



SETRON RESIDUAL CURRENT MONITORING FOR DISTRIBUTION BOARDS FOR FAIRS

Increased safety for event technology systems

A reliable, uninterrupted power supply is essential for concerts, festivals, theater performances, trade fairs, film shoots, and similar events. At the same time, the risk of fault shutdowns or electrical accidents due to insulation faults is very high. After all, electrical equipment is frequently moved around at events of this kind and are exposed to increased wear and tear due to constant – sometimes improper – handling. To significantly increase electrical safety in these situations, SENTRON circuit protection devices and SENTRON Powercenter 3000 can be used to integrate residual current monitoring alongside residual current protection in trade fair and event distribution boards. [siemens.com/protection-devices](https://www.siemens.com/protection-devices)

Residual current monitoring at the final circuit level

Fine-grained, real-time residual current monitoring (RCM) with SENTRON devices at the final circuit level allows insulation faults to be detected before the fault current reaches the trip threshold of a residual current protective device (RCD). This information advantage enables the responsible electricians to take timely action and correct resulting insulation faults in good time – ensuring smooth event operation and a trouble-free participant experience.

Condition monitoring and documentation

All data from the SENTRON circuit protection devices can be forwarded in real time to SENTRON Powercenter 3000 in the trade fair distribution system and stored there for later analysis – for example, in the event of an insurance claim. If a threshold is exceeded, a push notification with details on relevant changes is automatically sent via email to the responsible electricians. This allows them to react promptly and access the SENTRON Powercenter 3000 web interface remotely via PC or mobile device for a quick overview of the electrical circuit parameters.

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Adjustable safety in the smallest of spaces

Setting the monitored frequency range

When selecting the residual current monitoring device (RCM) for the distribution board, the frequency range of all equipment potentially connected to the respective sockets must be considered. For single-phase sockets (e.g., Schuko), a type F RCM is recommended for a frequency mix up to 1 kHz – such as the communication-capable SENTRON 5SL6016-7MF miniature circuit breaker with RCM function. For multi-phase sockets (e.g. CEE 32/5), a type B RCM is the appropriate choice to cover DC fault currents and frequencies up to 1 kHz.

Alarm thresholds for pre-warning of RCD tripping

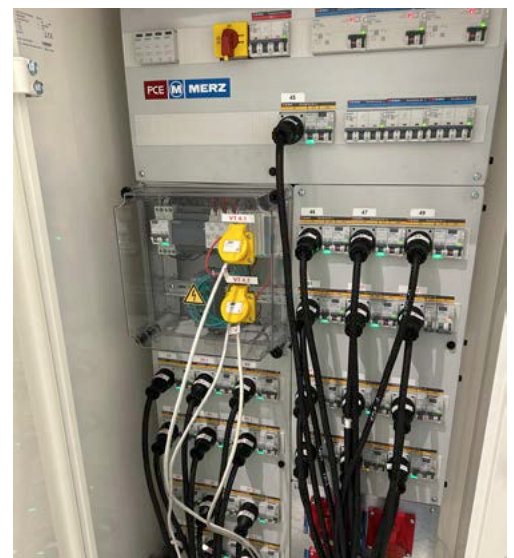
Socket circuits monitored in the trade fair distribution board are protected by RCDs, which interrupt the power supply in the event of dangerous residual currents. Therefore, the RCM alarm threshold for residual current monitoring should be set slightly below the lower end of the RCD trip range. Example: An RCD rated at $I_{dn} = 30 \text{ mA}$ trips between 15 mA and 30 mA. In this case, the RCM alarm threshold should be set below 15 mA. To detect emerging insulation faults as early as possible, it is also advisable to set the RCM's pre-warning threshold to, for example, 50% of the alarm threshold value.

