POWERnews

Q1/2024

Customer Magazine

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Safely supplied: Sustainable solutions for critical networks

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POWER news Q1/2024

Editorial

Dear Reader,

In the midst of current debates about the sluggish expansion of electricity grids and the procurement or connection of primary energy sources, we often overlook the fact that numerous companies are currently actively investing in the modernisation and expansion of the critical infrastructure facilities, grids and processes they operate.

In this issue of POWER news, we will focus precisely on these projects. One of these projects is the expansion of the 450 MHz network, which serves as a wireless communication and telecontrol platform for operators of critical infrastructures. This expansion ensures that energy supply companies can maintain the telecontrol processes for managing their critical infrastructures, even during a blackout. In accordance with EU Regulation 2019/941, power supply systems must be able to reliably supply these transmitter sites with energy for a bridging period of 72 hours.

A project in Munich shows how a newly constructed, state-of-the-art transformer station can secure the energy supply for an entire city district. At the same time, in line with the energy revolution, it meets the objectives for a sustainable energy supply for e-mobility and heat pumps. The modern auxiliary power supply in particular is essential to safely operate this substation. It enables remote access to the control room even in the event of a blackout and thus contributes to secure, continuous grid operation.

Current measures taken by industrial and service companies also prove that smart power supply solutions can master both the challenges of the energy revolution and the safety of mission-critical processes. Find out more about the automotive supplier that elegantly combines economical peak load management and maximum security of supply using one of BENNING's hybrid UPS energy storage systems. In another article, we report on why a shipping company has chosen our solutions for safety at sea.

Safety and efficiency are also the focus of our interview on the new BENNING Test Equipment Cloud – an online application that significantly simplifies and streamlines the workflows and administrative processes previously required for testing mobile equipment in accordance with DGUV V3.

I hope you enjoy reading our latest issue and look forward to your feedback.

Best wishes,
Dietmar Papenfort

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Contents

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When endurance and performance make the difference: SLIMLINE NG systems for the 450 Mhz network

BENNING power supply systems play a vital role protecting the critical infrastructure of NetCologne's telecontrol radio network

Protecting and modernising critical infrastructure is one of the most important tasks in the upcoming years.

One component is the nationwide roll-out of the 450 MHz network as a wireless communication and telecontrol platform for operators of critical infrastructures. The NetCologne teleccommunications company is also involved in the construction of this network and relies on BENNING SLIMLINE 3000 NG systems for the emergency power supply of the transmitter and repeater stations. →

NetCologne

NetCologne offers products and services relating to Internet, telephone, television and mobile telephony, particularly in the greater Cologne, Bonn and Aachen areas.
With over 29,000 kilometres of laid cables and a continuous expansion, the company's own fibre optic network is one of the most modern ones in Europe. More than half a million private and business customers make NetCologne the largest regional telecommunications provider in Germany. NetCologne has also been carbon-neutral since 2022 and was recently certified as a climate-neutral company by the independent testing service provider TÜV-Rheinland.

Source: www.netcologne-unternehmen.de

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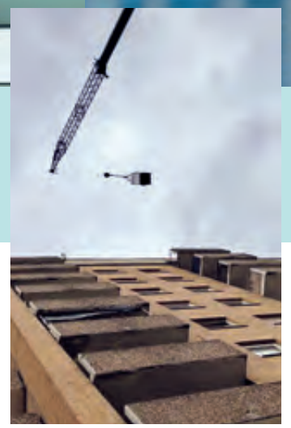
“Protecting and modernizing of the critical infrastructure are among the most important tasks of the coming years. The power supply systems used for this purpose must guarantee this reliably and ensure economical operation.”

Thomas Kerren,
BENNING Project leader



5 Photos: © Konstantin Ehchen for NetCologne

Smooth installation on site; the outdoor cabinets are set down and installed on an existing platform using a crane

Installation of the system technology and lithium batteries

The new system was installed back-to-back on the existing platform of the old power supply container. The small footprint of the new system compared to the old platform base is easy to see

An ideal combination: In industrial and infrastructure applications, telecontrol typically means that processes or machines are controlled and monitored from a remote location using wide area network technologies.

Such services are technically characterised by the highest demands on the devices and transmission paths used. Above all, this includes maximum security, low probability of failure and maximum availability.

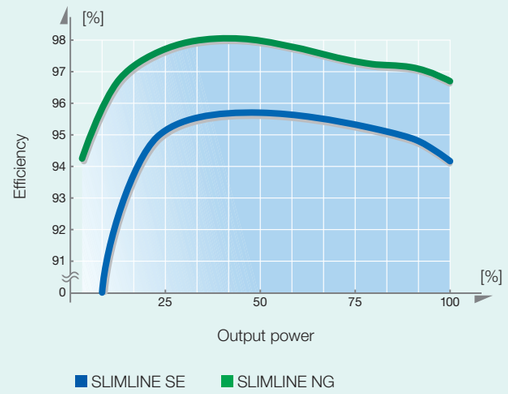
This also applies to the 450 MHz radio network that is being set up throughout Germany, which therefore defines “high availability by means of emergency power supply”*1 as one of its core characteristics.

This is precisely why BENNING offers individually configurable telecommunications power supplies based on the SLIMLINE 3000 NG series of rectifiers. They cover the entire bandwidth of mobile radio applications and successfully protect the entire transmission technology against network faults or failures.

SLIMLINE 3000 NG – with a few extras

In order to meet the specific requirements of NetCologne in connection with the 450 MHz radio network, BENNING supplied customised systems for 24 transmitter stations and five radio relay repeater stations last spring.

The 48 V DC power supplies are configured in outdoor cabinets and equipped with lithium batteries for 72 hours of backup time. For this purpose, 32 batteries with 150 Ah each were connected in parallel. →



Efficiency in relation to output power

Maximum energy efficiency with minimum user space

In this series of highly efficient rectifiers, the power loss that occurs when converting energy from alternating current to direct current has been reduced by up to 30 per cent compared to the previous model. At the same time, the volume of the rectifiers has been reduced by more than 33 per cent.

