



# NEWSLETTER

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## CONTENTS

02-09

**BACS® 4 „NEW LINE“ –  
NEXT-GEN BATTERY MANAGEMENT**

CLICK!

10-13

**NEW 'AI HELP CENTRE' –  
INDUSTRY-LEADING SUPPORT  
MEETS AI POWER**

CLICK!

14-20

*US MARKET EXPERIENCE REPORT*  
**LITHIUM IN EMERGENCY POWER APPLICATIONS  
IN DATA CENTRES**

CLICK!

22-28

**NEW 'SMART BATTERY COMPANION APP V4' –  
A NEW ERA IN BATTERY DATA COLLECTION**

CLICK!

TECHNICAL DEEP DIVE

29-31

**DOUBLE-FASTON RING TERMINAL ADAPTER –  
FOR BACS® AND ALL OTHER TYPES OF  
BMS SYSTEMS**

CLICK!

TECHNICAL DEEP DIVE 32-40

**THE MULTIFUNCTIONAL USB PORT –  
THE USB INTERFACE ON THE CS141 AND  
BACS® WEBMANAGER HAVE BEEN EXPANDED**

CLICK!

41-42

**BACS® IN THE CROSSHAIRS OF PRODUCT PIRATES –  
COUNTERFEITERS FROM THE ASIAN REGION  
LAUNCH NEW WAVE OF ATTACKS**

CLICK!

TECHNICAL DEEP DIVE 43-53

**MAINTENANCE, UPDATES &  
SYSTEM ENHANCEMENTS**

CLICK!

# BACS® 4 'New Line' – Next-gen battery management

## THE FIRST BACS® C44 MODULE OF THE NEW GENERATION 4 IS NOW AVAILABLE

We are delighted to present the first sensor from the BACS® Generation 4 'New Line': the BACS® C44 sensor module, which is the first module in the new BACS® Generation 4. Besides the also brand-new measuring cables, the new C44 module is compatible with all other BACS components (bus cables, current sensors, etc.) and BACS® WEBMANAGERS, thereby seamlessly replacing the previous C40 module. The third-generation BACS® C40 module was manufactured in Europe for 16 years and was primarily used in lead-acid batteries with a 2-volt nominal voltage. More than 500,000 units were manufactured in Germany and the USA and brought to market.



## TODAY MARKS THE END OF THIS SUCCESSFUL C40 SENSOR, WHICH MADE BACS® A MARKET LEADER



The launch of BACS® 3 in 2010 marked a breakthrough in a battery monitoring market that had been stagnating for over 30 years. BACS® 3 is the reason why battery **management** systems (BMSs) are now widely accepted; it is the difference between a battery management system like BACS® or any other lithium technology system and other battery **monitoring** systems that have met with little success in the market and are really nothing more than a 'luxury'. However, both systems bear the abbreviation 'BMS' and are often confused. It was only with BACS® that this difference became clear, and today it is the reason why our clients decide to purchase BACS®.

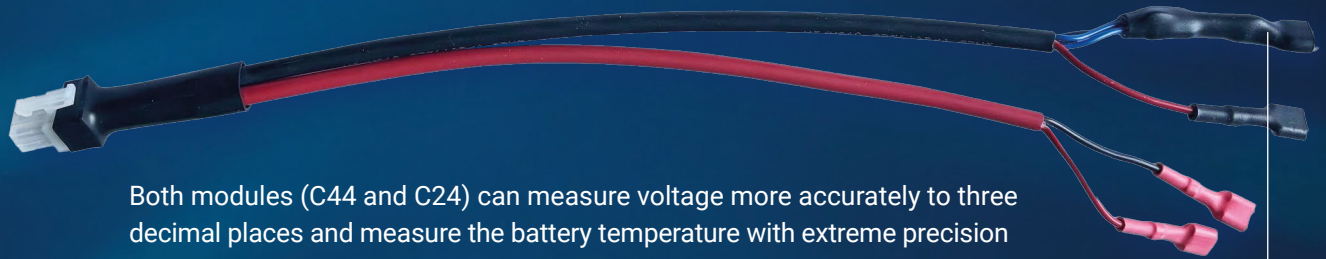
This 'management' function of BACS® was already known in 2004 as 'equalising' and later as 'balancing', which clearly distinguishes BACS® from 'monitoring' systems. Enhancements include improved impedance measurement accuracy and battery capacity measurement, which remains unrivalled to this day. These are now functions that are 'standard' for lithium batteries but were 'new' for stationary lead-acid batteries at the time. To this day, the BACS® 3 'Classic Line' remains the first choice for Western users of BMS systems. A key reason for this is that the BACS® WEBMANAGER is a 100% GENEREX product and is also the market leader in the vast UPS market. The UPS sector utilises BACS® technology in the 'CS141' network manager; this is identical in construction to the BACS® WEBMANAGER and is therefore significantly more widespread in modern safety-critical networks worldwide than any other BMS on the market.

**The successor to this successful BACS® 3 C40 module is now the BACS® 4 C44 module from the 'New Line'.**

# BACS® 4 'New Line' More compact and precise



THE NEW BACS® 'NEW LINE' MODULES C44 AND C24 ARE SMALLER THAN THE 'CLASSIC LINE' BACS® MODULES YET MORE POWERFUL



Both modules (C44 and C24) can measure voltage more accurately to three decimal places and measure the battery temperature with extreme precision by positioning the temperature sensor directly on the negative terminal of the battery via the BC6 test lead. This complies with the EN 60896-21 standard and means that, together with the more precise impedance measurement, the capacity measurement has also been significantly improved compared to what was possible with the BACS® 'Classic Line'.

Integrated  
temperature  
sensor

## EASY INSTALLATION AND ELECTRICAL SAFETY

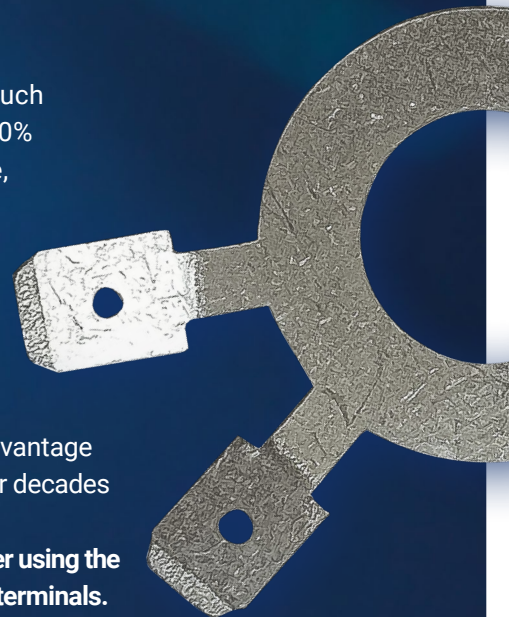
Thanks to the new super-flexible BC6 test leads, installation is much easier than before. As always, all cables are halogen-free and 100% tested, but there is now increased robustness with the BC6 cable, because there are no longer any fuses integrated into the cable.

## NEW GENEREX TERMINAL OPTIONS SIMPLIFY INSTALLATION

The new double-faston adapters for battery installers are another advantage of BACS®. Although these double-faston adapters have been in use for decades as part of the 'Classic Line' in the USA, they are hardly known in Europe.

**We recommend our experienced BACS® installers once again to consider using the new double-faston adapters by GENEREX instead of the previous ring terminals.**

The measurement accuracy is now on par with that of ring terminals, but installation is significantly easier when setting up new battery systems and for retrofits.



*For the user, this means: faster installation, consistent contact quality and reduced risk of connection issues during operation.*

# BACS® 4 'New Line' Maximum electrical safety

THE ELECTRICAL SAFETY OF BACS® IS ONE OF THE MOST IMPORTANT ADVANTAGES OF OUR PRODUCT

With two integrated high-voltage-resistant 1000-volt fuses



## WHY WE CHANGED THE PREVIOUS DESIGN:

In BACS® 3, this objective was achieved through two sophisticated fuses that were built into the cable and calibrated and then welded in place after manufacture. These fuses in the test lead have made BACS® 3 the market leader. **No other BMS on the market can offer high-voltage protection with automatic disconnection whilst still measuring impedances.** Since the introduction of this sophisticated technology 16 years ago, there has not been a single fire caused by BACS® modules involving faulty batteries. This is a genuine problem with all other BMS systems, which in the event of a fault, are known to heat up quickly and can accelerate a fire. That is not the case with BACS®.

### But this technology also had its drawbacks

The BC4 and BC5 test leads came with two calibrated fuses and were expensive, and because of the fused fuses, the stiff halogen-free cable was difficult to lay. Furthermore, these cables were susceptible to rough handling, as is common on construction sites. This often resulted in the fuses breaking, meaning a new cable had to be procured, as the fuses cannot be replaced.

**The BACS® 4 no longer has these drawbacks**, thanks to a remarkable feat of engineering by our GENEREX developers: two new fuses are located on the circuit board inside the housing, replacing the two fuses previously used in the test lead. The potential problem of an electrical arc being generated when the fuse trips has been resolved, meaning that a fuse can now finally be installed in the housing of the BACS® 4 circuit board, and it is still possible to protect it against the highest voltages and currents without requiring a long arcextinguishing distance as was previously the case. **The most important safety feature of BACS® is also in Generation 4. It is significantly smaller, is integrated into the housing, and is replaceable in the event of a fault. This design makes the BC6 test lead significantly more flexible, robust, and therefore even more cost-effective.**

The new generation addresses these weaknesses consistently.



Despite the new, super-flexible test leads, electrical safety remains at the highest market standard. Two high-voltage fuses ensure maximum reliability and protection.

# BACS® 4 'New Line' Top balancing and max. efficiency

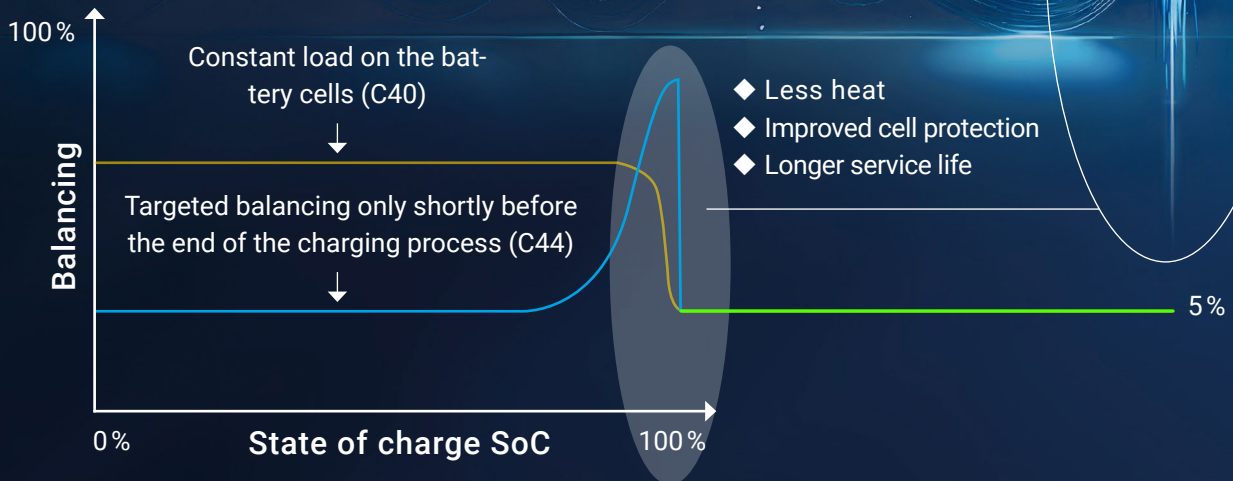
## THE PROVEN BALANCING SYSTEM HAS BEEN OPTIMISED WITH THE AIM OF IMPROVING EFFICIENCY

Previously, a BACS® module had to have 'cooling fins' to dissipate heat from the housing during the equalising phase. The downside of this phase was that dust and dirt could get onto the circuit board. Consequently, the circuit board was meticulously protected by a coating process, but not all areas could be coated, and the circuit board was expensive to produce.

The new BACS® 4 module uses 'top balancing', an optimised balancing method that originates from lithium technology and generates less heat. This reduced amount of heat that is generated can now be effectively dissipated via the housing, and cooling fins are no longer necessary. This results in an improved protection rating.



*BACS® 4 modules comply with the IP62 protection class, providing protection against dust and splashing water.*



# BACS® 4 'New Line' Improved mounting/status display

The BACS® 4 module once again features two Velcro strips to position it on the battery or on the new BACS® DIN RAIL clips



Removing the Velcro strips reveals two guide rails, allowing the BACS® module to be easily slid into and secured within a SMART BATTERY.

The visual status indicator on the BACS® module has also been improved. It features the familiar horizontal LED, as well as a vertical LED that indicates the operating status. Regardless of the installation method, the LEDs are always clearly visible and immediately show battery technicians which battery has exceeded its threshold values.



# BACS® 4 'New Line' Modern battery technologies



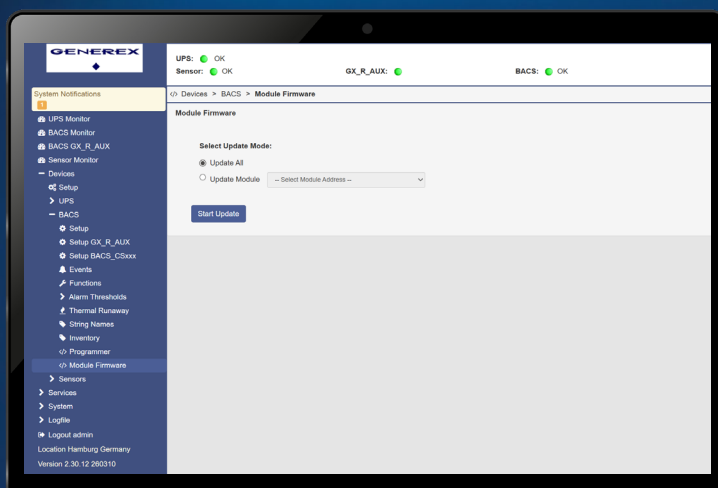
## THANKS TO A WIDE MEASURING RANGE

BACS® C44 'New Line' is a wide-range module that is ideal for modern battery technologies such as sodium-ion, lithium titanium oxide, lithium ferro, manganese, and all other cell types that follow the technical design of lithium-ion batteries and use cell voltages that can be deeply discharged to well below 1 volt. In addition, 'wet cells' with a low voltage range, such as NiCd and NiZn cells, can now be measured down to below 0.7 volts using the C44. This low voltage range is important for recording the behaviour of the cells during discharge right up to the discharge limit, something which was previously not possible with competing BMS units on the market below 1 volt. This changes with the C44. Now, reliable measurements can be taken down to 0.7 volts; it is only below this level that the measured values fall outside the measurement tolerance. However, the C44 is also ideal in the high cell voltage range and now covers the previous voltage range of the C41 module from the 'Classic Line' of 4 volts. Naturally, the C44 is also ideally suited for the existing BACS® domain with all kinds of lead-based battery types from every manufacturer and continues the success of the C40.