Condition monitoring of equipment connected to sockets

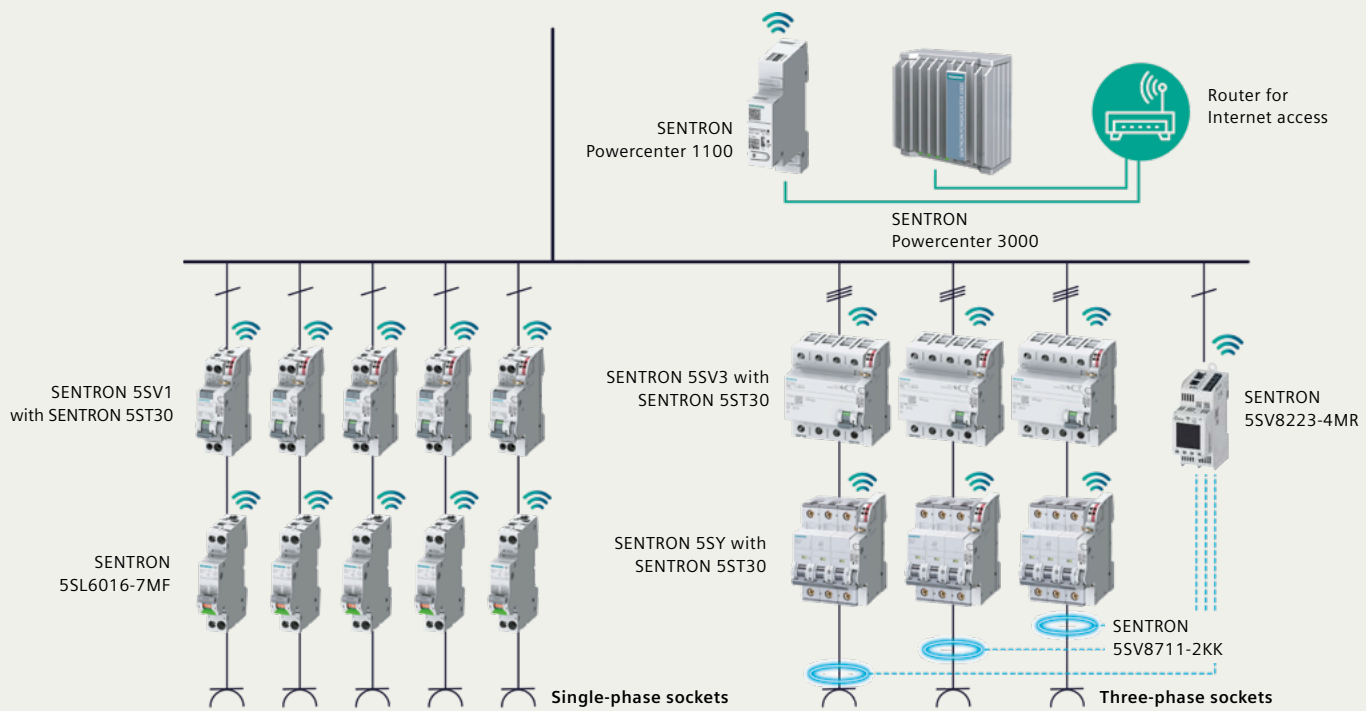
According to EN 50699, general electrical equipment that is not permanently connected to the power supply must not exceed a protective conductor current of 3.5 mA during recurrent tests. However, at events with many helping hands, it cannot be completely ruled out that untested, unsuitable, or defective devices may be connected to sockets. To detect the connection of electrical equipment with an excessive protective conductor current, the threshold of 3.5 mA should be monitored. For this purpose, the RCM alarm threshold is set to 7 mA, and the pre-alarm threshold to 50% of that value (3.5 mA).



Concert distribution board with residual current monitoring of each socket outlet circuit via SENTRON 5SL6016-7MF miniature circuit breakers with RCM and power monitoring function – and with RCD protection of the sockets via SENTRON 5SV3 residual current protective devices and compact SENTRON 5SV1 RCBO (residual current circuit breaker with overcurrent protection).



Trade fair distribution board for LED walls with residual current monitoring and load current measurement for each socket outlet circuit via SENTRON 5SL6016-7MF miniature circuit breakers with RCM and power monitoring function – and with individual RCD protection for the sockets via compact SENTRON 5SV1 RCBOs.



Example setup of a residual current monitoring system in the trade fair distribution board

Example: Application for trade fair distribution boards

Use of SENTRON circuit protection devices for residual current monitoring of the circuits in trade air distribution boards allows the detection of faulty devices, incorrect connections, and insulation faults at an early stage. This enables maintenance or replacement to be scheduled without stress and avoids an RCD shutting down lighting, sound systems, cooling units, displays, trade fair models, catering equipment, and more during the event.

Example setup from measurement to monitoring

Residual current monitoring for single-phase sockets is performed using the SENTRON 5SL6016-7MF miniature circuit breaker with RCM and power monitoring function. The three-phase sockets are monitored using a four-channel SENTRON 5SV8 (type B) residual current monitoring device (RCM) and the SENTRON 5SV8711-2KK type B summation current transformer. Communication-capable auxiliary switch/fault signal contacts are installed to monitor the switching states of the communication-capable SENTRON MCBs, RCDs, and RCBOs.

Measurement and threshold value monitoring data from all circuit protection devices is first transmitted wirelessly to the SENTRON Powercenter 1100 data transceiver and then forwarded via router to SENTRON Powercenter 3000. There, the data is stored long-term and visualized via a web interface. If a defined threshold value is exceeded, the electrician is alerted by push notification – e.g., via email.

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