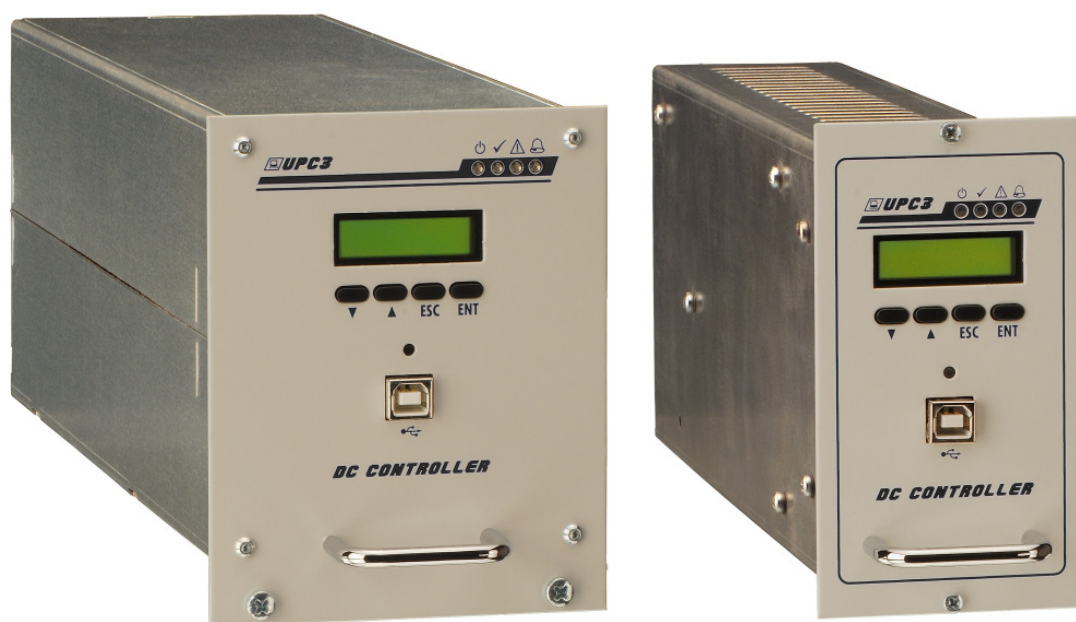


# DC CONTROLLER UPC3/S, V1.30

## USER MANUAL



## DC Controller UPC3

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### Notes to this manual

**ATTENTION!** Read this manual carefully before installing and commissioning the module. This manual is a part of the delivered module. Familiarity with the contents of this manual is required for installing and operating the module. The rules for prevention of accidents for the specific country and the general safety rules in accordance with IEC 364 must be observed.

The function description in this manual corresponds to the date of publishing. Technical changes and changes in form and content can be made at any time by the manufacturer without notice. There are no obligations to update the manual continually.

The module is manufactured in accordance with applicable DIN and VDE standards such as VDE 0106 (part 100) and VDE 0100 (part 410). The CE marking on the module confirms compliance with EU standards 2006-95-EG (low voltage) and 2004-108-EG (electromagnetic compatibility) if the installation and operation instructions are followed.

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The current revision status of this user manual is the following:

Revision: 5.1

Date: 2009-08-18

Revision	Description of change	Writer	Date
1.0	Translation of the German version "UM_UPC3_V1.30_D_R1.0". Introduction of the new revision numbering (X.X).	CF/RTH	2008-10-17
1.1	Minor text modifications.	RTH	2008-10-28
2.0	"Load balance" corrected, "Boost charge" extended, section "Known bugs" appended, version no. changed to V1.30.166.	CF	2008-11-28
3.0	Technical data "Supply voltage range" corrected, section "Options" completed.	RTH	2009-02-02
4.0	Reference numbers corrected.	RTH	2009-06-09
5.0	Section 3.4.6 "LVD/PLD function" reworked, minor text modifications.	RTH	2009-07-29
5.1	"Table of contents" repaired, minor text modifications.	RTH	2009-08-18

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## 1 Safety instructions and waste disposal rules



### Warning!

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Because several components of operating electrical devices are charged by dangerous voltage, the improper handling of electrical devices may be the cause of accidents involving electrocution, injury, or material damages.

- Operation and maintenance of electrical devices must be performed by qualified skilled personnel such as electricians in accordance with EN 50110-1 or IEC 60950.
  - Install the module only in areas with limited access to unskilled personnel.
  - Before starting work, the electrical device must be disconnected from mains. Make sure that the module is earthed.
  - Do not touch connector pins as they can be charged with dangerous voltage up to 30 seconds after disconnection.
  - Only spare parts approved by the manufacturer must be used.
- 

All electric devices must be disposed of separate from domestic waste at collecting points that have been set up by the government or municipal authority.

“Separate collection is the precondition to ensure specific treatment and recycling of WEEE and is necessary to achieve the chosen level of protection of human health and the environment in the Community.”

The above statement from EU directive 2002/96/EC applies to all electric devices installed within EU countries.

In countries outside the EU, different rules may apply regarding waste disposal of electric devices.

For more information about waste disposal of your discarded equipment, contact your ELTEK VALERE DEUTSCHLAND partner.

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## 2 Universal Power Controller UPC3

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### 2.1 Technical description

The DC Controller UPC3 is available in two versions:

1. UPC3 (1/4 x 19" unit)
2. UPC3S (1/6 x 19"unit)

The DC controller UPC is designed as a part of a modular power supply system and therefore it must be used exclusively in combination with a suited backplane.

The UPC is fitted with a 64 pole male multipoint connector on the rear side (DIN 41612, type of construction: C64) which is used as interface to the backplane. Almost all individual digital or analog inputs and outputs as well as the CAN-Bus and power supply are plugged with the male multipoint connector. All individual terminals for the digital or analog inputs and outputs, CAN-Bus and power supply are available on the backplane, alternatively on the connection board CONB01/CONB03, related to the backplane. For more information regarding the connectors read the corresponding manuals of the individual backplanes/connection boards.

The digital inputs and outputs of the UPC3 are carried out as floating free. Data which causes an alarm according to their configuration are saved and displayed as a fault, as long as they are active. Additionally, the latest 250 messages are saved with date and time in the history list.

Analog inputs are directly connected over internal measuring transformers to the 10bit AD converter of the processor unit. The measurement values are displayed in the respective menu, the thresholds are monitored and an alarm is created in the case of an over ride or dropping below the system values, according to the UPC3 configuration.

The firmware and the default values are permanently stored in a flash memory. In this way it is secured that the basic functions are retrievable even with the loss of customer specific adjustments (failure of the rewritable memory) after a restart of the UPC3.

The UPC3 is equipped with a battery buffered real-time clock and a processor monitoring unit (Watchdog), which monitors the power supply of the processor.

The buffering of the real-time clock is realised via a lithium-manganese coin cell CR2032. If the UPC3 is stored at dead-voltage, the durability of the CR2032 is for at least 10 years. At operating conditions the durability is nearly unlimited. Due to this fact a change is not necessary and therefore the coin cell is not designed for change.

The UPC3 is front side fitted with a free floating USB connector for the connection of a PC for programming. The installation of the USB driver is described in the manual of the UPC configurator software.

As option the UPC3 is available with a free floating RS 232 interface instead of the USB interface. The RS 232 interface is exclusively necessary if the UPC3 should be used with an external modem.

**REMARK:** The CAN-Bus interface for control and monitoring of the connected power modules is also integrated in the 64-pole connector.

The power supply (designed as DC/DC converter) provides the system with all necessary voltages.

For detailed technical specifications see section [Technical specifications UPC3 +UPC3S \(S= small version\)](#).

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## 2.2 The concept

### 2.2.1 System monitoring and controlling

The UPC3 is equipped with analog inputs for the measurement of the different system voltages and currents. Furthermore the unit is equipped with digital inputs e.g. for monitoring the states (closed or open) of switch contacts. Additionally, the data of the CAN-Bus connected modules (e.g. rectifiers) are detected and displayed, monitored and analyzed according to the UPC 3 configuration.

