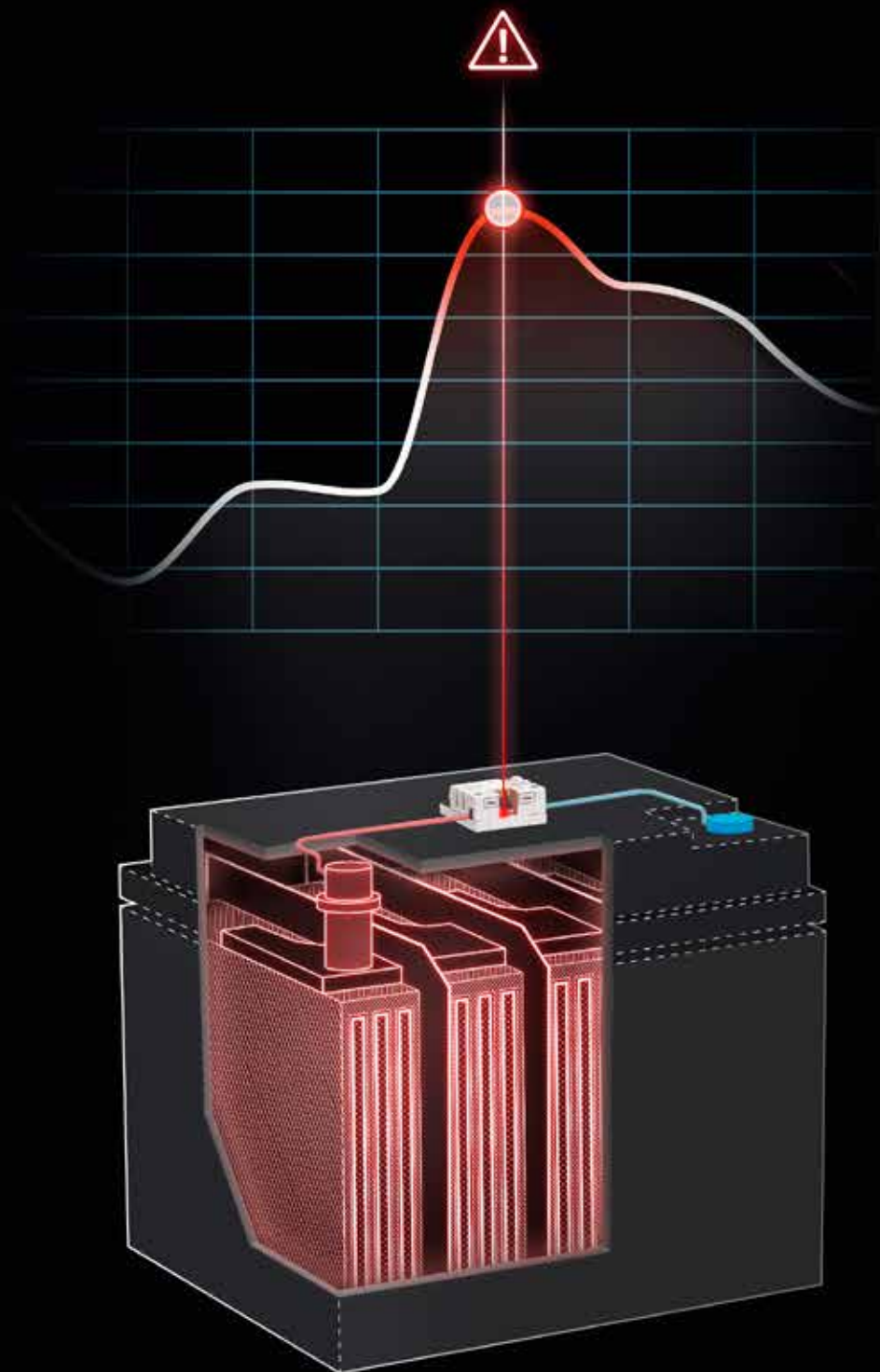


# BCS

Battery Control System



INOTEC

# INOTEC Sicherheitstechnik GmbH

## Innovative Emergency Lighting Technology



INOTEC Sicherheitstechnik GmbH is an innovative medium-sized company in Ense-Höingen, Westphalia with its own R&D department, production and a national and international sales and distribution.