**Upgradeable:** The BACS® 4 modules can be upgraded via the BACS® bus, ensuring future-proofing. We currently supply BACS® 4 modules that are compatible with the latest BACS® components. In early 2027, the new BACS® high-speed bus will be launched, providing a significantly faster data connection to the modules and increasing the number of battery cells in a BACS® system from the current 512 cells/blocks to 4096 cells/blocks. This is ideal for lithium battery packs and all other cell types with a low cell voltage range and the resulting high number of cells per battery. This increase in speed and cell count is accompanied by the new CS181, the new basis for all GENEREX products from 2027 onwards. For the use of

new functions, new firmware can be easily deployed to the BACS® 4 modules via the BACS® bus at the click of a mouse, as shown in the image on the left.

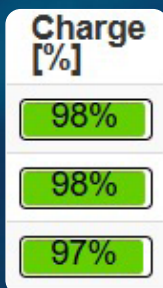
However, even without a high-speed bus, new features and bug fixes can already be easily distributed via this BACS® 4 firmware update. This makes BACS® 4 considerably more future-proof than the BACS® 'Classic Line'.



# BACS® 4 'New Line' Maximum cybersecurity

## BACS® 4 IS BASED ON THE LATEST ST PROCESSOR

This processor is manufactured in Europe and is significantly more secure than the 'American-made' CYPRESS processor from the BACS® 'Classic Line', which is no longer produced in Western countries. The switch to the Swiss manufacturer ST guarantees BACS® 4 the highest level of cybersecurity and supply chain reliability. This not only raises the level of cybersecurity significantly but also allows us to rigorously block pirates from our system. Furthermore, with the introduction of the new processor in the BACS® 4 module, we have revolutionised our manufacturing processes. Thanks to state-of-the-art components, only minimal calibration adjustments are now required to achieve the highest measurement accuracy. This enables us to achieve almost fully automated production and the highest end-product quality.



### Improved battery capacity measurement

Accurate measurement of battery temperature has a significant impact on determining the SoC % (state of charge) of the battery capacity in both lithium and lead-acid batteries. With BACS® 4, more precise temperature and impedance measurements have led to more precise capacity measurements than was previously possible. Currently, BACS® remains the only BMS with a battery capacity display on each cell.

### Compatibility

The BACS® 'New Line' modules are compatible with all currently available components, such as BACS® WEBMANAGERS, as well as the associated communication technology, such as BACS® splitters, BACS® converters, and CSH current sensors. The 'New Line' also continues to use the familiar BACS® bus cables from the B4BCRJxxxx series, which we have also been using since 2009 with the BACS® modules in the 'Classic Line'. The only incompatibility with the new generation BACS® 4 is as follows:



*The BACS® 4 modules and their associated measurement leads must not be mixed with BACS® modules or measurement leads from the BACS® 3 'Classic Line'.*

# BACS® 4 'New Line' Market launch

## THE 'NEW LINE' MODULE C44 IS NOW AVAILABLE

It has been delivered in large quantities since December 2025. The predecessor, the C40 from the 'Classic Line', has not been produced in Europe since the summer of 2025, but it continues to be produced in the USA and will therefore remain available as a spare part for a long time to come.



*The C20 module from the 'Classic Line' remains in our product range and will be offered alongside the new C24, which we expect to have available by the end of the first quarter.*

With the fourth-generation BACS® 'New Line', we aim to maintain our leading position in the BMS market for stationary batteries for many years to come and further widen the gap between us and our Asian competitors, particularly with a view to upcoming modern battery chemistries.



## VIDEO ON BACS® 4



CLICK!

### Video link:

<https://www.youtube.com/watch?v=mmArcAKIYC8>



# NEW GENEREX 'AI Help Centre' Industry-leading support meets the power of AI

**THE BEST ANSWER IS THE ONE YOU FIND IMMEDIATELY: THE AI HELP CENTRE IS THE IDEAL EXTENSION FOR OUR SUPPORT TEAM**

**GENEREX takes client support to the next level**

***Support is now available – regardless of time or location.***

Immediate answers to most questions about CS141 and RCCMD are now available. AI analyses our knowledge base and either provides an immediate answer to every query or forwards the question to our support staff in Germany and the USA (depending on the time zone), who then provides a tailored response. This enables us to achieve an even faster response time than before.

**Our manuals are also being 'digitized'**

AI filters the requested information from the relevant product manual and presents you with a solution immediately. You no longer need to spend time reading through our rather extensive and detailed materials, but you are still able to do so. GENEREX has always aimed to continuously improve its client service and focus even more closely on user needs. We are renowned for our support, both in terms of quality as well as response time, but times are changing, and 'telephone support' is being used less and less. Many clients from non-English-speaking countries hesitate to call us, partly due to language barriers and partly because they believe they will end up on hold, as with all other 'hotlines' worldwide.

**Email is now the primary support channel – but it comes with a key drawback: users do not know whether their request has been received or is already being processed. This is exactly where the AI Help Center comes in, providing immediate clarity.**

This marks the start of an automated help system that delivers immediate responses to inquiries and continuously improves answer quality through AI and the support team.

**With Zendesk as the technological foundation, GENEREX has built a global support system that covers not only Europe and the United States, but all time zones.** Up until now, we have only been able to provide assistance with significant gaps from our support staff locations in the USA, Germany, and Australia. Because the global reach of our products is now considerable, we also want to improve support in other parts of the world.



*With Zendesk, we are now able to cover all time zones. No one has to wait for an email reply anymore; our AI-powered system will automatically provide an immediate solution to most queries.*

## ZENDESK—THE TECHNOLOGY BEHIND OUR HELP CENTER



Zendesk is a support system developed in Denmark that is now the world's leading platform for client service and support management. It consolidates information and provides clients with a modern self-service experience.

### **Key features of the Zendesk support system**

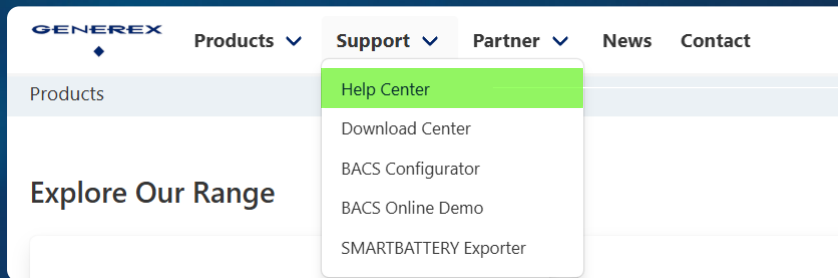
Zendesk support gathers all client enquiries from various channels in one central location and automatically forwards them to the appropriate contact person. Thanks to response templates and AI features, such as automatic classification and solution suggestions, tickets can be processed more quickly and consistently. In addition, detailed reports provide valuable insights into response times, client satisfaction, and frequently asked questions.

The GENEREX Zendesk Help Centre offers 24/7 access to a structured knowledge base containing articles, guides, and FAQs, which, thanks to AI-powered search technology, delivers results quickly even when there are typos.

Multilingual support and ongoing feedback ensure that the system is constantly improved.

# NEW GENEREX 'AI Help Centre' Where can you find it?

You can find the new GENEREX Help Centre on the familiar GENEREX website under the 'Support' drop-down menu.



The Help Centre is easy to navigate and features an AI search function similar to that used by Google and an intuitive menu layout modelled on the structure of the GENEREX website. This means that searching through user manuals is now a thing of the past: the AI will do that for you. For on-site technicians and clients on the move, the Help Centre is also optimised for mobile phones and can be used for quick searches in the field. **Our user manuals remain the foundation of our expertise – AI ensures that relevant information can be accessed precisely and within seconds.**

Because GENEREX products are distributed around the world, our clients are located across every time zone. Without our helpdesk, they would in some instances have to wait until sunrise at one of our service locations for their questions to be answered. Thanks to our database of step-by-step guides and instructions, which are accessible at any time, it is possible that by sunrise, their issues may have resolved and their systems may be up and running before our support team is available.

**One change that is only indirectly apparent is the integration of the support system into our internal ticketing system.** This system is capable of consolidating any client contact be it via email, chat, telephone, or online form into a single ticket. This allows our support team to trace the client's entire history, identify the causes of problems or emerging issues at an early stage, provide preventative advice, and ensure better cooperation with our US colleagues, who take over at the end of the day in Europe.

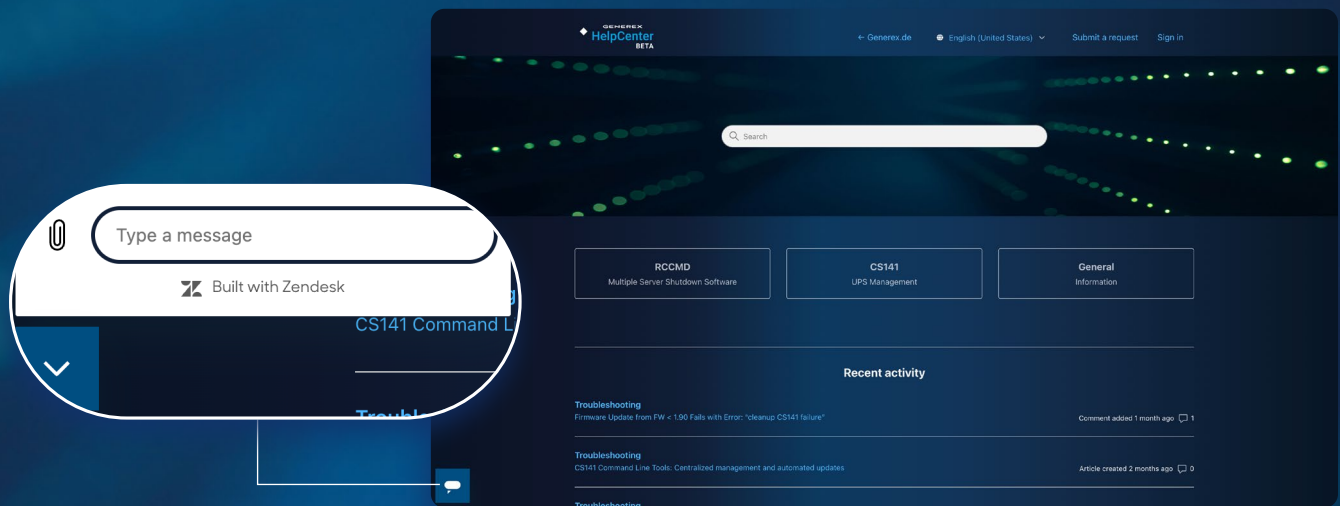
The new AI support lays the foundation for all future data analysis at GENEREX. This service enables automatic translations of enquiries from all languages. This is intended to encourage all our clients to contact our support team and, where possible, to overcome language barriers.

The new AI support analyses the enquiry, compares it with related issues, and can provide a response tailored specifically to the problem, with a link to the relevant Help Centre article.

### Our globally valued customer support remains in place – now enhanced by AI-driven assistance.

You can rest assured that all of your enquiries will be handled by our qualified support team and that you will receive the same high standard of support you've come to expect. It will likely be even better and faster than before. With every enquiry, our Help Centre grows as we document common issues or workarounds as quickly as possible and make them available to you.

Our Help Centre is currently still operating in a 'beta version', so its full potential has not yet been realised. Right now, the AI our Help Centre uses answers questions in English and German only and is currently limited to CS141 and RCCMD. BACS® and UNMS will be added in the coming months. Until then, feel free to test our Help Centre to find solutions to your problems.



### – CONCLUSION –

**The introduction of Zendesk and our new Help Centre means** faster and more targeted support, regardless of the time zone, location, or language. AI-powered search, a structured knowledge base, and a direct link to our ticketing system ensure that you receive solutions much sooner and that we can handle complex cases with even greater precision.

### We cordially invite you to try out our new GENEREX Help Centre

Try out the search function, browse through the articles, and continue to send us your questions and feedback. Every enquiry and every piece of feedback help us to improve the Help Centre so that you can resolve issues faster and keep your systems running without interruption.



## US Market Experience Report

# Lithium in emergency power applications in data centres

**Battery technology is now a question of risk and operational reliability!**

## HOW CELL CHEMISTRY, FAILURE MODES, AND THERMAL RUNAWAY DEFINE THE NEED FOR A BMS

Thermal runaway is a fault condition in which a battery generates heat faster than it can be dissipated. This leads to a rapid rise in temperature, outgassing, fire, or, in the case of certain cell chemistries, an explosion. The risk, speed, and severity of thermal runaway vary considerably depending on the battery chemistry and system design.

A battery management system (BMS) is designed to reduce this risk by monitoring parameters such as voltage, current, and temperature and enforcing operating limits through alarms, balancing, derating, power reduction, and shutdowns. However, a BMS cannot alter the underlying electrochemistry, nor can it eliminate all fault modes or guarantee safety if sensors, firmware, communication, or power paths fail or are incorrectly configured.

Our position is clear: Battery chemistry is not disqualified simply because it requires control mechanisms, but if safe operation depends on complex controls, the BMS and the system-level safety design must be regarded as an integral part of the battery itself. They must be subject to the same validation and lifecycle management as the cells they protect.

## KEY QUESTIONS REGARDING THE RISKS OF BATTERY CHEMISTRY AND SYSTEM SAFETY: WHAT HAPPENS IF THE BMS FAILS OR IS MISCONFIGURED?



Total loss of the yacht 'Flagship' following BMS failure (NTSB MIR-25/31)

If the BMS fails, is deactivated, commissioned incorrectly, or otherwise bypassed, the battery system will no longer operate within its validated safety limits. In lithium-ion systems, the BMS enforces critical protective measures such as overvoltage and overcurrent protection, temperature limiting, and charge control. Without these active protective functions, abnormal conditions such as overcharging, internal imbalance, and local overheating may go undetected and unchecked.

Investigations into real-life incidents demonstrate the severity of such scenarios. In one documented incident on board a vessel, a malfunctioning or bypassed BMS contributed to uncontrolled thermal runaway, rapid fire spread, and the ultimate loss of the entire vessel. This illustrates how a fault at the control level can escalate into a system-level disaster, rather than remaining a local battery fault (NTSB Marine Investigation Report (MIR) 25/31).


**This highlights a fundamental technical principle:** When safe operation depends on active electronic controls, a failure of these controls can turn a manageable fault into an uncontrollable hazard with consequences for the infrastructure.

### How quickly does the hazard develop?

The speed at which a safety risk develops depends heavily on the chemistry, the failure mode, and the presence of functioning protective controls. In lithium-ion systems, the transition from stable operation to thermal runaway can occur rapidly once a critical fault threshold, such as an internal short circuit, severe overcharging, or thermal instability, is reached, which can sometimes be within seconds to minutes. Incident reports and fire investigations have documented sudden triggering events followed by immediate explosion, smoke, and rapid fire spread, particularly in high-energy battery systems.