Particularly impressive is the fact that the SLIMLINE series operates with an efficiency of up to 98 per cent in the load range from 20 to 90 per cent. With the multitude of systems that a telecommunications service provider operates in the field, this results in high savings.

*1 www.450connect.de

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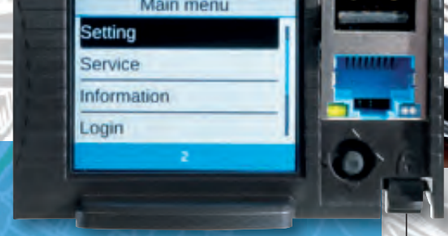
The entire outdoor package consists of five system cabinets. The power cabinet in the picture on the far left offers generous space for the power electronics, the transmission technology and the fibre optic connection. Underneath the SLIMLINE rectifiers, also designed in 19" construction, are the basic sending station (3 U) and the switch for installation on the fibre optic network.
The remaining four cabinets each hold eight 150 Ah/48 V LiFePO batteries, providing more than enough capacity for a bridging time of 72 hours with a payload of 2.3 kW

The telecoms outdoor systems for NetCologne include, among other things:

- A 48 V DC system with 3 SLIMLINE 3000 NG rectifiers (9 kW in total) and six spare plug-in units that allow the power to be increased to up to 27 kW
- An MCU 3000 module integrated into the 19" rack for remote monitoring and control
- The AC and DC distributions
- Sufficient space for the customer's technology, such as the base transmitter station (BTS), the radio relay technology (RIFU) and the fibre optic connection (GF)



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The 19" 1U SLIMLINE Carrier can accommodate either four 48 V and 3000 W rectifier modules combined with a SLIMLINE Controller or five rectifier modules with an output of 3000 W each

(above) The SLIMLINE controller offers remote monitoring and operational safety in the tightest of spaces. This can be inserted into the SLIMLINE Carrier as a module for small outputs. It can also be controlled using a mobile device. This demonstrates the excellent interface design of the MCU 3000. It is intuitive, object-orientated and to the point

For this purpose, the batteries are equipped with a modified battery management system (BMS) and their own DC/DC converter. In this way, it is possible to keep the voltage steady, down to the lowest discharge point, and avoid excess voltage.

This convincing overall concept made it possible to realise the required bridging time with 2.4 kW continuous output in a very compact outdoor system weighing just 3.5 t.

EU requirements fulfilled

The background: In the event of a blackout, the power supply system used must be able to provide a payload of 2.4 kW from the batteries for the base transmitter station, the radio relay technology and the fibre optic connection for a bridging period of 72 hours.

In addition, the power storage unit can be fully recharged in just 26 hours, which BENNING has achieved by using three SLIMLINE rectifiers with 3000 W power each.

The bridging time of three full days and fast charging are mandatory under EU Regulation 2019/941. The aim is to ensure that the energy supply companies can maintain the telecontrol processes for controlling their critical infrastructure systems even during a blackout.

Impressive system benefits

In addition to their conformity with the extremely demanding EU specifications, the DC power supply systems won over NetCologne with their principle-related advantages. These included its modular design, simple redundancy and flexible scalability in case more power will be required at a later date.

In addition, the modular component concept significantly reduces the time required to install or maintain the telecoms power supplies and, together with the high level of efficiency, contributes to economical operation and a low TCO (total cost of ownership). Last but not least, all modules can be hot-pluggable during operation, eliminating downtime for maintenance or servicing.

Smooth processes

Thanks to the forward-looking and professional sourcing of batteries and electronic components as well as the rapid order processing, NetCologne has been able to utilise the advantages of BENNING systems since April 2023. The quick communication channels between NetCologne and BENNING also played their part.
This meant that only around 14 months passed between the initial offer, the award of the contract and commissioning – including project planning and engineering with detailed adjustments to the specifications as well as various downstream optimisation processes.

The co-operation with HKT GmbH, the company commissioned by NetCologne for the installation, went just as smoothly. Since commissioning and maintenance were in the hands of BENNING and will be again in the future as part of a maintenance contract, maximum availability was and is also guaranteed in this respect. ◻

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Scan the QR code for further information

Safe and secure cruising at all times – with the ENERTRONIC modular SE on the high seas

Cruise specialist relies on high-availability, modular UPS systems from BENNING

The shipping company operates a total of more than 20 cruise ships and thus very complex systems that depend on UPS systems of the highest reliability to ensure the safety of their passengers.

And now, since spring 2022, another ship of its fleet has been equipped with an ENERTRONIC modular SE from BENNING.

As floating small cities, these cruise ships have a self-sufficient power supply for the on-board energy infrastructure, which must be classified as particularly critical both in port and especially on the high seas.

Ultimately, a power failure on board would directly jeopardize the navigability and safety of the ship and all the people on board – not to mention the adverse effects on passenger comfort.

Because not only the navigation, control and communication systems and the normal lighting require electrical power, but also safety equipment such as fire alarms and emergency lighting.

This is the background where BENNING was able to demonstrate its competence and the quality of its solutions for an uninterruptible power supply (UPS). →

ENERTRONIC modular SE, 40 kW module

ENERTRONIC modular SE, 200 kW (5 x 40 kW)

ENERTRONIC modular SE,
200 kW

„“With an efficient and well-coordinated implementation of the project, we were able to meet the customer’s high technical and scheduling expectations.
The prompt, proactive approach of our engineers, starting with the initial onboard inspection, through the planning phase, to the installation, contributed significantly to this.
In addition, the after-sales service offered by BENNING provides real additional value, as it ensures that the UPS system will always remain in top condition throughout the product’s life on board.”

