

MONITOR

20

Reliable power supply even in times of crisis

Coronavirus provisional hospital in Berlin exhibition hall

Condition Monitor COMTRAXX® CP907-I and CP915-I series:

A new dimension in installation overview



It's full steam ahead for the design of a DC power supply for industrial applications despite the Coronavirus

DC



Additional page **"Practical Expertise"** at the back of the booklet for collection!
Dynamic load management – What is it and why do I need it?

BENDER Group

Dear Readers,

Since March of this year the Corona pandemic has brought with it numerous changes – both for you as our customer and for our staff. We have seen restrictions, new rules and cancelled events. Yet we have all adjusted to this new situation and, in doing so, have demonstrated flexibility, consideration, understanding and a highly constructive approach. Thanks to the increased use of digital media, not just due to working from home but also webinars instead of seminars, and virtual events in place of trade fairs, great advances have been made in terms of digitalisation both at Bender and around the world.

At a time when the Corona pandemic is placing a huge strain on the health system, hospitals and clinics as well as companies and, ultimately, every single one of us, it is vital that we act collectively. We were particularly proud to have been able to equip the Corona hospital in the Berlin exhibition centre with our isolated power panels and alarm indicator and test combinations within a few days and thus ensure a secure power supply within a very short time. In Great Britain, too, Bender UK ensured a secure power supply for prestigious emergency hospital projects despite very tight schedules and was able to increase the capacity of the British health system during this pandemic.

Bender is investing continuously in the research and development of customer-oriented products. For example, our new development site in Dresden represents further growth in the increasingly important networked communication market and in particular electric mobility. This, in turn, serves to strengthen the Bender Group's market position.

We have also seen changes at management level. Markus Schyboll has left the company to take on new professional challenges. As part of the new appointments at management level, Heinz Nowicki has been appointed CSO (Chief Sales Officer). The new management team has already been successfully steering the fortunes of Bender for 4 months.

We are looking forward to our future together.

Yours sincerely,


Heinz Nowicki


Monika Schuster


Winfried Möll



SUBSCRIPTION

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IMPRINT

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Electrical energy storage

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It's full steam ahead for the design of a DC power supply for industrial applications

despite the Coronavirus

The DC-Industrie2 research project is funded by the German Federal Ministry of Economic Affairs and Energy (BMWi) and will run for three years – until September 2022. A total of 39 partners from industry and research are involved in the project. Bender is supporting the project as an associated partner.

DC power supplies in special individual applications such as PV installations, e-mobility or electrolysis applications are well known.

So why is the subject of DC power supplies getting so much attention in the industry?

The systematic analysis and rethinking that is taking place in the DC-Industry2 project is much more comprehensive than in individual DC applications. Even the reasons under discussion for the use of the IT system type are unusual and surprising from Bender's point of view.

In the DC-Industrie2 research project, the main objectives of an industrial DC power supply are identified as follows:

- Secure and resilient supply of energy for production plants
- Energy savings by reducing the number of voltage transformers
- Utilisation of the energy fed back
- System connection to the higher-level grid
- Straightforward planning
- Optimised use of decentralised, renewable power generation.

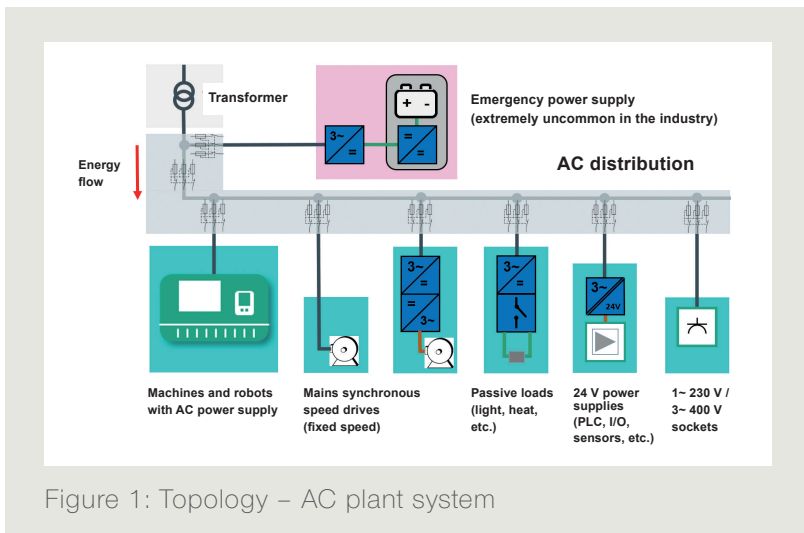
Proof that it is possible to achieve these goals is to be provided in six model installations and test centres.



FEATURE

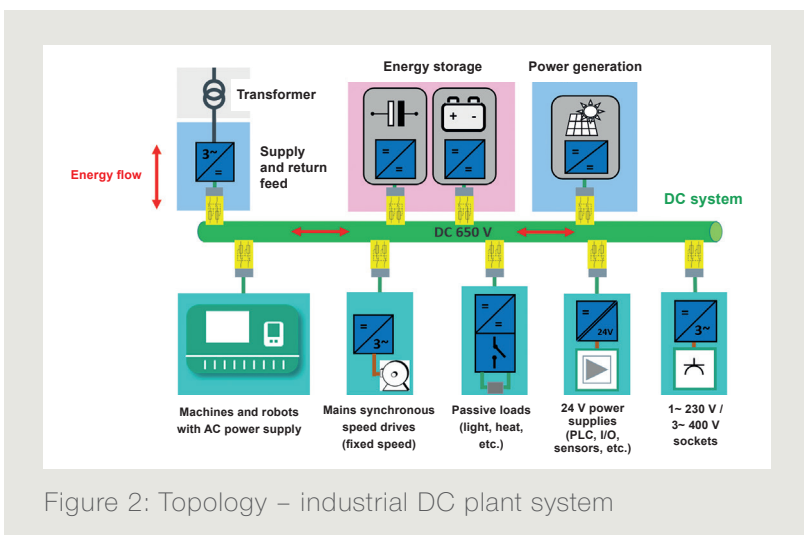
▶▶▶ What are the main differences to the industrial AC plant system?

As pictures speak more than a thousand words, two principle diagrams from the DC-Industrie2 consortium are provided below so that the attentive observer can see the differences.



A key difference between the current AC plant system and the future DC plant system is the energy flow. The energy flow in the direction of the AC main power supply connection can be utilised by the industrial DC plant system for the provision of system services. However, DC plant systems are not power generating plants compliant with VDE-AR-N4105, as the primary energy flow comes from the AC main power supply connection.

Further differences in the use of DC plant systems can be found in the integration of energy stores and regenerative power generators, and in the reduction of AC/DC conversion components.



What figures 1 and 2 do not show very clearly is the concept of load zones, the standardised behaviour of the equipment depending on the voltage zone in which the DC system is currently located, the procedures derived from this for maintaining voltage stability or the possibility to prioritise the operation of particularly important load zones.

Load zones form a logical unit with components that have strong functional dependencies on each other. Load zones also have sufficient DC-Link capacitors to keep switching frequency transients between their devices away from the DC system and are connected to the DC system via a DC branch.

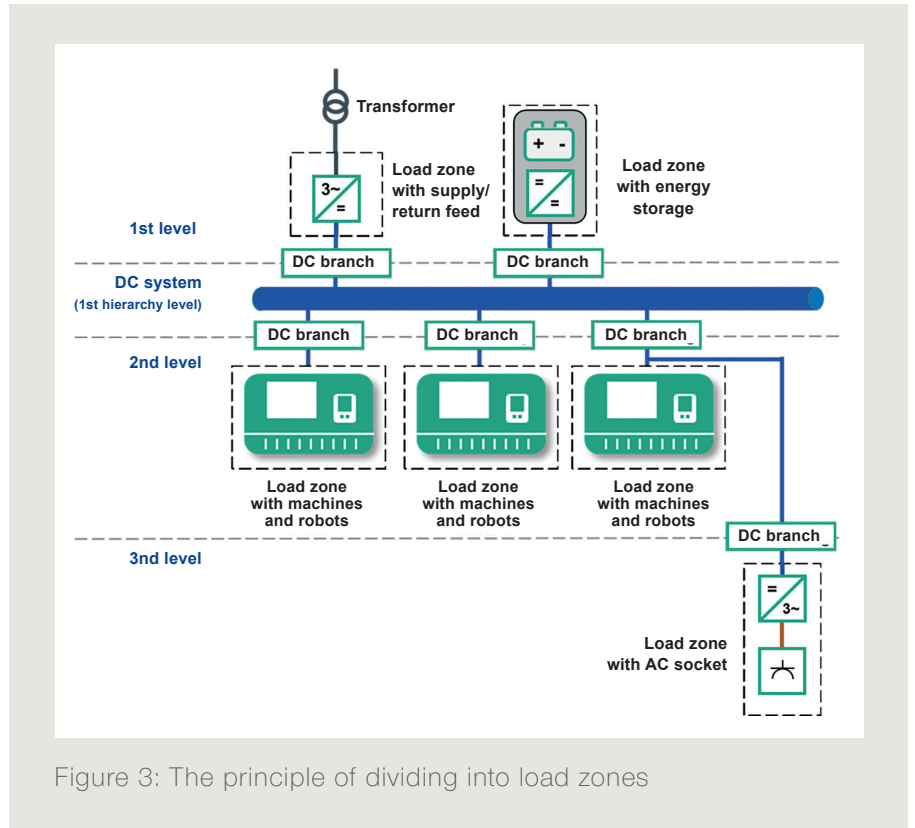


Figure 3: The principle of dividing into load zones

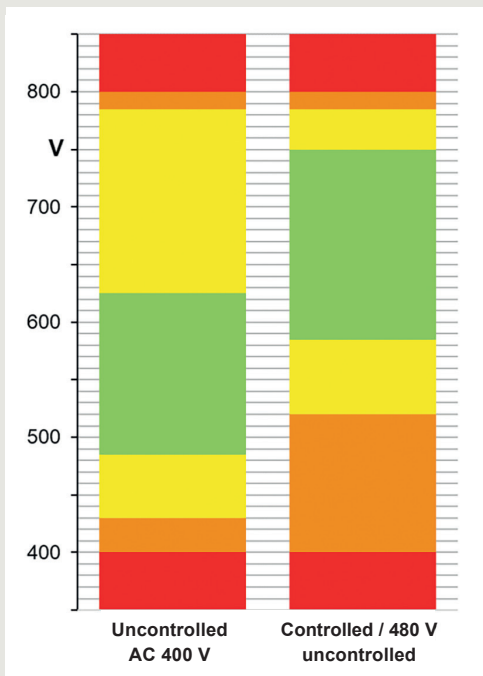


Figure 4: Operating voltage zones

Two nominal voltages are defined for the DC system

- DC 650 V: for controlled supply and uncontrolled supply on the AC 480 V system
- DC 540 V: for uncontrolled supply on the AC 400 V system

Nominal operation

- Unrestricted functionality of the devices

Stationary over/undervoltage

- Devices may be operated continuously in this area
- Functionality may be limited
- Active equipment attempts to compensate the voltage deviation

Transient over/undervoltage

- Devices may lose their functionality but should recover it again when the power returns
- Voltage may only remain in this zone for a limited time

Shutdown limits: 400 V/800 V

- Devices switch off permanently





FEATURE



As already mentioned, this makes it possible to implement different methods to maintain voltage stability. By choosing the control method, both very simple and complex DC systems with several generators can be built.

The following control methods are considered in the DC-Industrie2 system concept:

- Uncontrolled operation (basic system):
 - No active control of DC voltage (operation with diode rectifier)
- Characteristic curve-based control (decentralised group control):
 - All active supply devices control their power depending on the level of the DC voltage
 - The characteristic is provided by a non-linear characteristic curve
 - No communication required
- Extended decentralised group control:
 - The characteristic curve setting is modified by a central control unit during operation
 - Slow communication required
- Central voltage control:
 - Central control unit gives the supply devices the power setpoints
 - Fast communication required

DC-Industrie2 identifies the following advantages of a DC power supply for industrial installations.

Energy efficiency

- Less conversion and transport losses
- Use of recovered energy
- Direct use of renewable energy sources
- Peak power reduction through suitable storage

Resource efficiency

- Reduction in the use of copper (cables)
- Lower equipment costs and saving of space as no more power electronics are required

System stability

- Additional investments for system filtering and compensation can be omitted and existing systems are supported
- Production downtimes caused by system disturbances are prevented or reduced

Flexibility

- Infrastructure for the intelligent control of energy flows brings advantages in the purchase of energy and
- supports modular machine concepts.

What is Bender's role in the research project?

Bender helped to develop the system concept and is involved in the work packages in which its expertise in insulation monitoring, for instance, is particularly in demand.

What special features should be considered when using the IT system in DC-Industrie2?

The IT system from DC-Industrie1 was the preferred choice for larger DC plant systems because ...

- ... EMC measurements in the test facilities showed that EMC requirements were easier to meet here.
 - The EMC measurement of entire production plants is rather atypical as it is extremely complex. Usually only the individual components

are designed to comply with the limit values when tested in the EMC laboratory.

When combining many EMC-qualified components in a production installation, it is assumed that the entire installation will exhibit comparable EMC behaviour.

- ... the combination of earthed/unearthed energy stores and power generators in a DC plant system with earthing on the AC side was considered to be problematic.
 - For example, if a fault occurs in a DC plant with an earthed system type on the AC main power supply connection side, causing the DC part to separate from the AC part, and if, after separating from the AC main power supply connection, the DC part continues to be operated unearthed from an energy storage device or by regenerative energy sources, this corresponds to a change in the system type due to a fault.

This scenario is not provided for by current installation standards and if such a system were commissioned, the effectiveness of the protective measures for earthed and unearthed system types would need to be tested.