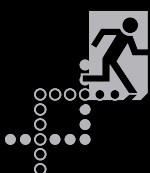
A competent team ensures the reliable support in all questions concerning products, planning, service and standards with flexible and committed employees.

Since the company was founded in 1995, INOTEC Sicherheitstechnik GmbH developed itself to a globally active company with over 230 employees. More jobs were created in the numerous partners across Europe and the Middle East. At the headquarters in Ense INOTEC is grown to approximately 14,000 m<sup>2</sup> of production, warehouse and management.

Today INOTEC Sicherheitstechnik GmbH is one of the leading manufacturers in the emergency and safety lighting. Modern, innovative and high-quality products "Made in Germany" set new global standards, such as decentralized emergency lighting systems CLS 24, Central battery systems with JOKER technology and the dynamic escape route system D.E.R. .

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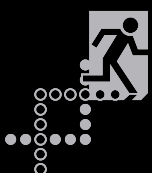
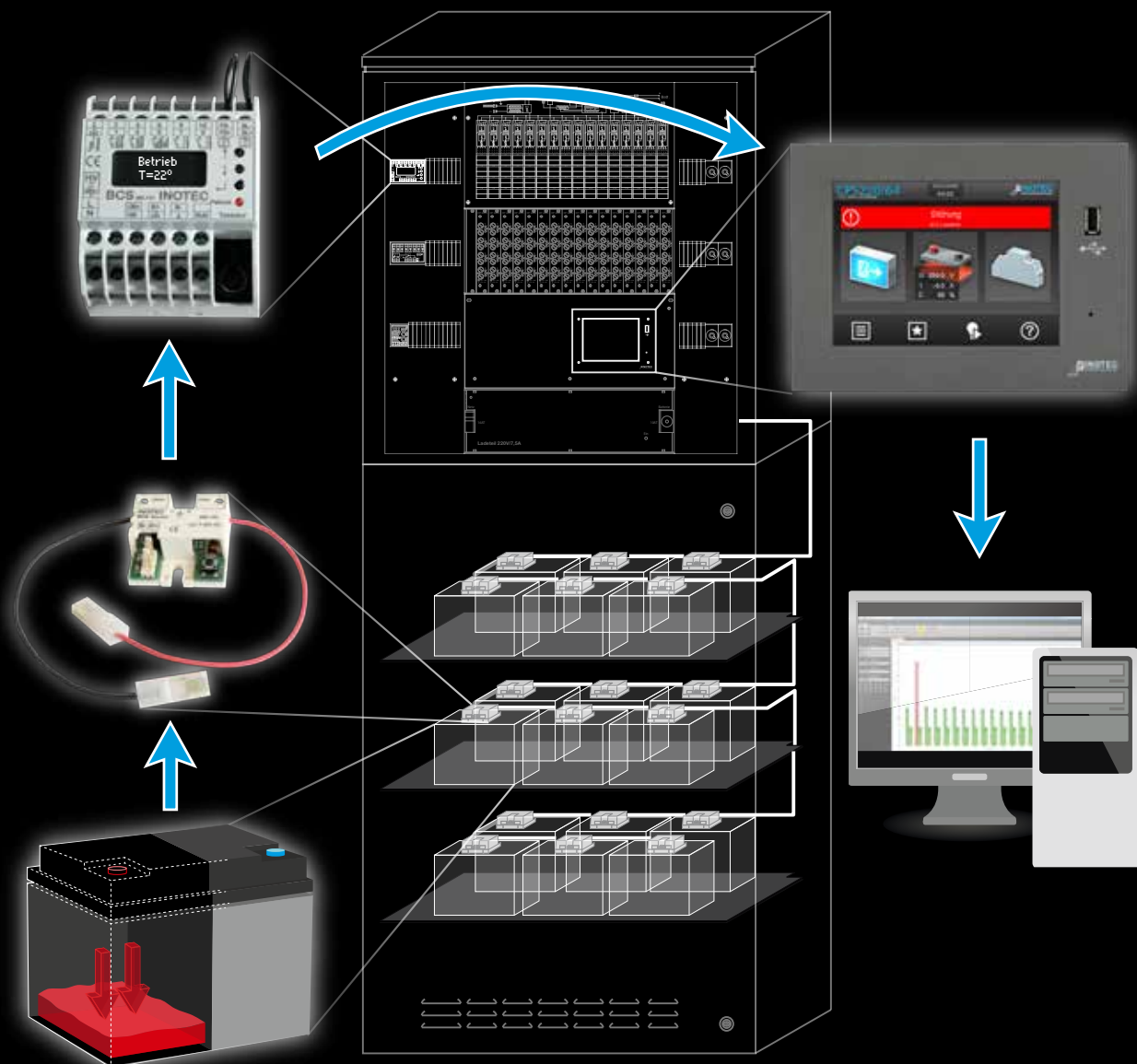
Subject to technical changes.