Alessandro Nalbone,
Managing Director, BENNING Italy

ENERTRONIC modular SE,
20 kW module

ENERTRONIC modular SE,
40 kW module

Smart integration

The solution recently implemented by BENNING on the cruise ship is an ENERTRONIC modular SE UPS, designed with IP22 protection degree, with a total power of 200 kVA provided by five 40 kVA power modules with inbuilt N+1 redundancy.

To meet the special requirements on the 275-meter-long ocean liner, the UPS is equipped with the MCU 3000 (Monitoring Control Unit 3000) remote monitoring system, which offers extensive reporting and monitoring functions as well as standard interfaces for connection to common PC systems.
The MCU 3000 controller module is also capable of communicating locally with onboard services and (on request) remotely with BENNING engineers. The entire system is installed in the technical room on board the ship, more precisely in the Emergency Diesel Generator Room (EDG).

No “Single Point of Failure”

The UPS solution is characterized by maximum availability, hot-swap capability and a consistently modular design with decentralized architecture and static bypass lines within each power module – i.e. by a parallel architecture of the modules that effectively excludes any “single point of failure”.

For this purpose, all critical components including bypass and control units have been relocated to the module level and, in some cases, additionally designed with redundancy therein. To increase system availability, the implemented “Multiple Master” technology also enables each ENERTRONIC modular SE module to automatically switch to master or slave mode. The high power density also enables space-saving installation, which allows for the limited space on board.
In offering the ENERTRONIC modular SE UPS system, BENNING combines the advantages of maximum reliability and lowest repair times (MTTR) to create a UPS system that meets even extreme requirements for the availability and quality of a safe power supply.

Thanks to the use of high-quality components and the generous dimensioning of the components in the critical path, the UPS system is thus optimally designed for critical application environments.
This applies to the use in cruise ships as well as to the areas of process automation and telecommunications or the gas, oil & petrochemical industry.

Lowest operating costs

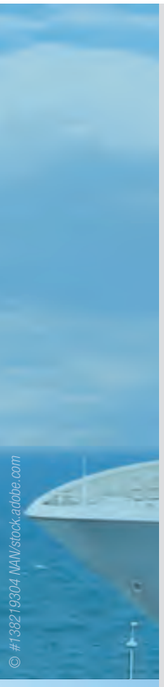
Due to the scalability and the very high system efficiencies, even at partial load, particularly low ongoing operating costs are possible with the ENERTRONIC modular SE without restrictions in terms of voltage quality and system availability.

From the cruise line’s point of view, the ENERTRONIC modular SE’s readiness for certification by Bureau Veritas or other marine certifiers spoke in favor of the BENNING solution, as did the advantage that the new UPS system could be optimally integrated into the space occupied by the previous system.

With these outstanding features, BENNING convinced the client that it could offer the optimal replacement for the original monolithic UPS that had been used by the ocean liner since its maiden voyage almost 20 years ago. →

ENERTRONIC modular SE – the profile

- Maximum availability through:
  - Very high reliability
  - Very low mean time to repair (MTTR)
  - “Hot swap” modularity
  - Modular self-configuration for N+1 redundancy
  - Black-start capability
- No single points of failure through:
  - Redundant critical circuits in each module
  - Multi-master operation
  - Decentralised parallel architecture
- Lowest running costs through:
  - Up to 96 % efficiency in double conversion mode
  - Up to 99 % efficient in “super efficiency” mode
  - “Pay as you grow” scalability
- Highest power quality through:
  - UPS classification VFI-SS-111
  - Input current total harmonic distortion (THDi) < 3 %
  - Input power factor ≥ 0.99 (adjustable)
  - Very high overload capability



The Monitoring and Control Unit (MCU) supports a range of protocols and interfaces. The MCU 3000 system controller, which can be installed in the cabinet door of higher-output power supply systems, has a 10” touchscreen

Grown customer confidence

However, BENNING was able to gain points not only with the specifications of its technical solutions, but also through customer orientation and prompt as well as reliable service. The excellent experience dates back to the very first contact between the cruise specialist and BENNING Italy.

The cruise line needed technical support for another ship in those days and was pleased with the responsive and positive resolution of the issue. Meanwhile, these BENNING systems have proven their long lasting operating life and easy serviceability on board.

Just-in-time installation

A new dimension of cooperation arose when, in 2021, BENNING was invited to bid for the renewal of the UPS on the ocean liner, which has been used in cruise operations for almost two decades, – and was promptly given preference over strong competitors.

In the course of implementation, BENNING was able to master a number of scheduling and logistical challenges.

For example, between the start of planning – during which BENNING engineers analyzed the old system on board the ship – and the installation of the new ENERTRONIC modular SE UPS, there was only around half a year.

The installation itself turned out to be particularly time-critical. There was only a short time slot available for it during the cruisers stay in dry dock in Malta in March 2022.

This meant that all processes had to be perfectly coordinated – which was achieved in full: the available time frame, especially for the work on board, was kept perfectly and the UPS system was properly commissioned.

Continuing on course for cooperation

This successfully completed project and the convincing performance of the ENERTRONIC modular SE during the further operation of the ocean liner, convinced the cruise line to award further projects with BENNING solutions. The client and BENNING are thus continuing on a course of partnership and the highly available, reliable ENERTRONIC modular UPS systems are contributing to safety on the high seas. □

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The UPS system is scalable and grows with your demands

From now on, no more problems at peak loading: peak shaving and UPS functionality in one

Read on to find out how a BENNING energy storage system has provided technical and financial security for a major automotive supplier

The UPS energy storage system was installed in two system containers and delivered by HGV as a turnkey solution

Why content yourself with just one advantage when you can have two of them?
This was clearly the view taken by an international automotive supplier – having several sites in Germany – when it decided to opt for BENNING's hybrid UPS energy storage system: "ENERTRONIC modular storage system". After all, this is how the Company obtained more than just a powerful UPS: rather, it was first and foremost a valuable tool for effective peak load management, with all of the associated positive benefits.