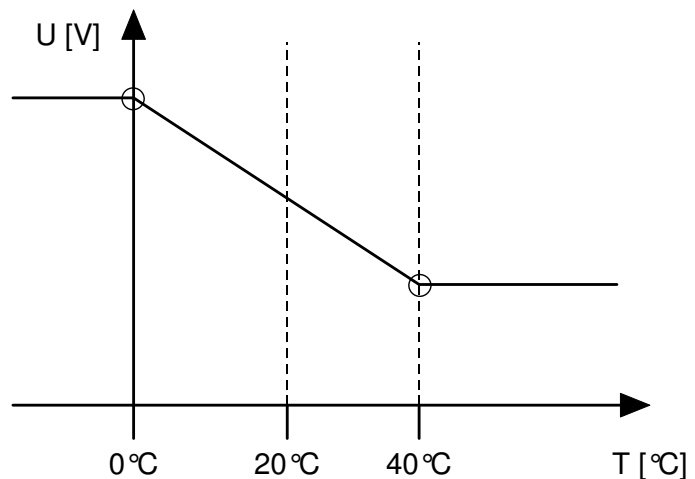
After analyzing the data the UPC3 controls the power modules (e.g. rectifiers, LVD/PLD) and gives alarm messages if applicable according to the UPC3 configuration.

### 2.2.2 Temperature controlled output voltage

(Float charge of batteries in backup systems)

For this operation mode a connected temperature sensor of type KTY 81- 220 is necessary.

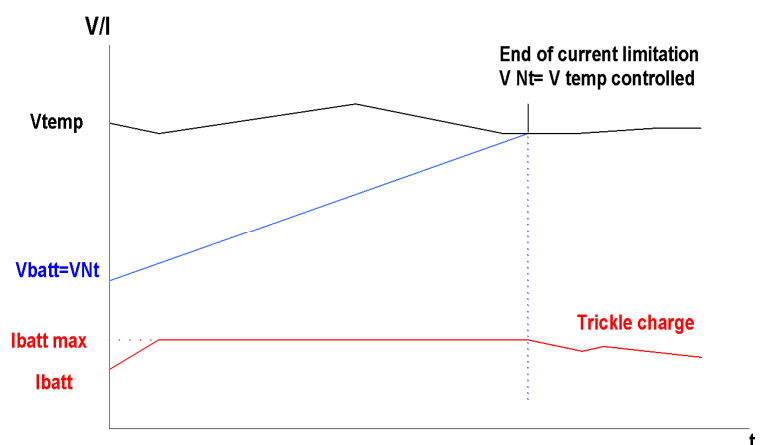
The temperature information provided by the temperature sensor is analyzed by the UPC3 according to the voltage/temperature characteristic line. The output voltage for the CAN-Bus connected rectifiers are controlled accordingly. This characteristic line linearly proceeds in an adjustable range (e.g. 0°C...40°C) and is constant beyond this range (see illustration). The steepness of the characteristic line is adjustable as the charge voltage difference, related to one battery cell and one degree C is changed. The charge voltage difference of a lead acid battery is -2mV per cell and per °C by default.



(Configuration [Battery](#))

### 2.2.3 Charge current limitation

Discharged batteries, e.g. after backup operation, are charged with an adjustable maximum current until the temperature-controlled trickle charge mode, is reached. The battery voltage is measured at the beginning of the battery charging. Commencing with this battery voltage, the output voltage of the rectifiers is respectively increased so that the set maximum of the battery charging current is reached. This process is retained as long as the output voltage has reached the value of the trickle charge (temperature-controlled).



(Configuration [Main set](#))



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#### 2.2.4 Uncontrolled output voltage

(Autarkic operation)

If the rectifiers do not get a control signal, e.g. because of:

- Failure of the UPC3,
- Break of the CAN-Bus connection,

the rectifiers self-acting return to a constant output voltage of 54.5V. At backup systems with connected batteries this operating mode should be seen as an emergency operation.

#### 2.2.5 PLD function (power load disconnect)

There is the possibility to disconnect up to two consumer loads (inferior priority loads) independently from each other in order to save battery capacity during the backup operation.

The disconnection criteria are selectable independently from one another:

- Disconnection after falling below an adjustable voltage threshold, reconnection after exceeding the adjusted voltage threshold
- Disconnection after expiration of an adjustable time after recognition of a battery operation. Reconnection at ending of the battery operation.

The activation of the PLD contactors can be realized via an optocoupler or one of the six internal relays of the UPC3.

(Configuration [LVD/PLD function](#))

#### 2.2.6 LVD funktion (low voltage disconnect)

For the protection of the connected batteries against total discharge during back up operation a voltage threshold can be adjusted. If the threshold value is reached the LVD contactor switches off. The activation of the LVD contactor can be done via optocoupler or one of the internal relays of the UPC3.

(Configuration [LVD/PLD funktion](#))

#### 2.2.7 Battery asymmetry

It is possible to monitor the battery symmetry voltage in order to locate faulty batteries within a battery string. Therefore, a voltage (symmetry voltage) is measured at the centre of the battery string and compared with the total battery string voltage.

The symmetry voltage amounts to  $\frac{1}{2}$  of the total battery string voltage if the connected batteries are faultless. If the symmetry voltage deviates more than an adjustable value of  $\frac{1}{2}$  of the battery string voltage an alarm is activated via the UPC3.

For details see:

(Configuration [Battery](#))

#### 2.2.8 Battery test

The battery test serves for the inspection of the batteries as well as for the inspection of the faultless connection to the batteries.

This test can be performed in the following manners:

- manually at the UPC3 display,
- automatically with date and time
- automatic daily repetition
- externally via SNMP or MMT software
- via digital input

For details see:

(Configuration [Enable](#))

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The rectifiers' voltages are reduced to an adjustable voltage value during the battery test.

**ATTENTION!** This voltage value has to be greater than the voltage threshold of the LVD/PLD function. Otherwise the load supply could be disconnected during the battery test if the batteries are faulty. 

Thereby, the batteries supply the connected load and therefore will be discharged. Adjustment criteria of the battery test are:

- test duration
- the minimum allowable battery test voltage
- the maximum battery capacity to be withdrawn in %

The battery test is assessed as faulty and a respective alarm is activated, if the minimum test voltage has been achieved within the test duration or the maximal battery capacity has been withdrawn. After the end of the test duration or after an identification of a faulty battery the rectifiers are set back to the default value relating to the battery charging current limitation.

An activated alarm of a battery test failure can be cancelled via reset of the UPC3, via UPC3 menu or via an anew execution and faultless completion of the battery test.

For details see: (Configuration [Battery Test](#))

### 2.2.9 Battery test data memory

With the assistance of the data memory the data are recorded during a battery test and later the data can be analyzed via USB or Ethernet with the UPC3 configuration software.

The following automatically is recorded during any battery test:

- Start- und stop time of the battery tests
- Duration of the battery tests
- The activation of the battery tests (manually or automatically)
- The withdrawn capacity during the battery tests and the measured battery voltage at the end of the test
- The data of the battery type, date of the battery installation and the nominal battery capacity

These data are retrieved from the entered data in the main menu.

The above described (head) data are each saved for the last three battery tests.

Additionally the collection of the following data of the last battery test is saved:

- Number of the generated data set
- The elapsed time of the battery test (hours, minutes, seconds)
- The particular battery voltage and the battery symmetry voltage
- The particular battery current
- The particular battery temperature

Due to this facts detailed information are available at the end of the test.

### 2.2.10 Boost charge

For a rapid recharge of the battery (only ventilated batteries) a boost charge mode is available. The boost charge mode can be manually activated via the user or self-acting via different configurable criteria (e.g. if a mains breakdown occurred).

(Details see: Configuration [Enable](#))

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During the boost charge mode the battery voltage is increased to a greater value than the trickle charge voltage. Furthermore a considerably greater battery charge current is defined for the duration of the boost charge mode. If the defined charge voltage value is reached, a follow up charge duration starts. After the expiration the boost charge voltage automatically is decreased to the value of the trickle charge voltage.

The boost charge mode can be started via the buttons of the UPC3 and if necessary be stopped before the defined boost charge time has been elapsed.

(Details see: Configuration [Boost charge](#) )

#### 2.2.11 Monitoring of the load utilization of the rectifiers

With the assistance of this function it is possible to monitor the load utilization of each individual rectifier (REC).

The UPC calculates the percentages of the different between min and max current from rectifier, to the max current of rectifier.

The output power of the units is not changed by this and remains at 100%.

For example

Max current of one rectifier	40A
Min current of one rectifier	30A

$$\frac{(40A - 30A) * 100\%}{40A} = 25\%$$

If the configured load utilization is under 25 % than the UPC set a signal bit.

The UPC3 generates an alarm "REC load" if a higher current is withdrawn.

