BENNING
World Class Power Solutions

Excellent Technology, Efficiency and Quality

MCU 2500

Remote Monitoring System

MCU 2500 Monitoring and Control System for Telecoms and Industry

Monitoring and Control System MCU 2500

The quantity of IT and telecommunication equipment with related AC and DC power systems has increased dramatically during recent decades.
To handle this rapid growth whilst maintaining system reliability in the face of operation and service cost cutting, power monitoring and control solutions are required.
BENNING´s microprocessor based monitoring and control system MCU 2500 offers a user friendly and flexible solution for the integration of AC and DC power systems into a network management system. A great number of MCU 2500 systems are already operating in telecommunication and industrial power systems all over the world.

Fig. 1: modular rectifier with MCU 2500

The MCU 2500 provides local monitoring and control of power systems via a keypad and LCD or remote operation via modem, Ethernet or TCP/IP--/WEB-adapter.

Local operation of the MCU 2500 is available via the front door mounted monitoring and operation panel with LCD and push buttons. Local operation is also possible from a standard PC using the Windows-based BENNING monitor/service software.
Password protection guards against unauthorized access.

The capabilities of the MCU 2500 with remote monitoring and control and real-time feedback of critical system parameters and alarm events, helps to cut service and maintenance costs as service engineers can resolve problems on site quicker and more efficiently.

MCU 2500 Features

- **Flexible and modular monitoring and control system for AC and DC power solutions**
- **Front panel with graphic display and keypad for local operation, RS 232 interface for PC connection**
- **Remote monitoring and control via modem, Ethernet, WEB or SNMP**
- **The analysis of critical system parameters and alarm events allows quick and efficient service and maintenance activities**
- **Local and remote battery management optimises the availability and service life of system batteries**
- **Free configuration of alarm relays**
- **Digital inputs for monitoring of external site equipment (air-conditioning etc.)**
- **Integrated data logger stores up to 131070 events**
- **Messages are date and time stamped**

Modular Design allows flexible Solutions and easy Maintenance

The modular design of the MCU 2500

The MCU 2500 consists of the following modules:

