

Data centres

Safe. Highly available. Profitable.



Design the future
of energy



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Safety, maximum availability
and profitability

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Safety, maximum availability and profitability

Protect data

Data protection is one of the most important requirements for data centres. Great efforts are therefore being made to ensure that servers are not compromised. But when it comes to protecting data, it is not enough to focus solely on the IT infrastructure. Many other aspects have to be considered. Above all, a reliable power supply is important.

To be prepared for power failures, data centres have an alternative power supply (e.g. diesel generators). This should guarantee uninterrupted operation of servers and other important components. However, if one of these components fails due to a technical fault, a UPS alone is not enough. Further measures must be taken to prevent failures and ensure high availability 24/7/365.

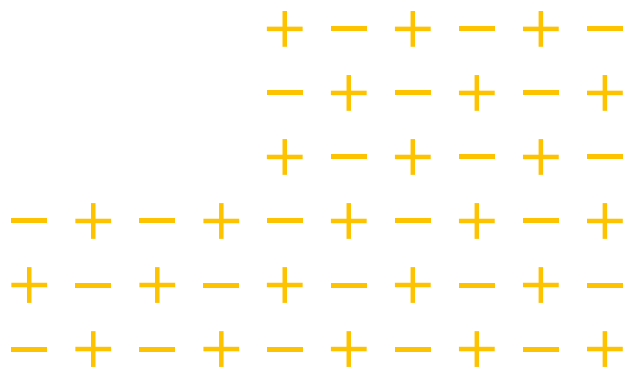


Prevent failures

Data centres are highly complex systems. They consist of the IT components and other electrically operated system parts that ensure that the IT components can run smoothly. These include the cooling system as well as the power supply with all the components required to provide electricity. If even just one of the components fails, other parts of the system or even the entire data centre can fail, which is associated with considerable costs and possibly also data loss.

Ensure safe operation

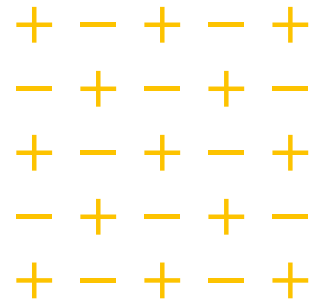
Fewer and fewer staff are required to monitor and maintain the highly complex operation of data centres. Smooth and efficient operation of the data centre can only be ensured by monitoring systems that enable staff to easily monitor and assess the condition of the entire system at all times. This is the only way to detect errors quickly and ensure high availability.



Electrical safety, availability and DIN EN 50600

The DIN EN 50600 or ISO / IEC TS 22237 standard (often referred to as the data centre standard) specifies how a data centre must be structured in order to ensure safe and efficient operation. It specifies requirements for the building construction, power supply, air conditioning, cabling and safety systems and describes requirements for operation. DIN EN 50600 distinguishes between four availability classes for data centres. Depending on the availability class, different measures must be taken to maintain operations.



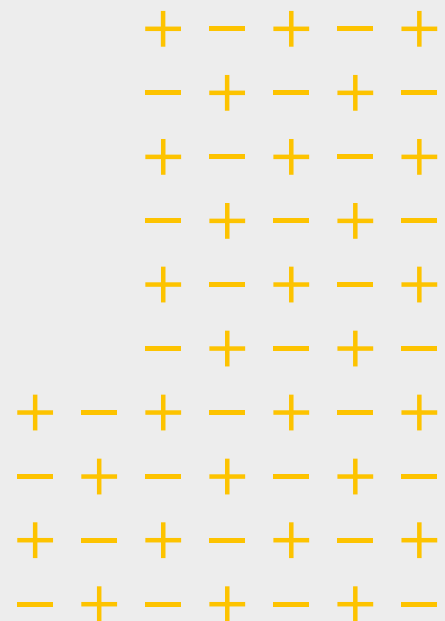


Availability class	Availability class 1	Availability class 2	Availability class 3	Availability class 4	Availability class 4 advanced
Availability	low	medium	high	very high	
DIN EN 50600-2-2 power supply	no redundancy	components redundancy	maintenance in ongoing operation	fault tolerance (transfer switch)	
Supply paths	of an N	of an N+1	several 2N	several 2N	
DIN EN 50600-2-3 Monitoring of the environment	—	no fail-safety	Components redundancy	maintenance in ongoing operation	
Supply paths	—	of an N	of an N+1	of an N+1	several 2N



Data centres that are operated according to availability class 3 or 4 require additional precautionary measures in addition to redundant systems. This also applies to the power supply. This may not be spontaneous or unpredictable.