For example, incidents involving large lithium-ion batteries in backup and infrastructure applications have shown that ignition and fire spread can occur rapidly; however, due to the persistent thermal energy and cell-to-cell propagation, it can take many hours to fully contain and extinguish the fire in dense battery installations (UL 9540A test methodology background; FSRI expert panels on lithium-ion fire propagation).

**In contrast, stationary lead–acid battery systems, particularly valve-regulated lead–acid (VRLA) batteries, typically exhibit fault modes that develop more slowly.** Thermal runaway in these systems is usually caused by prolonged overcharging, elevated ambient temperature, and an imbalance in the float voltage. Industry maintenance studies show that precursor indicators such as rising float current and increasing temperature can occur over weeks or even months before a critical state of thermal runaway is reached.

 *Lead–acid batteries or battery types with lower energy density offer a longer window of opportunity for diagnosis and intervention, provided that proper monitoring is in place (Megger BITE Application Guide; specialist literature on battery maintenance).*

**From a risk perspective, hazards that develop within seconds require automated, validated damage control, whilst hazards that develop over weeks rely more heavily on continuous monitoring, trend analysis, and preventive maintenance.**

### Can a system fail safely (electrically and thermally)?

A fail-safe battery system is one that in the event of a fault transitions to a stable, non-escalating state, rather than requiring continuous active control to prevent a dangerous outcome. Electrically, this encompasses multi-stage protective measures such as fuses, current limiting, contactors, and verified isolation paths that operate independently of higher-level software or communication. If the BMS loses power, freezes, or is misconfigured, the system should default to a protective state rather than continuing uncontrolled charging or discharging.

Thermally, intrinsically safe behaviour means that abnormal heat generation does not immediately lead to a cascading failure or rapid propagation across cells and modules. This property is influenced by battery chemistry, energy density, enclosure design, thermal barriers, spacing, and ventilation. Test frameworks such as UL 9540A specifically assess the propagation of thermal runaway at the cell, module, and installation levels to determine whether a system can contain or limit escalation during a fault event (UL 9540A fire test method).

Systems that rely entirely on active electronics to prevent escalation and have only limited passive tolerance to thermal faults inherently have lower fail-safe margins should the control level be compromised.

#### **Can the hazard propagate (cell-to-cell, module-to-module, or system-wide)?**

The potential for propagation is a decisive factor in the overall risk of the system. In high-energy-density lithium-ion architectures, closely coupled cells and modules can cause a thermal runaway in a single cell to trigger neighbouring cells, leading to a cascading failure across modules and, in severe cases, affecting the entire infrastructure. Fire tests and incident analyses have shown that once propagation begins, an incident can escalate from a localised battery fault to a site-wide hazard if it is not quickly contained (UL 9540A; Fire Safety Research Institute (FSRI) lithium-ion fire research).

By comparison, traditional lead–acid battery systems generally exhibit a lower risk of runaway. Whilst thermal runaway can occur in VRLA batteries under sustained overcharging and thermal stress, the process typically progresses more gradually and is less prone to cascading, explosive cell-to-cell reactions. Failures are more commonly manifested by overheating, degassing, electrolyte loss, and long-term degradation than by rapid, energetic propagation, particularly in properly ventilated stationary installations (The Institute of Electrical and Electronics Engineers (IEEE) and industry maintenance studies on VRLA batteries).

**This distinction is of crucial importance for emergency power and UPS applications. A cell chemistry with a high risk of propagation requires validated containment strategies, robust monitoring, and a fully integrated safety architecture, whereas in cell chemistries with slower, more observable failure modes, the emphasis is on early detection and maintenance discipline rather than on immediate electronic intervention.**

#### **What does ‘requires a BMS’ really mean?**

This is a practical decision-making framework for UPS and data centre applications.

The phrase ‘this battery requires a BMS’ is often used vaguely. From an engineering perspective, however, it has the following very specific meaning:

*A battery chemistry requires a BMS if safe operation necessitates continuous, active electronic monitoring and adherence to voltage, current, and temperature limits.*

#### **This distinction is important.**

All modern battery systems benefit from monitoring. However, not all cell chemistries **rely** on active electronics to remain in a stable, non-escalating state. The difference lies in the speed at which a hazard arises, the potential for propagation, and the fail-safe tolerance

### Active protection vs. monitoring

In lithium-ion systems used in UPS and backup applications, the BMS is typically responsible for the following:

- ◆ Overvoltage protection
- ◆ Overcurrent protection
- ◆ Enforcement of temperature limits
- ◆ Cell balancing
- ◆ Charge control (interlock)

If these functions are not continuously operational and validated, the system may enter unsafe states. For this reason, standards such as IEC 62619 (industrial lithium cells and batteries – safety requirements) require protective functions and tests under fault conditions. Lithium systems used in infrastructure environments are also rated in accordance with UL 9540 and UL 9540A, which specifically examine the propagation of thermal runaway and fire behaviour at the system level.

In contrast, stationary lead–acid battery systems (sealed or VRLA) do not rely on continuous active electronic management to prevent immediate catastrophic failure. Their failure modes are generally determined by the charging procedure, the temperature, and the maintenance status. **Monitoring lead–acid batteries improves their reliability and service life, but the cell chemistry itself is not dependent on software as it remains inherently stable under normal float-charging conditions.**

This distinction defines what ‘requires a BMS’ really means.

### Propagation and containment

The UL 9540A test was specifically developed to assess whether a thermal runaway in a cell or module spreads to adjacent cells or escalates into a fire incident at the installation level

Lithium-ion systems, particularly those with high energy density, are assessed in terms of the following:

- ◆ Cell-to-cell propagation
- ◆ Module-to-module propagation
- ◆ Fire behaviour at installation level

NFPA 855 incorporates these findings on propagation into the requirements for site selection, spacing, and fire protection for energy storage systems in buildings

Traditional lead–acid battery rooms for UPS systems are subject to different design principles (ventilation, hydrogen management, and containment systems). Whilst thermal runaway is possible in VRLA batteries under sustained overcharging and high temperatures, the propagation characteristics are fundamentally different and generally develop more slowly.



**The practical question for operators is not whether a battery has a BMS but rather whether a fault in a single cell could cascade into an infrastructure incident without rapid intervention.**

### Fail-safe tolerance

A cell chemistry **that requires a BMS** has only limited passive tolerance to fault conditions. If the control level fails, the system can very quickly leave its safe operating range.

A cell chemistry **that does not require a BMS** may still degrade or fail if maintenance is inadequate, but typically it provides measurable warning indicators (rise in temperature, increase in trickle current, and rise in impedance) over extended periods.

In UPS and data centre environments where systems are expected to operate unattended for years, this distinction influences the design philosophy, the monitoring strategy, the thoroughness of commissioning, and the insurance considerations.

**Decision matrix: Does this cell chemistry 'require' a BMS?**

## Battery Selection Considerations for UPS & Data Centers

### Risk Profile Decision Matrix

|                                 | Lead-Acid UPS Batteries | Lithium-Ion UPS Batteries     |
|---------------------------------|-------------------------|-------------------------------|
| Hazard Development Speed        | Slow (hours to months)  | Fast (seconds to minutes)     |
| Propagation Potential           | Localized, limited      | Cascading, high               |
| Safe Without Active Electronics | Yes                     | No                            |
| Dependence on Control Systems   | Low                     | High                          |
| Consequence of Control Failure  | Degradation             | Thermal Runaway               |
| Key Standards                   | IEEE 1188, NFPA 70      | UL 9540A, IEC 62619, NFPA 855 |

A battery *requiring* active controls makes the **BMS part of the safety system.**

### Key Questions to Ask Before Choosing Lithium-Ion



#### Facility Preparedness

- Is the building ready to handle a thermal event?
  - ▶ NFPA 855 compliance?
  - ▶ UL 9540A propagation tested?
  - ▶ Firefighter access & safety?



#### BMS Usability

- Is the BMS clear and actionable?
  - ▶ Easy to understand?
  - ▶ Provides early warnings?
  - ▶ Integrates with facility systems?



#### Propagation Risk

- Can a failure stay contained?
  - ▶ Cell-to-cell spread?
  - ▶ Module or cabinet level?
  - ▶ Full room fire risk?

### Where battery management systems such as BACS® fit in

In lead-acid UPS applications, systems such as the GENEREX BACS® (battery analysis and care system) enhance reliability and operational transparency through continuous monitoring of battery levels and voltage management.

The GENEREX BACS® system has been developed to provide both state-of-health monitoring and an active voltage-balancing function designed to extend the service life of lead–acid battery banks. The balancing function helps to prevent overcharging and undercharging of individual batteries within the bank. By maintaining voltage symmetry across the battery bank, the system reduces the conditions that accelerate grid corrosion and sulphation, both primary ageing mechanisms in lead–acid batteries.

Maintaining the voltage balance also reduces interactions amongst the batteries within the string. This enables operators to replace a single battery in an ageing string without causing significant imbalances or stress on neighbouring batteries.

**Key features of the BACS® system include the following:**

- ◆ Monitoring of voltage, impedance, and temperature at the individual battery level
- ◆ Identification of imbalances and early degradation within a battery string
- ◆ Maintenance of voltage symmetry across the string through balancing
- ◆ Provision of alarms and integration into UPS and building management systems

Through continuous monitoring and balancing, BACS® improves predictability, extends battery life, and enables early fault detection.

However, it is important to distinguish its role from that of lithium-ion protection systems. BACS® does not function as a chemistry-dependent safety interlock in the same way as a lithium-ion BMS. Instead, it is designed to improve the monitoring, diagnostics, and lifecycle management of lead–acid batteries, whose safe operation does not rely on continuous electronic enforcement.

## Conclusion

The need for a BMS does not automatically render a cell chemistry unsuitable. However, it does redefine the product. When safe operation depends on active electronic controls, the BMS and the system safety architecture become inseparable from the battery itself. They must be developed, tested, commissioned, and maintained to the same standard as the cells they protect.

For UPS engineers and data centre operators, the decision is not just about energy density or footprint. It is also about system dependency, fault tolerance, and infrastructure readiness. Before choosing a cell chemistry that requires continuous active control, consider the following:

### Is the system designed to cope with a worst-case scenario?

### **If a lithium-based UPS battery system experiences a thermal event, can the building respond safely and quickly?**

- ◆ Is the room designed in accordance with NFPA 855 installation guidelines for energy storage systems?
- ◆ Has the system undergone UL 9540A propagation testing at the cabinet and installation levels?
- ◆ Is access for firefighters practical and safe?

In documented incidents in lithium battery rooms, firefighters have been reluctant to use water jets in rooms that are under voltage and contain high-current disconnect switches and dense electrical infrastructure. In a UPS room, 1,000 Amp DC disconnect switches and high short-circuit current paths add to the complexity during an emergency response.

New builds can incorporate clearances, fire barriers, suppression systems, and ventilation strategies from the outset, but retrofits often cannot.

Cabinet placement, cable sizing, and room layout become design specifications that influence both performance and the emergency response strategy.

**The question is not whether lithium is feasible but rather whether the system is technically designed to support it.**

### **Is the BMS transparent, intuitive, and capable of taking action?**

If safe operation depends on the BMS, operators must ask the following:

- ◆ Is the user interface intuitive for on-site staff?
- ◆ Are fault conditions clearly distinguished?
- ◆ Does the system provide early warning indicators or only alarms for forced shutdowns?
- ◆ Can it be seamlessly integrated into DCIM, building management systems, and UPS controls?

A protection system that is difficult to interpret or poorly integrated can become a hidden risk. Early detection, clear diagnostics, and predictable alarm behaviour are essential in unattended standby environments.

Complex protection without operational clarity does not reduce risk, but merely redistributes it.

### **What is the propagation risk?**

If a single cell fails:

- ◆ Is the event confined to the cell?
- ◆ Is the event confined to the module?
- ◆ Is the event confined to the cabinet?
- ◆ Is the event confined to the room?

Propagation characteristics are a central component of the UL 9540A assessment and influence the installation guidelines in accordance with NFPA 855.

**In high-energy lithium systems, cell-to-cell propagation can escalate rapidly without thermal isolation. In traditional lead–acid UPS installations, faults are typically localised and develop more slowly, even if thermal runaway occurs.**

The engineering question is therefore as follows:

**If a thermal event occurs, is it confined to the battery pack level, or does it threaten the entire facility?**



*The infrastructure risk must be assessed at the building level, not just at the level of the battery cabinet*

#### References:

[1] National Transportation Safety Board, 'Fire aboard motor yacht Flagship', Marine Investigation Report MIR-25/31, 2025. [Online].

Available at: <https://www.nts.gov/investigations/AccidentReports/Reports/MIR2531.pdf>

[2] UL Standards & Engagement, ANSI/CAN/UL 9540A, Standard Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems, Northbrook, IL, USA. [Online].

Available at: <https://www.ul.com/services/ul-9540a-test-method>

[3] UL Standards & Engagement, ANSI/CAN/UL 9540, Standard for Energy Storage Systems and Equipment, Northbrook, IL, USA. [Online].

Available at: <https://www.shopulstandards.com/ProductDetail.aspx?productId=UL9540>

[4] Fire Safety Research Institute (FSRI), Lithium-Ion Battery Fire Safety Research, UL Research Institutes. [Online]. Available at: <https://fsri.org>

[5] International Electrotechnical Commission, IEC 62619: Secondary Cells and Batteries Containing Alkaline or Other Non-Acid Electrolytes – Safety Requirements for Secondary Lithium Cells and Batteries for Use in Industrial Applications, Geneva, Switzerland, 2022. [Online].

Available at: <https://webstore.iec.ch/publication/64073>

[6] National Fire Protection Association, NFPA 855: Standard for the Installation of Stationary Energy Storage Systems, Quincy, MA, USA, 2023. [Online]. Available at: <https://www.nfpa.org/855>

[7] Megger, BITE3 Battery Impedance Tester – User Guide, Dallas, TX, USA. [Online].

Available at: <https://www.instrumart.com/assets/Megger-BITE3-ImpedanceTester-Userguide.pdf>

[8] Plant Engineering, Battery Maintenance and Thermal Runaway Prevention Articles, [Online].

Available at: <https://www.plantengineering.com>

# New 'SMART BATTERY COMPANION APP V4' and SMART LOGGER



SMART LOGGER  
from 2027 in the SMART  
BATTERY V4 housing



AB 2027



SMARTLOGGER  
2019-2026



## A NEW ERA IN BATTERY DATA MONITORING



**For the user, this means: all relevant battery data at a glance – mobile, clear, and in real time.**

With the SMART LOGGER and the new SMART BATTERY COMPANION® APP V4, we have created the perfect combination of hardware expertise and intelligent software. Our aim is to provide you with a flexible, modular solution that offers maximum transparency and control over all relevant battery data, both in service operations and within the SMART BATTERY infrastructure.