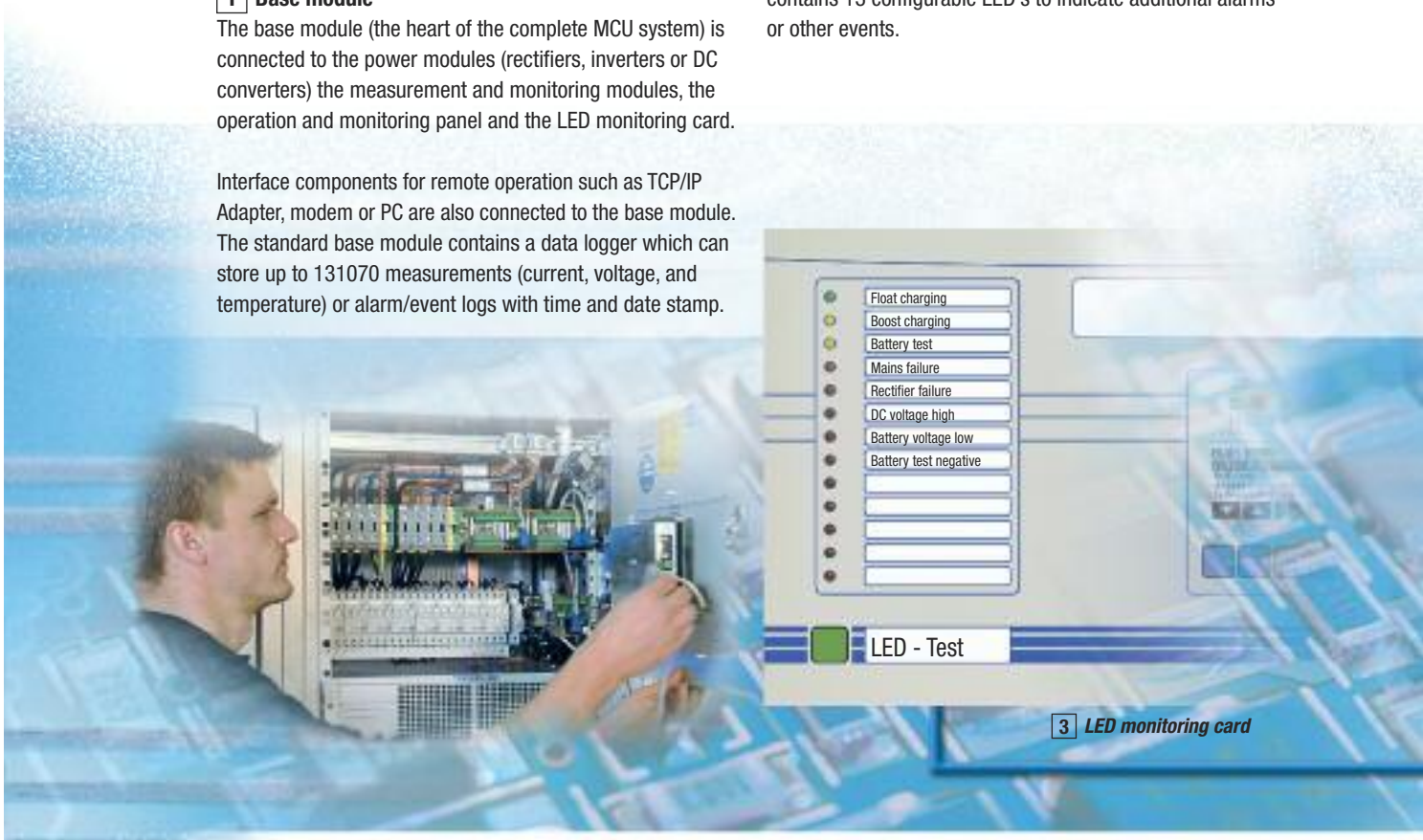
1 Base module

The base module (the heart of the complete MCU system) is connected to the power modules (rectifiers, inverters or DC converters) the measurement and monitoring modules, the operation and monitoring panel and the LED monitoring card.

Interface components for remote operation such as TCP/IP Adapter, modem or PC are also connected to the base module. The standard base module contains a data logger which can store up to 131070 measurements (current, voltage, and temperature) or alarm/event logs with time and date stamp.

3 LED monitoring card

The LED monitoring card is mounted on the front door and contains 13 configurable LED´s to indicate additional alarms or other events.



3 LED monitoring card

2 Monitoring and operation panel with LCD display, 4 push buttons and 4 LED`s

The front door mounted monitoring and operation panel enables local operation of the power system via either the keypad and LCD or from a standard PC equipped with the BENNING service software.

An RS 232 C cable connects the PC to the RS 232 interface of the MCU 2500 base module.

Measurement and monitoring modules

The following DIN rail mountable modules extend the functionality of the base module.
To optimise the length of measurement cables the mounting position of the measurement modules should be near the measurement points.

4 RELIO-module

The RELIO-module is available in two versions:

- Version 1 with 4 volt- free relay contacts and 8 digital inputs
- Version 2 with 2 volt- free relay contacts, 8 digital inputs and 2 powered outputs

The powered outputs are designed to operate low power contactors (maximum 80 V).

5 TUII-module

The TUII-module incorporates 4 analogue inputs to measure:
1 DC voltage (0 up to 320 V DC), 2 DC current (0 up to 110 mV), 1 Temperature (-30°C up tp 80°C).
Accuracy of all measurements: +-1%.