# Why Should I Use A Battery Control System?

The battery is the central element inside of an emergency lighting system. A battery breakdown leads to the loss of all safety functions.

- ▶ The interval of the mandatory annual service / battery duration test is too long to detect a faulty battery block early.
- ▶ The operating reliability of the battery is checked at any time.
- ▶ A single failed battery block may damage permanently the complete battery set. The complete replacement is associated with very high costs.
- ▶ Higher safety by proactive protection
- ▶ Cost minimisation



# Sufficient battery capacity for the full rated duration?

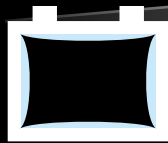
Due to the fact that all 18 or 36 battery blocks of a central battery system are connected in series, one broken block can damage all remaining blocks after a while. For this reason the early identification of defective battery blocks is imperative. Otherwise the operational safety is no longer given until the battery replacement is done. Worst case, this happens after the next annual battery service.

A single broken battery block will also not be detected during the daily function tests. The energy of the remaining battery blocks is high enough for the function tests. However, a broken block would lead very quickly to a failure of the entire battery set, if the mains supply fails for a longer time.

## Failure types

### ▶ Dry out

The in fleece or gel bounded electrolyte dries out, even during normal operation. This is not visible from the outside and can't be prevented by annual service. A broken battery block will be the result.



### ▶ Thermal runaway

Heat can be generated for example by internal short circuits. This heat accelerates exothermic (heat generating) reactions, which are creating even more heat. A result can be smoke or flames, in worst case explosion of the battery block.



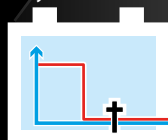
### ▶ Plate short circuit

Out flushed material, which is gathered at the bottom of the battery, may cause a short circuit between the cells.



### ▶ Sudden Death

The connection between the plates and the pole bolt can lose material thickness by corrosion, what can also lead to a total tear off of the connection. This is called Sudden Death.

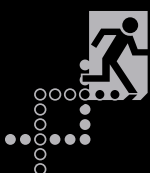


## Result

- ▶ No safety by the emergency lighting system
- ▶ High replacement costs

## Conclusion

- ▶ The complete duration can only be guaranteed with an appropriate monitoring (prophylactic).
- ▶ Annual duration test / maintenance is not sufficient for an early detection of broken battery blocks.



# Are you sure your emergency lighting system is ready for use in case of an emergency?

Emergency lighting must be immediately ready in case of an emergency. If the power fails they have to ensure a safe evacuation of a building for a specified time. This requires not only the continuous monitoring of emergency- / safety- luminaires and the switching technology, but also monitoring the battery as the backup power supply.

Customary systems only monitor the battery symmetry. This method is not meaningful, since in this case the battery pack is only monitored in 2 groups with 9 blocks. An individual block monitoring isn't done.

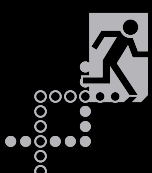
The INOTEC BCS-system monitors and logs each individual battery block, their voltage and temperature. All battery block data can be displayed comfortably at the controller unit and the higher level monitoring software.

Exceedance of the specified limits initially creates a failure and might lead to a safety shutdown of the charger. Through the early identification and replacement of a single defective battery

block the damage of the entire battery set can be effectively prevented, thus prolonging the life of the battery.