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The whole debate concerning electricity prices to industry hinges on the fact that "end users who make particularly intensive use of the grid" (mostly companies with high energy consumption) are already enjoying special conditions at the present time. Under §19, para. 2, StromNEV (= German electricity network levy regulation), companies whose annual consumption comes to at least 7000 operating hours and 10 GW are able to negotiate their own specific grid charge.*1 So that these "intensive grid users" do not jeopardise the related concessions, they are prohibited from causing any load on the grid as the means of avoiding falling short of the figure of 7000 hours. In the past, this could sometimes cause a situation where major consumers suffered unscheduled shutdowns whilst their production operations were ongoing. Counterintuitively, though, this procedure has a repercussion on complicated manufacturing processes which are designed for the maximum of productivity and efficiency – and which presuppose an uninterrupted flow of operations. This is a set of circumstances which makes it increasingly difficult to intervene in the interests of avoiding peak electrical loads – and which comprises major economic risks.

Load smoothing from the energy store

This is a challenge which the automotive supplier had already succeeded in resolving, a couple of years back, using a BENNING solution – the ENERTRONIC modular UPS storage system – at one of its sites. Since then it has come to represent a reference project. The system can be configured individually and combines the energy store, a UPS system and an EMS (Energy Management System). It has beneficial effects when it comes to efficiency, operating costs and reliability of supply. After all, it enables a totally different response to short-term loading peaks, namely: the injection of additional energy from the UPS energy store, and this can aptly be characterised as classic peak shaving. This approach makes it possible to save production plant from suffering unscheduled switch-offs.
The overall result provides for enhanced productivity, improved product quality and less wear & tear on plant.

Benchmark: a threefold improvement in the capacity for absorbing overloads

Taking account of experience to date, and the combination of other positive characteristics, it made sense (in 2022) for a further works belonging to the same group – based in a location in Brandenburg, which has a rich industrial tradition – to enquire about the possibility of having a UPS EMS (Energy Management System) modular storage system installed by BENNING.

A turnkey product in system containers

The initial requirement – in the same way as in the above-mentioned reference project – was to integrate the system into the existing energy infrastructure. Initial studies worked on the assumption that it would be possible to install the system in the existing premises.

But it became clear, in the course of further planning, that it was not possible to accommodate a modular system – comprising the output required in this application and in this storage capacity – without considerable additional expense concerning the existing building.
The most cost-effective alternative appeared to be to supply the installation in system containers – a solution which has been applied with no problems at the Brandenburg site, thanks to the existing outdoor space available, the excellent installation conditions and the benefit of shorter cable distances.

The adopted turnkey solution, which was housed in two containers – one measuring 20 feet long and the other measuring 40 feet long – combines the advantage of a compact, safe and cost-effective means of accommodating all of the system components together with straightforward future expansion options (pay as you grow) thanks to planned-in reserves.

Stored energy is a source of safety

From the outset, the planning work assumed that PV (photovoltaic) power, together with the UPS function, would be utilised. UPS operation in particular is a source of safety in terms of energy. It offers a diversity of options which are exceptionally important in the event of a prolonged grid failure. Such options include the provision of reliability for communications and safety media, crucial IT areas, process control and emergency lighting in the production areas. And there is the option – in conjunction with a PV system – of setting up an independent island grid as an additional, permanently available safety measure.

It pays to have a good reputation

BENNING's first hybrid UPS energy storage system had made such a good name for itself in the automotive supplier's group that the decision to opt for BENNING – when the question of investment in an energy storage system for the site at Brandenburg was discussed around the table – was clearly a logical step to take. Accordingly, the positive experience gained in the reference project with regard to the system's quality and versatility – together with the expertise, depth of advisory capability and of support for planning from BENNING's engineering, sales & service team – played a major part in the decision. →

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*1 https://www.bundesnetzagentur.de/DE/Beschlusskammern/BK04/BK4_71_NetzE/BK4_71_Ind_NetzE_Strom/BK4_Ind_NetzEntg_Strom_basepage.html

The 7000-hour rule: advantages – but with a catch

In order to be able to exploit the advantage of a “special individual grid charge”, the operating hours figure – i.e. the quotient obtained from calculating annual energy consumption (> 10 GW hours) and the maximum load peak arising within the integral period of 15 minutes – has to be in excess of 7000 hours. This rule has to be fulfilled as the prerequisite for enabling energy-intensive industry to claim the considerable reduction in grid costs up to a maximum of 20% of the regular rate.
Due to process considerations, however, the course of production may give rise to loading peaks entailing a quotient coming to less than the 7000-hours figure. In that event, it would not be possible to claim reimbursement of the network charge for the whole year.
In other words, the functions expected of the UPS storage system include its having to cap these peak loads, i.e. it has to guarantee “peak shaving”.

The 40-foot container is hoisted into position

ENERTRONIC modular storage system: 19” rack

ENERTRONIC modular storage as installed in containers

The MCU (monitoring & control unit), with its diversity of supported protocols and interfaces, makes it possible to connect the system to the EMSs developed by the widest range of software manufacturers. The system controller (MCU 3000) integrated into the power supply system cabinet door comes with a 10.4” touchscreen

For decades, now, BENNING has also acquired the reputation of being a can-do, reliable partner for industrial electrical power systems. It was particularly important for the client – specifically in these times of disruption to supply chains, not to mention political tensions – to have a partner which could deal professionally with these challenges but without jeopardising quality and the ability to deliver.

Benchmark: a threefold improvement in the capacity to absorb overloads

What BENNING had achieved was to produce a comprehensive, detailed concept based on the stipulated benchmark parameters. It included the electrical system components, integration into containers, the installation of the containers themselves and their connection to the low-voltage infrastructure and the client’s own EMS (Energy Management System).