The load limit of the whole facility is determined in the following way: The number of the installed rectifiers is multiplied with the load limit of each rectifier.

For example: 4 installed rectifiers => 4 x 25A load limit of each unit = 100A load limit of the whole facility.

#### 2.2.12 Monitoring of redundant rectifiers

If the facility is equipped with more rectifiers as necessary (redundancy), these spare rectifiers can be configured as redundant.

All rectifiers within the facility remain active, merely the signalling would be changed in the case of an unit failure.

For example: The facility is equipped with 3 rectifiers, 1 unit is configured as redundant.

The UPC 3 generates an alarm „REC redundant“, if one unit fails.

For example this alarm could be classified as not urgent because the efficiency of the facility is not in danger with the failure of one unit because there are more units available than really necessary (redundancy).

#### 2.2.13 Isolation monitoring

Via a high-resistance resistive voltage divider the half of the UPC3 system voltage (V/2) is connected to the UPC3 housing. The UPC3 permanently measures the voltage difference between the half system voltage and the housing. In the case of failure the measured voltage is different to V/2.

As exemplification both extreme cases are considered:

1. case: System voltage +V is connected to the housing. In this case the reference potential is 0V.
2. case: System voltage -V is connected to the housing. In this case the reference potential is the system voltage.

If the isolation monitoring is disabled via configuration, the mentioned voltage V/2 is separated from the housing with an independent relay.

## 2.3 Measurement inputs

The UPC3 serially is fitted with the following measurement inputs:

- UPC3- 24 V: Measurement voltage range 0-100VDC
- UPC3- 48 V: Measurement voltage range 0-100VDC
- UPC3-110V: Measurement voltage range 0-300VDC
- UPC3-220V: Measurement voltage range 0-300VDC
- 3 x voltage 0-60V (48V version)
- V1 and V2 are used as power supply
- 3 x current 60mV shunt
- 2 x temperature KTY81-220

### 2.3.1 Voltage measurement inputs

The voltage measurement inputs are defined as follows:

- V1 → battery voltage (power supply 1)
- V2 → battery voltage (power supply 2)
- V3 → battery center tapping point (V<sub>batt</sub>/2)

### 2.3.2 Current measurement inputs

The measurement range of the current measurement input I1 is ± 60mV (bi-directional).

The measurement range of the current measurement inputs I2 and I3 is 0-60mV (unidirectional).

### 2.3.3 Temperature measurement inputs

The temperature measurement inputs are designed for the use of sensors of type KTY81-220. The temperature measurement input 1 is related (factory preset) to battery 1 (temperature compensation).

### 2.3.4 Measurement range monitoring

The voltage measurement inputs can be monitored with the setting of changeable thresholds within a certain range.

The UPC3 generates an alarm if the voltage deviates from the adjusted parameters. Due to this fact, overvoltage and undervoltage alarms are realisable.

For the system voltage/consumer load voltage two thresholds are adjustable:

V<sub>load</sub> > V<sub>max</sub> and V<sub>load</sub> < V<sub>min</sub>

For the battery voltage three thresholds are adjustable:

V<sub>batt</sub> > V<sub>max</sub>, V<sub>batt</sub> < V<sub>warn</sub> and V<sub>Batt</sub> < V<sub>min</sub>

For the battery current no range monitoring is available. For the load current a "load current limit" is to be adjusted. If the limit is exceeded a failure bit is generated.

For the temperature measurement inputs a failure bit is generated if T > T<sub>max</sub>. A defective sensor (e.g. cable break or short circuit) is signalled with a further failure bit.

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## 2.4 Safety concept (authorization)

A configurable user administration is implemented in the UPC3. The safety settings show, which parameters can be seen or changed by the user or which privileges are available for him (e.g. "delete event history").

When an user wants to perform a protected operation at the unit, he has to authorize via login. After 10 minutes inactivity time, the log out has to be carried out via control keys.

### 2.4.1 Default User and Password

Name: User1

Password: user

All user and default passwords:

Name	Password
Factory	<access only for the factory >
User1	User
User2	User
User3	User
User4	User
User5	User
User6	User
User7	User

## 2.5 Quantity of the rectifiers: adding/removing

The quantity of the rectifiers which are to be monitored, results from the automatic registration of the units. But the removing of a rectifier generates an alarm. For the abolition of the alarm either you have manually to change the number of the rectifier quantity or the item „REC default ok“ is to be processed via the UPC3 system menu.

## 2.6 Alarms

Within the configuration of the UPC3, item "signal enable", you are able to define which failure bits shall activate an alarm (e.g. over-/under voltage, rectifier error, fuse fall etc.).

Alarms which are registered within the error list are signalled via a blinking error LED. Furthermore the notice "ERR" is shown on the display.

Attention: Actual alarms only can be deleted by fault repair.

It can be distinguished between two kinds of alarms:

- Internal alarms
- External alarms.

### 2.6.1 Internal alarms

Internal alarms are directly reported by the UPC3, e.g. failures signalled via the CAN-Bus or by excess or shortfall of alarm thresholds.

The designations (failure text) of internal alarms are set by default in the program and cannot be changed.

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#### 2.6.2 External alarm inputs

External alarms are recognised via the digital alarm inputs. At those inputs it is monitored whether or not a connected contact is closed or open. By reversing of the inputs it can be determined whether an alarm is activated at an open or closed contact.

The designations (clear text) of the external alarms can be entered or changed individually (max. 16 characters).

The UPC3 is fitted with 8 integrated alarm inputs. Those digital inputs 1.1 up to 8.1 are freely available for the user. The connection of an external DCC-DIG8 module (as option) to the CAN-Bus extends the system with further 8 alarm inputs (digital inputs 1.2 up to 8.2).

#### 2.6.3 Alarm signalling outputs

For external fault signalling the controller is equipped with 6 internal relays (UPC3 configuration relay 1.1-6.1), each of them equipped with a free floating change-over contact. The connection of an external DCC-RB6 module (as option) to the CAN-Bus extends the system with further 6 signalling relays (UPC3 configuration relays 1.2-6.2).

Each generated alarm can be assigned to a single or several signalling outputs. Likewise it is possible to assign several activated alarms (e.g. "general fault") to a single signalling output. In this case the signalling relay remains active until all assigned alarms are disappeared.

Whether the respective signalling relay is turned on or off during an alarm is adjustable via reversing.

#### 2.6.4 Alarm message (failure list)

Within the failure list all active failures (alarms) are shown at the display (clear text and an ID number according to the definition in the program).

If a failure (alarm) is not active anymore it is not shown any longer within the failure list.

#### 2.6.5 Event list

Within the event list all occurred failures are stored with the appearance and disappearance of the failures as well as the date and time.






Attention: With leaving the event list the system requests whether the list shall be deleted or not. If the list shall be deleted, the system asks for a log-in if the actual user has no privilege for "delete event list" or if no log-in has been done.

If the memory is full (250 entries), the eldest failure is deleted and a new one is added.

## 2.7 Display

The UPC3 is equipped with a green coloured front side display (two lines per 16 characters) with backlight.

Four LEDs indicate the state of the device and existing active alarms.

		LED 1 green = UPC3 „ON“	-
		LED 2 green = no active alarms, system „OK“	Configurable at " <a href="#">Signals enable</a> " LED OK
		LED 3 yellow = isolation failure	-
		LED 4 red existing = active alarms	Configurable at " <a href="#">Signals enable</a> " failure list

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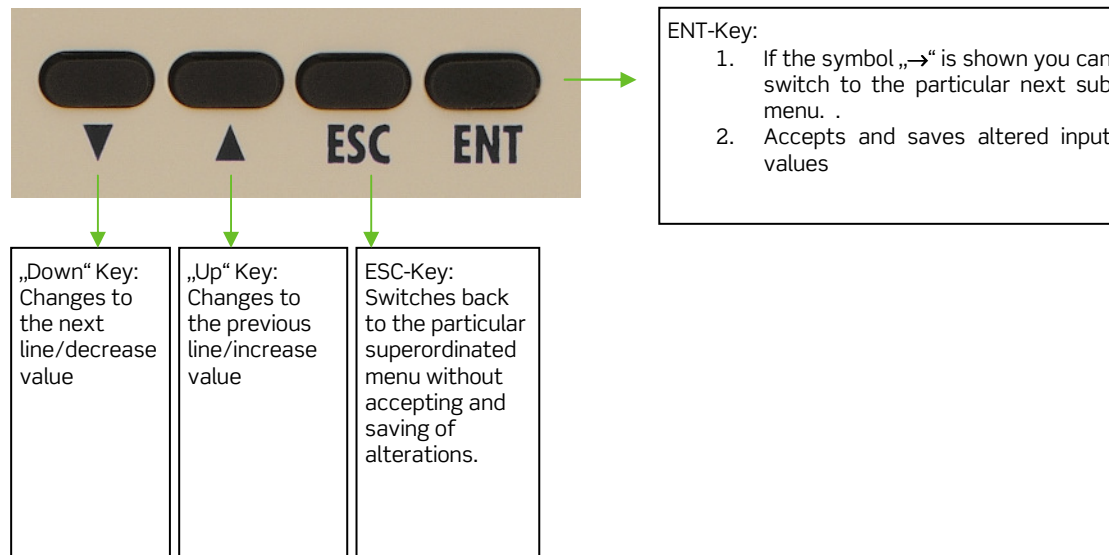
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### 2.8 Operating elements

The operation of the controller basically takes place via the 4 front side buttons (↑, ↓, ENT, ESC). The function of each button depends on what is shown at the display and on the respective menu level.