## Advantages

- ▶ Prolonging the battery life
- ▶ Temperature controlled charging
- ▶ Safety shutdown at battery over temperature
- ▶ More precise battery failure detection compared to the symmetry measurement by splitting into two groups with 9 blocks each.
- ▶ Continous monitoring of the individual blocks
- ▶ Logging of battery block voltage and temperature
- ▶ Safety shutdown of the charger and cancellation of the battery duration test on error
- ▶ Battery data logging



# Are you always doing the required battery tests documentation?

Although the total voltage, charging current and ambient temperature of the battery set have to be monitored in accordance with EN 50171:2001. These values are not sufficient to determine the operational status of the backup power supply.

For this reason the EN 62034:2013 calls for an annual duration test over the full rated duration, including the measurement of the individual battery blocks, to check the remaining battery capacity.

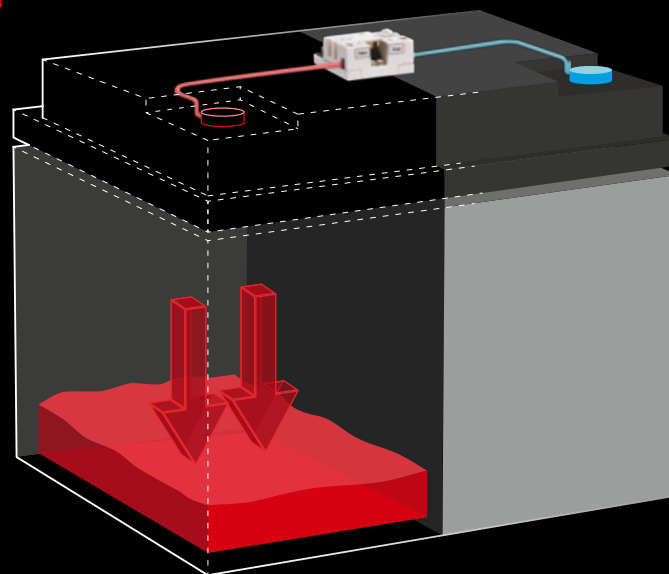
But this annual test simply shows the condition of each individual battery block at intervals of 365 days. An information about the condition of the individual battery blocks in the meantime can not be given.

The draft **E DIN EN 50171:2013** specifies that the voltage of

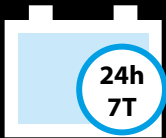
each battery block has to be measured and recorded. In case of using a system like the INOTEC BCS, this monitoring system must meet the following requirements:

- ▶ Periodic monitoring of the battery block voltages (6.11.3. a)
- ▶ Failure messages at a deviation of the battery block voltage (6.11.3. b)
- ▶ Only manual resetting of failure messages (6.11.3. d)
- ▶ Logging the battery block voltages during a duration tests in 5 minute interval (6.11.3. f)
- ▶ Monitoring the battery temperature (6.11.)

The INOTEC BCS system already meets the future requirements and logs the battery condition in the logbook of the device.