Faults in the power supply or cabling must therefore be detected early and reliably in order to prevent failures and keep the data centre up and running.



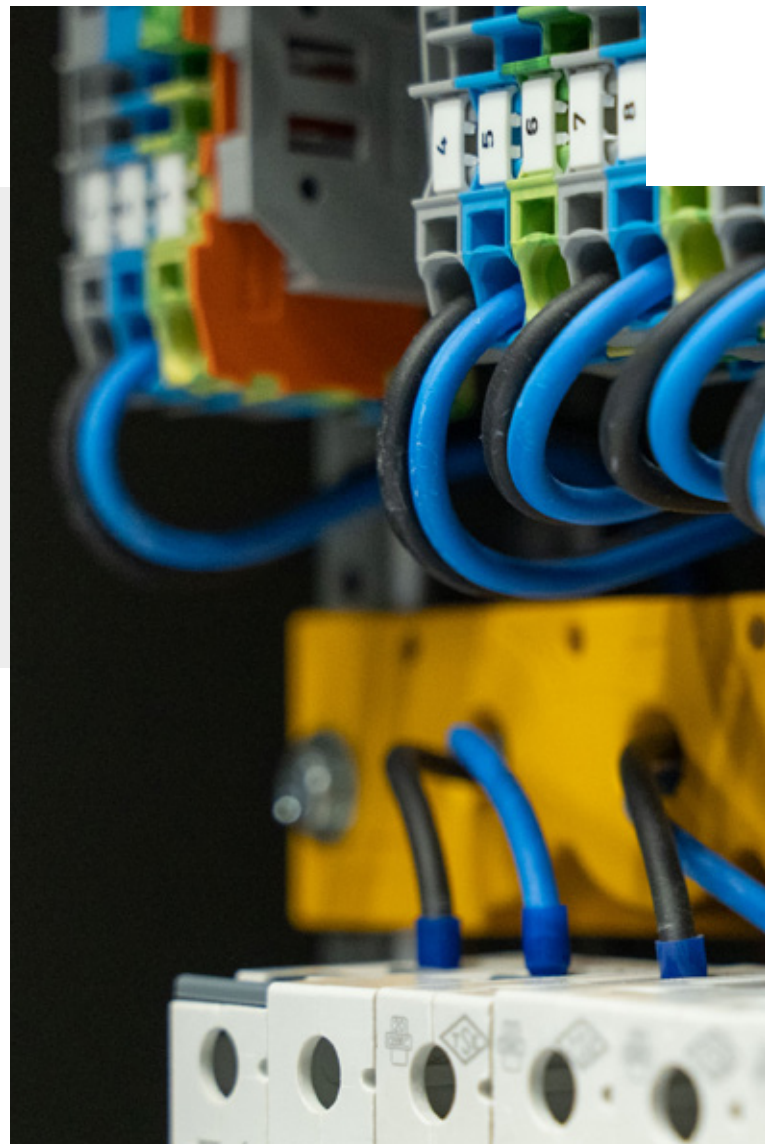
Periodic verification in accordance with IEC 60364-6

No electrical system runs permanently without faults. Faulty electrical devices or installations constitute a danger to human beings. To prevent accidents due to electric shock, electrical installations shall be checked regularly, and detected defects shall be corrected immediately. If there is an imminent danger that cannot be eliminated, operators shall ensure that the respective electrical installation or equipment will not be used in its defective condition. The timelines for the **periodic verification** of the electrical installations shall be defined in such a manner that any defects that may occur can be detected in good time.

For the verification to be carried out and defects to be eliminated, electrical installations and equipment must be switched off and separated from the power supply system. This requires work and takes time. In a data centre that must be available 24/7, interruptions of this type are unwanted.

However, operators can avoid a shutdown for the verification of installations and equipment by employing technical and organisational measures as well as measures to protect people.

The installation of a measuring device that substitutes the work-intensive verification of installations and equipment may constitute such a safety measure.