Extended Functionality with external Monitoring and Measurement Modules

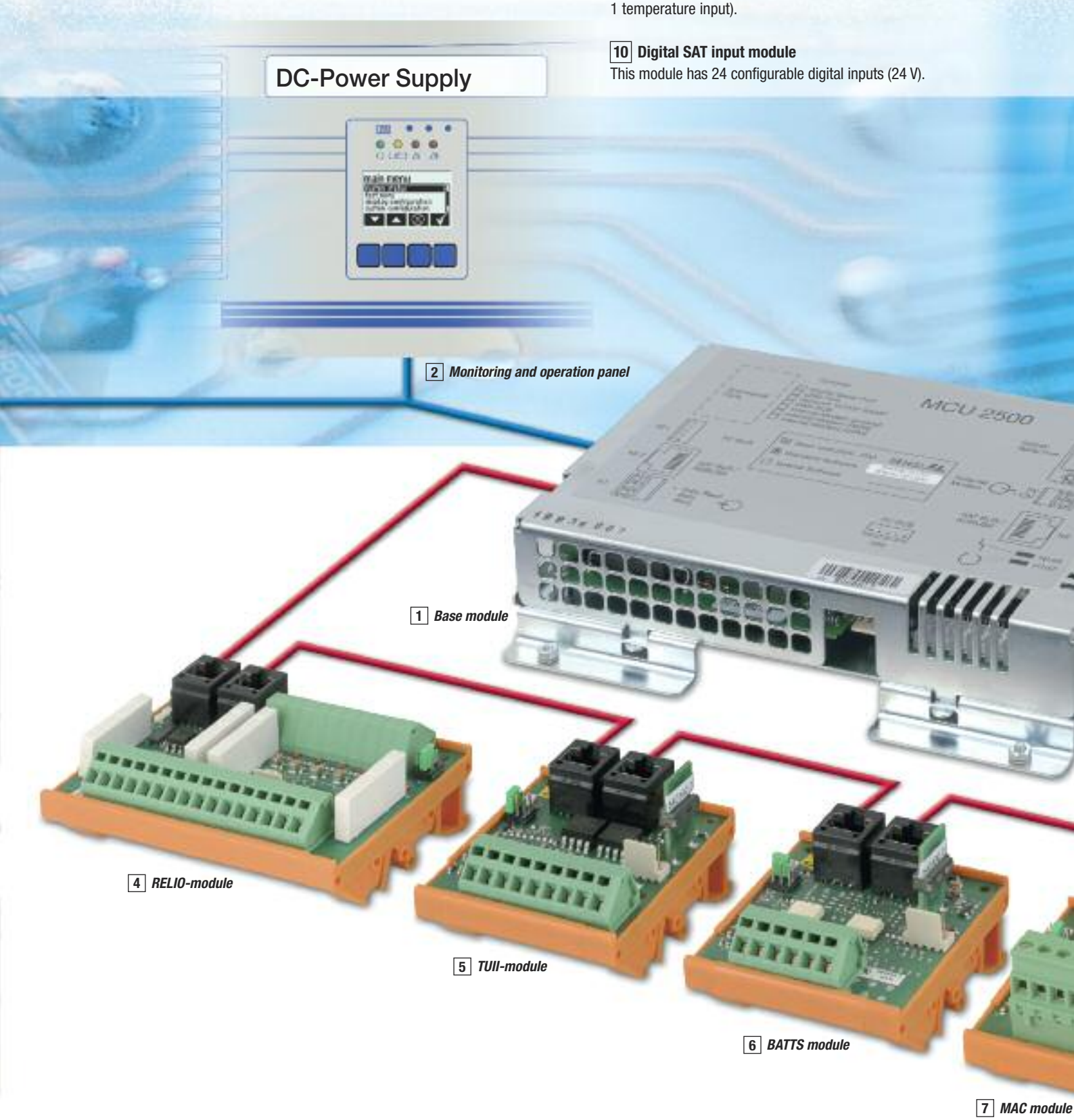
6 BATTS module
The BATTS module provides battery symmetry testing. With five measurement inputs the BATTS module can test 5 x 12 V battery blocs (60 V battery) or 4 x 12 V battery blocs (48 V battery). Mid point measurement of single 48 V or 60 V batteries is also possible.
A special BATTS module is available for 110 V or 220 V batteries. (see page 7, fig. A and B)

7 MAC module
The MAC module measures the AC phase voltages of a single phase, two phase or three phase AC mains.

8 SAT-relay module
The SAT-relay module contains 8 volt-free relay contacts.

9 SAT-Measurement module
This module can have 5 different voltage, current or temperature measurement inputs (ie. 3 current, 1 voltage and 1 temperature input).