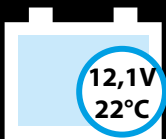
# BCS Advantages



- ▶ 24/7 battery monitoring of individual blocks

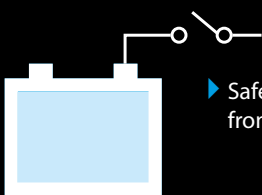
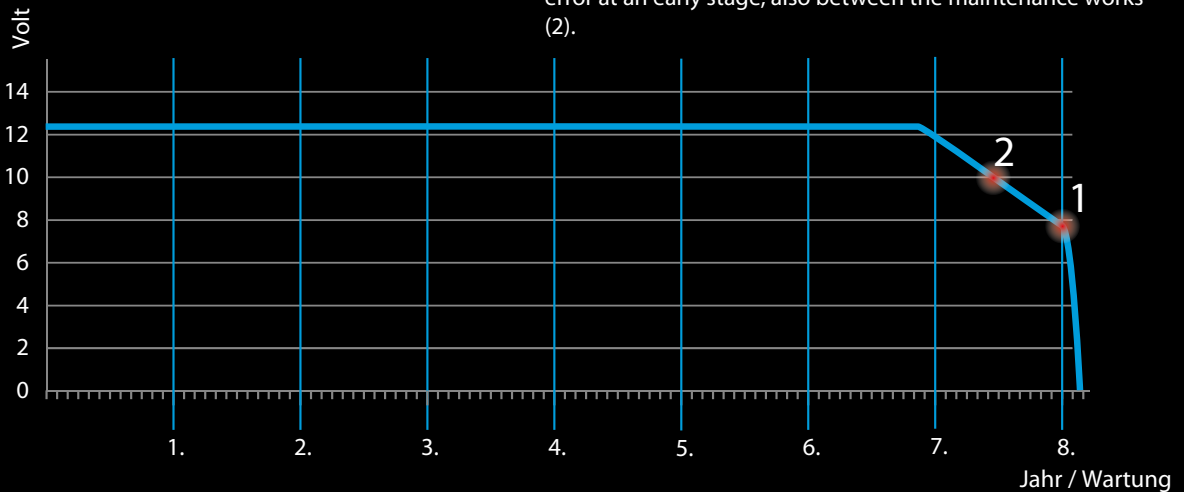


- ▶ Logbook for battery data



- ▶ Daily logging of individual block voltage and temperature

Usually a battery block failure would only be noticed during the annual maintenance (1). A BCS system detects such an error at an early stage, also between the maintenance works (2).



- ▶ Safety charger shutdown at deviation from the limits



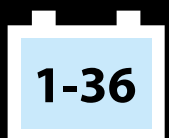
- ▶ Already meets future requirements



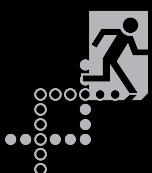
- ▶ Cancellation of a battery duration test at deviation from the limits