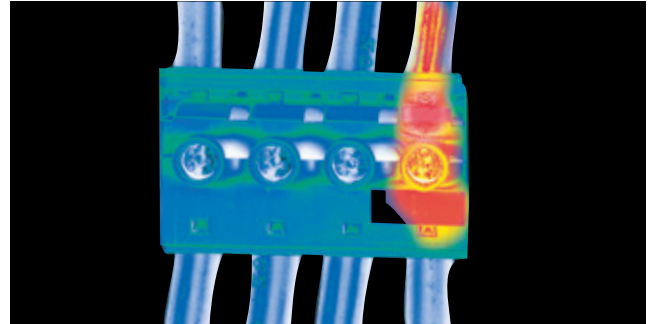


Fire protection



Even the smallest electrical faults can lead to fires. The main cause of fires in electrical devices or systems is insulation faults and the resulting residual currents. These can be caused by inadequate insulation, mechanical damage to device connection cables or brittle insulation of devices due to permanent thermal stress.

Detecting insulation faults and the associated residual currents in good time is an important part of fire protection in data centres.



Overload of the neutral conductor



Safer operation with Condition Monitoring

Continuous monitoring of the entire electrical system (server, air conditioning, infrastructure), including power supply and cabling, is essential in order to meet the requirements for safe operation. If data centres are to be operated in accordance with availability class 3 or 4, measures must also be taken to prevent interruptions to operations due to maintenance or faults.

The use of a **Condition Monitoring System with residual current monitoring is recommended here**. This system continuously monitors the condition of the entire electrical system and detects faults quickly and reliably before an unplanned interruption to operation occurs. In addition, faults can be easily localised with a residual current monitoring system. This enables operators to react quickly and in a targeted manner in order to rectify the fault and avoid critical operating states.

Not only can continuous residual current monitoring make the data centre more profitable but it can also lead to safer operation.



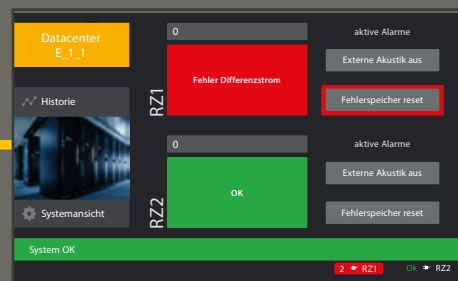
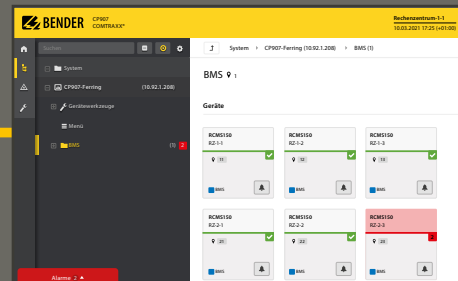
Benefits of Condition Monitoring in data centres

- Continuous monitoring of the system
- Simple overview
- Early fault detection
- Fault localisation
- Cost of testing according to DGUV Regulation 3 decreases
- Lower risk of electrical fires

For you as a data centre operator, this means

- Risk of spontaneous and unplanned business interruptions is reduced
- Improved availability and cost-effectiveness
- Increased personal and system protection
- Personnel expenses are reduced

Examples of status displays for a Bender Condition Monitoring System



How the Condition Monitoring system from Bender works

Condition Monitoring systems consist of sensors for detecting fault currents, evaluation units and the Condition Monitor itself. The measured values, as well as status and alarm messages, are transmitted to the Condition Monitor (e.g. EDGE500 or CP907-I) via the existing interfaces.

The measured values are displayed locally either on a screen via a browser (EDGE500) or on a control panel with display (CP907-I). It is also possible to forward the data to a higher-level software solution (e.g. Bender POWERSCOUT®) or a building management system.

As the Condition Monitoring system operates continuously 24/7, the condition of the system can be assessed over a longer period of time. This gives staff an optimal overview of the condition of the electrical system at all times.