10 Digital SAT input module
This module has 24 configurable digital inputs (24 V).



2 *Monitoring and operation panel*

1 *Base module*

4 *RELIO-module*

5 *TUII-module*

6 *BATTS module*

7 *MAC module*

MCU 2500 features Comprehensive and Clear Monitoring Functions

Remote operation and monitoring of power systems

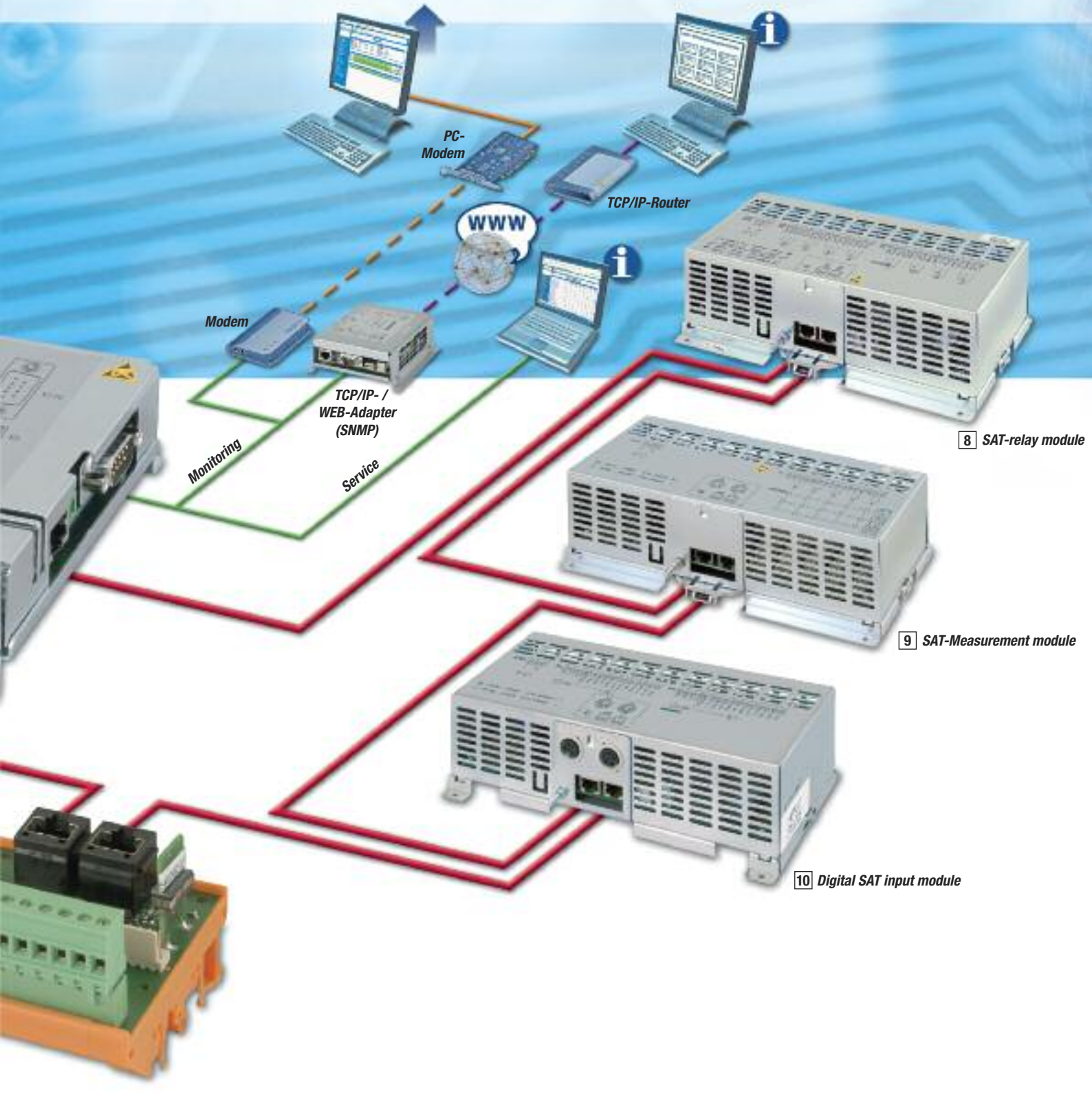
To ensure real time feed back of critical system parameters and alarm events, DC or AC power systems need to have power ful and intelligent remote monitoring solutions.
The advanced monitoring and management system MCU 2500 ensures quick and efficient service and preventive maintenance.
Battery availability testing detects battery problems at an early stage and can help avoid a battery or system break down.
The analysis of critical power system alarms helps to optimise service activities and saves cost.

The following solutions are available for remote monitoring and operation

1. Modem operation using standard - or ISDN telephone line
Connection of the power system to the public telephone network is achieved via an analog or digital highspeed-modem. Modems are available from BENNING.

2. Operation via serial Ethernet adapter
for connection to a computer network.

3. Operation with TCP/IP-/WEB adapter
allows internet communication or SNMP-traps.



Global Remote Monitoring via HTTP and TCP/IP Server

Remote monitoring and control center

The universal remote communication capabilities of the MCU 2500 are the basis for the operation of the technical monitoring and control center at BENNING.

The control center monitors customer locations 24h a day and 365 days a year. Beside BENNING power systems the MCU 2500 allows the remote monitoring of customer products like air conditioning equipment or fire alarm systems.

The engineering staff at BENNING´s remote monitoring center analyse all incoming messages and alarms regarding relevant customer locations and manage all necessary service activities. Repair times depend on the fault status-system critical or non-critical. System critical problems should be resolved as quickly as possible, typically 4 to 6 hours after the critical alarm was identified by the control center.

