company offers the creation of service specifications, consultation and planning as well as documentation (CAD department) for power distribution systems. Production takes place exclusively in the company's own workshop. In addition, maintenance and service in the event of malfunctions is offered for the self-manufactured systems. ■

*Thomas Budéus,
Elektrotechnik Thimm GmbH
Michaela Heck M.A.,
textwerk*

EXHIBITIONS 2019



EXHIBITIONS INTERNATIONAL

Intersolar Indien

04. – 05.04.2019
Mumbai, India

CASHE April Trade Show

10.04.2019
Cockeysville, MD

WSSHE Spring Symposium

17. – 19.04.2019
Chelan, WA

10th Edition BIID

25. – 27.04.2019
Dhaka, Bangladesh

CIM Convention 2019

28.04. – 01.05.2019
Montreal, Canada

CAHED Seminar & Tradeshow

02. – 03.05.2019
Denver, CO

EV2019VE Conference & Trade Show

06. – 09.05.2019
Quebec City, Canada

Expo Arminera Buenos Aires

07. – 09.05.2019
Buenos Aires, Argentina

Elfact 2019

07. – 10.05.2019
Gothenburg, Sweden

Medicall Hyderabad 2019

08. – 10.05.2019
Hyderabad, India

Exponor Antofagasta

27. – 30.05.2019
Antofagasta, Chile

Expo Eléctrica Internacional

04. – 06.06.2019
Mexico City, Mexico

OIL AND GAS ASIA 2019

18. – 20.06.2019
Kuala Lumpur, Malaysia

Cloud & Datacenter Convention

11.07.2019
Marina Bay Sands, Singapore
Stand: EETARP Engineering

Offshore Europe

03. – 06.09.2019
Aberdeen, UK
Stand: 3J05

Perumin Arequipa

16. – 20.09.2019
Arequipa, Peru

BEX Asia

04. – 06.09.2019
Marina Bay Sands, Singapore

Canadian Healthcare Engineering Society

22. – 24.09.2019
Saskatoon, Canada

Expo Ferroviaria 2019

01.10.2019
Milan, Italy

Healthcare Estates

08. – 09.10.2019
Manchester, UK | Stand: B44

Data Centre World Asia

09. – 10.10.2019
Singapore, Singapore | Stand: EETARP Engineering

Seoul International Electric Fair 2019

16. – 18.10.2019
Seoul, South Korea | Stand Wonlee

EXHIBITIONS NATIONAL

Hannover Messe

01. – 05.04.2019 | Hanover | Hall 012, Stand E67



Electric & Hybrid Vehicle Tech Expo

07. – 09.05.2019 | Stuttgart | Stand 123



SPS/IPC/Drives

26. – 28.11.2019 | Nuremberg



INFORMATION DAY



for industrial electricians of Electrosuisse
– Association for Electrical Engineering, Power
and Information Technologies

24.09.2019 Basel, Switzerland

16.10.2019 Bern, Switzerland

22.10.2019 Zurich, Switzerland

24.10.2019 Locarno, Switzerland

05.11.2019 Schaan, Switzerland

12.11.2019 Bern, Switzerland

19.11.2019 Regensdorf, Switzerland

26.11.2019 Lucerne, Switzerland



Frank Baier

Manager of the Industrial Solutions Business Unit, Bender GmbH & Co. KG

CAREER OUTLINE

Frank Baier is 46 years old and lives with his family in Reiskirchen, between Grünberg and Gießen. He studied electrical engineering, focussing on automation technology, at the Gießen-Friedberg College of Higher Education (now Mittelhessen Technical College) and worked in a software company for visualisation software, energy management and communication solutions. He has worked for Bender since 2012. He was initially responsible for marketing, and since April 2018, he has been manager of the Industrial Solutions Business Unit (BU).

Being close to the market, international, solution-oriented and communicating well

The ideal combination of safety and availability

Mr Baier, what has your work so far at Bender involved?

In the marketing department I had the opportunity to work on many projects from the strategy phase up to implementation and to market across various channels. It was and is an enjoyable job communicating both internally and externally the complex applications of electrical safety in a simple and appealing way. Above all the closeness of the activities to the customer made this job particularly interesting. I focussed on the creation and expansion of digital marketing channels, for example homepages (one platform for all branch offices, optimised for mobile devices), social media (focus on LinkedIn and YouTube) and portal marketing.