# One SMART LOGGER, many applications

The **SMART LOGGER** is a precise, stand-alone, long-term data-logging module for battery data that requires no network connection and consumes virtually no power. It is designed for mobile use in battery capacity testing and for stationary use in long-term monitoring. For long-term monitoring, there is also the option of the 'EU Battery Passport', i.e. a 'fixed' connection between the electronics and the assigned battery, to meet EU requirements for monitoring batteries from the time they are 'placed on the market' until disposal. However, even without the 'EU Battery Passport', the device offers service technicians and operators a powerful tool for long-term recording of battery data for up to 10 years.

#### The device records the following measured values:

- ◆ Voltage
- ◆ Temperature
- ◆ Charge/discharge cycles
- ◆ Battery capacity (in Ah) and, calculated from this, the state of charge (SoC)
- ◆ State of health (SoH) by displaying the time and duration when the battery exceeds or falls below threshold values.

In addition, a further version is in the planning stage, which continuously measures and logs battery impedance. This is particularly important for determining the ageing of lead or nickel-cadmium batteries or for detecting faults at an early stage.

**An ATEX-certified version of the SMART LOGGER is available for industrial use in potentially explosive environments.**

All battery data can be read, exported, and analysed at any time via the SMART BATTERY COMPANION APP (contactlessly via NFC) even after years of use. A battery can thus be monitored from cradle to grave.

SMART LOGGER in  
ATEX housing



# Future-proof integration into SMART BATTERIES



SMART LOGGER  
2019–2026

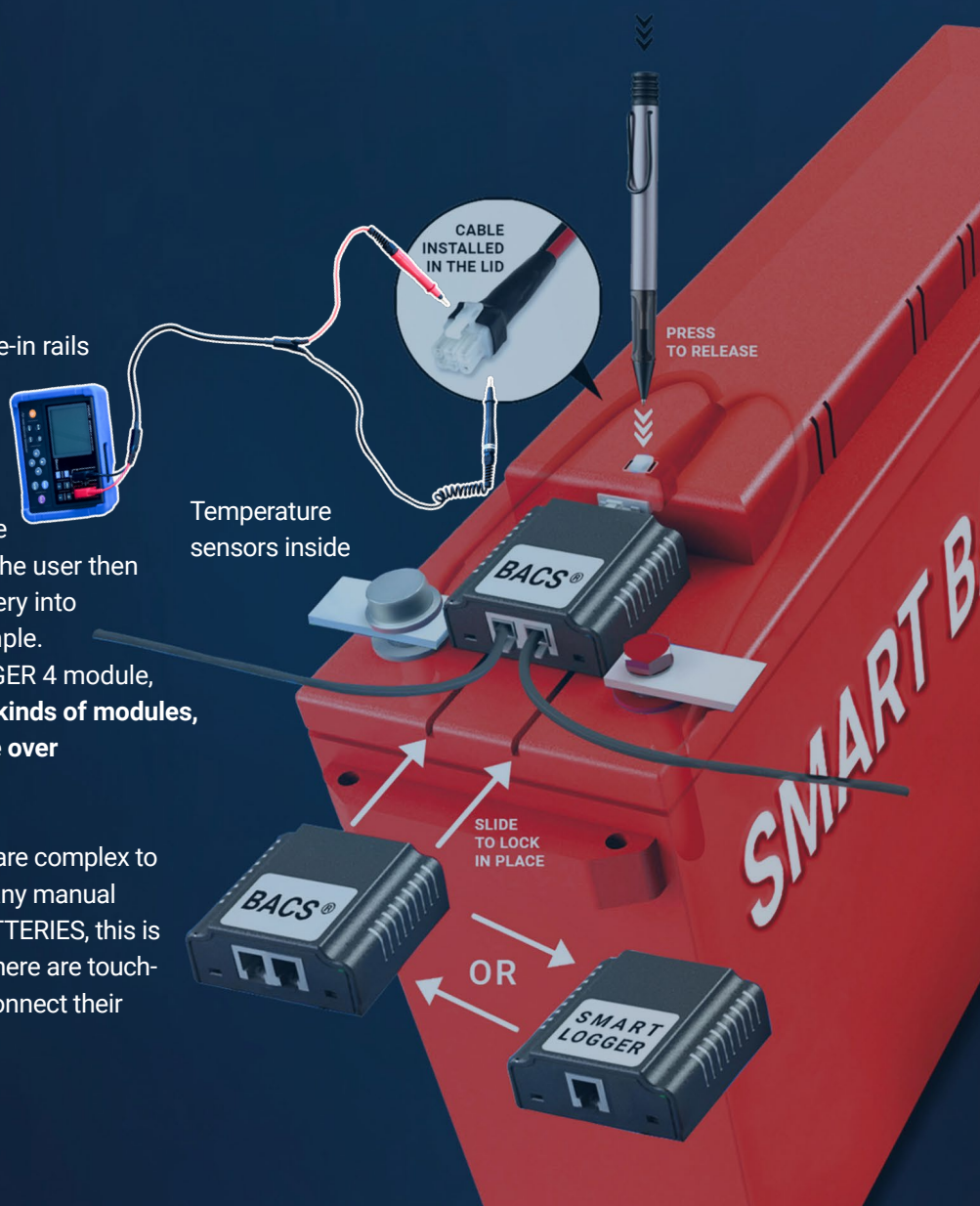


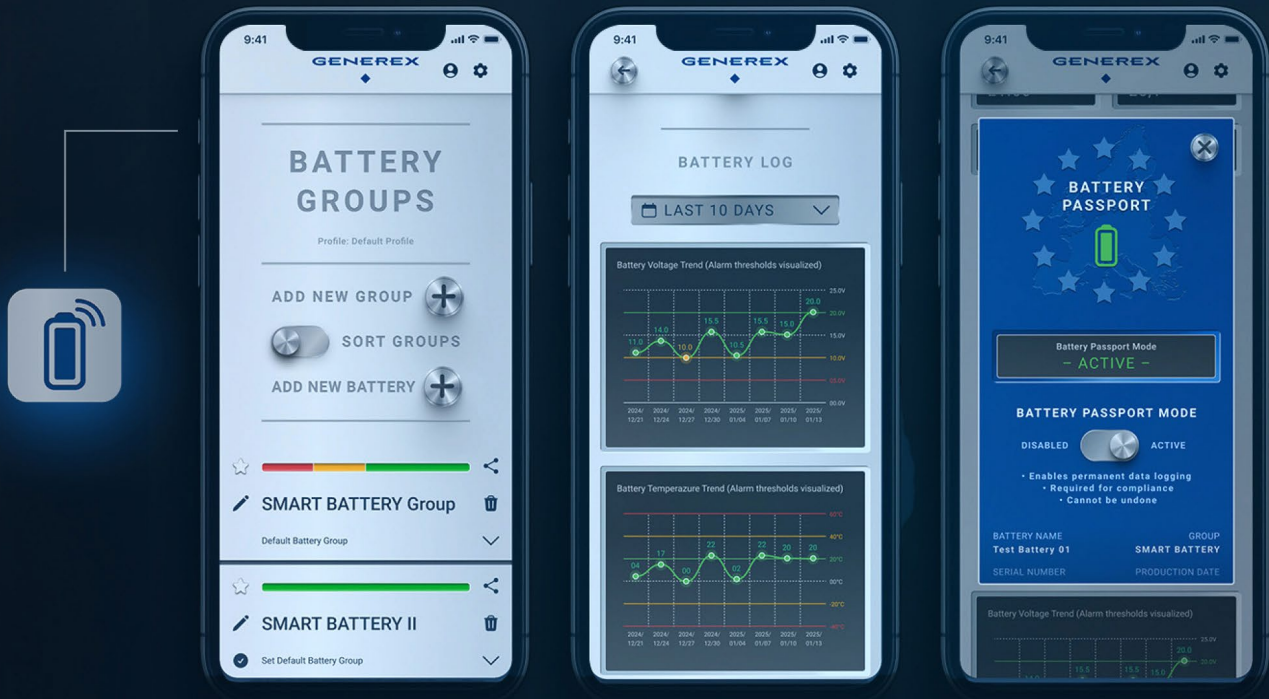
SMART LOGGER  
from 2027 in the SMART  
BATTERY V4 housing

The SMART LOGGER is currently available in the familiar housing and will use a new housing in 2027, meaning that it will then be identical to the housing of the new BACS® 4 module. **The advantage** is that both a BACS® module and a SMART LOGGER can be inserted directly into a SMART BATTERY-compatible slot. **This reduces installation to a single 'click'**. There is no need to consider space constraints or mounting options. At the same time, costs are reduced as no additional test leads are required. The connection is already integrated into the SMART BATTERY and can even be used as a manual measurement point, even in otherwise fully enclosed, touch-proof battery systems.

Image of a SMART BATTERY with slide-in rails for BACS® and SMART LOGGER modules. This gives this battery type an advantage over 'standard' batteries without SMART preparation. The test lead and thus the installation costs are already included within the battery. If the user then decides in future to integrate this battery into automated monitoring, this is very simple. Just insert a BACS® 4 or SMART LOGGER 4 module, and it's done. **But even without these kinds of modules, a SMART BATTERY has an advantage over standard batteries.**

Fully touch-protected battery systems are complex to maintain because there are no longer any manual measurement points. With SMART BATTERIES, this is simple. Where no module is inserted, there are touch-protected contacts. Technicians can connect their measuring devices to these.





# The new SMART BATTERY COMPANION APP V4

**MODERN, INTUITIVE, POWERFUL,  
AND NOW ALSO AVAILABLE FOR APPLE IOS**

Alongside the hardware, the SMART BATTERY COMPANION® app has also undergone a complete overhaul. The new interface is modelled on the new design of the BACS® CC Cabinet touch panel display 'HN1-485', also a new addition, and on the user experience of leading platforms from other app providers, offering a more modern and user-friendly way to analyse the data stored by the SMART LOGGER.

## **We offer a special solution for Apple iPhones**

Although iPhones also have an NFC interface, it is used almost exclusively for contactless payments. This makes Apple's NFC operation significantly less convenient than on Androids, as you constantly have to respond to Apple's security prompts. This may be due to security during the payment process, but it is really 'annoying' when you have to repeat this every time a battery is read. We therefore recommend using the new NFC reader stick when iPhones are used. The image on the next page shows how such a stick is used.



**TECHNICIANS HAVE THEIR IPHONE (OR ANDROID) IN THEIR POCKET. THE NFC INTERFACE IS REDIRECTED TO A BLUETOOTH CONNECTION TO THE NFC READER AT THE END OF THE 'SELFIE STICK'**

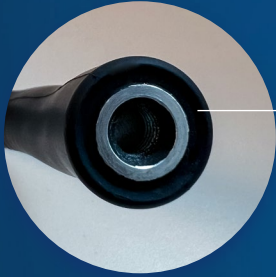
This allows technicians to easily and securely access all battery data via the SMART LOGGER, read out the measured values, or configure the SMART LOGGER.

Image below: SMART LOGGER V4 installation in test mode. In a fully enclosed battery system, technicians can read the measurement data via NFC, whilst BACS® operates simultaneously. Technicians can also measure hard-to-reach modules using a selfie stick and, in the case of 100% enclosed battery systems, require only their mobile phone.

The reader can be attached to a 'selfie stick' (GENEREX item numbers exSM\_STICK and exSM\_READ), which is ideal for SMART LOGGERS that are difficult to reach in battery racks where space is limited. This means the smartphone can stay in your pocket, making NFC reading significantly more convenient, faster, and more secure.



## THE SELFIE STICK IS FULLY INSULATED, HAS A LENGTH OF 50 CM, AND IS IDEAL FOR MEASURING SAFELY EVEN IN TIGHT BATTERY COMPARTMENTS



The stick is flexible and can be adjusted from 'soft' to 'hard' by twisting it. It has an M8 thread at the end, which can be used for optional mounts or extensions.

Set-up is carried out via the device menu in the SMART BATTERY COMPANION app. Once paired with the Bluetooth NFC reader, data can be read and analysed immediately, or, alternatively, a CSV export can be performed for further processing in a Microsoft Excel file. This also works on Android.

### The highlights

- ◆ Updated SMART LOGGER app V4 companion interface for even easier operation
- ◆ NFC support: Contactless reading by simply 'tapping' and simultaneously NFC-via-Bluetooth support for professional users using a 'selfie stick'
- ◆ Live analysis with instant display of health status, battery capacity, voltage, and temperature, as well as long-term data in graphical form
- ◆ Capacity measurement based on actual discharge data
- ◆ Export function for graphical processing for battery reports or documentation
- ◆ RESET function for reuse on other batteries after a capacity test has been carried out. This is ideal for battery servicing. The SMART LOGGER version with crocodile clips is generally used here, as it can be attached quickly and allows the capacity test to be carried out and evaluated. Afterwards, perform the RESET, reset the SMART LOGGER for the next use, and simply disconnect it again.





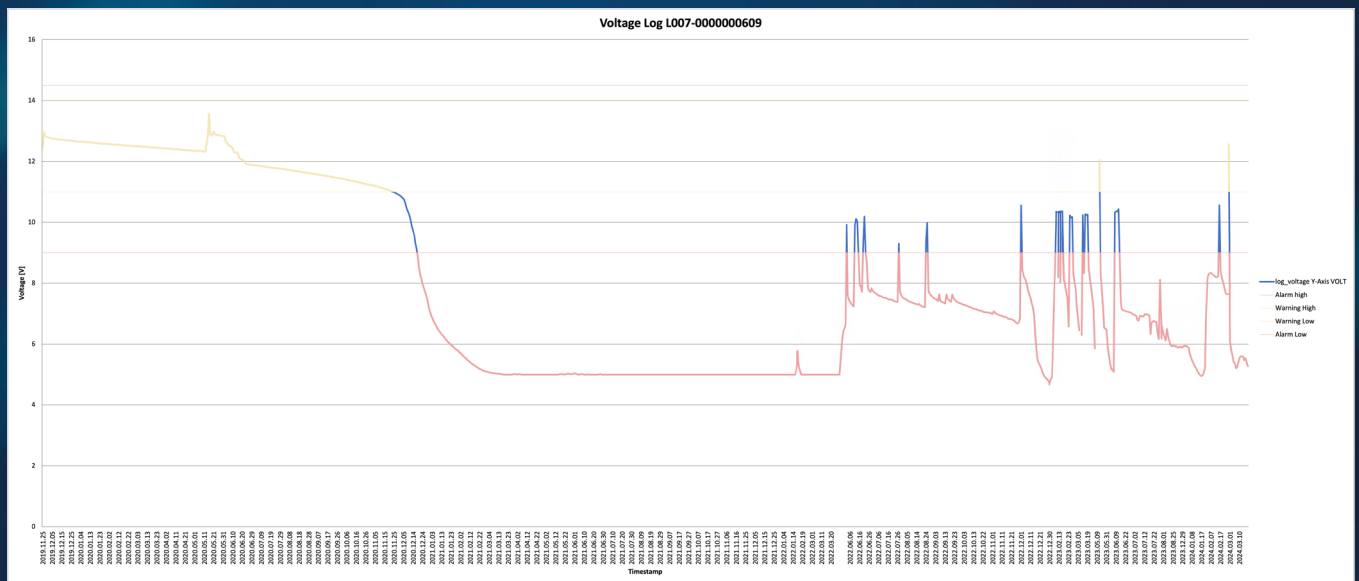
CURRENT



2027

## PARTICULARLY PRACTICAL

The export file generated during the readout via the app in MS Excel CSV format can be uploaded directly to the GENEREX website. Our online tool automatically converts this into an Excel file for easy further processing or as the basis for a battery report. Simply send your SMART LOGGER export file to the following website: <https://www.generex.de/de/support/smartbattery>



The new app version V4 is currently in testing and is scheduled for release in the second quarter of 2026 in the Google Play Store (Android) and the Apple App Store (iOS). The previous app version (V3.x for Android) will, of course, remain fully functional beyond this date and will continue to be supported by us. It is ideal for Android users who wish to continue working with the existing SMART LOGGERS V3 as before.