- ▶ Easy installation

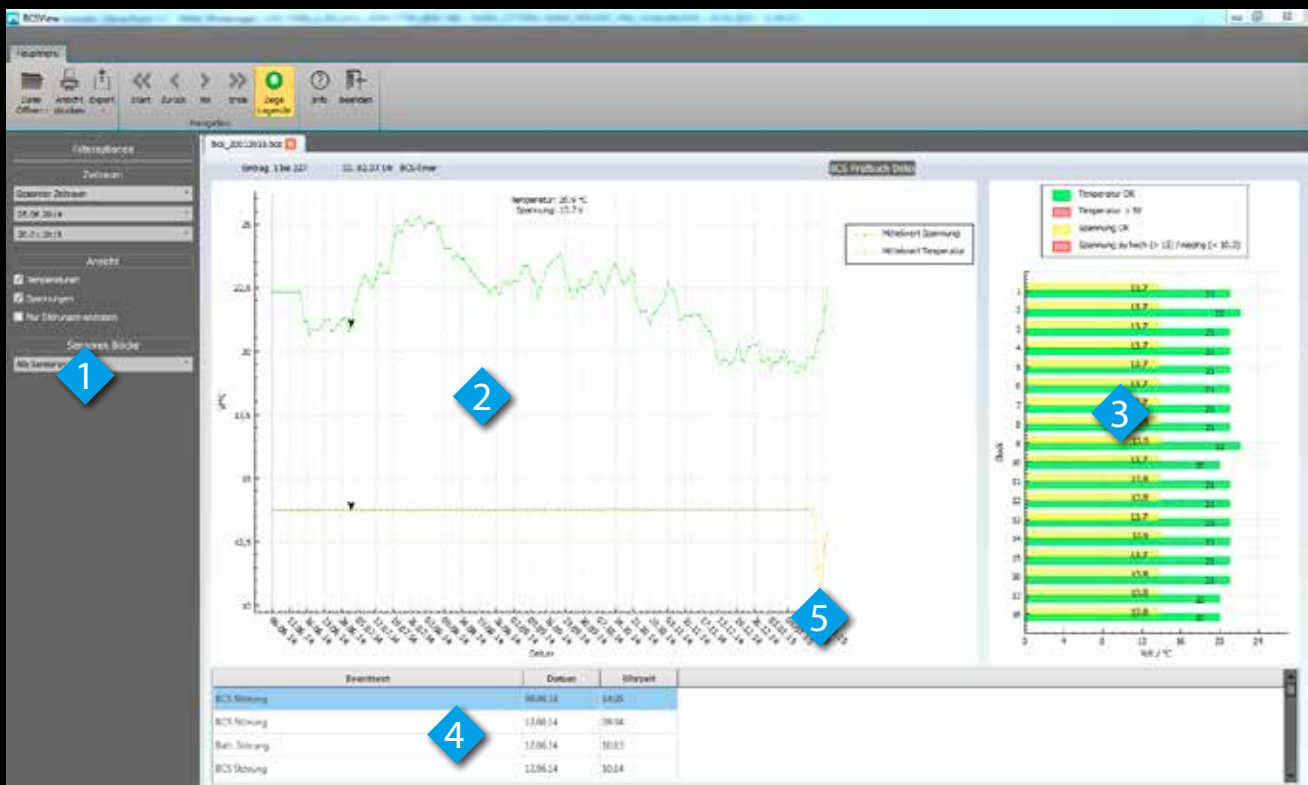


- ▶ Monitoring of up to 36 battery blocks



# BCS View - A New View

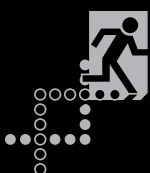
Using the intuitive evaluation software BCS View the recorded data of a BCS system can be analysed easily. The condition of each battery block in normal and battery operation is visualised by diagrams. Defective battery blocks can be located very easily.