A remarkable special feature in using the IT system type in DC-Industrie2 is that no importance is attached to the fact that an unearthed DC plant system continues to operate if a first insulation fault occurs between an active conductor and earth.

Therefore, the main argument for using the unearthed IT system type for the vast majority of applications is of less relevance in the DC plant system according to DC-Industrie2.



On the contrary, according to DC-Industrie2, in the DC plant system, even when operating with the unearthed IT system type, an initial earth fault requires the faulty circuit to be disconnected within 10 seconds.

Why is that the case?

This is required for cost reasons. It should be possible to continue using existing, less expensive components, which so far have also been used in AC plant systems, in DC plant systems.

As the previous AC plant systems were predominantly operated with an earthed system type, these components are not designed to permanently tolerate the zero-sequence voltage in the event of an earth fault in the IT system. ■

*Dipl.-Ing. Dieter Hackl
Standards & Innovations*



Important information for our partners:

Explanation of the German standard DIN VDE 0100-410 (VDE 0100-410):2018-10

Safety in electrical installations

The revised edition of the German standard DIN VDE 0100-410, the English title of which is "Low-voltage electrical installations - Part 4-41: Protection for safety – Protection against electric shock", was published in October 2018. This edition is essentially a continuation of the standard which has been in existence for many years. The interpretation, however, of some subclauses continues to be somewhat of a challenge.

Therefore, in order to achieve a uniform interpretation of the standard text, experts involved in the development of the standard in the relevant German standardization committees have taken this uncertainty as an opportunity to bring about technical clarity. The result of their work can be found on the DKE homepage at www.dke.de/konzept-0100-410.

In particular, the requirements of the protective measures "automatic disconnection of supply" and "double or reinforced insulation" as well as on "additional protection" have been revised.

RCDs in IT systems

In DIN VDE 0100-410 (VDE 0100-410):2018-10, 411.3.3, the additional protection provided by residual current devices (RCDs) with a rated residual operating current, $I_{\Delta n}$ not exceeding 30 mA is also required for the socket-outlet circuits of IT systems if a residual current I_d von > 15 mA can flow at the first fault.

The normative requirement for the use of RCDs for socket-outlets according to subclause 411.3.3 is limited for IT systems by the following requirement:

"This subsection does not apply to IT systems in which the fault current, in the event of a first fault, does not exceed 15 mA."

"When used in
AC IT systems,
it is recommended to use
directionally selective
residual current monitors
(RCMs)."

In the IT systems usually installed in Germany, the residual current remains well below 15 mA in the event of a first fault. With this in mind and given that RCDs have a rated residual current of $I_{\Delta n} \leq 30$ mA, it is highly likely they will never be triggered, thereby making their use in IT systems unnecessary.

Leakage capacitances and directional selectivity

If high leakage capacitances should occur, DIN VDE 0100-530 (VDE 0100-530):2018-06, subclause 538.4 contains the following paragraph which says that when used in AC IT systems, it is recommended to use directionally selective residual current monitors (RCMs) to avoid unwanted alarms resulting from high leakage currents when high leakage capacitances are to be expected behind the installation location of an RCM's current transformer. Directional selectivity in this case means the ability to differentiate between supply-side and consumer-side differential currents. **An RCD cannot fulfil this requirement of directional selectivity.**

Permanent insulation measurement and fault localization

DIN VDE 0100-410 (VDE 0100-410):2018-10, subclause 411.6.3 requires the installation of an insulation monitoring device (IMD) to detect or report the first fault as early as possible, as well as rapid localization of the fault by an insulation fault location device (IFLS) before a second insulation fault occurs. With this recommendation, the standard follows a very simple idea: When a first fault occurs, rapid fault location is the logical consequence. This is the only way to ensure speedy rectification.

Why is an IT system often the better choice?

Early and precise fault localization, very low first-fault currents and the associated positive consequences as well as no unplanned interruptions of operation and thus significantly higher availability - all these are installation-specific advantages which should be taken into account during the planning phase and which prove to be extremely useful during subsequent operation. A first fault does not lead to dangerous operating conditions. And insulation faults are detected before they occur. The use of an IT system therefore not only saves costs, but also significantly increases safety. After all, safety is not open to discussion. ■

*Dr. Catherine Körbächer, Standards & Innovation
Roman Schmattloch, EMEA-BGER, Head of Sales, Germany*

INFO

We would be happy to develop a safety concept for your electrical system.

You will find a suitable contact person under:
<https://www.bender.de/kontakt/bender-deutschland>

You can also send an e-mail to: Vertrieb.inland@bender.de



Permanent monitoring of residual currents:

Availability without additional protection in data and colocation centers

The now generally known DIN VDE 0100-410, updated in 2018, offers room for interpretation.

Subclause 411.3.3 in particular contains requirements that raise questions, and which need to be explained. For this reason, experts involved in the development of the standard within the relevant German standardization committees of the DKE (i.e. The German Commission for Electrical Engineering) in the German Association for Electrical, Electronic & Information Technologies (VDE) published the flyer: "Explanations of the concept of DIN VDE 0100-410 (VDE 0100-410):2018-10" to provide clarity. The flyer contains both the explanations of the concept of this standard and the application of the protective measure, "Automatic disconnection of supply".

Highlighting one aspect in particular:

Subclause 411.3.3 requires additional protection for socket outlets in final circuits and for the supply of mobile equipment for use outdoors. This additional protection always consists of a residual current device (RCD) with a rated residual operating current not exceeding 30 mA.

This requirement is limited only by the following:

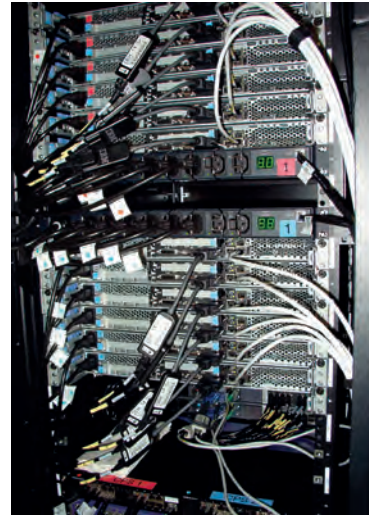
- AC socket-outlets in final circuits with a rated current not exceeding 32 A
- Sockets intended for use by ordinary persons
- Sockets intended for general use
- This subclause does not apply to IT systems in which the fault current, in the event of a first fault, does not exceed 15 mA.



Link to the Flyer:

<https://www.dke.de/resource/blob/1955610/32a348d528261fef9550a8e371fd6517/konzept-din-vde-0100-410-pdf-data.pdf>

"A technical measure, for example, is **continuous monitoring** by a residual current monitoring system. Such a system consists of multi-channel detection devices (RCMS)."



What does this mean for my data center?

Do I have to do without the proven information advantage of continuous RCM monitoring?

Does an RCD now have to be installed in front of every server socket-outlet? (This in turn will destroy my availability without warning by disconnecting the system).

It is important to be clear about which socket-outlets are meant, and that means only those intended for use by ordinary persons and for general use, as is stated in subclause 411.3.3 of the standard.

Statements on a possible waiver concerning the use of residual current devices (RCDs) are contained in an additional note which says that "socket-outlets with a rated current not exceeding 32 A may be exempted from this requirement if measures are specified within the scope of a risk assessment in accordance with the German Ordinance on Industrial Safety and Health (BetrSichV) which permanently exclude the general use of these sockets."¹⁾

Installations in the industrial and commercial sector, which are monitored by qualified electricians and if it is ensured by metrological measures that damage can be detected and repaired in time, then the use of RCDs can be avoided!

This can be solved by technical and organizational measures.

A technical measure, for example, is continuous monitoring by a residual current monitoring system. Such a system consists of multi-channel detection devices (RCMS), which consist of sensors adapted to both the plant and the systems (e.g. universal current-sensitive residual current sensors) and a suitable processing device that registers changes and can independently issue alarms (e.g. via e-mail notification) to technical personnel in the event of a fault.

An organizational measure contains information on the operation of the plant and the processes to be applied. This means, for example, that only instructed persons have access to the server room.

A simple measure that can be considered both a technical and organizational measure is the use of socket-outlets, which are not suitable for general use but only for the intended server racks or switches and hubs.

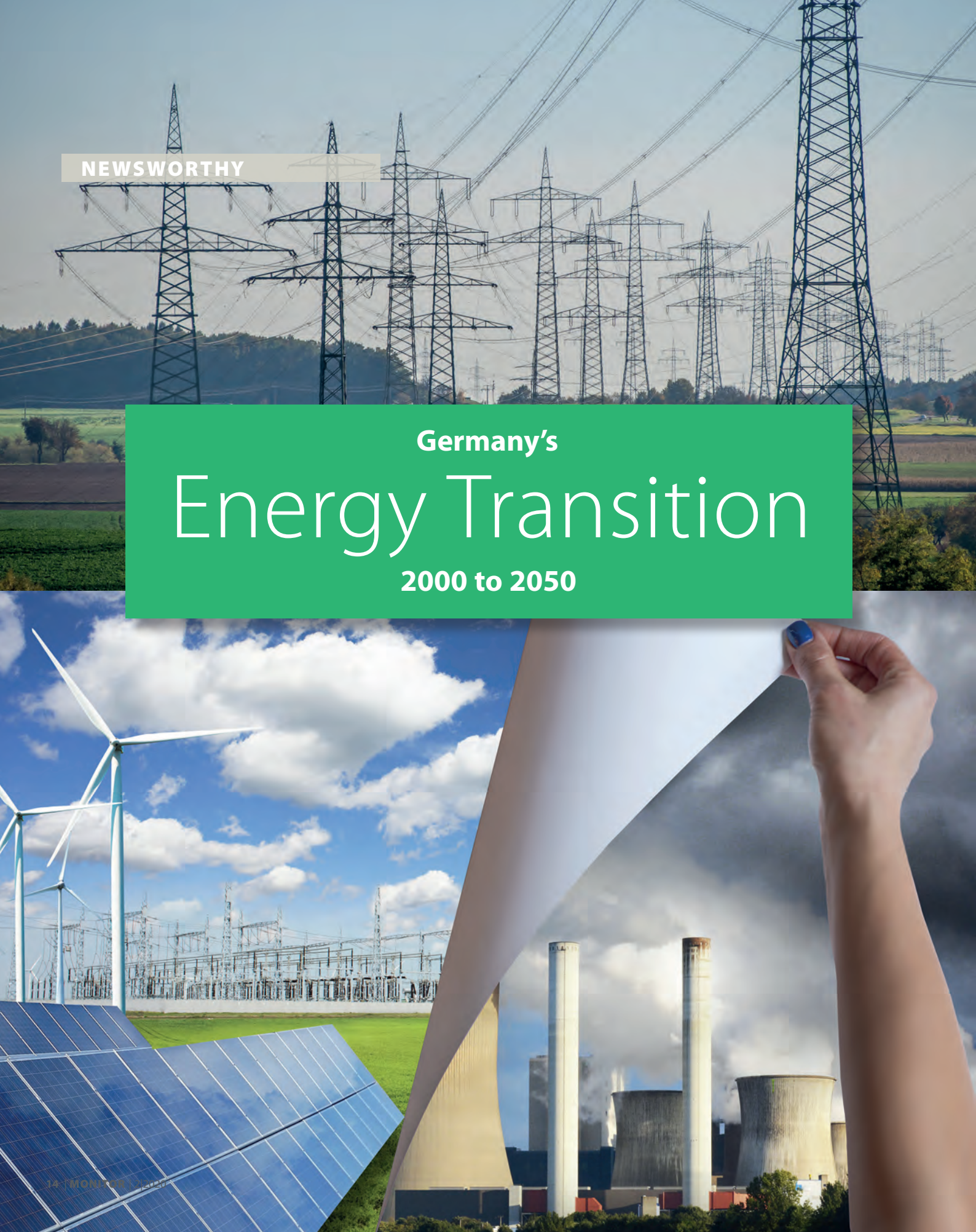
This process must then be described accordingly and documented in a legally compliant manner. ■

*Dipl.-Ing. Holger Potdevin, Standards & Innovations
Dr. Catherine Körbacher, Standards & Innovations*

¹⁾ DIN VDE 0100-410 (VDE 0100-410):2018-10

NEWSWORTHY

Germany's
Energy Transition
2000 to 2050





The energy transition in Germany: following the first beginnings back in 2000, it was officially resolved in 2010 and introduced in 2011. Applauded by many and doubted by others, even before its official launch, this revolution has achieved ambitious milestones since the turn of the millennium. For example, wind-power and solar parks are now the cheapest electricity generation plants in many regions and locations, something which would have been considered almost inconceivable not that long ago.

In addition to the further development of power storage, and in particular battery technology, the key focus must now be on ensuring the final breakthrough of e-mobility, hydrogen technology and the digitalisation of the energy sector.

Whilst the rapid growth of renewable energy sources is undoubtedly impressive, no secret should be made of the fact that the overall ENERGY TRANSITION project is not nearly as advanced as it should be. The plans and will of policy makers at federal and state level have not been realised.

That is hardly surprising on closer consideration and analysis of the core elements of the energy transition and its complexity. The interim target is 2050. By then, the plan is for the share of renewable energy sources to have been sharply increased, energy efficiency improved considerably, and greenhouse gas emissions slashed. This overall goal applies not only to the three areas of electricity, heating and mobility but also to the departure from the currently central fossil resources such as oil and coal.