### Interested in a test device or advice on integration?

Our sales team will be happy to help you choose the right solution for your system. Please contact us at [sales@generex.de](mailto:sales@generex.de)

# DOUBLE FASTON ring terminal adapter



## FOR BACS® AND ALL OTHER TYPES OF BMS SYSTEMS



### **For the user, this means:**

*more precise impedance measurement at the same cost.*



### **Where can you get Double Faston?**

*At GENEREX – developed, manufactured, and proven in real-world use.*

### **Improved measurement quality**

In BACS® systems, the resistivity (RI) value is a crucial parameter for calculating the SoH (state of health) and the SoC % (state of charge). **Only through balancing can a battery's impedance value be reliably compared with others, as this harmonises the voltage of all batteries, which is a prerequisite for comparable measurement results.**

### **Previously**

To date, ring terminals have been used in Europe to measure modern lead–acid batteries and wet-cell batteries with extremely low RI values. Whilst the measurements were sufficiently accurate and better than those of competitors, measurements taken on identical systems in the USA were significantly more precise. The US measurement results consistently provided a clear picture of the SoH and SoC % of the batteries, whereas there were fluctuations in identical European installations. Why was that? To find out, we travelled to the US and carried out measurements in data centres and military facilities. The only difference compared to Europe was that in the US, faston adapters were used in a double configuration, whereas in Europe, only ring terminals were used.

The explanation lies in the double-faston ring tab used in the USA, which is placed directly on the battery terminal and splits the connection points into two separate connection points. Unlike ring terminal cables, there is a longer section where the measurement points run separately until they then merge into a single cable.

With the ring terminal, on the other hand, the measuring leads and the live leads run parallel to each other right up to the battery terminal, which made it easier for interference to creep into the measurement pulse.

With the double-faston adapter, however, the measurement lead and the live lead are separated directly at the battery terminal over a distance of 5–6 cm. This physical separation of the measurement leads minimises interference from the live cables.

### **The result**

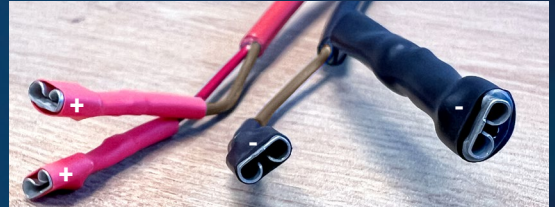
More stable readings, fewer false alarms, and significantly more accurate battery monitoring.

## TECHNICAL IMPROVEMENT

### Comparison: BC5 test lead vs. BC6 test lead with double faston

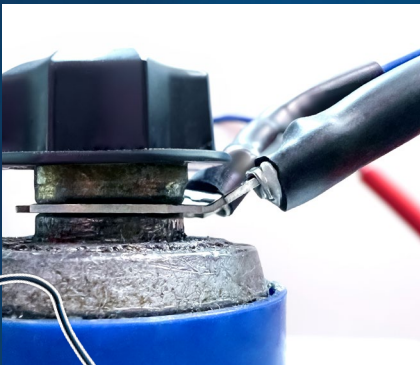


Previously: BC5 with two test leads crimped into a single terminal.



New: BC6 with double faston where the test lead and the live conductor are separated from one another

## THE ADVANTAGES



Measurement points shown schematically

- 01 Maximum measurement accuracy of the impedance**  
 The double-faston adapter enables more precise impedance measurement than conventional BC5 cables with ring terminals. The improved separation of the test and current-carrying leads minimises interference, delivering more reliable measurement results.
- 02 Faster installation and maintenance with double faston**  
 Battery technicians can swap BACS® test leads more easily and fit them to new batteries more quickly without having to disconnect the battery connection.
- 03 Manual measurements made easy**  
 Battery technicians can carry out measurements without disconnecting the connectors on the system or the protective cover. This simplifies maintenance work and saves time.
- 04 Safety without compromise**  
 The double-faston adapter creates two additional measurement points without compromising the existing touch protection. When the BACS® test leads are connected, touch protection is maintained whilst the terminals for the probes of a battery tester remain freely accessible.
- 05 Proven technology**  
 The technology has been successfully tested in the USA and is now also available on the European market.

## GERMAN BATTERY MANUFACTURER HOPPECKE HAS RECOGNISED THE BENEFITS

Hoppecke has been offering a fully insulated faston connector for its Grid Xtreme VR series since 2024. As of mid-2025, we started offering the double-faston ring, which were previously available only in the USA, in a version specially adapted for Europe.

Image of a Hoppecke battery connector with a double faston M8 adapter and BACS® BC5/BC6 test leads with double-faston plugs. The new Hoppecke M8 screw is sealed with a cover cap.



### DIFFERENCES BETWEEN 'OPEN RING DOUBLE FASTON' AND 'RING DOUBLE FASTON'



**Closed ring terminal adapters on double faston:** For just a few euros, a battery system can be fitted with double-faston ring terminal adapters, making subsequent BMS retrofitting particularly cost-effective. Even if a BMS is to be installed immediately, the double-faston adapters are ideal and easy to fit.

**Open ring terminal adapters on double faston:** For existing systems, the open double-faston ring terminal adapters are ideal; these can be easily slid under the loosened battery connectors and measure almost as well as the closed ring terminal adapters. The differences are barely measurable.

**For both new installations and retrofitting, Double Faston can be easily integrated and delivers immediate, measurable benefits in operation.**



# The usb port with multifunctionality

THE USB INTERFACE ON THE CS141 AND BACS® WEBMANAGER HAS BEEN EXPANDED AND NOW OFFERS THREE FUNCTIONS



*For the user, this means: direct access to system data, fast diagnostics, and easy maintenance – without additional tools or network connectivity.*

## WLAN

The USBNANO adapter is an important extension to the network functions of our products and provides a second network card, e.g. for setting up network redundancy or 'private' access to the device for on-site technicians.

## USB mass storage

Any USB memory stick can now be used to automatically download UPS, SENSOR MANAGER, and, in particular, BACS® log files without having to log in to the device. This makes it easier for technicians to export and analyse the data.

## UPS communication

Some UPS systems now only have a USB port as an interface. This USB port can now be used instead of the DSUB-9 serial port COM 1 on the CS141 or BACS®.

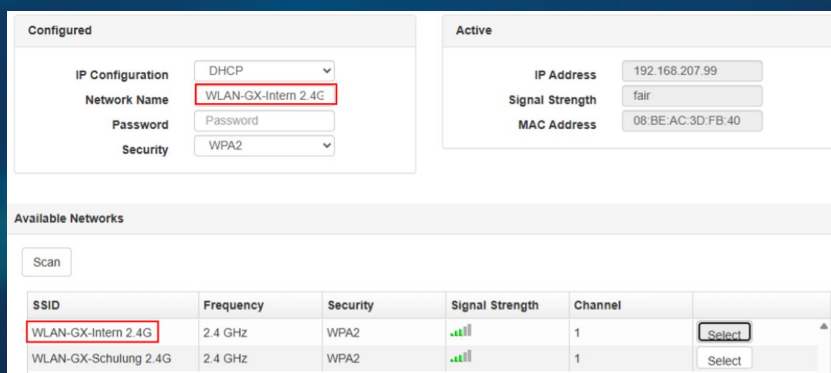
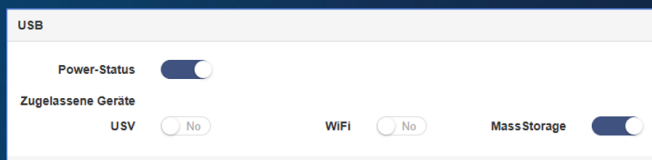


### 1. WLAN as a second network connection

The function of a second network card using the USBNANO WLAN adapter has been established in CS141/SITE MANAGER 7/BACS® for some time now. In addition to acting as a second network card via WLAN, it is frequently used for redundancy or as a separate access point for on-site technicians who only require occasional access to the devices.

Each CS141, BACS®, and SITE MANAGER 7 can be managed both via the built-in network interface using a LAN cable and, at the same time, via the USBNANO's WLAN interface. This allows for redundancy or simply provides network access for system technicians without them needing to be on the user's network.

Use the toggle switch in the USB menu to activate the USB port 'Power Status' and select 'Wi-Fi' as the function.



The USBNANO is now active and can log in to a WLAN network using the login credentials in the CS141/BACS® configuration menu after selecting an available WLAN network.

Once the USBNANO is active, there are various potential applications:

#### 1. Use case

Network service interface – 'on-demand WLAN' for technicians

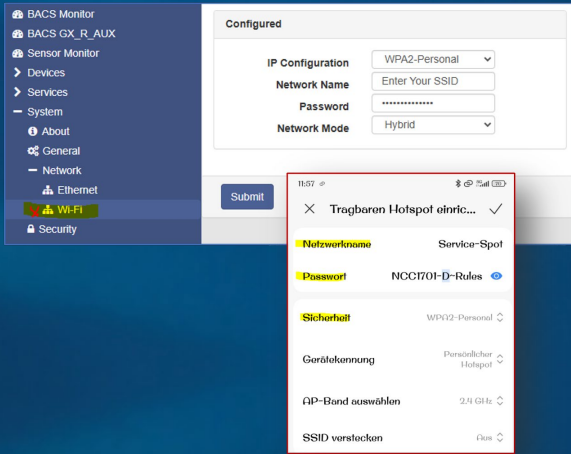
#### The problem

Increasing security requirements (e.g. bans on third-party devices) make it difficult for service technicians to access critical CS141 systems quickly on site.

#### The solution with USB2NANO involves the following:

- ◆ Set up a separate, secure ad hoc WLAN
- ◆ Enables quick access for maintenance
- ◆ Updates and fault diagnosis via smartphone hotspot or laptop
- ◆ Technicians access the device directly without IT approval and without using the client's network.

How it works



Once the USBNANO has been activated and set to Wi-Fi, first set up a Wi-Fi network on the CS141/BACS®, as shown in the menu on the right. To do this, define a specific WLAN, including encryption and password.

Then, the CS141/BACS®/SITE MANAGER 7 will always automatically attempt to connect to this specific WLAN only as soon as it is within range. Once the SSID, encryption, and password are correct, the CS141 will establish an exclusive connection and will be available to technicians who have set up this access on their WLAN router.

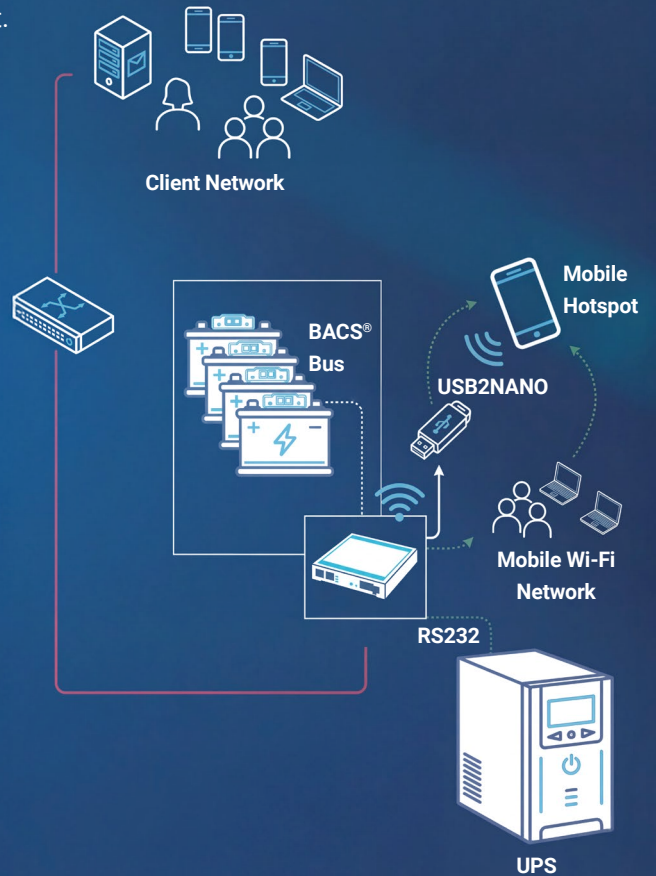
The IP address assigned for access is usually displayed directly in the mobile hotspot.

On your next on-site visit, you simply need to switch the mobile hotspot back on, and the CS141 will connect automatically.

No routes and no network configuration, just switch it on, and you're ready to go.

- ◆ All device operations can be carried out directly via Wi-Fi; no local LAN access is required from the client's on-site administrator. The access password is the only thing that's required.