Since 2018 you have been the head of the Industrial Solutions Business Unit. What is it about the large “Industrial Solutions” sector that you find fascinating?

Right now, Industrial Solutions is Bender's top-selling segment and thematically, is actually its broadest. It includes everything apart from the medical sector or electric mobility, for example, complete machinery and plant engineering, renewable energies and public power supply and distribution.

It also encompasses preventive monitoring of electrical installations on ships and in ports, in open-cast mining and the mining industry, electrical safety for smooth railway operation, active damage prevention in applications in the oil and gas industry, and safety in machinery and plant engineering through to high availability of power supplies in data centres.

I find the breadth of my task profile and the opportunities associated with it very motivating indeed. Our recipe for success, knowing today what the customer will need tomorrow, is becoming more and more meaningful. It's no longer simply a matter of safety. The ideal combination of safety and availability is now in demand.

Why does a Business Unit like this exist?

Bender is already a successful provider of industrial applications. Through the Business Units, which we also have for the sectors “Hospital Solutions” and “eMobility Solutions”, we aim to bundle our competencies, increase our strengths, focus and internationalise ourselves. One of the goals is to expand the range of solutions and services we can offer. First and foremost, we can work close to the market, have deeper connections to customers and are therefore closer to them. Every employee can actively contribute in having direct dialogue with sales channels, markets and customers.

The Business Units combine their activities across three business areas and sales across three regions of the world. Together this results in a 3x3 field with a strong orientation towards international customer and market requirements.

What specific tasks do you have as a BU manager?

As manager of "Industrial Solutions", I'm responsible for product managers and market segment managers as well as a development department which is integrated into the Business Unit. Requirements converge in the Business Unit and products and solutions are derived from this. I, as BU manager, and all employees in the Business Unit have several common tasks: for existing products, we manage a variety of operative issues and at the same time give space for strategic business development. Close contact with the business provides the best information about customers, markets, applications, trends, sales and more.

The result: Bender makes electricity safer.

How do you see the sector developing?

Bender is all about electrical safety: protecting against risks to life and limb resulting from electric shock or fire. But no longer just for people. What's also important is having reliable supplies to machines and installations, whose number and complexity continues to grow.

Bender now offers innovative technologies for safely handling electric current in all common system types – that means electrical safety for unearthed systems (IT systems), earthed systems (TN systems) as well as resistance-grounded systems (HRG). Being able to offer good solutions in all system types allows us to give customers the best advice. The perfect system type as the ideal solution for every application doesn't exist. The customer specifies the application. We can recommend suitable system types based on this and offer the appropriate products and solutions.

Communication between devices plays an increasingly important role. Bender will rely more and more on standard technologies to facilitate a good and simple exchange of information in the overall system. Topics such as "Industry 4.0" and the "Digital Transformation" are clear statements about it being more than just a question of the next suitable bus system.

Do you see any problems here?

What has to be kept in mind?

For several years, Bender has been a successful player in the market for industrial solutions and is considered to be a technological leader, especially in insulation monitoring and residual current measurement. It is, therefore, inevitable that competitors will follow our lead. For the future, it's worth keeping in mind the factors that have brought us success: continuous development of our technologies in combination with close orientation to customer wishes, normative development, market segments and regions.

What does your daily work look like? Which moments and tasks do you find particularly stimulating?

The Business Unit combines business development and product development. This offers a wonderful mix of issues across the entire product life cycle. As Business Unit manager, I enjoy having a strong team which can combat these issues mostly on their own. I foster an intense exchange of information with neighbouring areas such as sales, marketing, development and of course the other two Business Units.

Where do you want to put more emphasis in the future?

Being close to the market, international, solution-oriented and communicating well.

What concrete objectives have you set for yourself for 2019?

After a successful start to the Business Unit in 2018, we find ourselves continuing to grow in 2019. We will intensify strategic work as well as co-operation with the sales regions. The objective is to be more international than before and to continue to shorten reaction times in daily communication as well as in development.