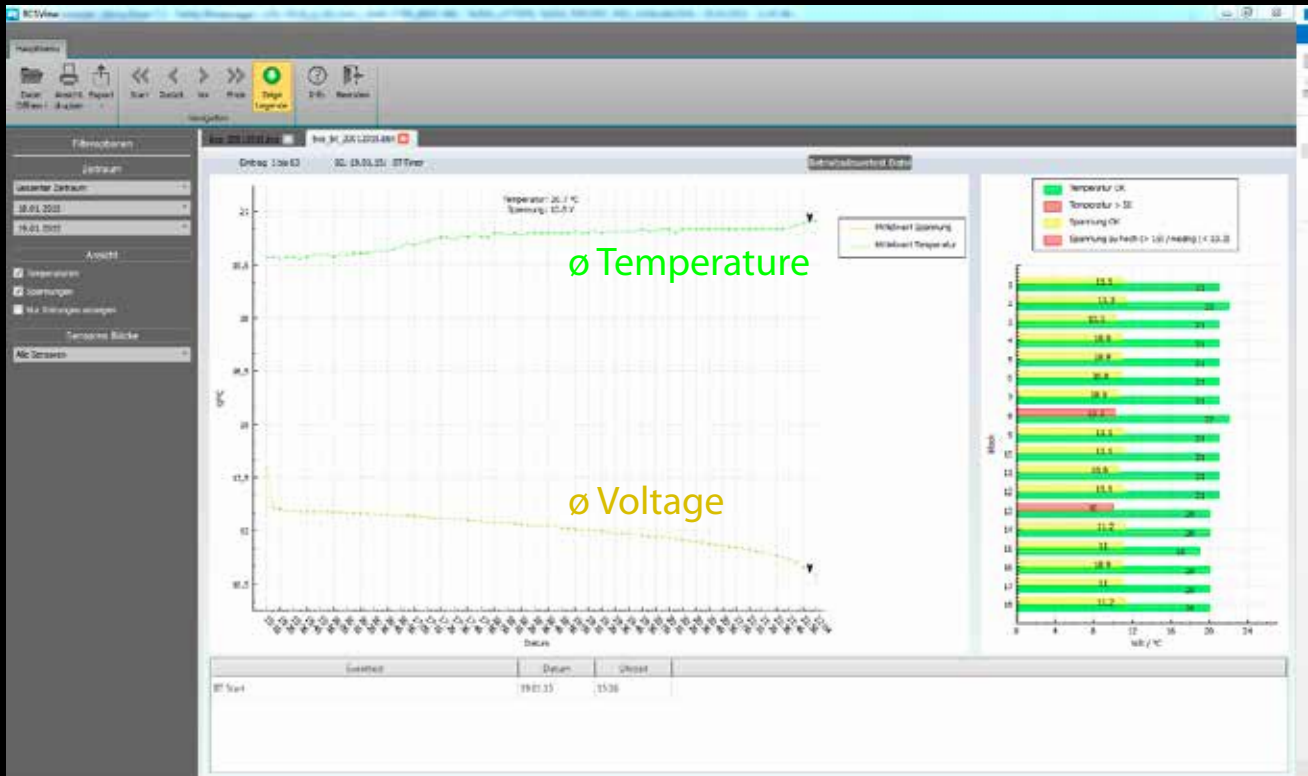
## User Interface Overview

- 1 Filter functions
- 2 Battery block temperature / voltage within a period
- 3 View of the individual values at a specific time
- 4 Table with special events (e.g. failures)
- 5 Voltage drop of the battery block

The data can be downloaded via network connection or with an USB pendrive from the TFT controller unit of the emergency lighting system. Visualisation can be done with BCSView software. Daily values and values during a battery duration test are logged in separate data files.

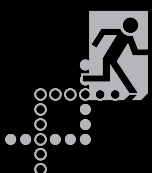
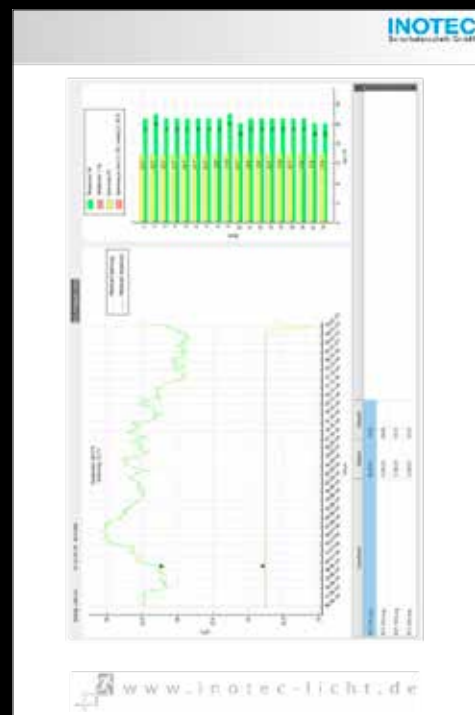






This log of a battery duration test clearly shows the sloping average voltage of the battery blocks (green) for the duration of the test. Exceedances of the limit values are indicated in red, this indicates the reviewing user directly the necessity of a battery check.

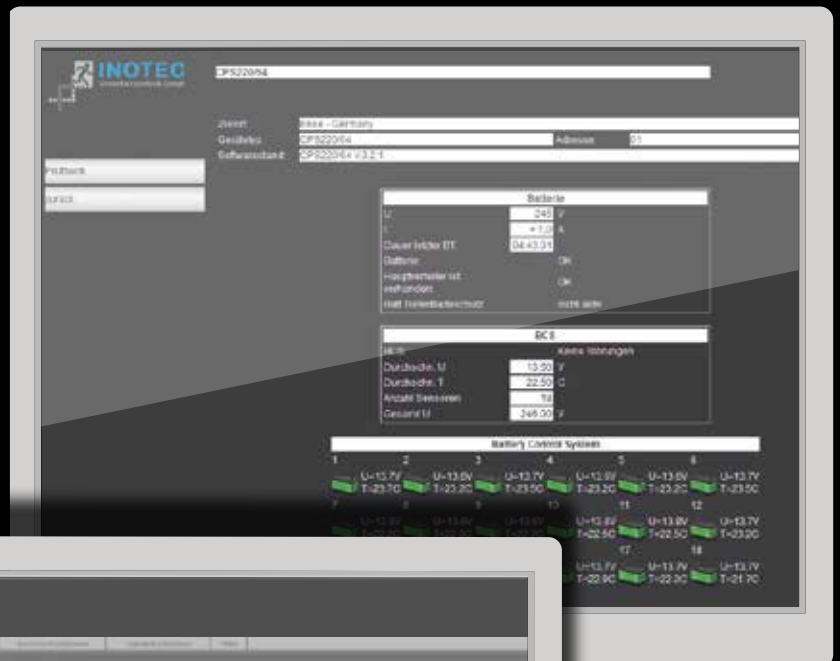
For documentation purposes or further analysis all data can be exported as a data file (\*.csv) or as an image file.