LAN:  
Restricted network LAN  
port locked  
No LAN port access



## 2. Use case

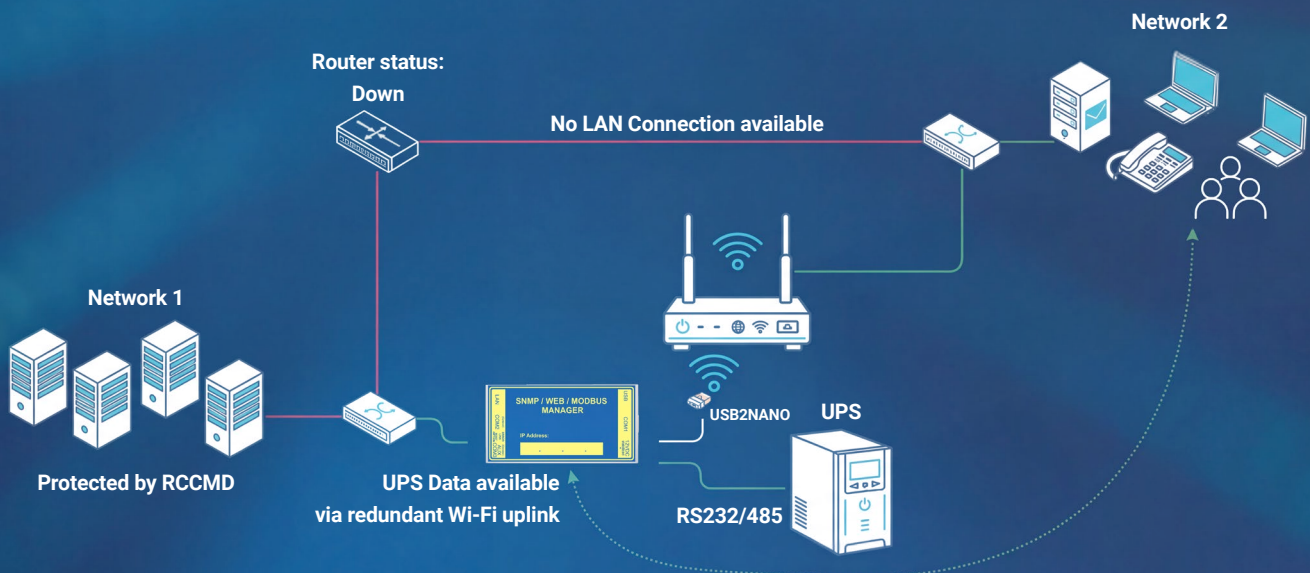
Additional network interface via WLAN as redundancy for the built-in wired network card

### The problem

In large networks, the failure of a router or firewall can prevent UPS data from being retrieved via a LAN cable.

### The solution with USB2NANO

The administrator can still access the system via WLAN if the LAN port is down, but the WLAN is still working and vice versa.



The CS141/BACS®/SITE MANAGER 7 is connected directly to the router on Network 2 and is also connected to Network 1 via a network cable. In the event of a router failure, the WLAN is available to Network 2 as a backup.

### 3. Use case

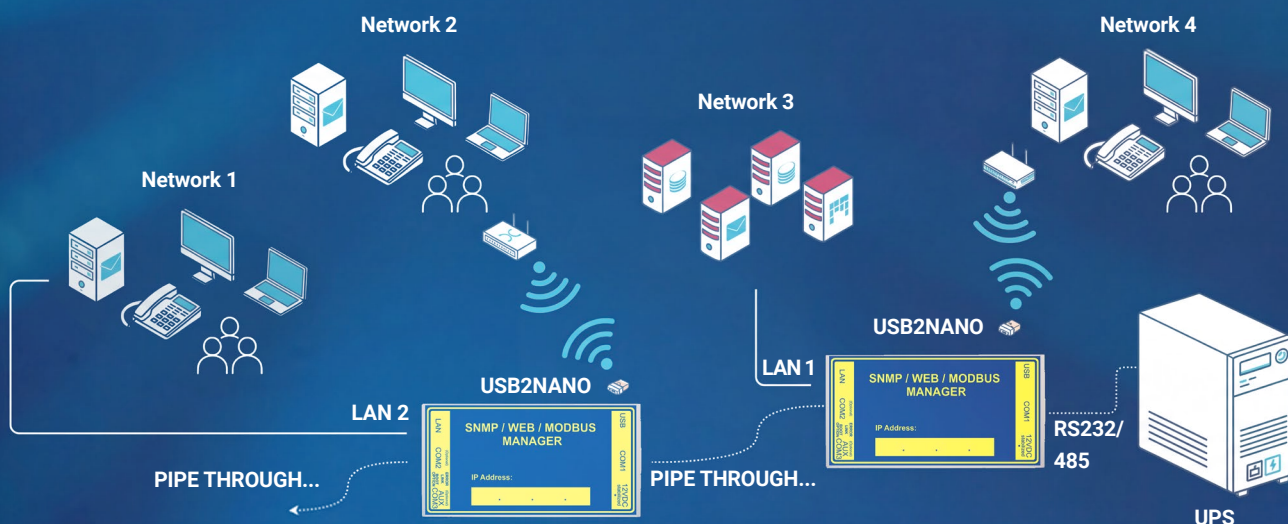
Shared use of the 'power' from a UPS but separate use of the network interface

#### The problem

A UPS is often used to supply power to various 'clients', i.e. power users. However, in most cases, only one network can be supplied with UPS data, as the UPS has only one interface for connecting a CS141 or BACS®. Although an entire building may receive 'uninterruptible' power from a shared UPS, only one network can retrieve the relevant data and, for example, configure automated shutdowns.

#### The solution

The 'physical solution' has been known for years: Use several CS141 units 'in a series' in 'pipe-through mode'. Essentially, this is a 'daisy chain', meaning each 'customer' in the network is assigned their own CS141/BACS® for management.



Pipe-through mode: Multiple CS141 units connected in series, with one device per network. A new feature is that the USB2NANO provides an additional network interface via WLAN, halving the number of CS141 units required for such a 'pipe-through' solution.

The USBNANO now offers a second, significantly more cost-effective solution than simply adding more CS141 units: A second network card is used via WLAN and the USBNANO to provide a second network interface with just a single CS141/BACS®. Users can then use this WLAN USBNANO to connect their separate, physically isolated network to a 'shared' UPS, as shown in the image here.

**With the USBNANO, your CS141/BACS®/SITE MANAGER can now be monitored in two different ways:** via the LAN cable and directly via WLAN. If a third network or additional networks are added, the only option is to duplicate the CS141 and connect them in series as a 'daisy chain', but the USBNANO is sufficient for up to two separate networks.

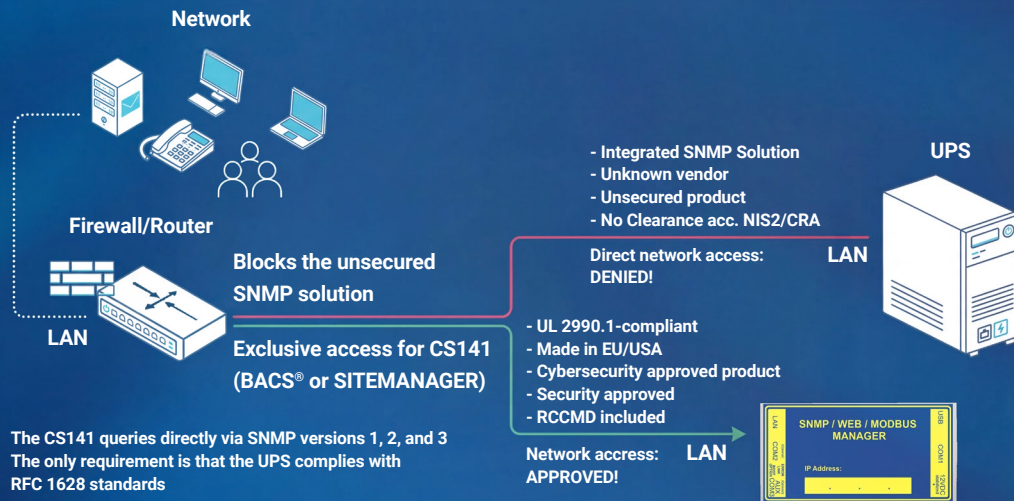
#### 4. Use case

Protection against unsecured network devices

Another way to use the USBNANO is to protect against unsecured network devices that are supplied with the UPS and are permanently connected to it.

#### The problem

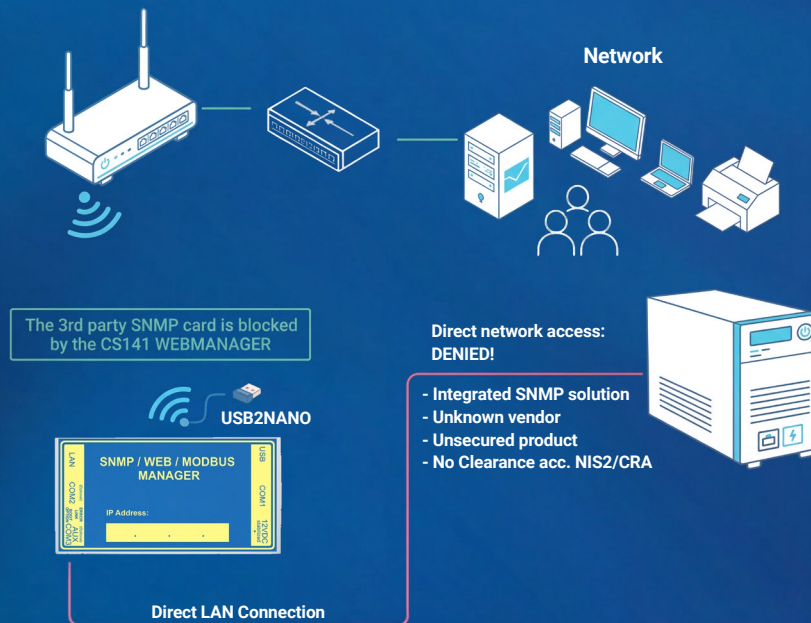
New EU regulations (NIS2, CRA, and DORA) are tightening network security requirements. Now, certain components (e.g. SNMP cards from China) are classified as security risks and must not be used. As a result, the Chinese UPS would only be able to supply power, would no longer be able to transmit alerts across the network, and would be excluded from monitoring.



The CS141 can query the 'unsecure network card' of a UPS via LAN and firewall, provided that it supports the RFC 1628 standard. This means that the CS141 acts as a 'filter' between this unsecure card and the application and functions as if the CS141 were connected directly to the UPS via a 'serial' connection.

**This setup requires a hardware firewall and configuration by the administrator. With the WLAN USB2NANO, there is now a simpler solution**

Using USB2NANO, this problem can be solved much more easily, rendering the firewall obsolete. The 'secure' CS141/BACS®/SITE MANAGER is plugged directly into the unsecured network card via its built-in LAN port and now uses a 'peer-to-peer connection' without ever being on the user's network. Access to the user's network is via the WLAN connection using USB2NANO, and there is no direct cable connection between the unsecured UPS component and the client's network. Thus, there is no chance of any malware being introduced. The user only 'sees' the CS141, not the unreliable network adapter.

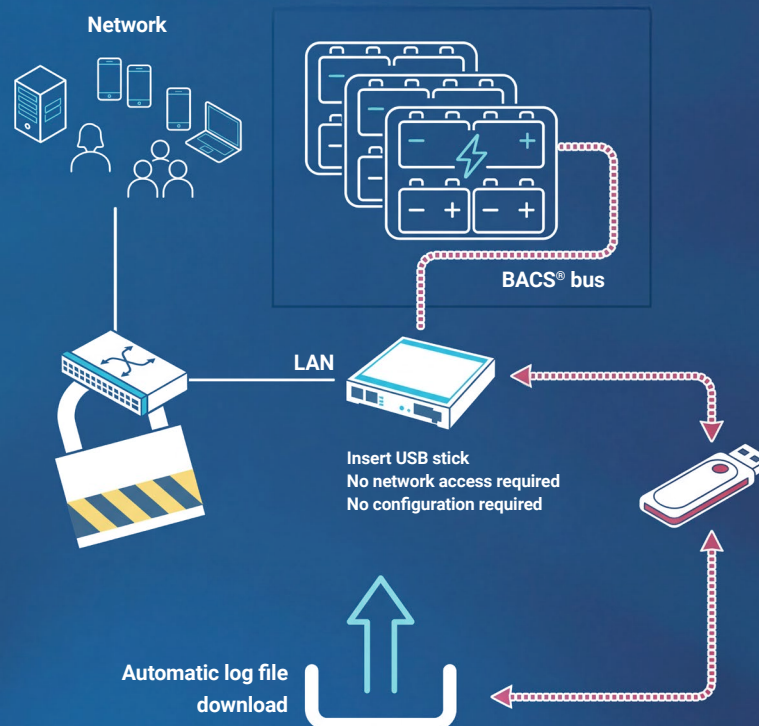


The USB2NANO now offers a streamlined and direct solution. The LAN port is connected directly to the network card of the 'China solution', and both cards are assigned a static IP address. This allows the CS141 to query the 'China solution' directly via SNMP and forward the data directly to the user's network via USB2NANO and WLAN. There is no need for any complex configuration work; the CS141 itself acts as a 'filter', similar to a hardware firewall.

## 2. USB MASS STORAGE BACS® AND OTHER LOG FILES WITHOUT NETWORK ACCESS VIA USB STICK

### Problem

Given the strict policies that apply these days, technicians and service teams face a real dilemma.



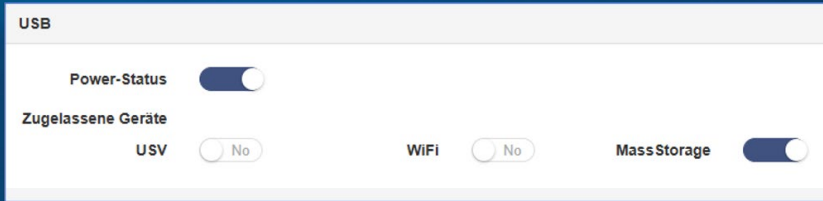
Essential maintenance and analysis tasks must be carried out, whilst the relevant network interfaces are now only available to a limited extent for security reasons. Technicians now find themselves faced with locked network sockets and are not permitted to bring their own devices into the secure areas, and port restrictions prevent network access meaning nothing can be done during an on-site visit without the administrator's assistance. This means that even a simple maintenance task like reading out the BACS® battery data to generate a battery report becomes problematic.

Until now, it has not been possible to download the battery log files from the BACS® WEBMANAGER, which are essential both for in-depth analysis and for reliable failure prediction when planning maintenance windows, without gaining access to the user's network or asking them to retrieve the data and send it to the technician.

**Solution: This has now changed thanks to the USB port on the CS141 and BACS®!**

Every CS141 and every BACS® can now be configured during commissioning so that log files can be downloaded automatically via the USB port.

**Automatic log file download by activating 'Mass Storage'**



Using the toggle button in the USB menu of the CS141/BACS® WEBMANAGER, activate the USB port 'Power Status'. Now, select the function 'Mass Storage'.

Once the USB interface has been enabled and configured and the device has restarted, the UPS and BACS® log files are automatically copied to any USB stick that is inserted.

Each USB stick is automatically formatted before writing, so that no viruses or other programmes have a chance to run. This is followed by a brief check of the USB stick, and then the download of the log files begins.

The STATUS LED on the CS141 or BACS® is used to provide feedback to the user. In UPS mode, this normally flashes slowly in green; during USB writing mode, the indicator changes to a rapidly alternating red and green flashing light as soon as the USB stick is inserted and the formatting process begins. The subsequent writing process maintains this indication until the process is complete. If the formatting process and the subsequent writing process were successful, the LED flashes rapidly in green and returns to normal operation after approx. 30 seconds, indicating UPS communication.

If the writing process or formatting has failed, the LED will flash red to indicate 'Failed' before the UPS status indicator lights up again.