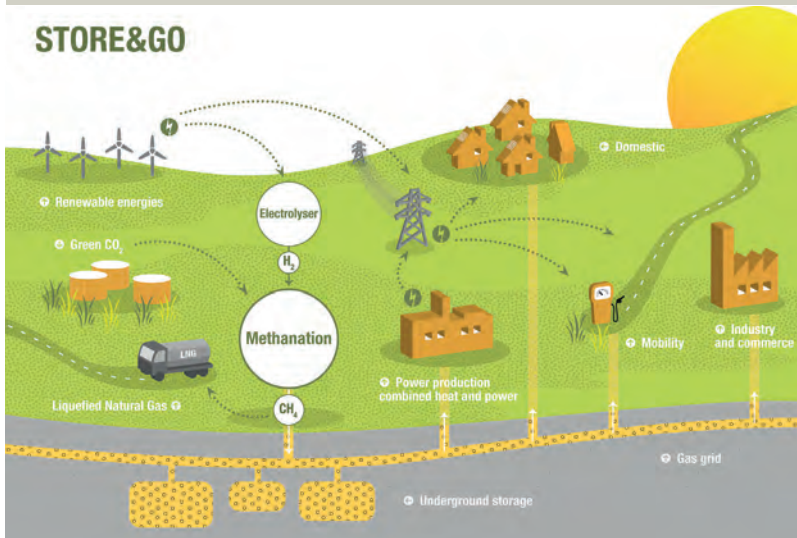
The timeline for the next 30 years is as follows:

1. Nuclear phase-out by the end of 2022 and coal phase-out by 2038.
2. Increase in the share of renewables to 60 % of gross final consumption of energy by 2050.
3. Increase in the share of renewables to 80 % of gross electricity consumption by 2050.
4. 55 % reduction in greenhouse gas emissions by 2030 and around 80 to 90 % reduction by 2050 compared to 1990.
5. 50 % reduction in primary energy consumption by 2050.
6. Increase in energy productivity to 2.1 % with regard to final energy consumption.
7. 25 % reduction in power consumption by 2050 compared to 2008; even just considering the general switch-over to e-mobility, this seems unrealistic.
8. 80 % reduction in primary energy demand in buildings by 2050 – with, as far as possible, a constant number of renovations of older buildings.



NEWSWORTHY

STORE&GO



However, even today, these very ambitious targets are already reaching their limits. Take, for example, greenhouse gas emissions. A target value of 750 million metric tons was set for 2020. From the current perspective this would seem unattainable, although the impact of the Covid-19 pandemic in 2020 has not yet been taken into consideration.

The hopes of improving energy efficiency also now seem unrealistic. This has fluctuated greatly since 1990, in part in line with overall economic development.

Another issue which is the subject of regular public debate is the ongoing sluggish development of various power grids and, in particular, the “electricity highways” channelling wind power through the country: these are plagued by approval processes which would seem to go on forever. But that is not all. The Federal Network Agency recently stated that even upon the commissioning of the projects which are still in the approval phase, grid expansion will still be far from complete. This is why a new federal requirement plan law with additional projects was to be introduced this year.

The delays in the grid's expansion and development require more funds which, ultimately, the economy as a whole and consumers have to bear. This also applies to Renewable Energies Act funding, which is more expensive than ever before. For example, for the private consumer this now, on average, makes up a quarter of the electricity price including VAT.

Nonetheless, having had to wait some time to see a breakthrough in terms of sales figures, e-mobility has now recorded pleasing developments. Thus, last July, an unprecedented, record number of new electric cars were registered; an increase of almost 300 % to some 36,000 e-vehicles. It was the first time that electric vehicles represented more than 10 % of all newly registered cars, reaching 11.4 %. In the time period from January to July, the market share of electric vehicles rose to 8.5 %. Given the increased purchase premium of up to €9,000 from the state and the experience to date, the market share is likely to continue to grow both in this and the coming year. This is also in part due to the additional funding from the public sector and energy providers for the installation of wallboxes.

Consumers need this broad range of funding if, as in many cases, they are also expected not only to revamp older buildings' power use but also make new buildings significantly more efficient.

Another heartening development this year is the clear political desire to help hydrogen technology become established, in the shape of comprehensive financial aid. The successful research endeavours aimed at making practical battery storage technologies available for wide-ranging use are also cause for celebration. ■

Karl-Heinz Wierz
Business Communication, Stuttgart



Change in management at Bender in Gruenberg

As of 1 May 2020, **Heinz Nowicki** as new Chief Sales Officer (CSO) took over management of all sales activities of the Bender Group in Grünberg. He succeeds Markus Schyboll, who was CEO since 2017 and left the company on 30 June 2020 to take on new challenges.



Heinz Nowicki is joining the Executive Board alongside Winfried Möll (Chief Technology Officer) and Monika Schuster (Chief Financial Officer). Together they are responsible for the worldwide management of the Bender Group.

After completing his studies in electrical engineering/communications engineering, Heinz Nowicki held various management positions with responsibility for the strategic orientation of different companies in the industrial, medical, energy and automotive sectors. Heinz Nowicki has worked in leading positions in various research institutions, family-owned companies and international corporations such as Tyco/TE, Marvell and Prettl.

Heinz Nowicki will continue the future-oriented direction of the Bender Group together with the management team and promote the position of the company as a pace setter of innovative technologies worldwide. ■

*Andrea Gossel
Marketing*

INNOVATIVE PRODUCTS

Condition Monitor
COMTRAXX® CP907-I
and CP915-I SerieA new dimension
in installation overview

In industrial installations, the early detection of critical operating conditions is extremely important in order to prevent system downtime. The devices of the new COMTRAXX® CP907-I and CP915-I series offer a perfect overview of all devices integrated in the system at all times, quickly issue alarms in the event of a fault and include a variety of analysis functions for monitoring the status of the installation.

As a specialist in electrical safety, Bender has further developed its proven COMTRAXX® series. The new COMTRAXX® CP907-I and CP915-I series include a condition monitor with display and integrated gateway. All the information from a large number of integrated interfaces converges here allowing the installation to be optimally monitored and configured. Thanks to the flexible display content that can be adjusted for all applications and the robust user interface and design, the application scenarios are limitless.

Highlights:

- 7" and 15.6" displays with tempered and non-reflective glass
- Operation via robust, industry-standard touch panel
- Individual display contents: system overview or self-generated visualisation
- Monitoring and parameter settings of all communication-capable Bender devices
- Visual and acoustic alarms in the event of a fault
- Multiple interfaces for device integration and data transfer
- Future-proof thanks to the latest hardware and continual software development



Display content

Due to the flexibly adaptable display content, all requirements can be covered. It is now possible to decide individually whether to have an overview of all devices and the associated parameters in the system overview or whether to generate your own visualisation that provides only specific information. Views are also easy to change during live operation. In addition, both views issue an active notification in case of an alarm and enable quick reaction.

Interfaces

The integration and transfer of device data plays a key role in the COMTRAXX® CP907-I and CP915-I series. Bender devices as well as third-party devices can be integrated in the system via Modbus TCP and Modbus RTU and the Bender protocols BCOM and BMS. The data of all the devices integrated in the system is provided by Modbus TCP and SNMP.

"Due to the **flexibly adaptable display content**, all requirements can be covered."

COMTRAXX® features

As with every device of the COMTRAXX® device series, the comprehensive analysis and evaluation functions are also available for these versions. Among other things, abnormal operating conditions can be investigated with the data loggers or the history memory and detected in advance. Further integrated functions are active notification via e-mail in the event of a fault and self-generating system documentation in PDF format. Updates provided free of charge together with continuous extension of the range of functions round off the complete package.

Enclosure variants

Devices of the COMTRAXX® CP907-I and CP915-I series are supplied with a flush-mounted enclosure and can therefore be ideally integrated in the most diverse conditions. The CP907-I is also optionally available with a control cabinet door mounting that allows it to be easily and safely installed in a control cabinet door. This way, all important parameters are immediately visible. ■

*Jan Hofmann
Program Management
Product Management Gateways*

INFO

More information: https://www.bender.de/en/products/communication/comtraxx_cp9xx-i-series



INNOVATIVE PRODUCTS

isoCHA425HV

Insulation monitoring for DC charging stations



One device – two charging standards

Increasing battery capacity means that DC charging of electric vehicles is becoming more and more important. In addition to charging at motorway service areas or petrol stations, the subject is also of increasing interest in the domestic environment. Some vehicles only provide a single-phase AC charger with 3.7 or 7.4 kW for larger batteries, which can lead to the battery not fully charging overnight. This means that DC wallboxes are also increasingly required for the private sector. In addition to the CCS standard (Combined Charging System) established in Europe, the Japanese charging standard CHAdeMO (acronym from "CHARGE de MOve") is used for most vehicles from Asian manufacturers.

Both standards differ in their requirements for monitoring the charging process, both in terms of the required disconnection times and the limit values for shutdown in the event of a fault, as well as in symmetrical or asymmetrical fault monitoring.

Two in one ...

Until now, two different devices have been required for monitoring depending on the DC charging standard, which has meant double warehousing for manufacturers. For years, Bender has also been offering a separate device for both solutions in its portfolio and is now responding to the requirements of the market. The new isoCHA425HV +AGH420-1 insulation monitoring device has been developed as a combination device to support both charging methods (CCS and CHAdeMO).



A galvanically isolated Modbus RTU interface can be used to switch between CCS and CHAdeMO. The individual parameters are pre-stored for the respective standard and then automatically selected. The device is designed for voltages of up to 1,000 V, thus already taking ever increasing battery voltages into account.

In addition to monitoring the insulation level, the isoCHA425HV+AGH420-1 is also capable of measuring the nominal voltage during charging and generating a report if the voltage exceeds or drops below self-defined limit values. Furthermore, the system leakage capacitance of the charging station and the vehicle is monitored and, if insulation faults occur, the fault location is displayed (DC+/DC-/symmetrical). This helps the service technician to assess the status of the charging station and facilitates fault location.

... these are the advantages

If monitoring for symmetrical (two-pole) and asymmetrical (single-pole) faults is mandatory for CCS, tripping in case of asymmetrical insulation faults with a response time of ≤ 1 second is sufficient for CHAdeMO. The isoCHA425HV+AGH420-1 from Bender raises the protection level by additionally reporting two-pole insulation faults within 10 seconds in CHAdeMO mode.

This is a major benefit compared to conventional monitoring devices for DC charging stations according to CHAdeMO, as so far, they only monitor single-pole faults and do not detect symmetrical faults. The cause of symmetrical faults, however, is mainly moisture combined with dust, dirt or road salt. These factors lead to ageing of the charging cables, which generally results in a consistent drop in the insulation level, so that, in the event of symmetrical faults, there was no tripping, even though the insulation level had dropped.

Conclusion

The isoCHA425HV+AGH420-1 now makes it possible to monitor DC charging stations with a single device by simply switching to the different requirements of the common CCS and CHAdeMO charging standards by means of Modbus RTU. In addition, CHAdeMO mode increases the protection level and detects symmetrical faults – which leads to significantly improved safety. ■

*Frank Mehling
Business Unit eMobility, Business Development*

INFO

More information: https://www.bender.de/en/products/insulation-monitoring/isometer_isocho425hv-with-agh420-1



INNOVATIVE PRODUCTS

Charge Controller CC613



Safe home charging with the CC613 charge controller home variants

Using permanently installed charging points or wallboxes to charge electric vehicles in domestic settings will be of increasing importance in the future. Because of this, it is not enough for wallboxes to be easy to use, they also need to be as compact as possible and affordable for end users.

The growing popularity of Home Energy Management Systems (HEMS) and the growing number of energy loads connected within homes means that charge controllers are also subject to higher requirements. End users want to be able to distribute available energy intelligently to all their loads. This means that it must also be possible to connect the charge controller to a HEMS. That's why Bender has designed the home variants of the new CC613 charge controller.

Expanded charge controller portfolio – New field of application

Following the successful launch of the CC613 series, the next generation of charge controllers, Bender has now gone a step further. The early versions of the CC613 already offered all the functionalities needed to successfully and intelligently create a connected charging infrastructure in public and semi-public areas. With the new portfolio expansion, Bender is positioning itself in the private and domestic sphere.

What are the requirements for a wallbox in the private sphere? Three factors play an important role/: In addition to having a compact design, a private wallbox also needs



to be user-friendly and ensure electrical safety. This means that, in addition to electrical safety, an easy charging process is of prime importance to the end user.

Electrical safety for home users

The first safety feature boasted by the CC613 home variants is the integrated DC fault detection that is compliant with the IEC 62955 standard. In the event of a DC fault, this feature not only protects type A RCDs in home installations from blinding, but also stops the charging process of the electric vehicle. The integrated DC fault detection means that no type B RCD is required, thus significantly lowering installation costs. A type A RCD in the charging station or sub-distribution is sufficient.

A further safety feature is the standard built-in 'weld check' that can reliably identify a 'welded' power contactor; in this event, it issues a fault message. This safety feature warns the end user of the hazard and prevents the start of any new charging process. In addition, continuous PE monitoring ensures the correct connection of the protective earth conductor in the charging station, which further reduces the risk of an electric shock.

The integrated emergency opener also brings more safety. In the event of a power supply failure, the charging cable is safely released, and the home user can safely remove the cable from the wallbox. This feature is not only reassuring; it also saves additional space in the wallbox as no further component is needed.

Connected controller as part of the HEMS

In the current Smart Home era, the interconnection of domestic loads plays a major role. Thanks to the integrated Ethernet interface, it is now very easy to connect the charge controller or wallbox to a HEMS via an EEBUS, for example. This allows the user, for instance, to plan and control the charging process of an electric vehicle intelligently in connection with the battery storage device of a PV system. This enables smart usage and distribution of the available energy.

The Powerline Communication (PLC) according to ISO 15118 facilitates a smart connection between the electric vehicle and the CC613 charge controller or wallbox. This provides the home user with the simple option of plug & charge or autocharge. Where the electric vehicle supports the ISO 15118 standard, this can be seen in the State of Charge (SoC) of the HEMS. This makes it possible to control the charging process in order to be able to cover a given distance at a specific departure time.