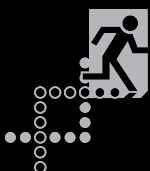
# BCS And Central Monitoring

All data are displayed with their current values of the individual battery blocks in a higher-level monitoring such as INOView or INOWeb. So the operator is notified immediately in case of limit exceedance and can react without any delay.

## INOWeb



## INOView



Batterymanagementsystem BCS for monitoring of up to 36 battery blocks. Logging of the individual battery block temperatures and voltages allows a temperature controlled charging and a safety shutdown when limits are exceeded. All RIF5 functionalities are intergrated. Usable only in combination with a TFT controller unit.

### Technical data:

<b>Nominal voltage:</b>	24V DC
<b>Temp.-range:</b>	-15°C ... +40°C
<b>Housing:</b>	Thermoplastic V0
<b>Terminals:</b>	2,5mm <sup>2</sup> solid core or 1,5mm <sup>2</sup> braid wire with ferrule
<b>Radio interference suppression:</b>	acc. to EN 55015
<b>Protection class:</b>	I
<b>Protection category:</b>	IP20
<b>Max. no. of sensors:</b>	36

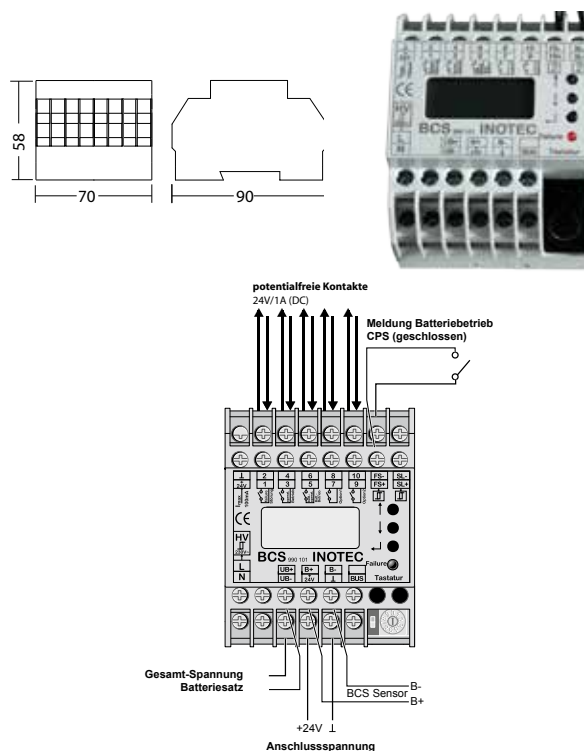
BCS sensor for monitoring of battery block voltage and temperature.

### Technical data

<b>Nominal voltage:</b>	7V DC-20V DC
<b>Nominal current:</b>	1.1mA Standby-Mode 1.5mA Test-Mode
<b>Temp.-range:</b>	-10°C ... +95°C
<b>Housing:</b>	Thermoplastic V0
<b>Radio interference suppression:</b>	acc. to EN 55015
<b>Protection class:</b>	III
<b>Protection category:</b>	IP20

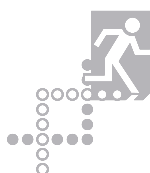
### BCS

Art. No. 990 101



### BCS Sensor

Art. No. 990 100





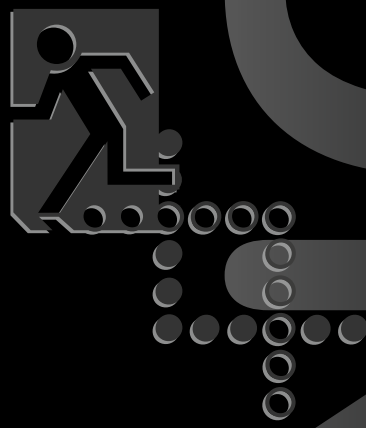
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