#### 2.8.1 Change of display (leave through the displays)

The change of the display takes place via pressing the buttons “↑↓”, whereas “↑” changes to the previous and “↓” changes to the next display.

#### 2.8.2 Change menu

Displays which include a selectable submenu are marked with the symbol „→“. By pressing the “ENT” button you get the submenu. The return to the superordinated menu takes place via pressing the “ESC” button.

#### 2.8.3 Alteration of numerical values/assignments

In order to increase the value it is necessary to press the “↑” button and press the “↓” button for the reduction of the value for alteration of a displayed value. The value is altered by the smallest possible amount by pressing the buttons in single steps. If the button is pressed by holding it down, then the values are changed continuously. The speed rate of change increases the longer the button is held down.

#### 2.8.4 Saving of altered values

Altered values are accepted and saved by pressing the “ENT” button.



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## 2.9 The menu

As a standard four menu blocks are available (see below).

The section [Log in](#) describes how to log-in at the UPC3. An authorization is necessary if you want to get access to a secured area (e.g. "Show parameters").

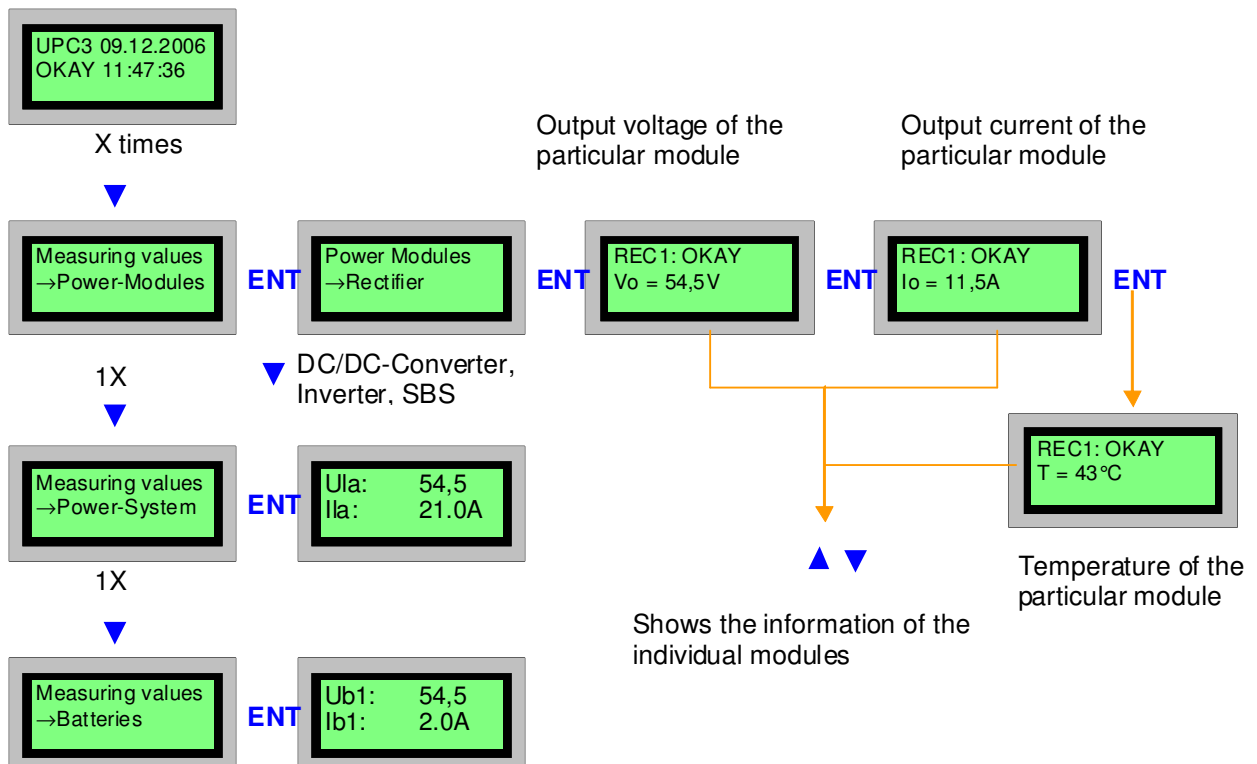
1. Measured values
2. Control functions
3. Operating status
4. System menu

### 2.9.1 Measured values

In this menu block the measured data of the system is displayed according to the configuration of the system,

*Measured values:*

- *General:* 4 x current, 6 x temperature and 6 x voltages
- *Mains:* Voltage, current and frequency (only systems equipped with mains monitoring (MM) board)
- *Power modules:* Rectifiers, DC/DC converters, inverters, static bypass switch (e.g. output voltage, output current, temperature)
- *Power system:* System voltage/-current, earth fault measurement (if activated) and the calculated battery-, rectifier- and consumer load currents.
- *Batteries:* Battery voltage, -current, center tapping voltage of the battery and temperature.



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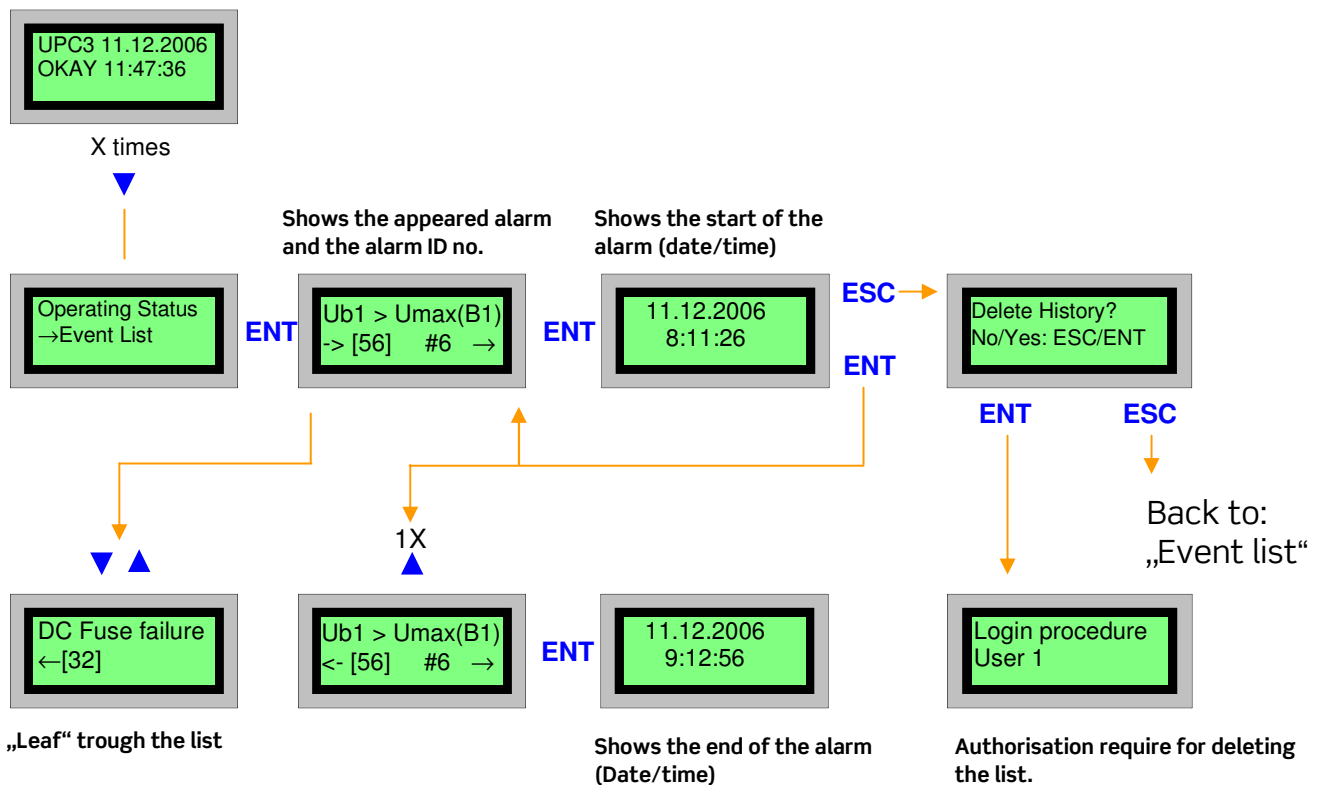
### 2.9.2 Operating status

In this menu block information about the actual operating status of the system can be queried.