Simultaneous UPS and energy storage operation, the threefold benefit in overload capability (short-circuit capacity) in the power output and electronics, the battery system with discharge rates in excess of 3C and more than 10 000 full cycles: these are some of the prominent features in terms of the benchmarking of industrial hybrid UPS/energy storage systems.
The system also features a wide range of UPS and storage applications offering the following benefits consistent with the requirement for economic, flexible operation: in addition to peak shaving and the provision of primary control power, it is possible to store energy from alternative sources (e.g. photovoltaic energy, wind power) with the result of minimising the costs of procuring energy. Furthermore, the storage system can supply rapid charging power for electric vehicles and – in the event of a blackout – provide crucial loads with grid-independent, reliable supplies of power thanks to the integrated, fully active UPS function.
The overall concept that had been developed by BENNING’s team was rounded off with a detailed timeframe and cost plan. The proposal they came up with fulfilled every client requirement, providing the automotive supplier with cost-effective peak shaving combined with UPS functionality at the highest level. Once the order had been issued, the product was delivered on the basis of division into three batches, with commissioning planned for March 2023. Finally, factors that were crucial to the investment decision were: manufacture locally in Germany; unparalleled quality; a long service life for the product; and the exceptionally long life-cycle support together with the cost-benefit analysis calculated by the client. In this context, the financial benefits from the investment were compared with the costs and the availability of the hybrid UPS energy storage system. The findings achieved included the advantages resulting from a modular system architecture: comprising straightforward redundancy structuring, flexible expansion options and the multifunctional design. These were the factors which prompted the purchase decision.

Smart solutions to meet the energy transition

This project is further proof that now – and in the future – BENNING develops innovative, sustainable products that meet the challenges of the energy transition and the associated market requirements. We’re referring primarily to the products in themselves: for example, the ENERTRONIC modular storage unit which many companies utilise purely as a UPS system and which had already been developed on the basis of a dedicated VFI-SS-111 UPS. This can be upgraded to a hybrid UPS energy storage system.
And the same applies – on the other hand – to the incorporation of regenerative energy sources. Here, particular attention is paid to grid-independent island solutions (power island) which can supply electrical power in conjunction with photovoltaic sources needing practically no external grid connection. This component is essential for any companies requiring not only storage-supported operation for the optimisation of energy costs (or grid stabilisation) but also a reliable supply of power: free of interruption and available to cover an extended blackout period. □

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Scan the QR code for further information

ENERTRONIC modular storage: peak shaving and UPS functionality in one

20-foot container for power electronics, equipped with:
- Raised floors including the mounting frame for the power electronics
- 4 x 200 kVA (UPS) ENERTRONIC modular storage inverter cabinets
- AC supply connection panels with supply connection protection corresponding to AR-N 4105 / 4110
- AC UPS consumer distribution (on safe bars)
- Air-conditioning systems
- Pressure relief valves

40-foot container for the lithium battery system, complete with:
- Base frame for battery cabinets together with reserve space for future expansions
- 16 battery cabinets each with 50 kWh capacity
- DC battery connection fields with battery controllers
- AC auxiliary distribution (on safe bars)
- Air-conditioning systems
- Pressure relief valves

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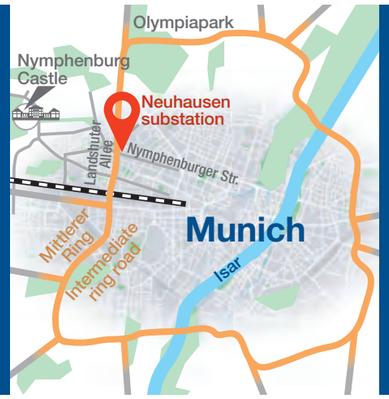
System components to meet the energy transition in the Munich conurbation

Adapting distribution grids to supply energy for EVs, and heat pumps in the greater Munich area



In Munich, the regional capital of Bavaria, the “Mittlerer Ring” (intermediate ring road) – which is needed for almost all of the traffic in the area – is to receive a new, modern and advanced transformer substation as commissioned by Stadtwerke München Infrastruktur GmbH & Co. KG (abbreviated to “SWM”). SWM’s extensive investments are intended to ensure a future-oriented power supply for the Neuhausen district, which is popular as a residential and business district, for decades to come.

Munich’s Mittlerer Ring or intermediate ring road, whose circumference extends to more than 29 kilometres – and which is Germany’s worst traffic system in terms of snarl-ups – is known in the city as a hot-spot for near-limit levels of atmospheric pollution. Consequently, this is precisely where compliance with limit values of pollution will depend on decarbonising both individual vehicles and those used for local public transport.

60 metrology stations dotted around this ring road are permanently monitoring pollution to the air which people are having to breathe. The information provided by this durable database may give rise to the need for restrictions on emissions-critical vehicle traffic in this environmentally mapped district of Munich. →

Munich at night, showing the Olympiapark and a section of the inner ring road with its habitually busy traffic

Munich's Neuhausen district

The Neuhausen district is located on part of the intermediate ring road. The city's image is enhanced by the impressively substantial architecture of the residential houses and business buildings around the Rotkreuzplatz (a business quarter) and along the Nymphenburger Straße.
The surrounding streets are characterised by spacious, tree-lined residential areas and characteristic family houses dating from the beginning of the last century.

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Decarbonisation and the energy transition

Charging stations for EVs, and heat pumps to provide heating for residential and commercial buildings: these are objectives to which the city's infrastructure must be adapted in order to fulfil the targets posted for the benefit of the environment and of the human population. One of the crucial components of this system is Neuhausen's newly constructed transformer substation. The new building comes equipped with the most advanced technology, replacing the previous substation. Consequently the space it requires is just one third of the previous plot – and the project is configured to meet the challenges entailed in the provision of environmentally friendly power. So, it can be considered a meaningful step towards that urgently needed energy transition and towards de-polluting the local environment for the residents. In the overall context of the building project, planners stipulated that the complex of buildings should enhance this well-greened district of the city, by way of a harmonious integration. And this was taken into account in the technical design of the whole frontage, such that the outline of the building, once completed, will be grown over with wild vines: a pleasing prospect for those passing by.