Sensors and evaluation units

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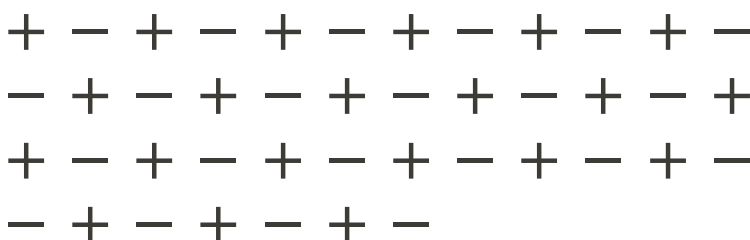


Condition Monitor

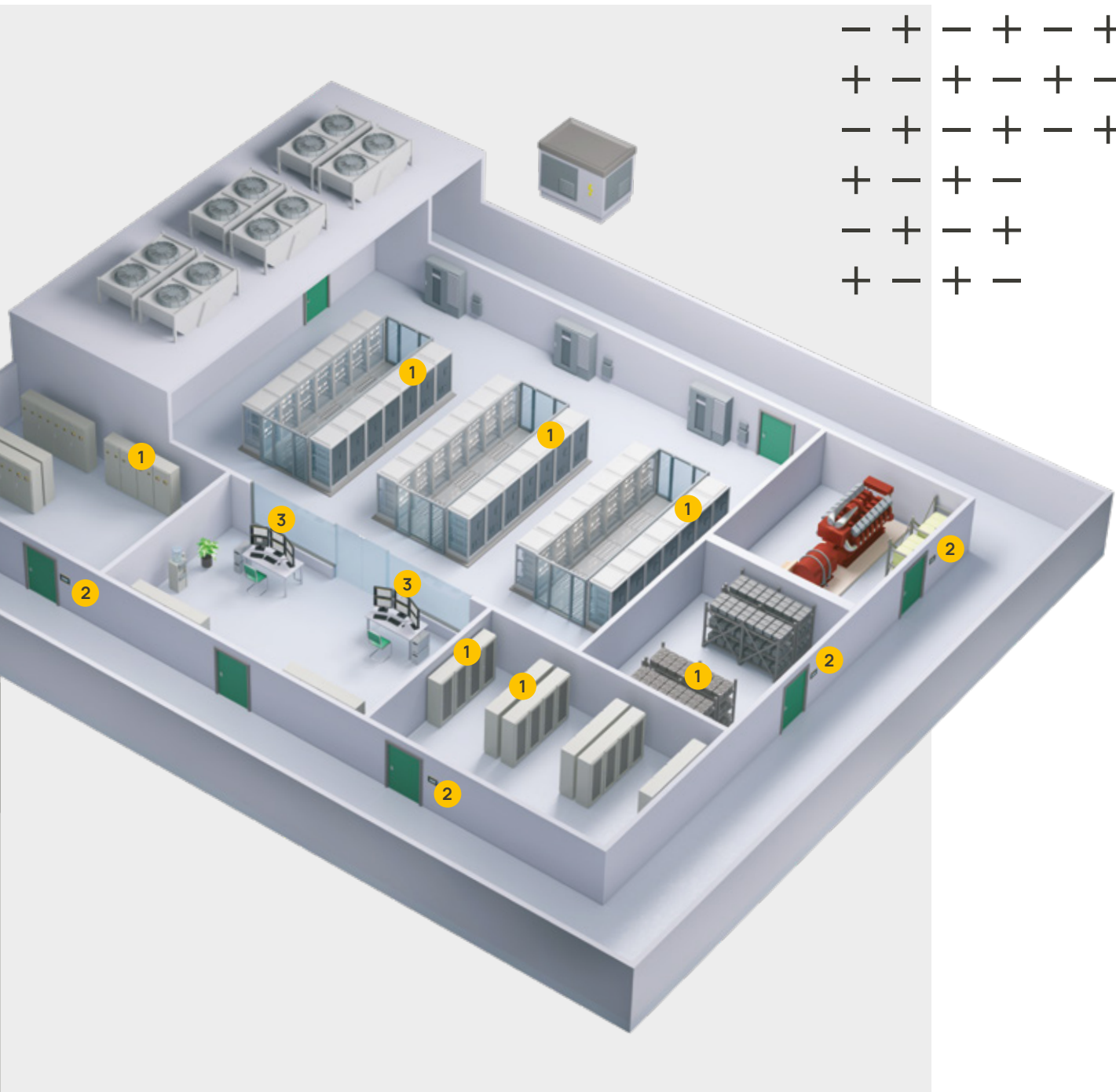
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POWERSCOUT®



+	-	+	-	+	-
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-	+	-	+	-	+
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Intelligent planning for small and large data centres