Compact wallboxes thanks to space-saving enclosure designs

Domestic environments, especially private garages, often have limited space. The space-saving design of the CC613 underpins the compact charging boxes. This is complemented by the new, integrated 230 V control relay, which can control the power contactor directly, thus avoiding the additional use of an intermediate relay and saving further space.



INNOVATIVE PRODUCTS



Two variants

– Perfect for private use

The CC613 home variant is available in two different versions. With the first version, the Home Basic (HB), users have a controller designed to control the charging process of an electric vehicle through an attached charging cable, whilst still providing all the security features, the 230 V control relay and the 'weld check'. This version is not compliant with ISO 15118.

With the second home variant, the CC613-Home Energy Management System (CC613-HEM), private users also have the option of integrating the controller into a HEMS by using an Ethernet interface. A Modbus meter can

also be connected to the charge controller if required. The CC613-HEM can be used with a charging socket or an attached cable.

Both variants are suitable for all standard electric vehicles that can be charged with a type 2 or type 1 charging cable.

Conclusion:

Bender is expanding its charge controller portfolio and, in doing so, is actively entering the market for wallboxes and charging points for private use. The CC613 home variants are ideal for use in private spaces, not least thanks to their compact design and compelling features. ■

*Dr Fabian Horst
Business Unit eMobility,
Product Management*



INFO

More information: <https://www.bender.de/en/products/charge-controller/cc613-charge-controller-home-variants>

NEW

The new RFID module for user authorisation using debit and credit cards

With the RFID117 module, Bender is taking a further step towards sustainable charging technology.

Customers can now use a charge controller extension that enables user authorisation using a debit or credit card¹⁾. As well as classic RFID cards, this module can read the type of cards that users always have on them.

The new RFID module also includes integrated LEDs to display the charging status and offers improved antenna performance. It is, of course, compatible with Bender's charge controllers, such as the new CC613; communication is via an RJ45 interface.



¹⁾ Charging process not billed directly

INFO

More information: <https://www.bender.de/en/products/charge-controller/rfid117-11>



INNOVATIVE PRODUCTS

UNIMET® 610ST:

Worldwide
safetyfor electrical machines
and equipment

UNIMET® 610ST – the DGUV regulation 3 safety tester

Legislation and professional associations repeatedly point out how important it is to ensure safe handling of electrical machines and equipment. This applies in particular to the production process.

For more than 40 years the "Bender tester" has been the term for quality and durability in the field of fully automatic electrical safety testers. In addition to the successful UNIMET® 810ST, which stands for the safety of medical electrical equipment, the new UNIMET® 610ST, is used as a DGUV regulation 3 (German Social Accident Insurance Regulation 3) safety tester for testing electrical machines and equipment.

The UNIMET® 610ST meets all standards for DGUV regulation 3 compliance, such as DIN VDE 0113/EN 60204-1, DIN VDE 0701-0702:2008-06 and ÖVE/ÖNORM E 8701-1:2003-01. The UNIMET® 610ST stores the "first measured value" in accordance with the standard so that it can be used as a reference value for subsequent comparisons. With the UNIMET® 610ST you can design

all your tests yourself. A device protocol history can be easily created using the PC software supplied (UNIMET® Control Center).

Additional advantages for the user are the 36-month calibration interval and the warranty period of 36 months. This means low follow-up costs over several years. ■

Karl-Heinz Rein, Business Unit Hospital, Product Management

Further advantages of the UNIMET® 610ST are:

- Easy operation and handling through Windows interface
- Design of individual test sequences
- Filter function for fast data retrieval
- Test date management
- Multitenancy
- Catalogue systems
- Data exchange and storage via Control Center
- Automatic, semi-automatic or manual test sequence
- Visual, electrical and functional testing user-definable

INFO

More information: https://www.bender.de/en/products/test-engineering/unimet_610st

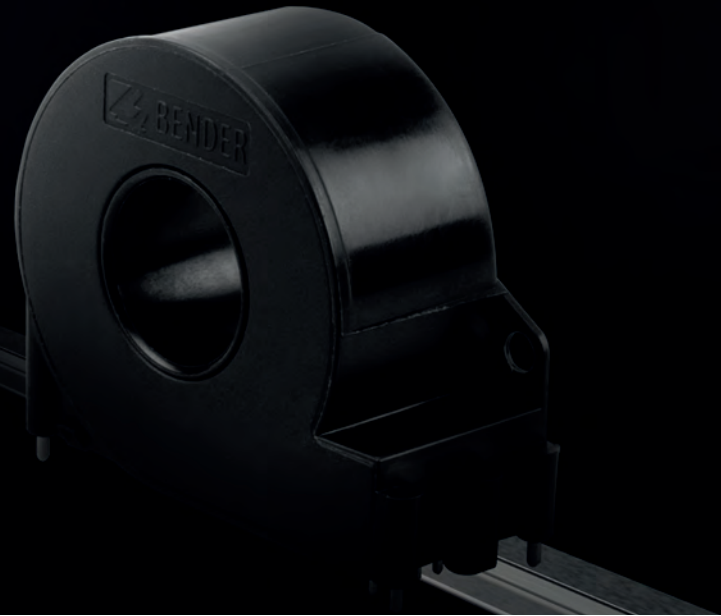


INNOVATIVE PRODUCTS

Flexible use in the charging infrastructure of electric vehicles

CTBC17:

The new measuring current transformer



When it comes to AC charging (charging modes 2 and 3), it is common practice to use a measuring current transformer in combination with a residual current monitoring module in order to reliably monitor AC and DC fault currents, detect faults and ensure charging can be stopped in a targeted way. The increased charging power involves larger cross-sections for the supply lines in the charging system. This means that the measuring current transformer must have an equally large diameter. In addition, AC wallboxes are becoming increasingly compact to save space, as well as to reduce costs and mounting work.

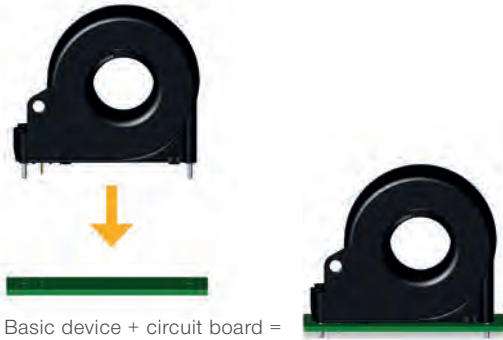
To do justice to this development, Bender has developed a new, compact and versatile measuring current transformer and added it to its portfolio. This also has further advantages.

A measuring current transformer for two charging modes and different mounting types

The new CTBC17 measuring current transformer is ideal for AC/DC sensitive residual current measurement, as it can reliably identify AC and DC residual currents in combination with suitable evaluation electronics (e.g. CC613, RCMB104, RDC104). This means it can be used to identify residual currents according to IEC 62752 and IEC 62955.

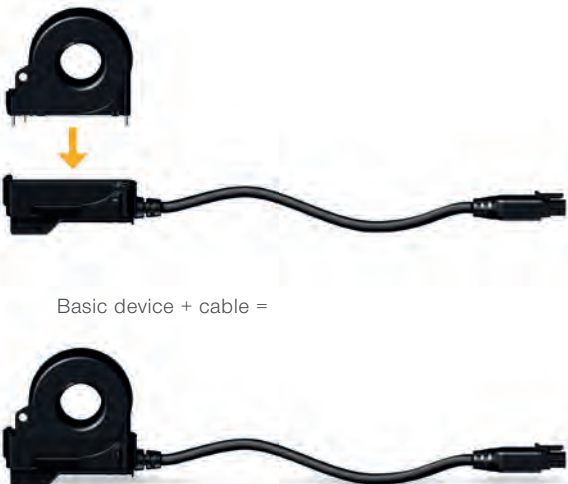
With its internal diameter of 17 mm, the new CTBC17 is best suited to the use of supply lines with a large conductor cross-section. In addition, the robust and innovative design is ideal for a variety of applications. For instance, the measuring current transformer can be directly mounted onto a circuit board in a vertical position, thus saving space and making it ideal for use in an AC wallbox (charging mode 3), as well as in compact IC-CPDs (In Cable Control and Protection Device) for charging mode 2.

Figure 1



For charging mode 3, using a larger charging station, the cable-mounted variant of the CTBC17 is also practical, as the current transformer does not need to be installed in a pre-determined position within the charging station. This means that there are no spatial restrictions on how the customer lays and positions the load current cable leading to the vehicle. Three different cable lengths are available: 18 cm, 32.5 cm and 1.47 m. Appropriate holding devices enable the current transformer to be fixed to the cable harness using a cable tie, if required.

Figure 2



As the new measuring current transformer is compliant with IEC 62955 and can therefore only be triggered by DC residual currents, it is ideally suited for use with Bender's charge controllers (e.g. CC613) and residual current monitoring modules (e.g. RDC104-4). A suitable connecting cable is available should the customer wish to connect and install the CTBC17 directly on a listed device. ■

*Dr. Fabian Horst
Business Unit eMobility, Product Management*

Further technical features at a glance

- Suitable for AC/DC sensitive residual current measurement and monitoring
- Fully compatible with W15BS measuring current transformer
- Cost-effective PCB variant for PCB mounting (can be soldered and screwed)
- Internal diameter 17 mm
- Connecting cable available in different lengths: e.g. 180, 325 and 1470 mm
- Integrated shielding of current transformer to avoid external interference
- Suitable for DC fault current monitoring and AC fault current monitoring in charging mode 3 to protect against RCD type A blinding in combination with the following devices: CC613, CC612 and RCD104-4
- Rated voltage/current: 230 V/80 A (single-phase), 400 V/32 A (three-phase).

INFO

More information: <https://www.bender.de/en/products/current-transformers/ctbc17>



Application SensorPRO LINETRAXX® RCMB300 series

The design of resilient data centres

can be achieved with residual current monitoring of electrical systems and PDU technology

In recent years, residual current monitoring (RCM) has become more established in data centres.

Designed to remove the need for power shutdown and meet the demands for advanced data centre availability and resilience, residual current monitoring is used in earthed (TN/TT) power systems to monitor residual and fault currents in electrical infrastructure. It provides early warning of developing failure and enables more cost-effective planned, predictive maintenance.

Alongside installations within data centre infrastructure, RCM has also been specified for use within rack power distribution units (intelligent rack PDU) and integrated within third-party data centre solutions.



Figure 1:
AC/DC sensitive residual current monitoring
modules RCMB300 series

However, since monitoring in the PDU alone does not fulfil the normative requirements of the professional associations and the insurer in the upstream data centre installation, additional monitoring must also be implemented. The new LINETRAXX® RCMB300 series is a suitable solution for busbar systems, which can now be offered in addition to the standard residual monitoring within various distributions.

For the outlets of the feed units we recommend RCMB300 sensors, whereas monitoring panel distributions we advise the use of RCMS460 due to the more extensive measurement technique (harmonic components, data points etc). If the installation is only possible in the input feed of the rails, the Modbus-ready sensors of the RCMB300 SensorPro series are suitable.

Residual current sensors are now available for monitoring the final circuits in tap-off boxes – in most cases the RCMB132-02 is suitable for this application, to monitor final circuits up to 32 A.

For larger outlets, the RCMB300 series offers a solution that can be seamlessly integrated into the structure.

Modbus technology also allows for easy scaling by adding or removing boxes without much installation effort.

This allows to continuously monitor the leakage and residual currents in the busways up to the terminals. Thus, any tendencies to deteriorate the equipment are likely to be detected early and countermeasures can be initiated long before a system deteriorates due to age and failure or a connection may cause a failure or faulty system.

For this purpose, in the case of conspicuous residual current developments and the smallest exceeding of previously defined thresholds, automatic warning messages are issued to the data centre or facility management.



Figure 2: Starline power busway

TECHNICAL APPLICATION



So far, data centre experts have only had the option for periodic testing of the electrical installation when disconnected by manually performing insulation measurements. Poor insulation, connections and corresponding developments could only be detected, if at all, when an insulation measurement was carried out. But if the error does not occur constantly, but only sporadically, there is an increased risk of power supply disruptions.

Predictive maintenance strategy

With the option of equipping the busbar with suitable residual current sensors for the in-feeds and also for the tap-off-boxes (outgoing modules), you have all data in real time and permanently in view. Current measured values can thus be matched with the corresponding loads, and a permanent analysis of the trend data enables a meaningful definition of optimal work areas and threshold values.

The slightest deviations and overruns trigger early alarms and provide the data centre personnel with enough time to thoroughly analyse changes and, if necessary, take measures so that the power distribution cannot be compromised from the feed to the final circuit.

The measurement data of the sensor modules can be viewed up at any time via the WEB interface of the COMTRAXX® communications gateway system. In addition, support for various serial and web-based protocols, such as Modbus RTU / TCP and SNMP, enables integration and processing across a variety of third-party building monitoring or data centre infrastructure management systems.

Possible equipment of a busbar with RCM in the upstream distribution and in the final circuits, energy measurement in the in-feeds.

Advantages:

- RCMS460 + SensorPro measuring current transformer in the distributions: frequency analysis and dataloggers available (the analyses of the harmonics is important for troubleshooting assistance)
- RCMB300 and RCMB132-01 in the outputs for monitoring the final circuits with the bus communication for easy and seamless integration

- The CP9xx alarm indicator and operator panel acts as a bridge between personnel and installed technology. Its task is to provide visual and acoustic alarms and to convert information from the system into comprehensible operating and handling instructions. This is especially true when critical operating situations are imminent. In the CP9xx, all modules for providing visual and acoustic information can be integrated into a complete solution and adapted to customer requirements
- Power quality monitoring system for measuring the power and the individual currents
- COMTRAXX® gateway for merging the measured values and generating virtual measured values (residual current in relation to the load current) and integration in SCADA and / or GLT (building control system)

The AC/DC sensitive SensorPRO residual current monitors combine the best high-resolution measurement technology with open communication in a minimum of space.