Comprehensive Battery Management Maximises Service Life and System Availability

The most important measurement, operation and alarm events of the MCU 2500

When used with a battery assisted power supply system, the MCU 2500 provides the following measurement, status and alarm information.

Measurements:

- System output voltage
- System output current
- System temperature
- Load current
- Max load power
- Battery charge voltage
- Battery current
- Battery temperature
- Battery test information

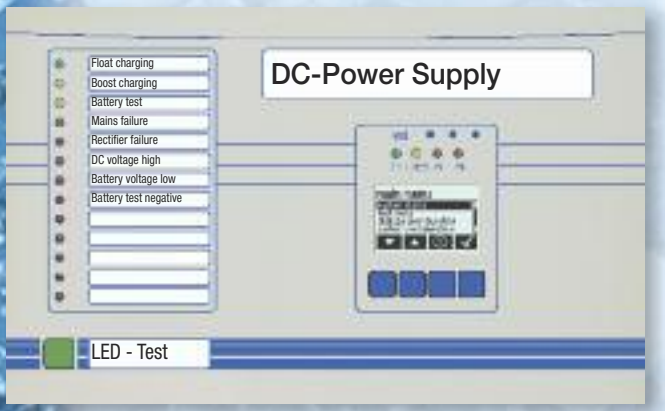


Fig. 2: Monitoring and control unit

Battery monitoring 110 V – 220 V:
This battery monitor incorporates 3 inputs. Two of them are used to enable a battery mid point measurement. This battery monitoring module can also operate as fuse monitoring. (Fig. A and B)

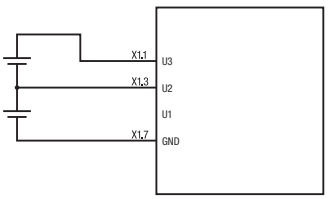
Battery management functions of the MCU 2500

Battery charging:
Power system batteries can be subjected to a wide variation of ambient temperature during operation.
With low temperature operation the standard float voltage level is too low and cannot charge the battery. Likewise during high temperature conditions the standard float voltage is too high and can overcharge the battery.
In order to compensate this effect and to optimise the service life of the battery, the MCU 2500 adjusts the float voltage according to the battery temperature.

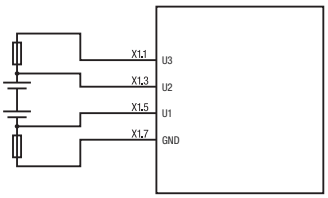
Battery availability test:
The availability test monitors the condition of the battery. During this time-controlled test, the load current is supported by the batteries.
The comparison of discharge time, discharge current and battery voltage results in a negative or positive battery availability test.
The test stops automatically with a negative result i.e. if the battery voltage reaches a defined limit before the full duration of the test.
During the availability test, the MCU 2500 reduces the DC voltage from the rectifiers and the entire load current is supplied by the batteries. There is no risk to the load during this test as the rectifiers are not switched off.

Battery monitoring 12 V – 60 V DC:
The battery symmetry monitor detects battery problems at an early stage, as it compares bloc voltages of up to 5 x 12 V battery blocs. A battery alarm is activated if the deviation of the bloc voltages exceeds the factory preset value.
Fig. C, D and E show mid point monitoring of one or two batteries.

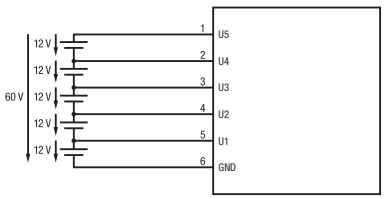
A) Battery symmetry monitoring of one battery



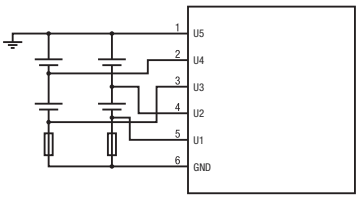
B) Monitoring of two fuses



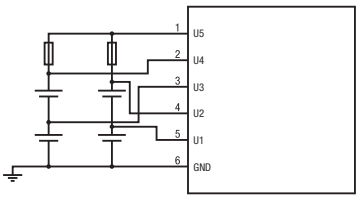
C) Monitoring of one 60 V battery with single bloc measurement



D) Monitoring of two batteries with positive earth



E) Monitoring of two batteries with negative earth



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