Provision of auxiliary power supply

A stable, fully secured supply of power for the internal infrastructure: essential prerequisites for the operation of a substation. The circuit breakers and disconnectors in the high and medium voltage, the protective devices as well as the measurement and control technology must be supplied without interruption with electrical power of the highest quality. →

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New substation project in Neuhausen

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The Neuhausen substation, which takes up a plot of land measuring 46 by 14 metres – and which presents a frontage 13 m high – is located directly on the Mittlerer Ring intermediate ring road and will be in the day-to-day sightline of thousands of people

Stadtwerke München ("SWM")
Munich City Authority

Responsibility for people, for resources and for the environment
The Munich city authority, being one of Germany's largest municipal corporations, has to supply Munich city and the greater Munich area with electricity, gas, remote heating, remote cooling and fresh tapwater: 24/7.

From day to day, SWM (Munich City Authority) is shaping the future of Munich. The objective is to maintain and further develop the quality of life in Munich and the region. The expansion of renewable energies, innovation and digitalisation play a central role in this.

Investments in new technologies – combined with the expansion and modernisation of existing structures – will make the production, distribution and storage of energy fit to meet future requirements.

Sources: www.swm.de/stadtwerke-muenchen, www.swm.de/zukunft

> ***"BENNING has been recognised by Stadtwerke München (SWM) as a quality manufacturer in the power plant sector and in the area of distribution grids for many decades. Thanks to the partnership-based cooperation, we were able to provide the transformer station's own power supply on time for our project in Neuhausen. The man-machine interface with 10" touch display and the attractive cabinet design in particular demonstrate the high technical standard of BENNING systems and the company's innovative strength."***
>
> *Project management of SWM*

The battery system, configured for redundancy, ensures that the substation can continue to operate in the long term, even if there are disruptions to the external power supply

Susbtation's AC switching system as per IEC 61439

220 V and 60 V DC power supply system for the substation – with consumer distribution

It's absolutely essential to have an "auxiliary power supply" as the assurance of remote access to the control centre (and consequently the continuous operation of the network as a whole).
And it's equally essential to have a DC power supply – configured with long-term backup – in order to secure the public power supply in the event of critical grid conditions. After all, such blackouts could have perilous consequences for the population, especially in major conurbations such as Munich.

Most economically viable solution

BENNING took on the challenge of constructing a reliable power supply system for the highly modern Neuhausen substation. In June 2022, when the invitation to tender for the AC auxiliary switching system (with battery-supported DC power supply system) was put out, BENNING participated in the competition to win the order for the supply, installation and commissioning of all of the required components. In September 2022, SWM having conducted an intensive analysis of the tendered technical solution and taking account of the financial considerations, decided to award the order to BENNING in recognition of their solution, which was the most economically viable one.

Rapid planning, continuous execution

Over the weeks that followed, it was possible to hold discussions with the client's representatives responsible for construction, whilst the technical details around plant specification were discussed on the basis of local conditions. In this context, the designers paid particular attention to achieving precisely the right specification for the AC switching system, and this is crucially significant for all of the components of the transformer substation. →

DC switching system for 220 V and 60 V, configured in a user-friendly design

Having rapidly clarified the relevant details, BENNING was able, no later than by the end of October, to present the project team with the plant installation plan required for the configuration of the raised floor. In February 2023, once the detailed circuit diagrams had been completed, the approval documentation was submitted; and work began with construction of the plant on site.
And it was no later than by the beginning of July 2023 that works acceptance was awarded, following completion of the AC and DC power supply systems. This was conducted entirely as the client preferred it: on a time-saving basis – video-conferencing – thus avoiding the need for travelling.

"Just-In-Time" installation

It was necessary to stick to the stipulated, tightly scheduled project plan governing the on-site construction and commissioning, in order to make it possible for work to begin very promptly on all of the subsequent project stages. Accordingly, once the power supply systems had gained works acceptance, their massive weight and bulk meant that they had to be delivered on-site directly by articulated HGVs.
On-site plant installation began in mid-August, and was promptly completed in September, after approximately 4 weeks, to the entire satisfaction of the project management team.

With the formal acceptance procedure now also completed, BENNING had fulfilled all of the requirements entailed in the subsequent installation of the modern high-voltage switching system. ■

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Scan the QR code for further information

Claus Kirmaier,
Director, Southern Division,
BENNING

BENNING Test Equipment Cloud (BTEC) – A new approach to testing

Testing of portable equipment

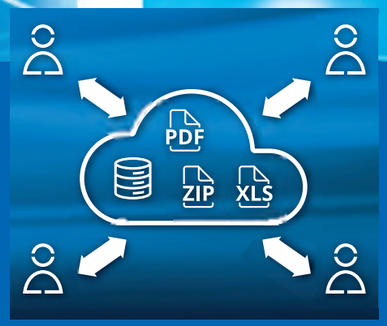
More and more electrical equipment is being used in both commercial and private applications. This increases the risk posed by faulty devices. Depending on the type of appliance and the damage present, this can even be life-threatening.

To counteract this risk, the inspection of electrical equipment in accordance with DGUV V3 has become increasingly important in recent years. At the same time, the number of mandatory tests is constantly increasing, causing an enormous amount of work for those responsible.

In times when skilled labour is scarce, and with a high volume of orders in the electrical sector, working efficiently is the key to success. BENNING wants to streamline the testing process for operating equipment with the BENNING Test Equipment Cloud (BTEC), a new innovative online application. Previously necessary workflows are optimised, administrative processes are significantly simplified and the overall process is therefore much more efficient.

POWER news (PN) spoke to Matthias Kamps, BTEC Cloud Product Manager at BENNING, about the opportunities that the BTEC Cloud offers in terms of more efficient processes for checking electrical equipment and the documentation required. →

BTEC



Multi-user capability: Several users can work in the cloud at the same time. Individual authorisations can be granted via flexible user role management.