**Now check the contents of the USB stick. You should find the following folders and files there:**

|                             |                  |                      |       |
|-----------------------------|------------------|----------------------|-------|
| back                        | 21/01/2026 14:35 | File folder          |       |
| backup-20260121T1435.tar.gz | 21/01/2026 14:35 | WinRAR-Archiv        | 11 KB |
| DataLog.csv                 | 21/01/2026 14:35 | Microsoft Excel C... | 42 KB |
| Event.csv                   | 21/01/2026 14:35 | Microsoft Excel C... | 1 KB  |
| System.csv                  | 21/01/2026 14:35 | Microsoft Excel C... | 2 KB  |

The data has been transferred directly to a USB stick via Autostore and can be analysed immediately on a standard laptop.

This USB stick is now assigned to this CS141/BACS® device and can be used for analysis via BACS® VIEWER or MS Excel.

If another USB stick is inserted, the process repeats itself. Only one device per USB stick can be written automatically at a time. All that is required is a standard USB stick and access to the USB port on the BACS® WEBMANAGER or CS141.

**Convenient and fast access to UPS and BACS® data with maximum security and without involving the user's IT system.**



# BACS® in the crosshairs of product pirates



## COUNTERFEITERS FROM THE ASIAN REGION LAUNCH NEW WAVE OF ATTACKS: COUNTERFEITS ARE INCREASINGLY THREATENING THE SECURITY OF CRITICAL INFRASTRUCTURE.

In 2023, we first reported on brazen product counterfeiting from the Far East.

Back then, we could still dismiss the copies as easily recognisable and cheap counterfeits. But the situation has changed since then: the once 'flattering' copies have given way to a new, more dangerous generation.

The new generation of BACS® 3 counterfeits we are now seeing are so true-to-detail that they are visually almost indistinguishable from the original. Even technicians with many years of experience run the risk of no longer being able to tell the difference between a genuine product and a counterfeit one.

Clearly, the distribution of these counterfeit products in Asia has increased to such an extent that the gradual spread of these fakes has become a problem for our clients' operational safety. Many users are absolutely convinced that they own an original, because the copy bears the 'GENEREX' copyright on the serial plate and the UL registration number, suggesting that it is a genuine GENEREX-licensed product. A recent example illustrates the audacity of these new counterfeiters.

The Vietnamese company 'PROLINK VIETNAM' holds the dubious record for brazen piracy. It blatantly counterfeits our BACS® products and documentation, right down to the UL registration number and has even installed these copies in power stations in Vietnam and elsewhere. This is no longer merely a matter of counterfeit technology but also of potential endangerment of entire infrastructures.

### The PROLINK case is not an isolated incident

We, too, were surprised by just how efficiently the more or less secret distribution network now operates and by the number of people who are accessing PROLINK's resources. We generally only become aware of product piracy when BACS® clients contact our support team because the supposedly professionally installed BACS® system is not functioning as intended or because incidents have even occurred involving an acute fire hazard. However, GENEREX cannot help in cases like these; we can only uncover the fraud; the damage remains with the unsuspecting user.

### Why the original matters

In light of this threat, it is important to understand now more than ever that only the original offers complete security, quality, and reliability. There are three key reasons for this from a technical, economic, and security perspective:

- ◆ **Technical:** Original GENEREX products (such as our BACS® WEBMANAGER) undergo rigorous testing and compliance assessments (e.g. UL 2900-1) and receive regular firmware updates. This ensures that our systems meet the highest security standards and act as a robust protective barrier against attacks within the network. A copy may look similar on the outside, but without GENEREX's quality assurance at delivery and ongoing product support, the cheap copy poses an incalculable risk.
- ◆ **Economically:** What starts out as a supposed bargain often ends up being costly. Cheap counterfeits can cause significant follow-on costs due to breakdowns or malfunctions, ranging from costly plant downtime to the loss of critical data. For illegal users or even unsuspecting users of such copies, this can have devastating consequences, as there is neither support nor warranty in the event of damage. At the same time, negative experiences with counterfeits damage the reputation of renowned brands. Neither we nor our clients have any interest in seeing the good name of our internationally protected products associated with poor performance or security incidents. Choosing the original is therefore always an investment in long-term reliability and reputation.
- ◆ **From a security policy perspective:** Counterfeit products have long been more than just a financial problem; they can also be seen as part of geopolitical strategies and serve as a means of espionage and sabotage. Some countries are already responding to this, for example, by banning certain technology from China outright. By relying on genuine products, consumers not only protect their own infrastructure but also everyone's collective security.

The following link illustrates just how sensitive our clients are to this issue. Time and again, attempts are made by foreign organisations to gain access to networks via 'Trojan horses' both through software and

hardware. US authorities are responding with drastic measures. There is a complete ban on the use of Chinese battery storage systems within the US military network:

<https://www.notebookcheck.net/U-S-Department-of-Defense-proactively-eliminating-Chinese-battery-energy-storage-systems-from-use-due-to-foreign-threat-risks.827400.0.html>

**To put it simply: it is no longer merely financial greed that has become a threat to Western infrastructure. Now that counterfeit products are being deliberately put into circulation to infiltrate networks, the threat has reached a far more critical level.**

**Protection through sovereignty and technical superiority:** GENEREX is combatting this form of economic crime through legal means. However, in countries where prosecution is not possible or where criminal acts are politically motivated, there is little we can do. We therefore strive to optimise the integrity, security, and performance of our products in order to put a stop to criminal activities. As a manufacturer, we do everything in our power to protect our genuine products against fraud.

As a user or partner, you can also play an active part in this protection. As a market leader, BACS® has become a target for counterfeiters worldwide, which is why we have an **urgent** appeal: Check your source of supply. Be wary of offers that attempt to lure you with unusually low prices or of suppliers who are unknown to you or seem dubious. Use only our authorised distribution partners from our official dealer list. **Here is our official dealer list:** <https://generex.de/partners/find-a-reseller>

And if you are unsure, please contact us at [Support@generex.de](mailto:Support@generex.de)

**We are happy to help you verify the authenticity of offers. Please send us any suspicious offers or suppliers. We will check quickly and discreetly whether the product is a genuine GENEREX product.**

# Maintenance, Updates & System Enhancements



'NATIVE MQTT SUPPORT IN CS141 AND BACS®'

NEW!

## FIRMWARE 2.30 – SECURITY UPDATE FOR CS141/BACS®/SITE MANAGER

In a rapidly changing market, the long-term security of infrastructure components is vital for professional users. GENEREX is addressing this challenge with a policy update that is unique in the industry.

- ◆ **Frequent updates**  
We release firmware and software updates on average every three to four months.
- ◆ **Lifetime guarantee**  
As long as a product is in production, clients receive all the new features and updates free of charge. Even after the end of production (end of life), we continue to provide critical security updates to ensure the operation of existing devices.
- ◆ **OEM confidence**  
Our OEM partners actively leverage this stability in their own marketing. In doing so, they highlight the reliability of the joint solution, which extends far beyond standard warranty periods.
- ◆ **Example: Online UPS systems:** Partners such as ONLINE USV-Systeme AG are already successfully promoting the security and modernity of these software interfaces (e.g. DataWatch), which were developed in Germany, on their platforms. [Go straight to the OEM reference article](#)

To ensure our clients can immediately recognise how urgently action is required, we classify our releases into two categories:

**1. Classification:**  
**SECURITY**  
(Critical)

2.24 - 250324  
📅 24. March 2025  
Security Update

This is the highest priority level. This update addresses newly discovered security vulnerabilities and hardens the system against threats.

**Recommended action**  
Users are required to update their devices as soon as possible in order to restore network security.

**Note:** A SECURITY update no longer allows a downgrade to a lower version.

**2. Classification:**  
**IMPORTANT**  
(Important)

2.30 - 260310  
📅 10. March 2026  
Important Update

These updates have a high priority. They address relevant issues, improve system stability, or resolve functional limitations that may impact operation.

**Recommended action**  
It is recommended to install the update promptly to ensure stable and reliable system operation.

**3. Classification:**  
**NORMAL**  
(Feature Update)

2.28 - 250930  
📅 30. September 2025  
Normal Update

These updates include usability improvements, new features, and optimisations.

**Recommended action**  
The end client can decide at their own discretion if and when to install the update in order to benefit from the new features.

Users can view the classification of each firmware update in our **RELEASE NOTES** at <https://www.generex.de/support/changelogs/cs141>

COMING SOON!

## BACS® CABINETS WITH NEW TOUCH PANEL 'BACS®\_HMI485'

Our BACS® clients have expressed an interest in a wall-mounted cabinet that houses all BACS® Web Manager components, sometimes with a built-in PC and screen, so they can manage their BACS® systems on site. Our CC Cabinets with touch panels have been meeting this requirement for years. These are full-fledged Windows-based PCs with touchscreens and Bluetooth keyboards, and like any other PC system, they require appropriate maintenance. However, not everyone enjoys working in the battery compartment and needs such a high-performance device. Many clients need a simpler option that does not require any setup or configuration and does not necessarily need a network connection or internet access.

Driven in part by Microsoft's new requirement for registration and online accounts and the resulting need for an internet connection on modern Windows PCs, we are now offering the BACS® HMI485 touch panel, a new display that has been deliberately designed to focus solely on the core function of displaying all BACS® WEBMANAGER systems in the battery room.

The simple display screen with touch panel controls for our CC Touch Panel BACS® Cabinets requires no network access whatsoever and does not need an internet connection. Utmost importance has been placed on cybersecurity, meaning that no network can be connected at all; all information is transmitted via a peer-to-peer connection directly to the BACS® WEBMANAGERS via an RS485 interface that is highly resistant to EMC interference.



View of the BACS® HMI485 screen displaying a BACS® WEBMANAGER in the current maximum configuration of the CC8 Cabinet with eight BACS® WEBMANAGERS. In this view, the CC8 Cabinet monitors a total of 1,640 batteries (up to 4,096 batteries possible). Here you can see string 3, which contains 240 batteries; of these, four are in the orange warning zone and are therefore shown in orange in the overview.

All BACS® status readings are displayed on the screen, providing the user with an overview of all systems controlled from this cabinet. Further information can be accessed via the touchscreen. This new display acts as a battery monitor within the battery room and is ideal for on-site visual checks; it can be installed and enabled within seconds. In addition to the user interface, which has been specifically optimised for this application, the new touchscreen display utilises the proven RS485 standard, making it resistant to interference and noise within a battery room.



The 'BACS® HMI485 touch panel' in our CC TP Cabinets will be available to order in June 2026



COMING  
SOON!

## INTRODUCING THE CS141 SUCCESSOR: THE CS181

The CS181 is being launched to set new standards. But before we talk about this next step, it is important for us to pause and acknowledge the era of the CS141 and its upgrade to the HW161.

### A look back at a success story

When the CS141 was officially launched in 2015, it had a great legacy to live up to. Its predecessor, the CS121, had established itself globally since its market launch in 2003 and enjoyed a remarkable run until its 'end of life' in 2018. Even today, eight years after the end of support, we still receive enquiries about active installations. The CS141 has not only met expectations but also exceeded them. Since its launch in 2016, sales figures have risen rapidly. Today, the CS141 and the BACS® battery management system, with more than 500,000 units sold worldwide, are regarded as the de facto industry standard.

### Quality by conviction: CS141 – Made in Germany and Made in the USA

A key factor in this success was, and remains, our conscious decision to prioritise technological excellence over mere cost optimisation. Whilst other suppliers opted for low-cost manufacturing in the Far East, we stayed true to our principles: Western technology for maximum reliability, manufactured in Europe or the USA. The heart of the CS141 came from Texas Instruments, a legend amongst American chip manufacturers. This combination of 'Made in the US' core components and 'Made in Germany' engineering expertise became our distinctive unique selling point and remains to this day a key factor in our clients' purchasing decisions.

### Looking ahead with the CS181 – Made in Europe

**With the CS181, we are now turning the page to the next chapter whilst remaining true to our company philosophy:** innovation through quality and a clear commitment to 'buy local'. We have chosen the Dutch manufacturer NXP Electronics as the supplier for the main processor, and all other components are also manufactured 'locally' mostly by other European manufacturers, with whom we have been able to establish significantly longer-term relationships than with the US manufacturers we used previously. This decision stems from increasing unpredictability in international supply chains. We have now chosen Europe as our source for our long-term planning. In Europe, things may move more slowly, but they are more reliable. Having more European components in our products allows us to plan for the longer term. Long-term and secure supply chains are a top priority for the CS181.

**The CS181 is more than the sum of its parts; it is an architecture of possibilities, designed to meet the challenges of tomorrow.**

- ◆ **Performance:** By combining state-of-the-art processor technology with optimised DDR4 RAM and optimised network hardware, we have created a platform designed for fluidity and responsiveness – cutting-edge architecture manufactured in Europe.
- ◆ **Connectivity and compatibility:** With the direct integration of Modbus RS485 on board and an expanded number of COM ports, we are opening the door to seamless building and system integration.
- ◆ **Compliance 'by design':** The CS181 is designed not only to meet the forthcoming requirements of the Cyber Resilience Act (CRA) but also to incorporate them as an integral part of its security architecture.
- ◆ **The CS141 also forms the basis for BACS®:** The most successful battery management system on the market is now also the most advanced on the market and the only one where both the sensor technology and the controller are supplied 100% by GENEREX. No competitor has the same depth of production as GENEREX.



*The CS181 will be available to our long-standing clients as a test unit in 2027.  
The first deliveries are not scheduled until mid-2027.*

NEW!

## AUTH2 PROCEDURE FOR EMAIL CLIENTS FOR MICROSOFT EXCHANGE

With the upcoming firmware for CS141, SITE MANAGER, and BACS® version 2.30, we are releasing an update to the IMPORTANT class, partly due to the introduction of new security guidelines for users of Microsoft Exchange email services. In addition to SMTP, this firmware 2.30 will now offer a further option for mail server configuration.

### AUTH 2.0 for Microsoft Exchange – With ‘Client Secret’ or ‘Certificate’

Microsoft had previously stated that SMTP would be disabled in Exchange Server by January 2026. There is now a further grace period until December 2026.

<https://techcommunity.microsoft.com/blog/exchange/updated-exchange-online-smtp-auth-basic-authentication-deprecation-timeline/4489835>

The bottom line is that Microsoft has announced the end of password-based authentication (SMTP) for all Exchange Online/Office 365 services by 2026. In future, use will only be possible via the AUTH 2.0 protocol. This means that any manufacturer that has merely integrated an SMTP client into their products will inevitably have to make changes; otherwise, the email function may no longer be used by Microsoft Exchange for security reasons.

### The key difference: Why the move away from SMTP and passwords?

The reason for switching from SMTP to modern authentication and OAuth 2.0 methods lies in the security concept used when logging in to the Exchange Server:

**Classic SMTP (obsolete):** The device sends the username and password to the server with every email.



**The risk:** If the server is hacked or the traffic is intercepted, attackers will have the real password and thus gain full access to the mailbox in question.

**Modern Auth / OAuth 2.0 (new and secure):** The device authenticates itself once and receives a time-limited access token.