Operating status:

- *Digital inputs:* Status active/inactive of the digital inputs 1.1-8.1 (internal) and 1.2-8.2 (external CAN). Active = active in signal matrix!
- *Relay outputs:* Status active/inactive of the relay outputs 1.1-6.1 (internal) and 1.2-6.2 (external CAN). Active = Relay operates!
- *FM board:* Status active/inactive of the fuse monitoring board.
- *Failure list:* The failure list shows the actual alarms.
- *Event list:* The event list shows all stored alarms (date/time, appearance/disappearance).
- *Fan racks:* Shows „Okay“ or „Failure“ of each of the connected fan racks.
- *Battery test:* Battery test active = '\*', inactive = '-'. Furthermore the withdrawn capacity (Ah) is shown.
- *Capacity calculator:* Shows the available capacity of the complete system or of individual battery strings.
- *Data memory:* Shows whether data currently are stored or not. ' OFF/ON'
- *Boost charge:* Boost charge active = '\*', inactive = '-'
- *Manual operation:* Manual control of the default voltage value of the rectifiers. Manual charge of the batteries.
- *System test:* Manual control of the default voltage value of the rectifiers within defined thresholds.
- *Modem:* Shows the initialisation status of the external or internal modem.

#### 2.9.2.1 Event list



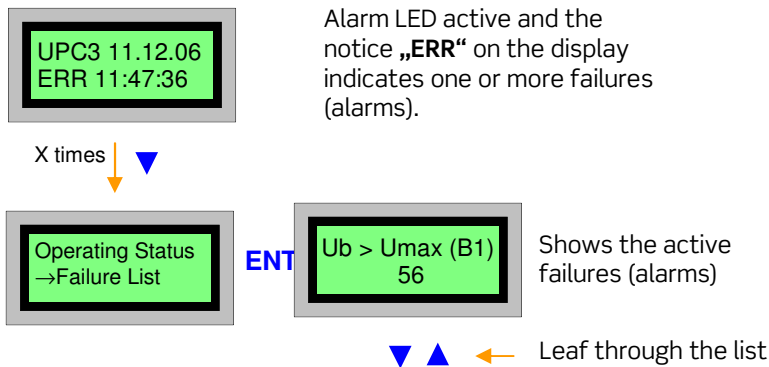
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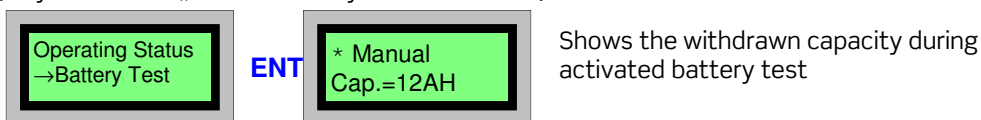
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### 2.9.2.2 Failure list



### 2.9.2.3 Operating status „battery test“

(only available if „manual battery test“ is enabled)



### 2.9.2.4 Operating status modem

(only available if „enable modem“ internally or externally has been configured.

(Internal modem available as option)

(An external modem is only available at UPC3 version with RS232 interface instead of USB interface).

An internal configured modem is designated with **Int** at the display an external modem with **Ext**.

The UPC uses the internal and external serial line each with two modes:

1. Modem configured. Modem status stopped. Direct communication is possible. Modem operation not possible.
2. Modem configured. Modem status started. Direct communication is not possible. Exclusively modem operation is possible.

To set the modem in the stopped status only makes sense with an external modem, because for a direct communication via front side interface the modem must be stopped.

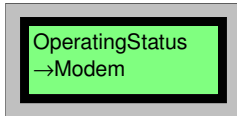
**Info.:** With an internal modem the communication and direct configuration via USB is possible at the same time.

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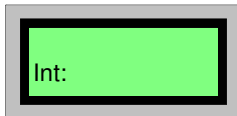
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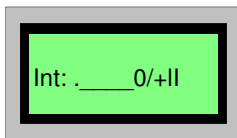


**ENT**



Mode 1) Modem status stopped.

No character string beside **Int** respectively **Ext** (see figure on the left). Direct communication possible. Modem operation not possible. For starting the modem see: [Control function modem internal/external](#)



Mode 2) Modem status started.

There is a character string beside **Int** respectively **Ext** (see figure on the left). Direct communication not possible. Only modem operation possible. For stopping the modem see: [Control function modem internal/external](#)

Explanation of the modem status string:

```
* _ _ _ _ 0 = + I I
.c a e o 1 / ! ? i
C A E O 2 1 > W
3 2 w
4 3
5 4
6 5
7 6
8 7
9
#
^
```

Important is the first and the final character.

Meaning of the first character:

\*= UPC3 communicates with the modem (e.g. sending of the initial string).

. = no communication with the modem

Meaning of the final character:

I= initialised

i= not initialised

During starting the UPC3 and during starting initialisation, the first character is “\*”, the final character is “i”.

After a time period the first character is “.”, the final character is “I”. This indicates a successful initialisation.

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### 2.9.3 Control function

In this menu block activated UPC3 functions can be executed.

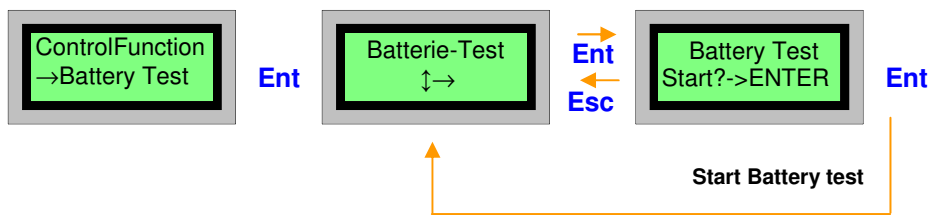
Control function:

- *Battery Test*: Start/stop battery test, deleting of battery test failures.
- *Data memory*: Output of the final series of measurements at the USB interface
- *Boost charge*: Start/stop boost charge
- *Modem internal/external*: Start/stop internal/external modem operation
- *Second menu*: Further system sub menus

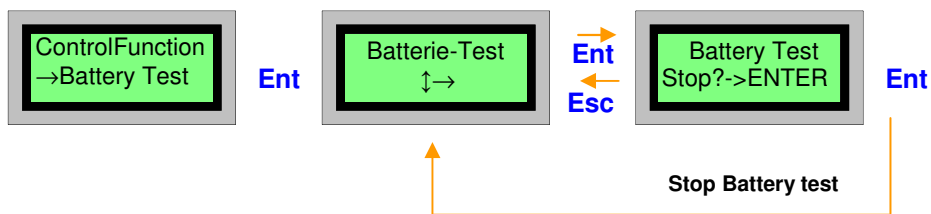
#### 2.9.3.1 Control function battery test

(only available if “enable manual battery test” has been configured)