This Bender RCM solution can be easily integrated into busbar applications. Whether current regulations and requirements or upcoming standards - thanks to the open interface and modular design, LINETRAXX® devices with SensorPRO are already prepared for predictive maintenance and future requirements in data centres. ■

*Peter Eckert
Business Unit Industrial Solutions,
Market segment Critical Infrastructure*

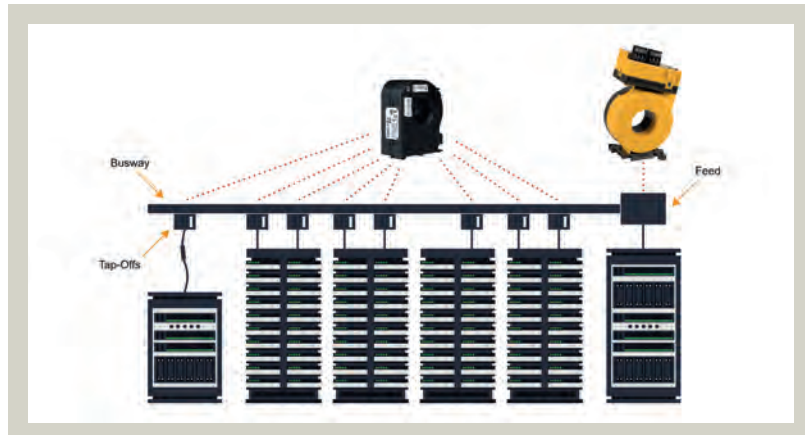


Figure 3: Placement of the individual Bender systems in the busbars

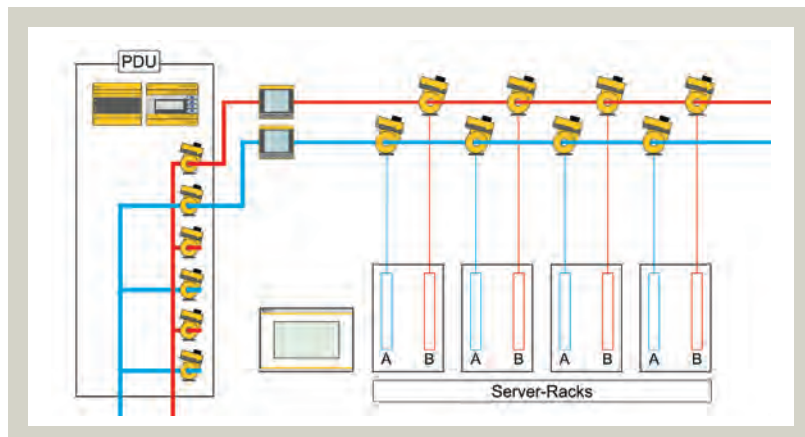


Figure 4: Basic structure

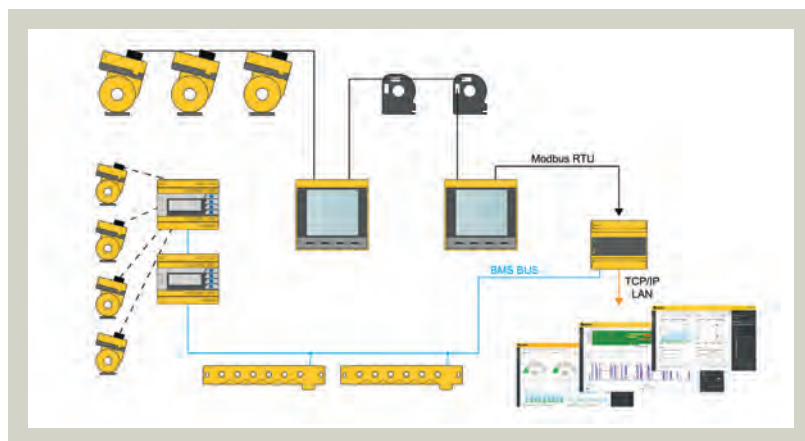


Figure 5: Bus setup and networking of the individual Bender systems

TECHNICAL APPLICATION



The city of Green Bay is the oldest city in the US state of Wisconsin and sits at the tip of the bay of Lake Michigan at the mouth of the Fox River. Together with Lake Erie, Lake Huron, Lake Superior and Lake Ontario they form the largest continuous body of freshwater in the world – the Great Lakes.

More safety for upgraded water reclamation

In the 1930s, it was discovered that local waterways had been polluted to such an extent that concerned citizens raised money to build the city's first wastewater treatment facility. This is how NEW Water, the brand of the Green Bay Metropolitan Sewerage District (GBMSD), which was established on 4 December 1931¹⁾, became active: The first wastewater treatment facility was commissioned in early 1935. Over several decades, the district was expanded and upgraded to accommodate for both population and industry growth. In 2008, NEW Water acquired a second wastewater treatment facility in the city of De Pere, Wisconsin. Today, as a wholesale provider, the utility serves over 236,000 residents from 18 communities covering a 285-square-mile area of Northeast Wisconsin.

Safety for increased availability

In 2019, Bender products were selected to be used on a project with NEW Water. The need for continuity of service is of utmost importance to any wastewater treatment facility.

The NEW Water project includes some safety-by-design steps including the addition of an Arc Flash mitigation system and High Resistance Grounding packages engineered and supplied by Tech4 LLC out of Wisconsin. The design is meant to serve the facility for the decades to come.



NGRM700 Neutral Grounding Resistor Monitor



Condition Monitor for Bender BMS devices and CP700 universal measuring devices

Safe through HRG systems

The solution, installed by Tech4 LLC, was a combination of current limiting resistors and contactors for pulsing fault location with some of the latest Bender products. The engineering team at Tech4 LLC worked closely with Bender's application engineers to fit the solution to the application.

On generator applications, non-pulsing simple Series 1 HRG package solutions were incorporated. On the main power transformers, the system took advantage of the NGRM700 (a Neutral Grounding Resistor Monitor) and a current sensor that could monitor for ground faults over a wide frequency range.

"A goal for the NEW Water project has improved electrical safety as well as reliability" explains Mike Bukovitz, VP Power System Business at Tech4 LLC. "The Bender NGRM700 used in the plant's high resistance grounded (HRG) systems is unique in its ability to identify and log intermittent ground faults, identify high-impedance ground faults, alarm for resistor failure, and automatically identify the location (circuit) of ground faults without resorting to a hand-held test instrument. Unlike other ground-fault relays, the NGRM700's accuracy is not negatively affected by non-linear loads and the resultant current harmonics, even in systems with high amounts of total harmonic distortion. We specify the NGRM700 in all of our critical-power applications."

All at a glance

In addition to the NGRM700, Bender's CP700 Communications Gateway was installed to interface with the NGRM700's and RCMS490 12 channel Residual Current Monitors. The benefit to the customer is realized any time there is a ground fault by immediately communicating that a fault has occurred, while also displaying a visual indication of the fault at the panel (even an intermittent fault on the system is communicated and displayed).



Bender Series 1 Wall Mounted High Resistance grounding package protecting the generators



Top right corner shows NGRM700 backplate mount neutral grounding resistor monitor



TECHNICAL APPLICATION



The CP700 Communications Gateway also benefits remote sites that are either unmanned or visited infrequently by instantly communicating when a fault occurs. The key to Bender's solution is quickly locating faults so that they can be cleared as soon as possible, thereby maximizing safety and uptime throughout the entire system.

Simplified fault location

Consider an example where a pump seal has failed and water gets in and contaminates the windings causing a fault. The fault can be alarmed along with the location of the pump via Bender's HRG system and then communicated to operations. The resistor portion of the HRG system has done its job by limiting point-of-fault damage but a repair is still needed. Through remote switching, a backup pump could be activated and the faulted pump can be scheduled for maintenance – all without the need for an electrician. When the electrician is available and they are dispatched to complete the repair, they will be better prepared to address the problem, saving time and money. ■

Quick Facts - NEW Water²⁾:

- Is a single-purpose government utility that reclaims water and promotes pollution prevention and water conservation.
- Is the brand of the Green Bay Metropolitan Sewerage District (GBMSD)
- Owns and operates two treatment facilities: De Pere, WI and Green Bay, WI
- Treats an average of 38 million gallons per day (De Pere: 8 million; Green Bay: 30 million)
- Is a wholesale provider of services to a total of 18 municipalities.

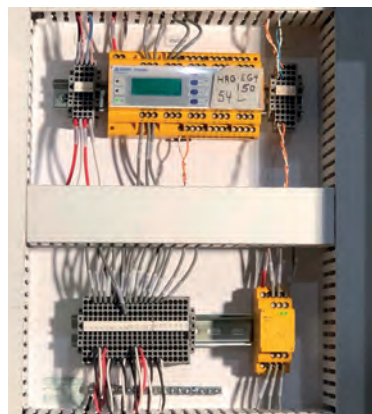
Jeff Glenney Head of HRG Sales, Bender Inc

Bryan Hadley Regional Sales Manager Midwest, Bender Inc

¹⁾ <http://newwater.us/about/history/>

²⁾ <http://newwater.us/education/news-archive>

Bender
12 channel Residual Current
Monitor (RCMS490)
and DC power for supply
for AC/DC capable
current sensors



Bender/Megaresistor Neutral Grounding
Resistor mounted above switchgear



TECHNICAL APPLICATION

Coronavirus provisional hospital in Berlin exhibition hall

Reliable power supply even in times of crisis

In May, after only weeks of construction work, the Jaffestraße coronavirus treatment centre on the trade fair grounds (Hall 26) was opened: a hospital intended to secure the treatment of coronavirus patients and function as a first point of contact before the patients are allocated to nearby hospitals. Bender provided the reliable power supply for the project at short notice.

At a time when the coronavirus pandemic is presenting major challenges for healthcare, hospitals and clinics and even companies, and ultimately for every one of us worldwide, it is especially important for us all to work together. Within a short period of time, the exhibition centre in Berlin was converted into something between a conventional hospital and a mobile medical unit, initially with 500 beds – to be used both for coronavirus patients, who are moderately ill, and as an intensive care unit for very serious cases requiring ventilation equipment. In general, major parts of the treatment centre are to be taken over by hospitals at a later date and will thus continue to be used.

The standardised power supply to the intensive care units (room group 2) has to take the form of an unearthed system (IT system), and to allow it to be set up in the shortest time possible. Bender provided rapid assistance: in a matter of days, the project was fitted with isolated power panels and alarm indicator and test combinations.

Reliable power supply in sensitive medical environments

Each intensive care bed has at least one medical electric device (ME device) or medical electric system (ME system), which supports the patient in their fight against the virus. In these group 2 rooms, which include operating theatres and intensive care units, emergency and anaesthesia, reliable power supply is important. All equipment and systems need to work without any interruption.



▶▶▶ Safety through redundancy

To secure availability and fail-safe operation, the industrial standard states that the power supply in the hospital must have a redundant design, with power coming from two independent power sources. In an emergency, the system structure needs to enable automatic switching (according to DIN VDE 0100-560:2013-10)³⁾ between the general power supply (AV), safety power supply (SV, emergency power system with combustion engines) and/or battery-based safety power supply (BSV according to DIN VDE 0558-507:2008-12)⁴⁾.

The IT system – uncompromisingly secure

For systems that would jeopardise the safety of patients in the event of shutdown or unscheduled downtime, there is no alternative to the IT system. In the medical IT system, the power supply is separated from the grid as a whole with isolating transformers. Unlike the earthed power supply, a TN-S system, the IT system does not have an earthed active conductor. As there is deliberately no low-impedance connection between a conductor and PE, a first insulation fault does not cause a high residual current to flow, which would result in the switch-off devices being triggered. Because of the very low contact voltages (≤ 10 mV even during a first fault), maximum patient safety is also guaranteed. This is especially important for all power sockets that the medical electric ME devices are connected to.

The insulation resistance in the IT system is also continuously monitored by an insulation monitoring device, which issues an alarm if any critical changes occur. A first insulation fault therefore does not cause the power supply to be switched off automatically, as it would in an earthed system. Instead, operation of the power supply can continue even in the event of a fault and the fault can be rectified promptly.

The regulatory basis for this is DIN VDE 0100-710:2012-10¹⁾ and Supplement 1 of June 2014²⁾. This document describes the protection objectives and the fundamental structure of power supply units in medical locations.

The solution: reliability thanks to continuous monitoring and redundancy

Continuous monitoring in the IT system is provided by the all-in-one solution from the ATICS® series. This automatic switching device performs the monitoring of the insulating resistance and the load



Fig. 1:
Isolated power panels (IPS) VIT-09-A-12B16 + TX6300

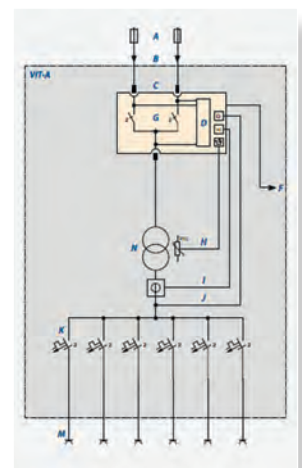


Fig. 2: VIT-09-A-xx



and temperature monitoring of the isolating transformers and switches between two power supply systems automatically, if problems occur (e.g. BSV/SV or SV/AV).

Alarm indicator and test combinations of type MK2430 are provided to issue visual and audible warnings and alarms, to display information from the monitoring system as needed, based on the relevance for the medical and technical personnel, and to carry out tests on the monitoring equipment. These units are not only user-friendly but also able to convey the output information in the form of a comprehensible plain text display. Furthermore, the MK2430 can be installed quickly and easily in any location.

It is thus ensured that the power supply remains fail-safe, thanks to two separate power lines with switching devices and the use of the medical IT system with continuous monitoring.