"Working with projects" opens up completely new possibilities for organising work processes. For example, test orders can be easily prepared as required and sent out as a database.

Data can be shared directly from the cloud using a simple sharing function. Created documentation can be easily sent to the client via a download link.

Your databases can be uploaded or downloaded to the BENNING Test Equipment Cloud directly via the WLAN interface or the network connection of the BENNING ST 760(+) and BENNING ST 755(+) appliance testers.

PN: Mr Kamps, in the BTEC Cloud presentation you just showed us, you often spoke of "streamlining" working methods through the interaction of testing hardware and software. Which processes are you referring to specifically?

Kamps: After the test is before the test. The results must be documented and managed once the functional test has been completed, but at the same time, the planning stage of the next upcoming device tests begins. The same applies to both: Testing, data entry, maintenance, transfer and processing should be secure, intuitive and efficient.

If this is not the case, for example due to a lack of coordination between hardware and software or overly complex operation, this increases the time required. As a result, the overall result suffers and profitability decreases.

PN: You addressed user-friendliness and ease of use. A great deal of experience is required to develop innovative, easy-to-use devices. What does BENNING have to offer here?

Kamps: BENNING is proud to have been offering first-class appliance testers for many years, which are orientated towards the requirements of professional users. The current BENNING ST 760(+) and BENNING ST 755(+) appliance testers in particular stand out thanks to their ease of use, high flexibility and optimised test sequences.

PN: The devices you mentioned are known on the market for their quality and user-friendliness, and the existing software is well developed and established. Why are you now breaking completely new ground with BTEC?

Kamps: Our developers did not simply convert the existing software into an online application. Instead, a completely new concept was developed and systematically implemented. So I think it would be more accurate to say: BTEC offers our users a new approach.

PN: Can you please explain this "new approach"?

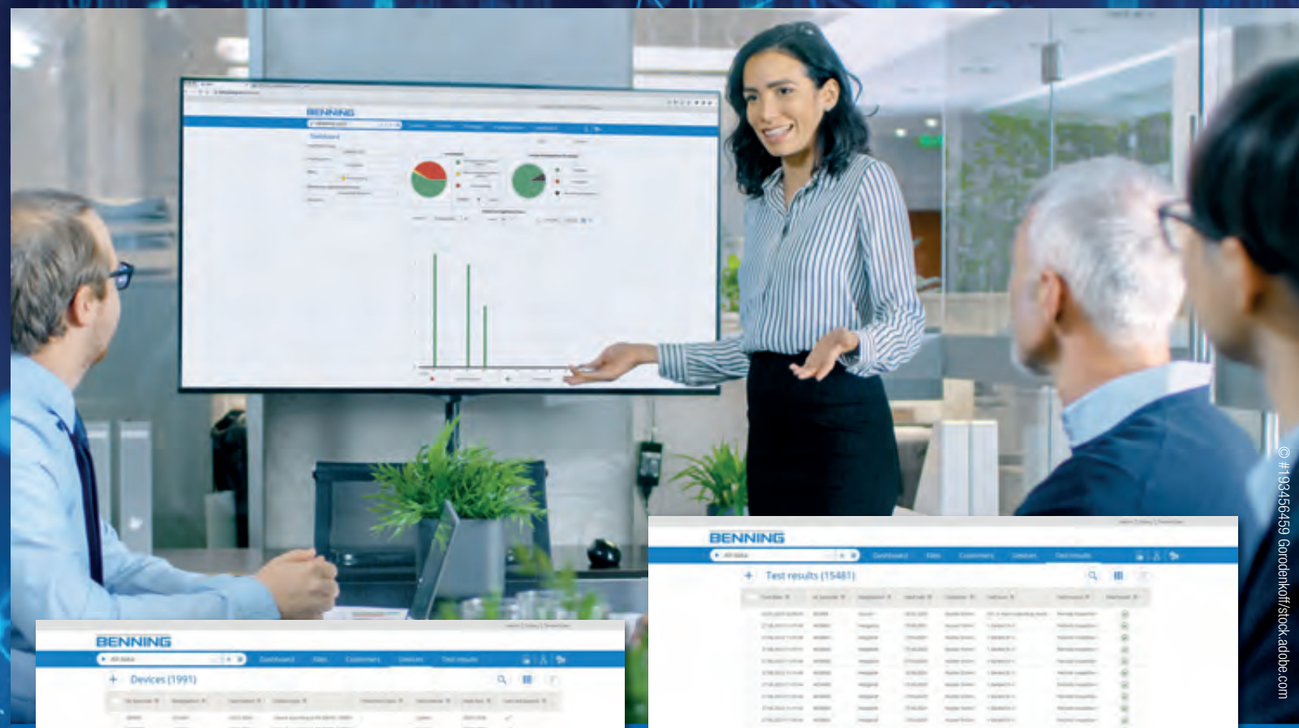
Kamps: Let's take a look at how easy and secure teamwork has become using the cloud. Thanks to the multi-user capability, several people can work on orders at the same time. Each employee receives personal access data to the cloud and can therefore record and generate data independently.

Each employee's authorisations can be individually adapted for this purpose. Thus, your data remains securely stored and every employee can be given the necessary freedom. All the data required for the order is available to the employee carrying out the work.

Managers always have a complete overview by assigning projects and devices individually to employees. In addition, a notification is sent automatically as soon as a device needs to be calibrated so that this can be taken into account in good time when planning orders and capacities.

PN: The "new approach" seems to be data transfer directly from the place of use to the cloud. What does this mean for the processes on site and for downstream documentation?