The larger a data centre is, the larger and more complex the entire electrical system is. The more parts of the system that are monitored, the better the overview of energy consumption and system statuses and the more precisely any faults that occur can be quickly localised and rectified. **When planning**

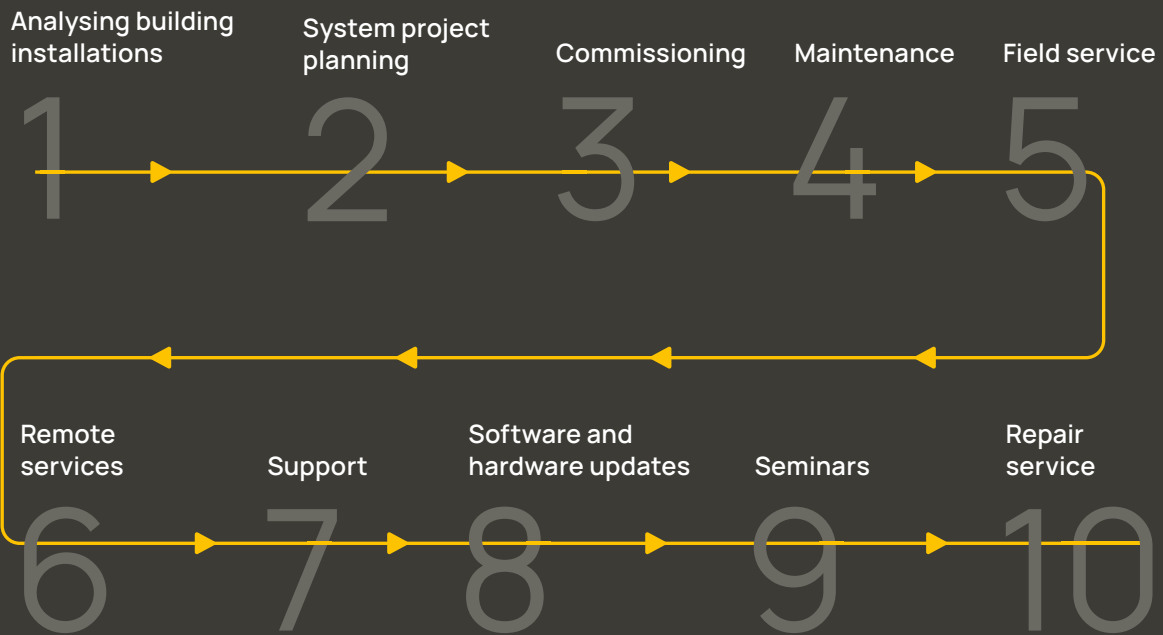
a data centre, it is important to consider how detailed a monitoring system should be designed in order to meet the operational and normative requirements, in particular those from DIN EN 50600 or ISO/IEC TS 22237 and their availability classes (see page 7).



Economical and safe

From planning to after-sales service

Competent service from your expert for safety and high availability



Bender has decades of experience in the field of electrical safety and offers practical solutions that pay off and ensure greater safety.

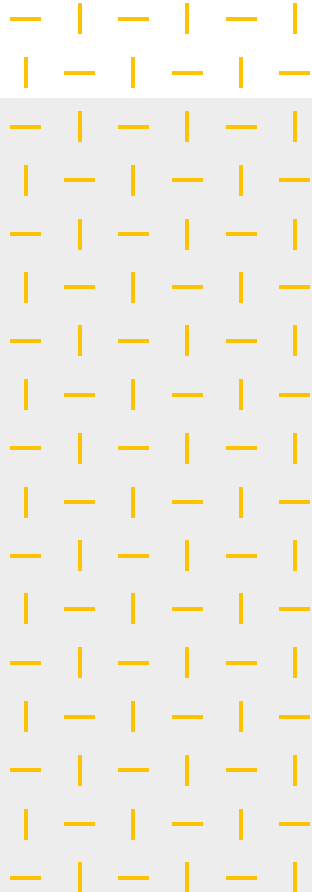
Do you have any questions? We support you in all matters relating to electrical safety and energy management, from planning to after-sales service.

You can find your contact person here:
www.bender.de/en/contact/bender-worldwide/



You can find more information about our data centre solutions here:
<https://www.bender.de/en/solutions/data-centres/>





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