Rapid and secure solution as needed

In these exceptional circumstances, with an acute increase in the number of intensive care beds needed, Bender made it possible for a compact medical monitoring system to be provided promptly, which could be delivered, installed on site by specialist companies and put into operation by Bender service technicians in a matter of days.

With these solutions, Bender was able to help in the fight against the virus and hopes that this will result in more human lives being saved. ■

*Dipl.-Ing. Friedhelm Dalitz
Business Unit Hospital Solutions
Product Management*

*Abdurrahman Namdar
Berlin Technical Office, Germany Sales
Hospital Building Technology*

¹⁾ DIN VDE 0100-560:2013-10 Low-voltage electrical installations – Part 5-56: Selection and erection of electrical equipment – Safety services

²⁾ DIN VDE 0558-507:2008-12 Battery-based central safety power supply systems for medical electrical equipment

³⁾ DIN VDE 0100-710:2012-10 Low-voltage electrical installations – Part 7-710: Requirements for special installations or locations – Medical locations

⁴⁾ Low-voltage electrical installations – Part 7-710: Requirements for special installations or locations – Medical locations; Supplement 1: Explanation for application of the normative requirements of DIN VDE 0100-710 (VDE 0100-710):2012-10

Subsea ROV operator relies on

power quality monitoring from Bender UK



Film-Ocean's Comanche ROV
launching during recent project

A global operator of ROVs (remotely operated vehicle) uses power quality monitoring equipment from Bender UK. It is the first application of Bender technology for monitoring the power quality in the subsea sector.

Bender's insulation monitoring devices and insulation fault location systems are widely employed within the oil and gas industry to protect personnel, subsea equipment, installations and associated electrical infrastructure from insulation faults.

Subsea contractor Film-Ocean provides ROV inspection and intervention services for subsea oil and gas production. Film-Ocean trusts Bender power quality monitoring (PQM) systems. A PGM system offers the possibility to identify issues with fluctuating power supplies on board support vessels and offshore installations and to implement possible corrective measures.

Bender's LINETRAXX® PEM735 digital power quality analyser measures and records the current status of electrical supply networks and displays the current/voltage harmonics as well as other measured quantities for assessment of the power quality. The product was first deployed by Film-Ocean after a project was affected by a fluctuating electricity supply that resulted in damage to high-value PCB boards in their ROV equipment.

Mike Mackie, Operations Manager at Film-Ocean, explains: "Bender's power quality monitoring equipment alerts us to spikes or troughs in the power supply voltage that can seriously affect the ROVs

and cause permanent damage. Equally serious is downtime of the equipment and delays that can result from fluctuations in the power supply. If damage occurs, we can now track the cause and most importantly identify the source of the problem using Bender PQM ensuring maximum utilisation for our clients.”

“Bigger ROV units can be more seriously affected by a dip or spike in supply” Mike Mackie says. “The Bender units will not protect against the effects, but they let us know that it is happening, and that enables us to identify the root cause. They are proving very successful and we are aiming to use more of the Bender power quality analysers in the future.”

The biggest power quality problems occur on three-phase systems. Cranes are often one of the most common causes of spikes and drops in the power supply. A crane pulls a lot of current when it starts up, and that can cause a fluctuation in the power supply. When the crane stops, the power can sometimes spike and potentially cause damage to other electrical equipment, but Bender’s PQM technology records the changes in the power supply and alerts the Film-Ocean team.

If there is a problem, then Film-Ocean can look at ways to make the power supply more stable – either by bringing in a separate dedicated generator or by installing compensation and filter systems.



LINETRAXX®
PEM735

“We use **a variety** of Bender insulation monitoring devices in multiple locations on all our ROV systems.”

Film-Ocean also uses Bender insulation monitoring devices to safeguard personnel and equipment subsea. Mike Mackie adds: “We use a variety of Bender insulation monitoring devices in multiple locations on all our ROV systems. Not only are they a critical safety device, but they are also used as condition-based monitors to identify a gradual or complete breakdown of insulation within our systems.” ■

*Robbie Mewton
Technical Sales, Bender UK*



Film-Ocean’s Cougar ROV during recent project load out

INFO

For more information visit:

<https://www.bender-uk.com/solutions/oil-gas>

<https://www.film-ocean.com>

**Prevent interruptions of operation
with SensorPRO residual current monitoring**

Increased availability of the "Hauptbahnhof" metro station at Nuremberg

The "Hauptbahnhof" (HB) metro station is one of a total of 48 stations on the Nuremberg metro network and, with around 137,000 people using the station every working day, it is by far the busiest. Built in two phases from 1974 to 1988, the HB metro station was initially opened in 1978 for the U1 line and then expanded ten years later to include the U2 line. Today, the U1, U2 and U3 lines intersect here and passengers can transfer to various tram and city bus lines as well as the local and long-distance train connections of the German railway network.



"The **general protection objective** when using residual current sensors is fire protection, so as such the devices used must issue an alarm at 300 mA at the latest."



Initiation and goal

Developed around 45 years ago, the somewhat outdated electrical main distribution board of the metro station is currently being modernised. One of the main reasons behind this was to prevent a deterioration in the insulation of the existing distribution lines. Planning for this comprehensive modernisation began at the end of 2018. This project is characterised by a number of unique organisational features: for example, several temporary structures had to be built to ensure a continuous power supply during the conversion phase. "Mobile distribution boards" were used to achieve this. Moreover, it was only possible to perform a large part of the work while the metro was not operating from 1.00 am to 4.00 am.

As part of the modernisation, the energy switch-gear combinations were to be fitted with residual current monitoring to simplify insulation measurement and aid maintenance. The general protection objective when using residual current sensors is fire protection, so as such the devices used must issue an alarm at 300 mA at the latest. Since the metro station is a critical part of the infrastructure where failures must be absolutely avoided, a residual current monitoring system is also used for monitoring in order to receive information on pending insulation faults in good time. For this, sensors were installed on all the outgoing circuits of the main distribution board. As a result of this, in addition to monitoring of the individual sub-distributions, the final circuits are also monitored, e.g. of escalators and lifts.





Products used

A Bender residual current monitoring system of the latest generation is used in the electrical main distribution board at the Nuremberg HB metro station: SensorPro residual current sensors of RCMB300 series in combination with the CP907-I Control Panel.

As an integrated solution (measuring current transformer and evaluator in one device), the residual current sensors take up less space and require less wiring than comparable multi-component solutions. This makes them ideal for the already highly complex and space-intensive electrical installation. Available with different measuring current transformer interior diameters, the RCMB300 series can be used both for supply and the monitoring of individual outgoing circuits and final circuits. The frequency range up to 100 kHz guarantees that the requirements of the standard

(IEC 60364-4-42) and the VdS (VdS 2033) in terms of fire protection are met in full.

The sensors feature a Modbus RTU interface via which they can be linked to a complete system. In this complete system, the CP907-I Control Panel functions as a condition monitor for the various devices. With the integrated interfaces, all Bender devices and other third-party devices can be connected with the CP907-I which also functions as a modular gateway between Bender systems and TCP/IP. The condition monitor provides a web interface and a display via which the measured values, parameters and all other data can be checked and configured. The incoming alarms of the residual current sensors can be reported and visualised in a variety of ways, even e-mail messages to the various users are possible.



SensorPro residual current monitoring with RCMB301 modules at the outlets of the main distribution



The Condition Monitor CP907-I provides information via the system status

Benefits and added value for customers

Thanks to the residual current monitoring system from Bender, the operator, VAG Verkehrs-Aktiengesellschaft Nürnberg, will be notified in good time of gradual deteriorations in the insulation and can carry out maintenance work before insulation faults result in the system being shut down by protective elements and thus operation being interrupted. In the initial phase, the alarms will be reported to the metro station's general monitoring system via potential-free contacts. These alarms are collected at the "Technical Fault Management" control centre. This centre is manned 24/7 to enable an immediate response to alarm messages. In the event of an alarm, the relevant engineer is notified by the control centre, who is then responsible for determining the cause of the fault on site and remedying the underlying problems.

The condition monitor with display used on site provides the engineer with detailed information on the alarm messages quickly and clearly: The history memory and data logger of the CP907-I provide data on the various events and their exact time of occurrence. As such, relationships with external influences at particular points in time can be detected for example.

The fine-grained use of the technology enables faults to be localised quickly and thereby increases the efficiency of service deployments. The highly accurate sensors offer a considerable time advantage in the case of gradual deteriorations, enabling problems to be remedied before a critical value is exceeded. This, in turn, allows maintenance measures to be planned early on and performed during non-operational periods.

Outlook

The installation at the HB metro station in Nuremberg will be finally put into operation and approved by the supervisory authorities towards the end of 2020. Over the coming months and years, more of Nuremberg's metro stations are to be fitted with residual current monitoring systems.

What's more, the residual current monitoring system is to be further developed so that continuous monitoring of the electrical installation may be regarded as an alternative to the measurement of insulation resistances within the scope of recurrent testing as per DGUV Vorschrift 3 (German Accident Prevention Regulation 3). Normally, the installation must be de-energised for the insulation measurement, yet this is obviously problematic for critical infrastructure. An alternative whereby de-energising is not necessary is permitted by the DGUV Vorschrift 3 and the standard DIN VDE 0100-600:2017-06 through the use of a permanently installed residual current monitoring system. Suitable evidence must be available, which can be provided via corresponding reporting functions. ■

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

*Daniel Leix
Technical Office, Nuremberg*



TECHNICAL APPLICATION



Insulation monitoring for more safety

Bender donates devices for historic submarine USS Pampanito

The USS Pampanito (SS-383) is a Balao-class submarine which was deployed by the United States Navy in the Pacific War during the Second World War. She is now a museum ship located at Fisherman's Wharf in San Francisco harbour.¹⁾

The USS Pampanito, which entered service on 6th November 1943, completed its last mission in spring 1945 and was decommissioned on 15th December 1945. During World War II, she completed six war patrols, during which she sank six Imperial Japanese ships and damaged four others. Between 1962 and 1971, the submarine served as a Naval Reserve Training ship. In 1976, the San Francisco Maritime National Park Association took her over and opened her to the public as a museum ship in March 1982.¹⁾

Insulation monitoring is the answer

Richard Pekelney, a member of the San Francisco Maritime National Park Association, has used many Bender products over the years. Most recently, Mr. Pekelney had a need for a product that could monitor and identify electrical issues on the USS Pampanito. Bender was delighted to assist

by donating several insulation monitoring devices (IMD) from the ISOMETER® series, which are specifically designed for marine and naval applications.

The Bender insulation monitoring device of type iso685W-D-P was the perfect fit for the USS Pampanito since these devices can monitor and report insulation faults in the unearthed power supply (IT system) on the ship. In addition, the locating current injector integrated in the iso685W-D-P enables the localisation of insulation faults with permanently installed or portable insulation fault locators. The iso685W-D-P is intended for highly corrosive environments and can withstand high levels of humidity, vibration, and other environmental conditions found on naval applications.

Improved values

Bender insulation monitoring devices (IMD) were installed on the ship's ungrounded DC 250 V auxiliary system and DC 115 V lighting circuits. The devices showed a 180 kΩ insulation reading, this closely matched Megger readings with rectifiers and monitors disconnected. After they isolated the faulty lighting circuits, the insulation resistance value increased to 680 kΩ.



A second Bender IMD was installed on the ungrounded output of a 75 kVA transformer that supplies the boat's historic AC motor generator set circuits to the modern 40 kVA DC rectifier. It read 440 kΩ when installed.

A third Bender IMD was added to the ungrounded DC 250 V emergency lighting circuit. An isolation transformer was installed to restore an ungrounded (IT) source for the emergency lighting circuit. The IMD read 680 kΩ when installed. Additionally, the emergency lighting controller was simplified by removing an unused test button timer, DC/AC relay, indicator lights and associated circuitry.

The three IMDs are configured to trip warning indicator lights when any one of the monitors falls below 40 kΩ. The team added an indicator light, visible to the Pampanito staff while doing their normal safety checks on the boat. There are also indicators in the battery tank and can be checked over the local internet network.

Museum ship goes online

Inspired by the networking capability of the IMD, Wi-Fi internet access has also been added to most of the boat. This allows the crew to remotely check the Bender IMDs while finding ground faults without entering hazardous areas, such as the battery tank.

In widely branched systems it is often difficult to locate and prevent earth faults due to inadequate insulation in the electrical installation. With the help of Bender, it is now possible to make the operation of the ship safer and to inform the crew if a problem occurs and intervention is required. Thanks to the installation of



"The (Bender devices) are working well and **with them we are learning more** about locating and fixing problems on the boat" states Mr. Pekelny."

this technology, Mr. Pekelny and the entire USS Pampanito team can plan for outages and make any necessary repairs without interrupting the normal flow of visitors.

Annually, the USS Pampanito hosts over 100,000 visitors and an additional 1,500 kids participate in Pampanito's educational days and overnight programs. The USS Pampanito undergoes on-going maintenance as ships are the only museum artifacts that are regularly stored in a corrosive environment (salt water).

The Bender Group is proud to be a partner in this project and we wish the entire team at the USS Pampanito success with future projects and we thank them for keeping a piece of US military history alive and accessible for all those that are interested in military history. ■

Ajay Pathak
Head of Industrial Sales, Bender Inc

INFO

Additional information about the US Pampanito:
<https://maritime.org/uss-pampanito/>
<https://maritime.org/tour/index.php>

¹⁾ [https://de.wikipedia.org/wiki/USS_Pampanito_\(SS-383\)](https://de.wikipedia.org/wiki/USS_Pampanito_(SS-383))

References:
USS PAMPANITO - ELECTRICAL SAFETY UPGRADE - 2018-2019. (2020). Retrieved 6 February 2020, from <https://maritime.org/pres/electrical/index.htm>



Bender UK selected to support the NHS in their fight against COVID-19

Turnkey operating theatre specialists Bender UK supported the urgent delivery of Nightingale and other NHS hospital projects in the fight against COVID-19. A trusted partner of healthcare prime contractors and a major supplier to the NHS and private medical groups, Bender UK was earmarked early on during the pandemic outbreak to be a potential supplier of critical care power for the high-profile Nightingale projects.

