

## INNOVATIVE PRODUCTS



### **An on-board computer for your electrical system**

Over the last 70 years, Bender has become a global market leader in various areas relating to the safety of electrical systems. Many customers usually talk about 'their Bender' referencing herewith the particular device that silently monitors their own electrical system, granting safety for persons, buildings and equipment.

Hence, the Bender Monitoring device now takes on the role of an on-board computer for the system. And in order to justify this status still further, Bender is now offering a central operating unit, its new *Condition Monitor*. The real challenge here lies in the fact that there is an extremely broad range of user groups with respect to technical background knowledge in electrical

### Bender Condition Monitor

## More measurement, less display!

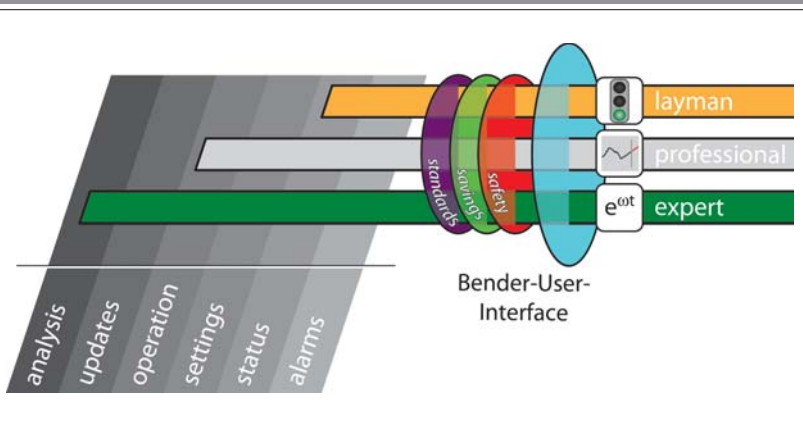
The Bender Group is adding devices to measure current and voltage quality to its existing product range. In this context, we are also creating a new operating level between Bender devices and the user. An intelligent evaluation unit, the *Bender Condition Monitor*, communicates with all Bender Monitoring devices connected and provides all the relevant information in a clear manner customised specifically to the target group.

safety. After all, most alarm messages are confirmed by people who do not fully understand the content of the alarm (e.g. medical personnel at the nurse station). Instead, they pass the alarm messages onto the electricians. However, the professionals use the same hardware to localise and fix the faults which have occurred as is used to display the alarm. It is clear that different display systems and user-related content are required for the different user groups.

The new Bender Condition Monitor meets these requirements and offers more benefits as well: A wide range of devices, from ISOMETER® through RCMS to Power Quality Monitoring, can be operated and configured from a single platform, with the focus on intuitive operability. Interactive help systems are largely replacing device manuals.

The new Bender operating concept is based on a user-specific display of a three-tier model:

**FIGURE 1: THE BUI MODEL (BENDER USER INTERFACE) CONTRASTS USER GROUP-SPECIFIC INTERESTS AND TYPICAL ACCESS PERMISSIONS.**



The Bender *Condition Monitor* interface adapts the display and information provided to the user, thus enabling user-specific display and access control.

### Create transparency – with Bender Power Quality Monitoring

In recent years, energy supply structures have changed considerably for both generators and consumers. Expansion of decentralised energy generation in the renewable energies sector and the increasing use of state-of-the-art semiconductor technologies are just two of the most important developments. Semiconductor technologies are everywhere these days: from mobile phone chargers to variable-speed drives in industrial applications. However, one thing all electronic equipment has in common is that it generates system perturbations to a greater or lesser extent. This feedback affects the installations within the building and the supply network itself. Countermeasures are wide-ranging and very specific to the particular application, but the first step is always to make the effects visible. Bender Monitoring brings transparency to electrical systems.

### Effects on safety measures

The use of frequency inverters has an impact on the behaviour of safety mechanisms. In practice, it is often the case that inverter-controlled drives are retrofitted to systems where protective measures are achieved by automatic disconnection of supply in accordance with DIN VDE 0100-410. Often, after the inverter is fitted, no checks are made as to whether the necessary safety conditions are still fulfilled. If there is a fault to frame on the secondary side, the fault current flowing from the frequency inverter can be limited. This results in the fault protection system failing.

Although less dramatic, it is still undesirable when systems switch off unexpectedly, as a result of harmonic currents or leakage current. If these are not taken into consideration when the safety measures are dimensioned, the threshold level for a circuit breaker can be reduced by the effective harmonic current component. This results in the safety device triggering unexpectedly in normal operation. This can be remedied by creating more transparency in the electrical system, with the help of Bender Monitoring systems.

### System protection

As part of the move towards saving energy, modern lighting is now forcing out conventional light bulbs, which are now nearly 200 years old. However, all modern lighting, whether based on LEDs or luminous materials, requires upstream electronics and this can sometimes generate significant harmonic current. The third harmonic (150 Hz) can often be found in the spectrum of fluorescent tubes or IT-related power supplies. These components add up in the neutral wire in the alternating current mains, even if it is designed on a symmetrical basis. This results in overloaded neutral wiring, generating a fire hazard. The only way to resolve this is to create transparency using suitable monitoring measures. If the supplying mains is not designed for system perturbations from consumers, harmonic current from electrical loads can have an impact on the entire mains voltage and thus affect other equipment. In order to protect the electrical system, you first need to look carefully – Bender Monitoring Systems create transparency. ■

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