What do you think are Bender's biggest advantages in this business area?

Bender stands for the best measuring technology, even in demanding industrial applications. This on its own, however, isn't enough; we see ourselves as partners to our customers.

Please complete the following sentence:

To me, Bender means ...?

... enjoying getting up on Mondays.

Mr Baier, thank you very much for the interview. ■

*Michaela Heck M.A.
textwerk*

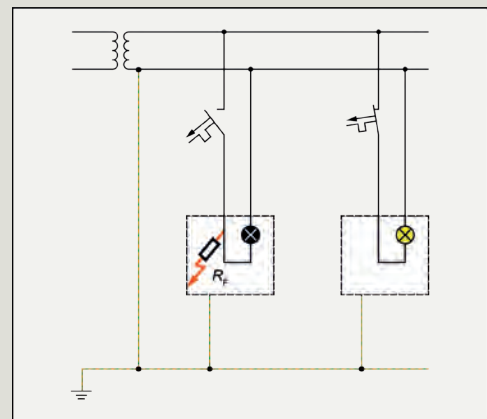
Insulation fault location in unearthed systems (IT systems)

If a low-resistance insulation fault occurs

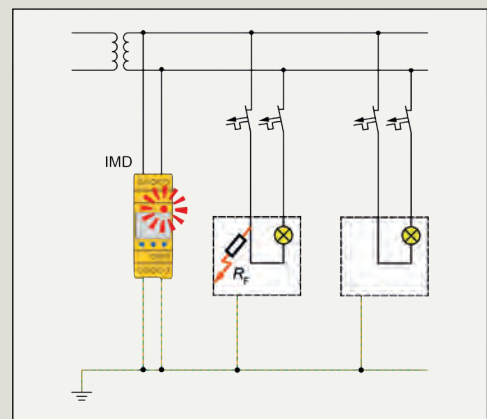
between the active conductors and earth in an unearthed system, an earth fault or short-circuit to exposed-conductive part will occur.

However, since the level of the residual current is limited by the overall leakage capacitance of the system, neither non-permitted high touch voltage nor a risk of fire will occur. The insulation monitoring device (IMD) will report an alarm, but the power supply is usually maintained and the system will continue to operate. The action required is to eliminate the insulation fault as quickly as possible. But how do you locate the fault?

In earthed systems, narrowing down the location is very simple. If a dead short-circuit to earth occurs, the short-circuit protective device closest to the location will trip (provided selectivity is maintained). In the event of a short circuit to exposed-conductive part in an electrical device, the circuit-breaker of the supplying final circuit will trip. Locating the fault is then narrowed down to the cable system and the equipment located behind the protective device in the direction of current. Although the system is shut down until the fault is rectified, locating the fault is quick in practice.



In earthed systems: A short-circuit to exposed-conductive part leads to a shutdown



In an unearthed system: The system continues to function despite a short-circuit to exposed-conductive part, the IMD indicates an insulation fault

Practical Expertise

▶▶▶ In an unearthed system, however, power continues to be supplied. There are no tripped circuit- breakers or other protective devices to narrow down the fault location. Locating the fault requires searching the entire electrical system for the unearthed source (transformer, generator or other).

A practical method is to carry out all-pole shutdowns of sections of the electrical system and check changes in insulation values displayed on the IMD.

If the IMD displays a good insulation value after shutting down a section of the system, the insulation fault is then located downstream of the switching device. But this method has two major drawbacks: it takes time and involves shutdowns, drawbacks which should actually be avoided in IT systems.

In contrast, using insulation fault location systems (IFLS) involves no system shutdowns. Maintenance personnel can differentiate “healthy” from “faulty” outgoing circuits, without any contact.. The final circuit can be quickly located without system shutdown. The procedure is systematic: fault location takes place from the main distribution board to the final circuit. ■

*Dipl.-Wirtsch.-Ing. Michael Faust,
Bender Academy*



Portable equipment
for insulation fault location EDS3090 with EDS195P



INFO

Information available under: <https://www.bender.de/en/products/insulation-fault-location-overview>

BENDER Group

The Bender Group with its main office in Gruenberg/Hesse has 70 representations and 14 subsidiaries with nearly 822 employees worldwide.

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