The company, who design and supply medical IT power systems and uninterruptible power supplies (UPS) for Group 2 medical locations and provide state-of-the-art Merivaara surgical and AV equipment, have played a major role in ensuring there is adequate life support across the UK for critically ill patients.



Bender UK supplying 600 kVA modular UPS critical power infrastructure to NHS Nightingale Hospital, Excel center, London

This involved specialist teams working on most of the NHS Nightingale Hospitals offering technical advice, design support and supplying and installing equipment.

The company have supported consultants, contractors and hospitals to help increase capacity, while Bender engineers have worked around the clock attending sites across the country for urgent repairs, call-outs, maintenance and commissioning to expand treatment areas and prevent shut down of critical areas.

In addition, Bender have also carried out major power refurbishments at several existing NHS hospitals that required further capacity to cope with the increased demands. Bender have successfully delivered almost 15MW of Uninterruptible Power Supplies (UPS), supporting approximately 10,000 additional bed spaces, and all in a time-frame of six weeks.



Gareth Brunton, Managing Director, explains: "As a company that works extensively in the healthcare sector, Bender UK takes immense satisfaction and pride knowing that we are able to help these amazing people carry out their work, delivering world-class medical intervention and saving so many lives. It is extremely gratifying to have been able to contribute in what we see as a fairly small way."

Gareth explains that Bender mobilised their highly skilled and dedicated workforce to work from home before lockdown began with direction and support from the head office based in Germany, and a strong UK leadership and management team. The company already had a reliable IT and phone infrastructure in place supported by a robust business continuity policy which took effect immediately.

The company also have a solid supply chain with long standing trusted and approved suppliers and partners, as well as an efficient stock policy which enabled them to respond quickly to hospitals' needs and meet demands.

Gareth said: "We were contacted personally to help with these urgent projects. The fact that we were the go-to company when the pandemic was in its rapidly evolving stages, represents how well known and trusted we are as a company to deliver healthcare power systems of this magnitude, especially in such tight timescales."

Our team worked day and night, including weekends, to facilitate the completion of these unprecedented projects, and I am extremely grateful to everyone involved for their commitment and resilience during these difficult times. Working on the Nightingale projects has been a major achievement for us."

Gerry Connor, the lead electrical design consultant for the critical power infrastructure at NHS Nightingale London, was in no doubt that Bender UK were the company to approach for the provision of UPS.



He added: "With the facility being urgently required to handle a potential surge of patients requiring life support due to the Coronavirus outbreak, we were tasked with getting the first 500 beds up and running within a 9-day period. Failure to meet this deadline was not an option. We are very grateful to Bender UK and the rest of our supply chain for their commitment and contribution to the successful completion of the Excel Nightingale Hospital." ■

Lisa Hudson, Marketing, Bender UK

INFO

For more information on Bender UK products and services for the medical sector, visit

<https://www.bender-uk.com/solutions/healthcare>





BENDER INHOUSE

TechniSat

Bender takes over all shares

of TechniSat GmbH from Techios Daun GmbH

The Bender GmbH & Co. KG, based in Gruenberg/Hesse, has taken over the development center TechniSat Dresden with effect from February 28, 2020. Thus, the Bender Group creates further growth potential for the increasingly important market of networked communication. The areas of e-technology development and charging technology infrastructure for electric vehicles play an important role in almost all branches of industry in the unstoppable transition to electric mobility with all its facets.

Bender can make direct use of the know-how available at TechniSat Dresden in the development of display applications, apps, programs based on Linux and versatile wireless communication modules, and can adapt even better to the challenges of the smart technology of e-mobility. This will also benefit the development of the charging technology for electric vehicles of ebee Smart Technologies GmbH from Berlin, which also belongs to Bender.

Since 1990, the TechniSat research and development center has been located in the university and technology city of Dresden. Since then, excellently trained and experienced engineers and technicians have formed the basis for many development projects. The Bender Group, with the former TechniSat development team from Dresden, will become an important development partner for the TechniSat Group – this guarantees a development agreement between the two groups of companies.

The headquarters of Bender GmbH & Co. KG is in Gruenberg, Hesse, but the medium-sized family-owned company, which has been growing steadily at a high pace for years, operates worldwide. 'With the new team in Dresden, our development, especially in the field of electric mobility, will

be massively expanded', said the managing director of Bender and ebee Winfried Möll, and is looking forward to the cooperation. For TechniSat managing director Stefan Kön, it is particularly important to be able to enter the fields of smart technology and e-mobility even faster in addition to the existing Consumer Electronic (CE) division in cooperation with Bender: 'We are proud that we have succeeded in this'. ■

Andrea Gossel, Marketing

About TechniSat Dresden GmbH

All business shares of TechniSat Dresden GmbH, previously a wholly owned subsidiary of Techios Daun GmbH, were sold to Bender GmbH & Co. KG as of February 28, 2020. Techios Daun GmbH is wholly owned by Techniropa Holding GmbH.

Techniropa Holding GmbH includes innovative and successful companies from various industries such as TechniSat Digital GmbH (90 %), TPS Technitube Röhrenwerke GmbH (92,93 %), TechniForm GmbH (100 %), Formitable GmbH (51 %), Eifelion GmbH (93,875 %), TechniVolt GmbH (100 %) and many others. Techniropa Holding GmbH is 100 % owned by the entrepreneur Peter Lepper.

All information about Techniropa Holding GmbH can be found at www.techniropa.de.



Power Plus Electric Co.

Innovative global solutions for electrical safety

PowerPlus Electric provides products, solutions and services

with focus on the Gulf utility, oil & gas and infrastructure market. The company is based in Muscat, Sultanate of Oman and provides solutions for projects related to electrical safety, stability and quality of power supplies using the latest technology, including special safety devices for electrical maintenance.

At present, the scope of activities of PowerPlus covers trading, on-site service, electrical safety audits and contracting activities. PowerPlus has successfully completed projects ranging from low voltage and medium voltage installations through design assistance and on-site service works to end user training. The overall portfolio covers regular equipment and tailor-made solutions or even unique patented solutions.





AGENTS CORNER



The commitment to ensure electrical safety of the highest quality on the market is something PowerPlus has never overlooked. This has contributed to always providing the best solutions which are truly a blend of innovation and technology. PowerPlus is proud to have implemented some technologies such as isolated power supplies for hospitals, magnetically controlled voltage stabilizers and electrical safety solutions for the first time in Oman. Due to its concept, the good cooperation with consultants and its ability to meet their requirements in an innovative way, PowerPlus was involved with its know-how already in the planning stage of many projects.

Cooperation with Bender

The cooperation with Bender started in 2014 with a very prestigious project in the Sultanate of Oman. It involved a private clinic/hospital of His Majesty Sultan Qaboos within the palace premises. Bender was recommended to PowerPlus as a partner by a renowned consultant from Oman. We successfully completed this project against stiff competition from established Oman market players.

As a result, all other hospital projects for isolated power systems in Oman were equipped with Bender isolated power panels.

PowerPlus also revived the demand for special electrical safety applications for well head units in the oil & gas industry. This concerns the volume business sector, where special efforts are required to promote the latest technology over old solutions tried and tested by the customer.

With Bender as a first-class technology partner of PowerPlus, major successes have been achieved in the hospital industry in Oman and a considerable share of the market in the oil and gas industry for the electrical

safety of well head units has been acquired. Industrial applications are becoming increasingly important.

Promotional activities

The promotional activities are focused on updating our consulting engineers and customers about the Bender solutions. Samples and demo kits (IPS1 and SCP²) are presented to the concerned authorities and end users. The direct interaction with the right target group has always been the key to success.

In addition to the new projects at the planning and construction stages, we contact the relevant industrial sectors to get to know their challenges regarding electrical safety aspects. PowerPlus provides them with the solutions after consultation with the Bender team.

Important projects ...

PowerPlus is active not only in the oil and gas industry, but also in the healthcare sector and in the solar and electricity industry. To illustrate this, here are some examples of successful projects:

... in the healthcare sector

Bender has a 100 % market share in all large hospital projects in Oman through the isolated power panels required by the ministries.

Armed Forces Hospital – Oman

The military hospital covering a built-up area of 19,200 m² and a land area of 15,000 m² includes approx. 120 hospital beds and other related facilities. The building was awarded for the best infrastructure in Oman. PowerPlus supplied 17 IPS panels that comply with the latest IEC standards and



Armed Forces Hospital
– Oman



provide safe power supply to 14 ICUs, 8 operating theatres and 3 isolation rooms. The solution provides a dual power supply source with the ATICS® switching device from Bender and a central BMS interface with Bender COMTRAXX® gateways.

Expansion of the Royal Hospital

The Ministry of Health of Oman expanded The Royal Hospital in Al Ghubra, Muscat, Oman. The project includes the expansion of a hospital with 56 covering a build-up area of 851 m², a neonatal intensive care unit (NICU) and a paediatric intensive care unit (PICU) including other related facilities. PowerPlus supplied 34 Bender IPS panels for this project.



Royal Hospital in Al Ghubra, Maskat Oman

Royal Oman Police (ROP) General Hospital

Oman ROP plans to develop the Royal Oman Police Hospital at Airport Heights, Muscat, Oman. The project aims to provide medical care to the members of the Royal Oman Police and their families. The project involves the construction of a general hospital with a built-up area of 90,000 m² comprising the main building and 20 auxiliary buildings.

The first phase involves the construction of a six-storey hospital with 400 beds, with a cancer centre, a centre for mentally traumatised patients, a children's clinic, a women's clinic, a cardiology centre, a surgical department and a VIP accommodation facility on the upper floors.

In the second phase, the expansion from 400 to 600 beds is planned. The hospital campus will include orthopaedic units, diagnostic and treatment zones, ambulatory care, research and education facilities, a multi-storey staff accommodation facility, residential units, substations, a sewage treatment plant, a multi-storey car park and the related infrastructure.



Royal Oman Police Hospital in Airport Heights, Maskat, Oman





AGENTS CORNER



For this project, PowerPlus supplied 32 Bender IPS panels and 12 SCPs. After a detailed product presentation to the medical team, PowerPlus replaced the originally planned conventional SCPs with the latest technology (touchscreen panels and PACS viewer with medical PC). This was presented to the concerned authorities using SCP demo kits.

Sultan Qaboos Cancer Centre



Sultan Qaboos Cancer Center

The project involves the construction of cancer centre comprising a ground floor and 9 additional floors with 72,650 m² built-up area at the Sultan Qaboos University Hospital. The centre will provide a range of services with focus on cancer care such as radiotherapy bunkers, operating theatres, medical imaging, nuclear medicine, inpatient accommodation and outpatient services including chemotherapy. PowerPlus has supplied 13 IPS panels. Some of them are dual type design due to the space constraints in the electrical room.

... in the oil & gas sector

Insulation monitoring for PDO well head units with Bender ISOMETER[®] insulation monitoring devices, EDS insulation fault locators and core sensor current transformers.



PowerPlus has introduced a solution for monitoring and locating earth faults in power supply panels that supply power to various well head units of Petroleum Development of Oman (PDO). The PDO is the leading oil & gas exploration and production company in the Sultanate. PDO provides the majority of the country's crude oil production and natural gas supply.

Bender devices were mounted in control cabinets to monitor the control circuits with DC 24 V and DC 110 V. PowerPlus has executed extensive projects with EDS technology supplying 144 facilities/ installations.

... in the industrial sector



Jindal Shadeed is a leading steel manufacturer, located strategically in the ancient port city of Sohar in the Sultanate of Oman. The company is situated on a 120-hectare property, just 60 metres from the shoreline and adjacent to the busy Muscat-Dubai highway. The production facilities include a rolling mill with a capacity of 1.4 MTPA.

There are 10 motors (3 KW each) in the roller table application of this steel mill, which are connected in parallel and driven by a single VFD³⁾. All motors start up simultaneously with a start-up time of 0 to 50Hz in 800 milliseconds, remain at full speed for only 10 seconds and then the cycle starts again. In this industrial application, PowerPlus has implemented a residual current monitoring solution for the steel industry to monitor the motor health of rolling mills. The components used in this solution are RCMS490-D-2 residual current monitors, ten W20AB current transformers and one COM465DP condition monitor with integrated gateway.

The unique feature of early detection of leakage currents (below tripping threshold value) indicates the need for maintenance. This prevents unexpected failure. The solution is integrated in the SCADA⁴⁾ system to display alarms on the screen.

¹⁾ Isolated power system

²⁾ Surgical control panel

³⁾ VFD (Variable-frequency drive)

⁴⁾ Supervisory Control and Data Acquisition

Source: www.copdata.com/.../visualisierung-steuerung/was-ist-scada

... in the solar sector



PowerPlus has supplied and commissioned various solar grid interface panels using the Bender VMD460NA control relay for network and system protection to monitor the network feed-in with Modbus interface and central monitoring system.

The success of PowerPlus Electric Company, Sultanate of Oman, would not have been possible without the high-quality and reliable Bender products, and the continued and competent support provided by Bender.

The PowerPlus Electric Co. would like to thank Bender GmbH Co. KG for their great support.