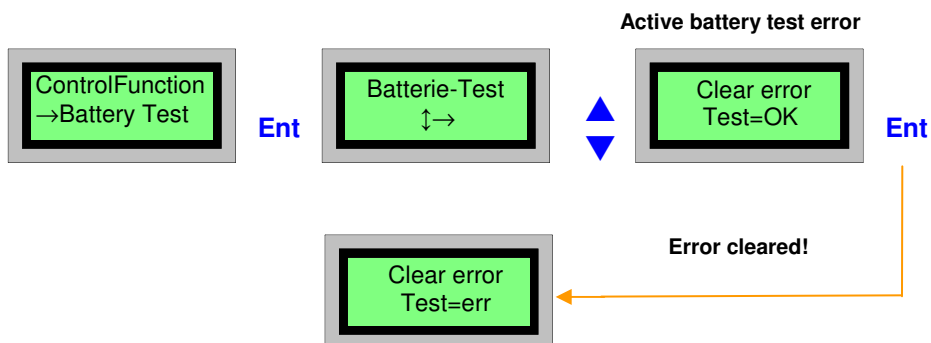
##### 2.9.3.1.1 Manual start



##### 2.9.3.1.2 Manual stop



##### 2.9.3.1.3 Clear error battery test



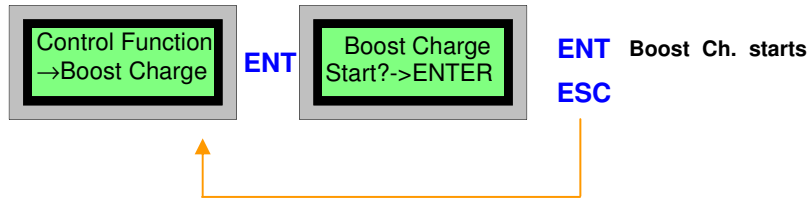
## DC Controller UPC3

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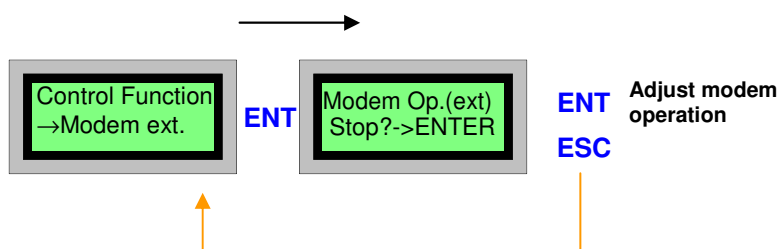
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### 2.9.3.2 Control function boost charge

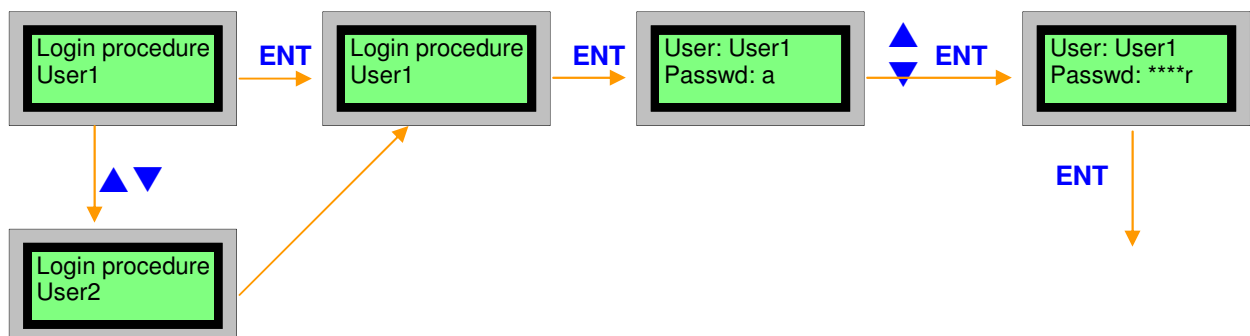


### 2.9.3.3 Control function modem internal/external



**ATTENTION!** If an UPC3 with RS 232 interface (optional version instead of USB) is used with an external modem, it is necessary to deactivate the modem mode via this function for direct configuration via PC. Otherwise, communication is not possible. 

### 2.9.4 Log in



#### a. Select user

First the user is to be selected with the arrow keys.

#### b. Password entry

With the arrow keys the alphabet, the figures and additional characters are passed through. The required character is selected with "ENT". After this, the cursor jumps to the next digit, overtakes the previous character as proposal and set "\*" as placeholder for the previous character. If only "ENT" is pressed without prior character selection via arrow keys, this is interpreted as "enter finished" (see next item). If the password consists of two consecutive equal characters (e.g. the password "flood"), please note: After keying in "flo", first select another character with the arrow keys. Following, go back to the character "o" and press ENT.

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### c. Finishing password entry

Press „ENT“. No prior pressing of the arrow keys.

## 2.9.5 Secondary menu (2nd menu)

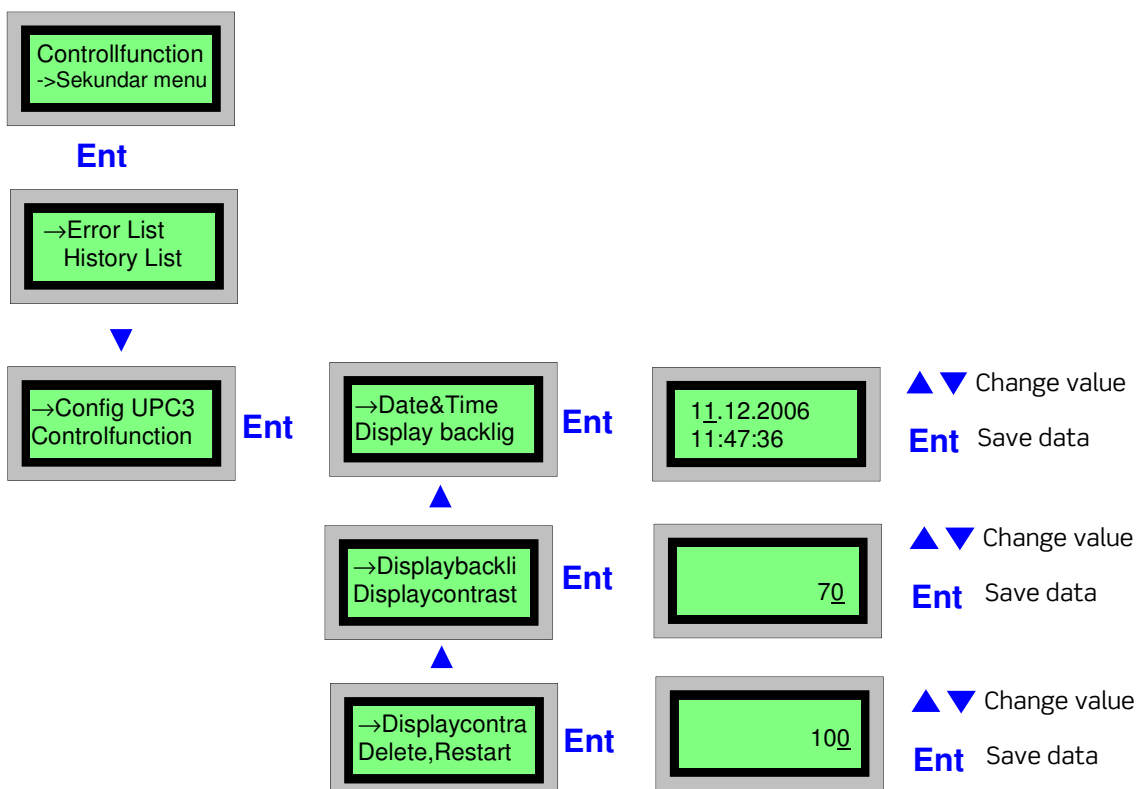
Via the secondary menu the status and the configuration parameters of the UPC3 are visible and can be changed (by entering of a protection code).

Control Function → 2nd Menu:

- *Error list*: All active present errors (failures)
- *History list*: The final 250 incoming and outgoing failures/events
- *History list P*: History list in the memory (flash) of the UPC3. (Not used).
- *Config. UPC3*: Configuration of the UPC3 hardware
  - *Date & Time*
  - *Display backlight*
  - *Display contrast*
  - *Delete, Restart*
  - *Delete NVmemHis*
  - *Calibration*
- *Control function.:* Control functions of the UPC3
- *View System par*: Display of the UPC3 configuration parameters
- *Manufacturer menu*: Secured area
- *Aut./User/Login*: Explicit login/logout at the unit

Following adjustments are changeable in this menu without entering of a protection code:

1. Date and Time
2. Display backlight in %
3. Contrast of the display in %



## 2.10 Communication interface

For the connection of a local PC to the UPC3 unit a connection via USB interface is necessary. For this connection is an USB wire A/B necessary (see figure below).