Kamps: The latest firmware for the BENNING ST 760(+) and BENNING ST 755(+) →



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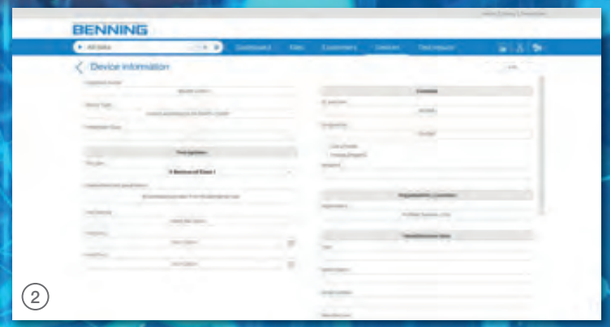

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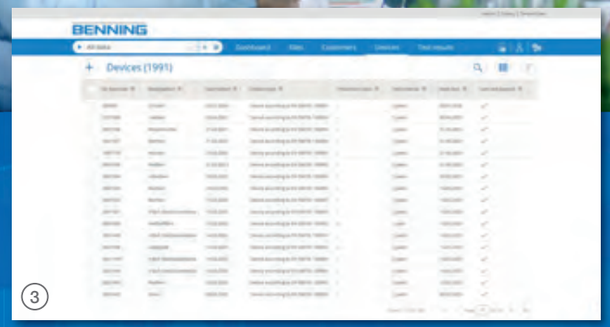

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④

1 – Clear file management
2 – Create and edit test items online
3 – Central overview of test items
4 – All test results available anytime and anywhere

appliance testers also considerably simplifies database transfer. The appliance testers can be connected to the Internet via WLAN / LAN and exchange data with the cloud quickly and easily. This eliminates the need for data transfer via an SD card or USB connection. As soon as the user has logged in with their personal access data, they can create and download the required database in the cloud. Once the tests have been completed, the new data is then uploaded to the cloud at the touch of a button. The data is immediately available online. You can start processing immediately in the office or create documentation on site using a mobile device. On request, customers receive a link to easily download their data records.

PN: The BENNING product portfolio offers a range of different appliance testers, some of which are optimised for specific applications. Are the current devices all compatible with the cloud?

Kamps: Our approach follows the motto: “Many appliance testers – one application.” For the first time, the new cloud application makes it possible to work flexibly with the current appliance testers from the BENNING range in parallel.

Using the app for Android and iOS devices, not only the test results of the BENNING ST 760(+) and BENNING ST 755(+) appliance testers, but also the test results of the BENNING ST 725, BENNING ST 720 and BENNING ST 710 mobile appliance testers can be easily added to the database. The data is simply entered via the mobile device. The mobile device’s camera acts as a barcode and QR code scanner to quickly identify the test specimen.

The cloud application is also being continuously developed. In this way, we guarantee our users future security and practice-orientated further development. This means that our customers can already look forward to the integration of further devices and features.

PN: Interesting, so ideally the data streams from all appliance testers should converge in a central database. Doesn’t this place high demands on the clarity of the presentation and data management in general?

Kamps: Although all test data is stored in the same place, the structure is simple and uncluttered. Flexible filter and search functions make it easy to find the information you need. In addition, the “Work with projects” function simplifies the test for complex company structures. The work processes involved can be streamlined and made more efficient, →

The dashboard clearly lists all important information. It provides answers at a glance, for example:

- *What is the status of my current project?*
- *Which devices are and will be overdue?*
- *What is the percentage of failed appliance tests?*
- *Where or at which customer's premises are audits due soon?*

Matthias Kamps, BTEC Cloud Product Manager, BENNING

as the creation of a project means that checks are divided into individual work packages and assigned to the relevant employees for processing / checking. Dashboards are available for a comprehensive, informative overview at any time.

PN: In our opinion, the applications and frequency of use are just as varied as the BENNING appliance testers, aren't they? How do you take account of these differences in your user and customer structure when using or licensing cloud services?

Kamps: Yes, you've got that right. The wide range of applications for appliance testing extends from in-house testing of a few items of equipment to service technicians or service providers with several thousand customers and test specimens. The BENNING Test Equipment Cloud offers a suitable service package for every requirement profile. Each package can be customised to meet individual requirements in a clearly structured display.

PN: Does this mean that each user chooses the package that best suits their needs?

Kamps: The BTEC scope of services differs in the number of users that are licensed, the number of test items to be tested and the size of the available storage space. This enables the optimum price-performance package for every requirement. – So yes, every customer chooses the scope of services that suits them best!
In addition, we are of course happy to offer so-called enterprise solutions in the event that the individual requirements actually go beyond the services specified in the packages. Our sales department then develops a customised offer together with the customer.

PN: Mr Kamps, thank you for the interview. You clearly conveyed how the combination of the BENNING ST series appliance testers with the BENNING Test Equipment Cloud (BTEC) will simplify the testing of equipment in the future.

Your approach, using balanced packages based on the number of users and not on a reduction in functionality, seems clear and fair. This makes the cloud application ideal for in-house repeat inspections as well as for service providers and service companies with very high test volumes. – Mr Kamps, do you have anything else to add, or do you wish to make a final statement about the "new approach"?

Kamps: With BTEC, our customers now have a forward-looking, smart cloud technology at their disposal. Those who use them consistently will streamline their work processes and at the same time raise inspections and documentation to a new level of quality. I would like to invite everyone: Try it now for three months free of charge! ◘

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Scan the QR code and test the new cloud solution now for three months free of charge

BENNING

Fairs, events and exhibitions
2024

LogiMAT
19.03. – 21.03. in Stuttgart/Germany

SHK+E ESSEN
19.03. – 22.03. in Essen/Germany

RENEXPO INTERHYDRO
21.03. – 22.03. in Salzburg/Austria

The smarter E Europe
19.06. – 21.06. in Munich/Germany

InnoTrans
24.09. – 27.09. in Berlin/Germany

belektro
05.11. – 07.11. in Berlin/Germany

GET NORD
21.11. – 23.11. in Hamburg/Germany

Solar Solutions Düsseldorf
27.11. – 28.11. in Düsseldorf/Germany

All details provided without liability

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