“The key factor of our success is partnership, cooperation, and the valuable and prompt technical guidance from Bender”, says Prasad Parulekar (Founder of PowerPlus Electric Co.).■

*Prasad Parulekar
Managing Director, PowerPlus Electric Co,
Sultanate of Oman*



LINETRAXX® Residual current monitoring system RCMS490

CUSTOMER PORTRAIT



We make the world go round

Gerstlauer Amusement Rides GmbH develops innovative concepts and customised solutions which are guaranteed to make you smile! Our highly qualified and dedicated team transforms steel into world-beating amusement rides: whether falling, spinning, upside down or simply a breathtaking panoramic view, we have it all! The family-owned company was established by Hubert Gerstlauer in 1982.



The roller coaster "G'sengte Sau", which was launched in 1998, marked the start of our success story in the amusement ride sector. Since then we have supplied customised rides to clients around the world. Europe, North America, Asia ... we make the world go round. Our customers include international amusement park chains and small family parks.

Our export strategy is focused both on new and existing customers. Firstly, we want to win over international amusement parks as new customers with our innovative products and, secondly, we set great store by our first-class after-sales service. In the hands of our highly qualified experts, this maintains customer contact and loyalty. Although we operate internationally, we remain committed to our roots in Münsterhausen in Bavaria. This location has proved excellent for the headquarters of Gerstlauer Amusement Rides GmbH for many years and will continue to do so. Today, we employ around

100 experienced members of staff. At the same time, we also operate a training programme in order to pass on our know-how to youngsters in the region.

We are a long-term, sustainable and reliable business partner. This long-term approach means that we know our customers well and can offer further products from our portfolio which ideally suit their needs.

Following on from the success of their first attraction from us, it is therefore hardly surprising that many of our customers go on to discover further attractions from our extensive range.

We produce unique attractions which are tailored to the needs of our customers and the conditions on site. Every roller coaster and every



CUSTOMER PORTRAIT



attraction is a bespoke creation produced by our expert staff. And all that from a single source: Our comprehensive service includes detailed simulation before construction of an installation, careful assembly and commissioning, extensive training, maintenance and the conversion of existing installations. This enables us to guarantee maximum quality, safety and close long-term customer relations.

In our business, a good after-sales service is vital. The focus here is on assisting our customers with problems and queries continuously and as quickly as possible. Thanks to flat hierarchies, short decision-making processes and well-trained service staff, we can provide immediate customer support.

The market in which we operate is dynamic and is characterised by large distances and local differences which we cannot accommodate completely.

"We produce **unique attractions** which are **tailored to the needs of our customers** and the conditions on site. Every roller coaster and every attraction is a bespoke creation ..."

To give us a world-wide presence for new customers, we exhibit at international trade fairs. A strong media presence is also important to us and, in particular, a high-impact website. Here at Gerstlauer Amusement Rides, we also embrace new media forms such as social networks to actively engage with customers and fans.

We place particular importance on close customer relations and set ourselves apart through constant further development and innovative new attractions in order to thrive in the turbulent leisure industry. Given our broad and ever-expanding product range, we can respond to our customers' wishes precisely and offer a perfect addition to every amusement park concept regardless of the visitors' age and height! With us you are sure to have a smile on your face at the start and end of every ride! ■

*Gerstlauer Amusement Rides GmbH,
Münsterhausen*

EXHIBITIONS 2020/21



WEBINARS INTERNATIONAL



LOUNGE & LEARN:

Conversion of Systems to High Resistance Grounding
18.11.2020 – Time: 1 PM EST

Protecting VideoRay® Remotely Operated Vehicles
03.12.2020 – Time: 1 PM EST

All seminar and webinar dates

can also be found on our homepage at:

<https://www.bender.de/en/know-how/seminars>



All exhibition dates national and international
can also be found on our homepage at:

<https://www.bender.de/en/company/exhibitions>



EXHIBITIONS INTERNATIONAL

LCV Cenex

18. – 19.11.2020
Millbrook Proving Ground, UK
Booth C3406



World EV Show

26. – 27.11.2020
Delhi, India



EP Shanghai 2020 & Electrical Shanghai 2020

03. – 05.12.2020
Shanghai, China



Intersolar India 2020

15. – 17.12.2020
Mumbai, India



Nepal Medical Show 2020

18. – 20.12.2020
Kathmandu, Nepal



BADS

British Association of Day Surgery Conference

18. – 19.03.2021
Cardiff City Hall, Cardiff, UK
Booth 9



MATELEC 2021

04. - 07.05.2021
Madrid, Spain



EXHIBITIONS NATIONAL

SMM 2021

The world-leading fair of the maritime economy

02. – 05.02.2021
Hamburg, Booth B6.229



Hannover Messe 2021

12. – 16.04.2021
Hanover



Eltefa

20. – 22.04.2021
Stuttgart



InnoTrans

27. – 30.04.2021
Berlin



Power2Drive Europe

09. – 11.06.2021
Munich
Exhibitor: ebee



INFORMATION DAY



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

24.11.2020	Locarno, Switzerland
16.02.2021 and 16.03.2021	Bern, Schweiz
23. – 25.02.2021	Lucerne, Switzerland
02. – 04.03.2021	Pfäffikon, Switzerland
09. – 11.03.2021	Regensdorf, Switzerland



Heinz Nowicki

CSO (Chief Sales Officer), Bender GmbH & Co. KG

CAREER OUTLINE

Heinz Nowicki has been part of the newly structured management at Bender since May 2020. The 54-year-old studied electrical engineering at both Hanover University and Hanover University of Applied Sciences and Arts, specialising in communications engineering and graduating with the title “Dipl.-Ing (FH)”. Having held positions in small and large companies after leaving the research institute – at Tyco/TE as BU Leader, at Marvell as EMEA Sales & Marketing Director and finally as Group CEO at Prettl, a larger family-run company – Mr Nowicki has now brought his wealth of experience to Bender.

"Internally and externally:
fair and transparent cooperation"

The new role at Bender: a deliberate, clear-cut decision

As the new third equal-ranking managing director of the Bender Group, you are now at the head of a company with a long tradition and more than 1000 employees in over 70 countries. What does this mean to you?

I am very much looking forward to this new role, as it is something that I specifically sought out. Together with Winfried Möll as CTO (Chief Technical Officer) and Monika Schuster as CFO (Chief Financial Officer), we form an interdisciplinary and united team in which all parties are informed, discuss and agree on impending decisions and planned changes. Therefore, I already feel very much at home at Bender with these two strong partners at my side. While we are all responsible for our own area, the dual control principle still applies. Transparent teamwork is a key part of the way I work.

The global alignment of a company is also something I am already familiar with as I have realised various projects at other companies all around the world. In the various positions that I have held throughout my career, most recently as CEO at Prettl, I was responsible for more than 10,000 employees.

Is the new management structure expected to result in any changes to the areas of responsibilities?

As CSO and (co-)managing director, I will be responsible for all necessary activities of the Bender Group in Grünberg and take on strategic and operational sales processes. In addition to the strategic direction, the areas of Quality, Service, Marcom and Programme Management will be my responsibility in future in order to ensure a separation of powers between product development and testing. There will also



"Particularly for an international company, **communication, openness and mutual respect are deciding factors** for success."

be a double reporting line of the BU managers as well as the BGM heads/VPs (Americas, EMEA, APAC and CN/IND/RUS). These areas report both to Winfried Möll as CTO as well as me but are clearly assigned to specific disciplines as I mentioned.

Sales, Marketing, Engineering and Product Management are areas that I have successfully managed in the past. I have also been responsible for M&A, Manufacturing, Quality, HR and IT.

In addition to your position as CSO at Bender, you are also the CEO at ebee Holding. What is the reason for this?

It was initially planned by the advisory board that I would only take on this role, yet in the course of our discussions it became evident that my core strength lies in the industrial field and that the medical sector is an additional area for me. My role was consequently expanded. It's a perfect fit!

What do you like best about your job and what do you like least?

Innovative and future-oriented companies have always appealed to me. Since I already knew Bender, the inventor of insulation monitoring, I specifically sought out the position I now hold. Bender boasts a stable core business and huge future potential – a mix of everything: I can work in a future-oriented manner as part of a team, the world market leader has all the expertise needed in house and the employees' knowledge base is impressive. In my career, I have been an all-rounder, and have already actively managed all the areas which are relevant to Bender. I am convinced that we can work together to make it even better. I have a fundamental aversion to unfair and non-transparent processes.

Will customers or business partners notice any change?

I think so, yes. I believe in fair, respectful and transparent cooperation and in useful structures; these principles are usually well received by customers because I really live by them. Particularly for an international company, communication, openness and mutual respect are deciding factors for success. I keep my promises and I do what I say, which is beneficial to both parties and a real win-win situation.

How do you see the industry developing in the future?

A development usually follows the mega trends, the undercurrents of change: Digitisation, big data solutions, pay-per-use to name only a few key words. They should always be integrated in strategies.

Please complete the following sentence: To me, Bender means ...

... my final sprint! After all, I hope I will be able to work at Bender up until my retirement and lead the company on to even greater things.

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

Michaela Heck, textwerk-heck

○ Dynamic load management – what is it and why do I need it?

Load management has been around as long as overland power supply lines. To prevent damage to the equipment in the supply system, two load states must be avoided at all costs:

- **Unbalanced loads**
- **Overloads**

○ Managing load currents avoids these unwanted states and therefore also unnecessary shutdowns. Underutilisation is, however, also a problem for energy supplies. Demand for electricity/energy is typically higher during the day than at night but even load levels are desirable for energy supplies.

This problem has led, for example, to variable tariffs for day and night cycles (off-peak and peak tariffs). In France, for example, hot water boilers were installed which were primarily intended to use cheap off-peak electricity at night to heat the domestic water supply for the following day. Many in Germany are still familiar with night storage heaters working on the same principle: heat was stored at night at a discounted tariff and released into the room during the day. Today, electricity in integrated grids is traded on the spot market, with demand and supply meeting at an appropriate price.

Electric mobility is coming

Electrical installation operators are often faced with the problem of operating multiple charging stations which could theoretically all be used at the same time. Typical power for all-electric vehicles (BEVs) is 11 kVA or 22 kVA. However, the available connected load is often insufficient to supply all charging points simultaneously. If all charging points were operated at the same time, operators would risk upstream protective devices (overload) tripping and switching off the entire supply.



Dynamic load management

– what is it and why do I need it?

Practical Expertise

▶▶▶ Charging capacity for plug-in hybrids is 3.7 / 7.4 kW. In worst case scenarios, unbalances could occur exceeding permissible unbalanced load limits.

A simple solution is available for both problems: **dynamic load management (DLM)**

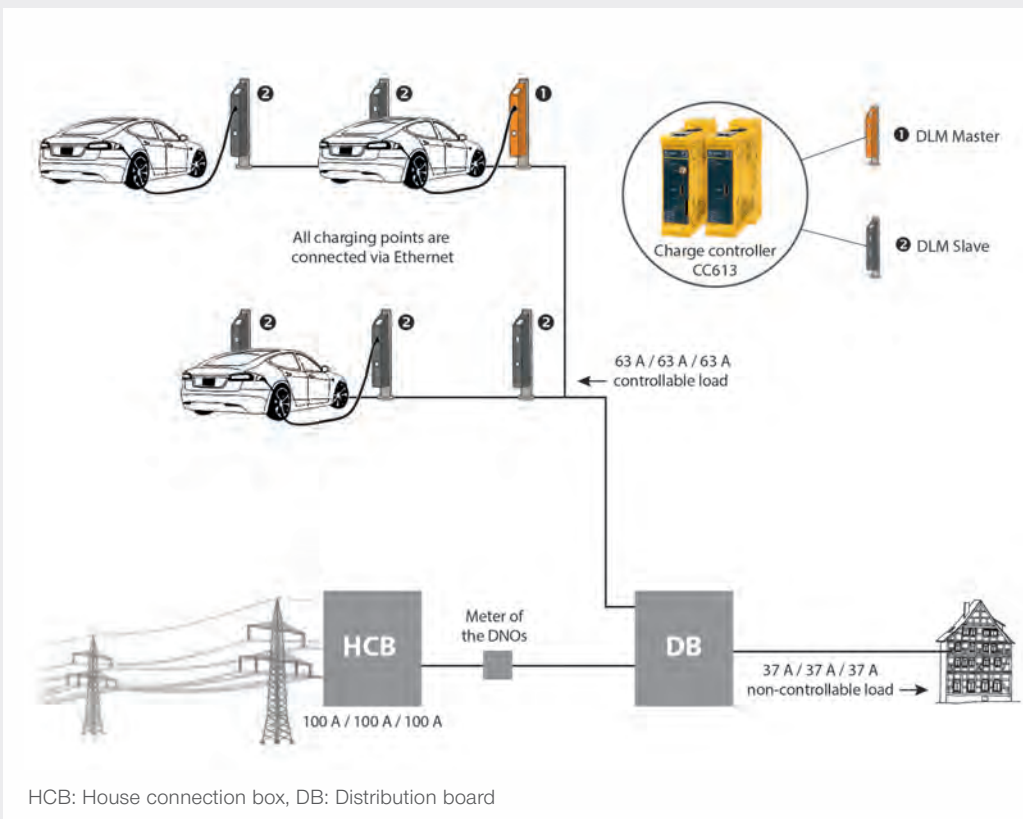
With dynamic load management, charge controllers communicate with each other to regulate the most efficient and optimal distribution of available power according to pre-defined rules. Unbalances are detected and corrected, maximum utilisation of power is guaranteed, cabling systems are not overloaded, and shutdowns due to overloads are prevented. The power grid remains stable. ■

*Dipl.-Wirt. Ing. Michael Faust
Bender Academy*



INFO

CC613 charge controllers from Bender monitor current consumption during charging with phase precision and can limit charging current by communicating with the electric vehicle. The maximum power available can therefore always be delivered without any unnecessary shutdowns.



BENDER Group

The Bender Group with its main office in Gruenberg/Hesse has 70 representations and 16 subsidiaries with nearly 1000 employees worldwide.

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Power in Electrical Safety

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