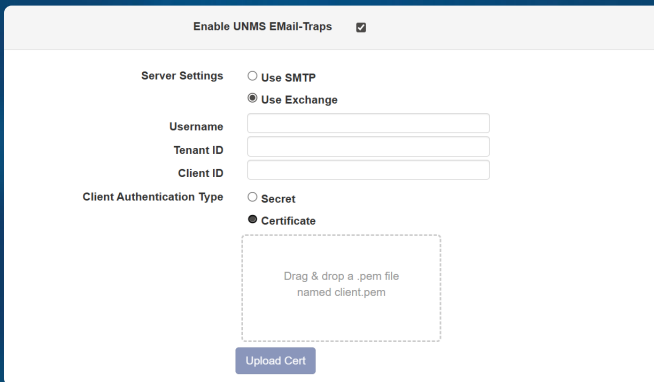
**The advantage:** The server never sees the password. Even if the system is hacked, attackers will only gain a worthless, expired ticket. Even if the account is known, it is not possible to access it.

The CS141/BACS®/SITE MANAGER now offers the following options in the email and email trap configuration menus:

**‘Use Exchange’** The user can then choose between ‘Secret’ or ‘Certificate’. These are two options that allow a CS141/BACS®/SITE MANAGER to authenticate with the relevant identity provider (e.g. Microsoft Entra ID) in order to obtain the aforementioned identity ticket.

## CLIENT SECRET (THE 'MACHINE KEY')

This works like a very long, complex password generated specifically for this one application.



The email/email trap configuration screen shows a typical configuration for Microsoft Exchange. In this example, the user has opted for the highest security level via 'Certificate'. This is provided by the relevant system administration.

**Advantage:** Quick to set up

**In practice:** You copy a cryptic text string ('Secret') that you receive from your administrator into CS141, just as you would a password.

**Certificate (the 'digital ID'):**

Here, you do not enter a string of characters, but instead upload a digital file (certificate).

**Advantage:** Highest level of security, as it is cryptographically encrypted and often required by company policies.

**In practice:** You upload a certificate file to the CS141/SITE MANAGER/BACS® using drag and drop.

NEW!

## AUTH2 PROCEDURE FOR THE ADMIN/USER LOGIN OF THE CS141/BACS®/SITE MANAGER

Just as Microsoft is stepping up its defences against cyber threats to its Exchange Server, so too are we raising our security barriers.

In modern infrastructure, the risk profile has shifted significantly since the start of the new 'Cold War' between East and West. Constant attacks on computers within critical infrastructure are making it increasingly clear that attackers are receiving support from governments and that the sophistication of cyber-attacks is increasing dramatically. Whereas it used to take weeks to 'hack' a password, today, it often takes just a few minutes. Particularly critical infrastructure is subject to attacks aimed simply at sabotaging it. This includes attacks on network cards in UPS systems, as these are often particularly easy to infiltrate. Even though our CS141/BACS®/SITE MANAGER devices are amongst the most secure on the market, the sophistication of these attacks means we are compelled to raise the bar for attackers.

**With firmware update 2.32, GENEREX is introducing a new authentication method for the admin/user login: the new AUTH2 method with two-factor authentication.**

Essentially this is similar to the Microsoft AUTH2 procedure, except that with the CS141, even 'private' users can easily use the highest level of protection without having to ask an Exchange administrator for help. We are implementing an additional, physically decoupled layer of security (multi-factor authentication) that goes far beyond standard password protection and uses freely available authenticator apps. The benefits are as follows:

The screenshot shows the 'Edit User' configuration page. It includes fields for Name (admin), Role (Super User), New Password (Cs141-snmpGX), and Verify Password (Cs141-snmpGX). There is a 'Show password' checkbox. Below this is the 'Two-factor Authentication' section with Name (admin) and Issuer (Generex) fields. The 'Authenticator App Registration' section features a 'Generate' button for the QR Code, which is displayed as a QR code. A yellow warning box at the bottom states: 'Please scan the QR code shown with your authenticator app on your smartphone! Once the user configuration has been saved, the QR code will no longer be displayed.' At the bottom are 'Save' and 'Cancel' buttons.

- ◆ **Prevention of damage to UPSs or batteries caused by sabotage in the event of an infected network**

Even if there is a successful breach of your IT network, the UPS system remains isolated and protected. Without the locally generated verification code, access to critical control functions is not possible.

- ◆ **Cost-effective implementation**

The new AUTH2 procedure uses standard authenticator apps such as Microsoft Authenticator or Google Authenticator, which are available free of charge for Android and Apple. No expensive additional hardware or complex server infrastructure is required. Pairing is simple and secure via a one-off QR code, which the CS141 generates anew with every login, thereby meeting the highest security standards.

- ◆ **Access control**

Of course, users can still decide for themselves how high the security barriers for login should be for administrators, technicians, and guests and whether they need to clear an additional barrier in the form of an AUTH2 code. This enables a perfect balance between high security and operational workflow.

**NEW!**

## DELIVERY TOOL FOR PRE-CONFIGURING CS141/BACS® WEBMANAGERS FOR SYSTEM INTEGRATORS

GENEREX offers various tools for system integrators, for example, to simplify the mass deployment of our products. With these software tools, all GENEREX devices can be 'remotely configured' via scripts.

Since we increased our login and password security levels in March 2025, every newly delivered device requires us to assign a new password before login. A default password is no longer permitted.

*Whilst this increases the security of our devices, it forces our system integrators to come up with and supply a password for every device that is to be prepared for a client. This is not conducive to security and is cumbersome for the system integrator.*

**New: Simplifying the delivery of fully configured CS141 and BACS® WEBMANAGERS the temporary password for system integrators**

*From firmware 2.30 onwards, every newly delivered CS141/BACS®/SITE MANAGER offers a new menu item on the login screen: 'User must set new password.'*

With this new function, the system integrator can now fully pre-configure each device and then 'lock' the system for the end client again using the new 'Change password at next login' function.

The screenshot shows the GENEREX web interface. On the left, the 'System' menu is expanded to 'Users' (1). In the 'Local Users' table, the 'admin' user is selected (2). The 'Edit User' dialog box is open, showing the 'admin' user with the role 'Super User'. The checkbox 'User must change password at next login' is checked (3). The 'New Password' field is empty, and the 'Verify Password' field contains 'Confirm Password'. A red box highlights the checkbox, and a yellow box highlights the 'New Password' field. The background shows the 'System > Users' menu with a red circle around the 'Users' option and a red circle around the 'admin' user in the 'Local Users' table.

|   | Name  | Role       | Disabled |
|---|-------|------------|----------|
| + | admin | Super User | No       |

The new function can be found under SYSTEM/USERS (1). Click the Edit button here at the 'admin' user (2) and enable the 'User must change password at next login' function (3). Then, click APPLY/SAVE, switch off the device, and send it to the client. The next time the end user logs in on site, they will be prompted to enter a new password first, just as if they were setting up a brand-new device.

NEW!

## NEW VERSION FOR VMWARE WITH VCLS AUTOCHECK FUNCTION

RCCMD is the most popular shutdown solution for VMWARE and is widely used in the UPS sector. Since Broadcom's acquisition of VMware, the prices of VMware licence models have risen sharply. Many other manufacturers of shutdown solutions for UPS systems, such as APC and Eaton, have seized the opportunity and also massively increased their prices for VMware shutdown software licences. This has led to a doubling of demand for RCCMD for VMware and, consequently, to a higher market share for our products in VMware environments.



*GENEREX has decided against removing the RCCMD product from the Windows and Linux packages and offering it at higher prices. We are retaining the RCCMD licence package in its current form at extremely competitive licence prices and are even regularly introducing new VMware features that our competitors do not yet have*

### VMware 'vCLS Autocheck'

vCLS VMs (agent VMs) are designed to decouple the cluster services (DRS and HA) from the vCenter Server in order to optimise their own storage management (vSphere Cluster Services). The vCLS VMs are used for the active management of vSAN objects or resource fragmentation: vCLS ensures that it is possible to calculate where storage space is available ('DRS'). If a VM is too large for a host, vCLS cannot 'split' it, but it ensures that space is created by moving other VMs (resource defragmentation).

- ◆ **Previously (without vCLS):** If the vCenter went down, DRS distribution would no longer work.
- ◆ **Today (with vCLS):** The logic resides directly on these small VMs on the hosts and continues to ensure optimal storage management.

What is new is that RCCMD recognises these vCLS VMs as 'system-local' or 'host-local' and does not attempt to shut them down in the normal way. With the introduction of vCLS at VMware, this is particularly important for avoiding shutdown loops.

Generally, vCLS VMs are monitored by the ESXi Agent Manager and vCenter. If a shutdown solution sends the 'Shutdown Guest OS' command to a vCLS VM, this inevitably triggers a response. As soon as it detects the loss of one of its vCLSs, it is either restarted immediately or automatically replaced by a newly generated vCLS, as vCLSs are considered 'disposable infrastructure VMs' within VMware.

**Problem:** This constant revival of 'zombie vCLS' can, under certain conditions, lead to a 'shutdown/restart loop', which prevents the ESXi host from entering maintenance mode or shutting down properly. **The ESXi host always has a running VM, even though it is supposed to be paused.**

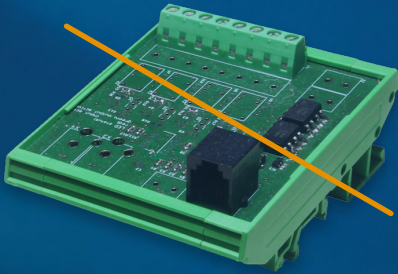
**Solution:** The new RCCMD shutdown software for VMware detects these existing vCLS instances during the shutdown process and treats them as infrastructure-related VMs, which actively prevents the shutdown/restart loop and thus the automatic generation of zombie VMs. Initially, only the production VMs are shut down properly. The vCLS VMs remain active until the ESX host itself shuts down.



*Unlike all other shutdown solutions for VMware on the market, RCCMD does the right thing.*

## EOL

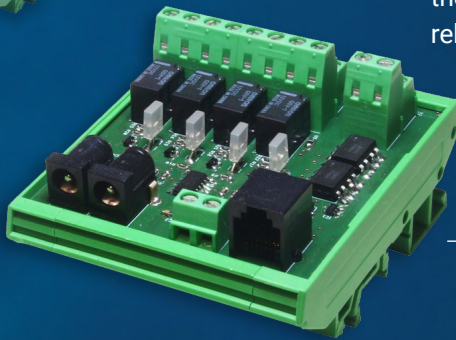
## CON\_AUX4 IS REPLACED BY CON\_R\_AUX4



The CON\_AUX4 is EOL (end of life). For many years, this interface card has served as a passive input card for potential-free contacts.

It has now reached EOL status.

The CON\_AUX4 input board is fully replaced by the technically and functionally superior CON\_R\_AUX4 relay board.



## EOL

## LONWORKS CONVERTER CS\_LON



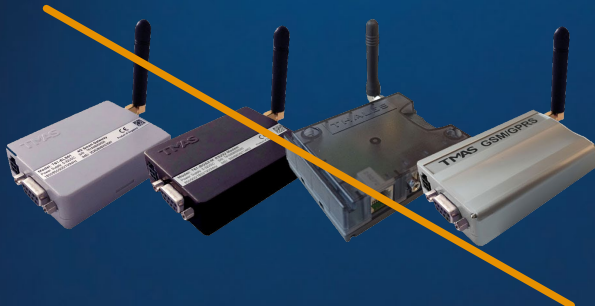
The CS\_LON is EOL.

For many years, this converter has reliably enabled the connection of CS141 RS232/COM2 MODBUS to LONbus systems.

It has reached EOL status.

## EOL

## GSM MODEM 4G-T61MR IS EOL

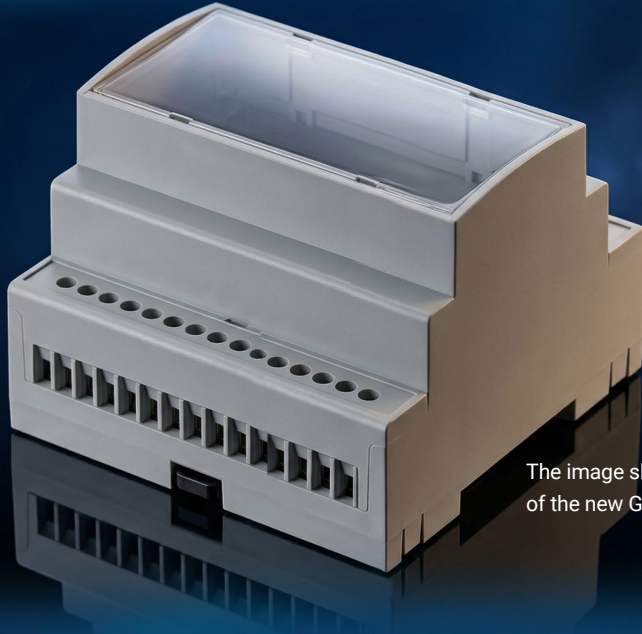


The GSM modem 4G-T61MR is EOL. Due to the ongoing phase-out of 3G and 4G networks in Europe as part of the 5G roll-out, this technology is becoming increasingly obsolete. 2G remains available in most countries at present.

EOL status will be reached in 2027.

COMING  
SOON!

## GX\_R\_AUX4 – THE NEW GENERATION OF THE BACS® BUS INTERFACE



The image shows the current prototype of the new GX\_R\_AUX.



BACS® bus interface GX\_R\_AUX is a proven solution for integrating input and output signals into the BACS® system.

With the new GX\_R\_AUX, GENEREX is expanding the BACS® bus architecture with a powerful interface module for the flexible connection and control of external signals and relays.

The module offers four freely programmable digital inputs as well as four relay outputs and is specifically designed for safety-critical applications in the battery sector, for example, to control battery disconnect switches in critical situations such as temperature rises or voltage deviations.

Integration takes place directly via the BACS® bus, meaning no additional power supply is required. Addressing is easily carried out via DIP switches.

Unlike the previous model, the successor has a voltage range of 8–18 VDC, a typical current consumption of just 200 mA at 12 V, and a higher switching relay capacity of 2 A at 48 VDC. The device is designed for operation in a temperature range of 0 to 60 °C and is installed in a DIN rail housing (IP20).

#### Other new features

- ◆ Firmware update via the BACS®-bus
- ◆ Replaceable fuse



*The new-generation GX\_R\_AUX is expected to replace the existing GX\_R\_AUX BACS® bus interface in mid-2027.*

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NO. 1 CHOICE WHERE IT MATTERS MOST:



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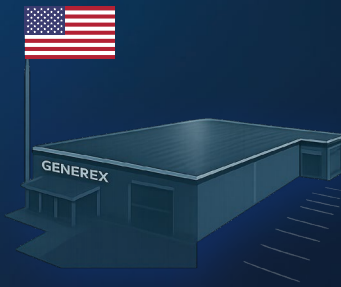
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YEARS

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**51**



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TECHNICAL

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