Studio and event technology

Operational safety of electrical systems
at events and productions

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On Air: Nothing works without electricity

Whether in radio and television studios, for outdoor shots, in broadcasting operations or at major events – they all have something in common: Nothing works without electricity! All electrical systems depend on a reliable power supply. Failure of the power supply is the worst case scenario and must therefore be prevented at all costs.

At the same time, the power supply for studios and events is subject to general safety regulations. These are primarily used to protect against electric shock (personal protection) but also for system and fire protection.

Operational safety of electrical systems in studio and event technology

The quality and success of productions and events also depends to a large extent on the operational reliability of the technology used. Without safety, there can be no reliable and fail-safe operation. Therefore, the relevant standards such as DIN VDE 0100 and DIN VDE 0105-100 also apply to the operation of electrical systems in the studio and event industry. The VBG and DGUV information 'Safety at events and productions – Guidelines for theatre, film, radio, television, concerts, shows, events, trade fairs and exhibitions' and DGUV Regulation 18 – 'Accident prevention regulations for event and production venues for staged performances', which have been drawn up by most radio and TV broadcasters and various associations in the event industry, must also be observed. Among other things, these regulations stipulate inspections before initial commissioning and after significant modifications, as well as regular periodic verifications. Compliance with these regulations and standards is of the utmost importance for the operational safety of studio and event technology as well as the quality and success of productions and events. The overall responsibility for safety lies with the entrepreneur (e.g. the broadcaster's director). The resulting obligations may only be transferred to specialised personnel.

Important safety instructions

- DIN VDE 0100 – Installation of low-voltage distribution systems
- DIN VDE 0105-100 – Operation of electrical systems
- Safety at events and productions (VBG and DGUV)
- Accident prevention regulation DGUV V18

For studio recordings or events, it must be assumed that most of the people on site have no electrical engineering knowledge and must therefore be categorised as non-professionals. Accordingly, the use of residual current devices (RCD) is mandatory in accordance with DIN VDE 0100-410. In final circuits up to IN = 32A, residual current circuit breakers (RCCB or RCBO) must be used, which must be checked for proper functioning every 6 months.

There is also another special feature: All safety-related equipment must be inspected by experts before initial commissioning and after significant modifications before initial recommissioning. And these systems must be inspected by experts at least every four years to the extent of the acceptance test. Recurrent inspections must be carried out annually by qualified electricians and every four years by certified experts.

Both the functional test of the residual current circuit breakers and the annual recurrent tests have a negative impact on the availability of the technology, as the audio and video technology is not available during these measures.

Important to note:

- RCD mandatory (DIN VDE 0100-410)
- Function test every 6 months (DGUV V3)
- Acceptance test/initial inspection by experts necessary
- Recurrent test at least every 4 years by experts

Information for planners

Planners have a duty to inform operators of electrical systems such as studio and event technology about business risks and the economic operation of the technology used. This also applies to temporary interruptions due to necessary insulation measurements as part of the electrical recurrent test.

Special challenges when operating electrical systems in the studio and event industry

All electrical installations are affected by ageing, material fatigue. and changes in the insulation level. Production technology in studios or at events is also subject to heavy use depending on the location and purpose. In studios, these include round-the-clock operation and changes in lighting technology. In the case of productions or indoor events, the mechanical stresses on cables are particularly significant. For outdoor shots and productions, weather-related influences such as precipitation and puddles play a major role.

Challenges in the operation of studio and event technology

- Round-the-clock operation
- Remodelling measures lighting technology
- Mechanical stress on cables
- Environmental influences (precipitation, puddles, etc.)

These challenges make it clear how susceptible the operation of studio and event technology is to potential failures. For example, the connection of a faulty end device can paralyse an entire studio or cause a power failure during a production.

Or a frayed cable can energise an entire stage and put people's lives in danger. What applies to property protection is all the more important for personal protection, because faulty cable insulation can put an entire stage under dangerous voltage if protective equipotential bonding is carried out incorrectly, putting people's lives at risk.

It is therefore important to recognise electrical faults as early as possible before a critical situation arises, be it a life-threatening situation or the failure of the entire studio and event technology.

Avoid failures during productions and events

If spontaneous shutdowns of the technology due to electrical faults are to be prevented, the faults must be recognised as early as possible before a critical or dangerous state occurs. Additional measures must be taken to achieve this.

To ensure a highly available and safe power supply for productions in studios or at outdoor events, continuous monitoring of the entire electrical installation is essential. Here a condition monitoring system with residual current or insulation monitoring is recommended. This system permanently monitors the status of the entire power supply and recognises spontaneous and creeping faults quickly and reliably before critical states or even operational interruptions occur. In addition, faults can be easily localised with a condition monitoring system. This enables operators and organisers to react quickly and in a targeted manner in order to rectify faults and avoid critical situations.

The key to the safe operation of studio and event technology lies in your hands!