Connect the USB port of the PC to the USB connector of the UPC3 with this kind of cable.



## 3 Configuration of the UPC3

---

### 3.1 General

In principle it is possible to do the UPC3 configuration directly via the UPC3 control buttons. But it is advisable to configure the system using the optional PC software „MMT“ (**M**ulti **M**anagement **T**ool).

For the connection of a PC the UPC3 is fitted with an USB interface at front side, optional a connection via modem or Ethernet is possible.

The configuration software works with the system software Windows 2000/XP/2003/Vista. The user manual for the dial-up and general operation of the software is optionally available (MMT user manual).

REMARK: This user manual is related to the factory-side allocated configuration parameters for user 1.

### 3.2 Configuration of UPC systems with external modem

(Only for UPC3 version with RS 232 interface possible)

To configure the system with the configuration software with an external modem directly via the serial interface please note the following:

Two different operational modes are possible.

1) External modem has been started.

Dial-up at the system is possible. The system can be configured via modem. In this case a configuration directly via the serial interface is not possible.

2) External modem has been stopped.

Configuration via a serial interface is possible. Dial-up at the system via modem is not possible.

For information how to start and stop the modem, please see the section „[Control function modem internal/external](#)“. For information about the modem status please see the section „[Operating status modem](#)“.

Basically please note following order:

1. Stop the external modem
2. Check whether the external modem has been stopped.
3. Disconnect the serial cable of the modem from the RS232 interface. Connect the PC via Null Modem Cable to the UPC3.
4. Configuring of the system
5. Disconnect the Null Modem Cable, connect the serial cable of the modem.
6. Start the external modem
7. Check whether the external modem has been started/initialised

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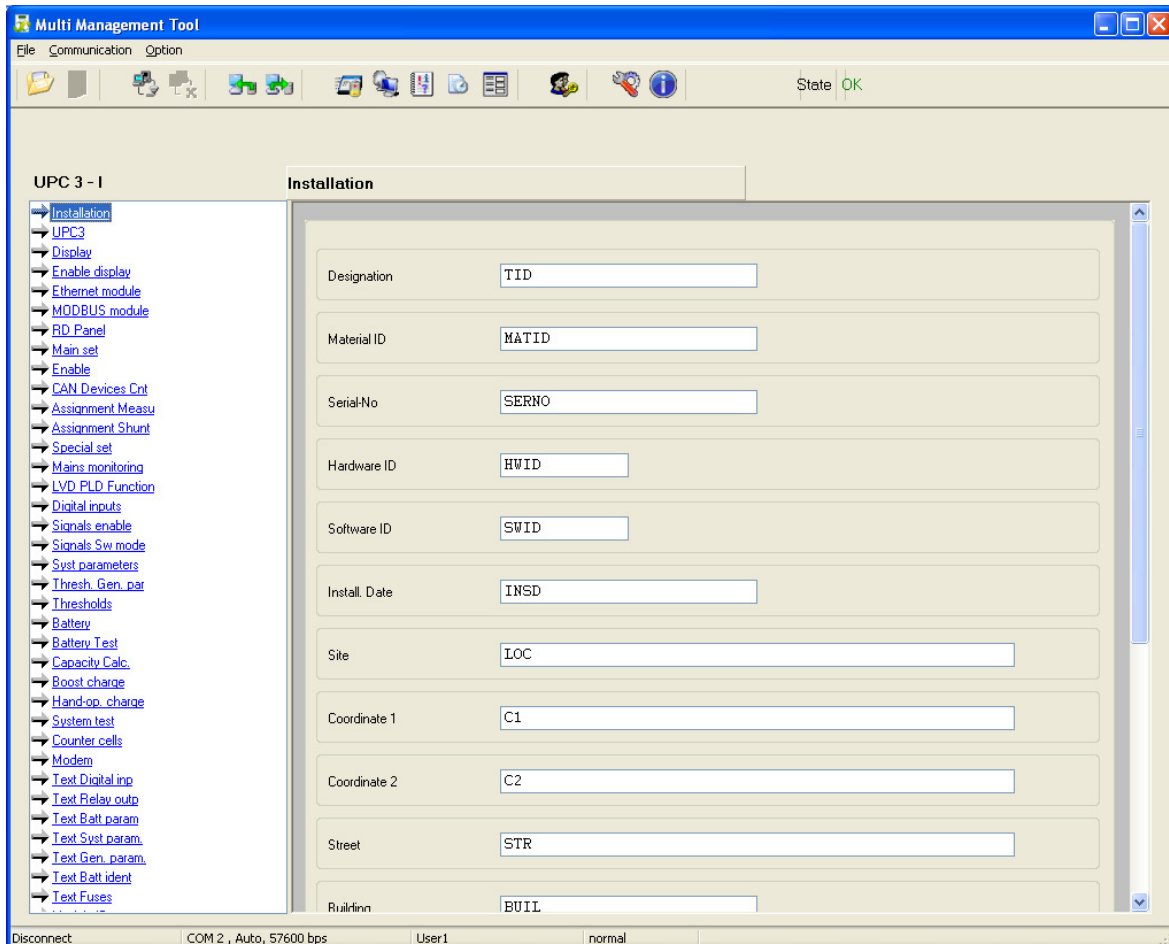
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### 3.3 UPC3 parameter groups

(The pictures shown in the following are screenshots of the configuration software MMT).

After a successful readout/start of a configuration a register of the parameter groups is shown to the left of the screen (MMT configurator). A selected group (via the left mouse button) is shown to the right.



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## 3.4 Configuration UPC3

This section describes the configuration of an UPC3. The configuration process is divided in the following groups for clarity.

### Basic setting UPC3

Main-set	Set-up of battery charge regulator (new), battery type/number of batteries, number of cells, voltage per cell
CAN Devices Cnt	Number of the connected modules via CAN-Bus: rectifiers, analogue measurement inputs (UMD2), fan racks, etc.
Comb parameters	Maximum charge current of rectifier (old), default values (voltage/current) of the rectifier modules
Battery	Set-up of the battery capacity, activating/set-up of the asymmetric measurement, activating/set-up of the temperature compensation, etc

### Location specific parameters

Installation	Location, service no., contact person, etc. The text has no effect on the system function!
UPC3	Only read: Serial number, firmware version, configuration date/person Set-up: Language selection, screen contrast/-illumination, baud rate USBtoUART
Ethernet modul	Set-up of SNMP agent, e.g. IP address, gateway, trap receiver.

### Measurement system

Assignment Measu	Displayed only at the start of the configurator with the add-on parameter „/sys“. Allows the assignment: Measurement channel to measurement object (e.g. measurement channel I1.1 = battery current)
Assignment Shunt	Assignment of shunt values to the current measuring inputs (e.g. I1.1 = 80A shunt)

### Thresholds

Thresholds	Thresholds of battery over/under voltage Threshold of over temperature Threshold of battery operation
Thresh. Gen. par	Thresholds of general parameters, e.g. UMD2 analogue measurement input
Main-set	Limit of the consumer load current

### Alarm signalling

Digital inputs	Inverting/delaying of the digital inputs
Signals enable	Via setting of failure/event bits in the related signal matrix it is possible to activate a Trap or an alarm relay.
Signals Sw mode	Signal switch mode, allows the inverting / delaying of output signals

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#### LVD/PLD

LVD PLD Function	Set-up of LVD/PLD function of the UPC3, e.g. switch-off-/switch-on voltage
------------------	--

#### Special functions

Enable	Release of spec. functions e.g. battery test or boost charge.
Battery Test	Determines the switch-off condition of a running battery test. Set-up of the start date of an automatic battery test.
Capacity calculator	Calculates the estimated battery capacity (only for Pb batteries)
Boost Charge	Conditions of an automatic boost charge, set-up "follow up charge" (follow up charge time, voltage limit)
Counter cells	Set-up of the counter cells
Mains Monitoring	Relates to an external mains monitoring (MM-) board, optional
MODBUS-Modul	Set-up of an optional MODBUS module, e.g. slave address, baud rate ...
Modem	Configuration of an internal/external modem

#### UPC3 display/text

Text Fuses	Text for a maximum of 32 fuses which can be monitored with a fuse monitoring board (FMB)
Text Digital inp	Text for the digital inputs of the UPC3. They appear e.g. in the failure list
Text Relay	Text for relay outputs of the UPC3, exclusively shown at the display
Text Batt param	Display text for battery measuring values, e.g. Vbatt
Text Comb param	Display text for system measuring values, e.g. Vload
Text Gen. param	Display text for general measuring values, e.g. Vana
Module Id-texts	Just for display! Text of the CAN modules are read out
Enable display	Deactivation of indications at the display of the UPC3

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### 3.4.1 Basic settings UPC3

#### 3.4.1.1 Main set



The main function of the UPC3 is to deliver a voltage default value to the rectifiers, in order to charge batteries or to keep them under well load conditions. This regulator (see picture on the left) provides a few additional functions. After a restart, the system overtakes the measured voltage as start voltage for the regulator.