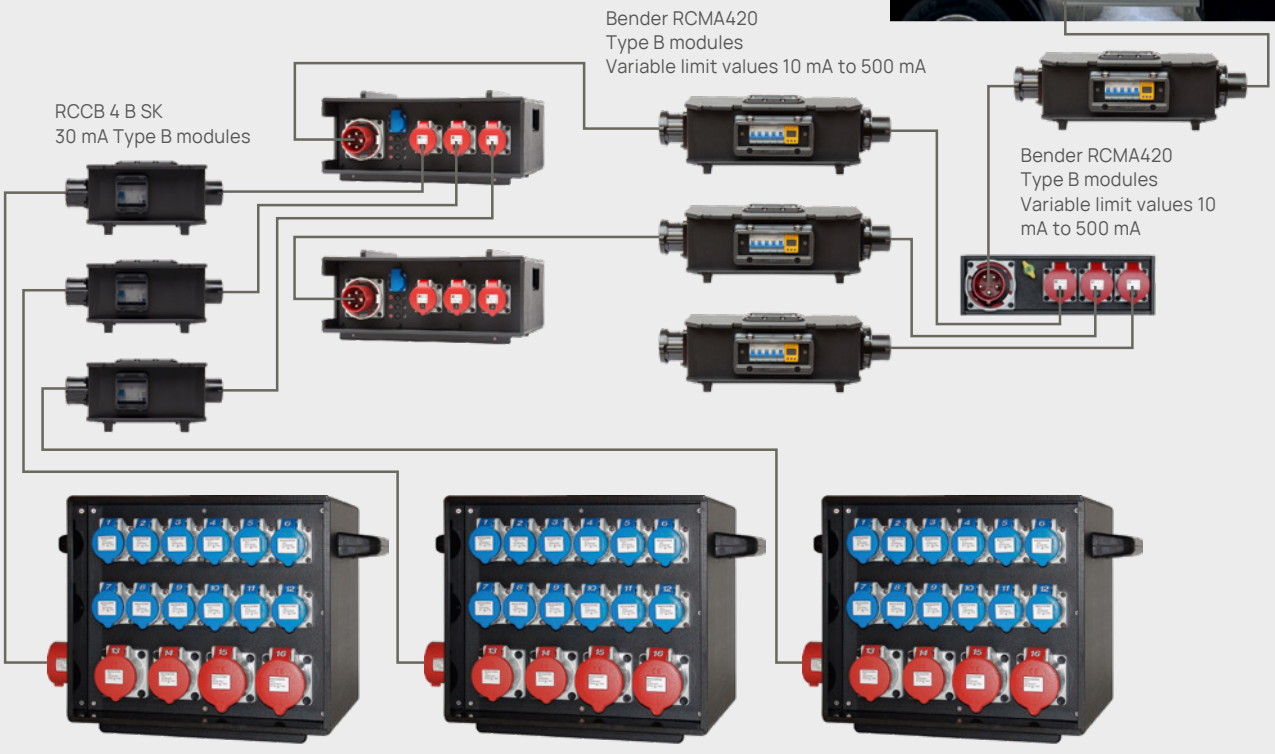
Condition Monitor
CP**9...**-I

Residual current monitoring device
RCMS**425**-D

How does a Bender Condition Monitoring system work?

Condition monitoring systems consist of sensors or measuring current transformers, evaluation units and the actual Condition Monitor. The sensors (e.g. Linetraxx® series) continuously measure the insulation resistance to earth potential or the residual current between the forward and return lines. Any faults that occur are recognised by the evaluation unit (e.g. RCMS series) and forwarded to the Condition Monitor (e.g. COMTRAXX®) via existing interfaces (e.g. Profibus or Modbus). The operator has the option of displaying the faults either via an internet browser or on a Condition Monitor with display (CP9...-I). Integration via the Bender cloud software POWERSCOUT® is also possible.

The condition monitoring system works 24/7 without interruption. Additional analysis functions allow the system status to be assessed over a longer period of time. In this way, operators and technical personnel have an optimum overview of the condition of the entire technology at all times. In addition, the analysis and documentation function of POWERSCOUT® can be used as proof for the insulation test in accordance with DIN VDE 0105-100/A1 (operation of electrical systems).



Mains safety with cascaded shutdown according to Vibrations German Electronic Solutions.

Benefits of a Condition Monitoring system from Bender

With a condition monitoring system from Bender, operators and technical personnel have an optimum overview of the condition of the technology in use at all times. Continuous monitoring enables faults in electrical systems to be recognised at an early stage before they cause interruptions to operations. At the same time, the risk of electrical fires is significantly reduced as high fault currents are signalled immediately.

If electrical systems are continuously monitored with a condition monitoring system, there is no need to measure the insulation resistance during periodic verifications. This significantly reduces the organisational, time and personnel costs for inspections in accordance with DGUV V18. Finally, the risk of electric shock is minimised because dangerous situations caused by faulty devices or cables are quickly detected.

Benefits at a glance

- Continuous monitoring of the technology used
- Structured overview of all measured values
- Early fault detection and localisation
- Risk minimisation of electrical fires
- Reduced effort for testing in accordance with DGUV regulation 18

For you as an operator, this means:

- Risk of spontaneous andunplanned interruption of operation is reduced
- Maximum availability
- Increased personal and installation protection
- Personnel costs for inspections are reduced

Residual current monitoring device
RCMS**410**

Condition Monitor
COM**465**IP

Do you have any questions?

Get in touch with us!

Bender has been a pioneer and market leader in electrical safety for more than 75 years. We offer the right measurement technology for all areas where high availability and increased personal protection are required. Around 200 developers, application engineers and service technicians work every day to make electrical systems intelligent and safer. Get in touch with our experts. You can find your personal contact here:
https://www.bender.de/en/contact/bender-worldwide/

Measuring current transformer CTUB**100**
for residual current monitoring systems

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