Every second the voltage default value is controlled (up/down) with the value (5) if deviations of the current default value exist.

For trickle charge the adjusted relative current default value (1) is used.

For an activated boost charge the charge current (2) is used.

If a diesel generator is used for power supply, the default value (3) is used. The digital input (4) indicates when a diesel generator works. This function is disabled, when the digital input is set to "0".

The entered normal capacity (6) is used as point of reference for the relative charge currents.

The UPC3 hardware (measuring inputs) is designed for the monitoring of a battery. If more batteries are connected to the system an external battery monitoring board (as option) is to be used. The parameter Battery Count (7) is to be set to the according number of batteries.

Cell Count (8) is to be set to the number of the used battery cells. This number is important for the function [Unsymmetric measurement](#).

At systems without battery (parameter=0) the function for charge control and temperature compensation is inactive. In this case the system operates with the set nominal voltage for the rectifiers.

The battery string of a 48V system usually is built with four daisy chained lead acid batteries per six cells. Due to this fact the cell count (8) amounts to 24 cells.

The following table shows the factory set threshold values for a 48V system (battery) as an example. The reference numbers (XX) are related to the sections "[System parameters](#)", "[Thresholds](#)" and "[LVD/PLD function](#)".

Parameter	Value	Example: Default values for a 48V system
Over voltage Vmax (56)/(59)/(64)	1,200 x number of cells x volt. per cell	1,200 x 24 c x 2,00 V/c = <b>57,6V</b>
Under voltage Vmin (65)/(66)/(67)	0,900 x number of cells x volt. per cell	0,900 x 24 c x 2,00 V/c = <b>43,2V</b>
REC nominal voltage VN (26)	1,135 x number of cells x volt. per cell	1,135 x 24 c x 2,00 V/c = <b>54,5V</b>
Battery test Vbatt_test (27)	0,886 x number of cells x volt. per cell	0,886 x 24 c x 2,00 V/c = <b>42,5V</b>
Boost charge Vboost (28)	1,198 x number of cells x volt. per cell	1,198 x 24 c x 2,00 V/c = <b>57,5V</b>
LVD/PLD voltage (89)(90)	0,000 x number of cells x volt. per cell	<b>0,0V</b>

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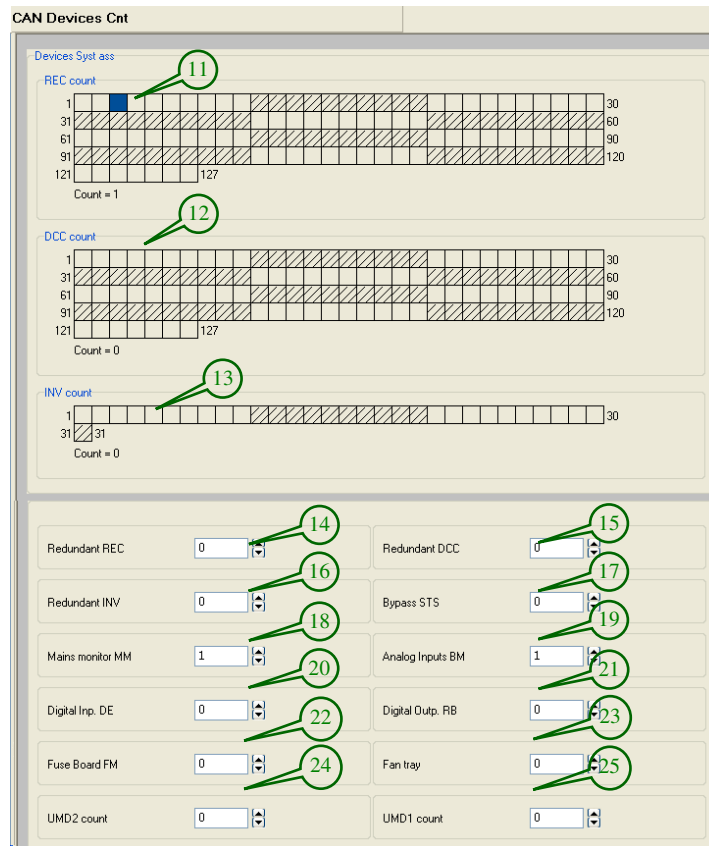
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### 3.4.1.2 CAN devices count



The screenshot displays the 'CAN Devices Cnt' configuration window. It is divided into two main sections. The top section shows three rows of device counts: 'REC count' (Count = 1), 'DCC count' (Count = 0), and 'INV count' (Count = 0). Each row has a grid of slots, with the first few slots shaded. The bottom section contains a grid of configuration parameters, each with a dropdown menu. The parameters are: Redundant REC (14), Redundant DCC (15), Redundant INV (16), Bypass STS (17), Mains monitor MM (18), Analog Inputs BM (19), Digital Inp. DE (20), Digital Outp. RB (21), Fuse Board FM (22), Fan tray (23), UMD2 count (24), and UMD1 count (25). Green callout lines connect the circled numbers to the specific elements in the interface.

A multitude of devices can be connected via CAN-Bus to the UPC3.

The number (in the pictures designated with “count”) of rectifiers, DC/DC converters and inverters **(11)/(12)/(13)** can vary for the different power supply systems. Each marked field corresponds to the CAN address of a registered rectifier. Due to the fact that not all of the slots must be equipped, gaps within the sequence can occur.

These parameters should be changed only for PSS, PSC and UNV modules because they do not have an automatic addressing. For all other modules (rectifiers, DC/DC converters and inverters) results the assignment and the number of the assigned modules from their automatic registration.

For example eight further digital inputs (DIG8) **(20)** or six relay outputs (RB6) **(21)**

In systems with redundant rectifiers, DC/DC converters or inverters additional alarms can be generated due to the designation of the parameters **(14), (15), (16)**.

The following example relates to rectifier modules but applies for DC/DC converter and inverters accordingly.

Example: System with seven registered rectifiers **(11)**, parameter “Redundant REC” **(14)** is set to 2.

When REC1 fails: The signal bit “REC no CAN” is active. No redundancy failure yet.

When REC2 fails too: The signal bit “REC redundant” is active. No redundancy anymore.

Further optional CAN modules:

CAN modules	No	Explanation
Bypass STS	<b>(17)</b>	Active static bypass switch mains/inverters
Mains Monitor MM	<b>(18)</b>	Monitors the mains input
Analog Inputs BM	<b>(19)</b>	Extension of the measurement inputs for battery monitoring
Digital Inp. DE	<b>(20)</b>	Extension of the digital inputs
Digital Outp. RB	<b>(21)</b>	Extension of the relay outputs
Fuse Board FM	<b>(22)</b>	Extension fuse monitoring
Fan tray	<b>(23)</b>	Active fan rack
UMD2 count	<b>(24)</b>	Extension measuring control (only used for CONB03)
UMD1 count	<b>(25)</b>	Extension measuring control (only used for CONB03)

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#### 3.4.1.3 System parameters

The nominal rectifier voltage „REC Nom voltage” (26) is equivalent to the normal (trickle) charge voltage (26) and to the boost charge voltage “REC Boost chge V” (28) without temperature compensation. These values indicate how the maximum default voltage value should be set by the regulator in case of trickle/boost charge.

Parameter (27) “REC Batt test V” indicates how the default voltage value should be set for the rectifiers in case of battery test. This value must be below the nominal voltage of the battery in order that the battery is discharged.

The parameter nominal rectifier current „REC Nom. current” (29) is sent via CAN-Bus to the rectifiers. Usually the value indicated on the type plate of the rectifier module is to be set.

The “REC Load limit” (30) applies in connection to the set “REC Nom. current”.

The UPC compare the sum of all REC currents with the maximum possible current (RecCount\* NomCurrent (29)).

The parameters (32) and (33) make the monitoring of the load distribution of the rectifiers possible. This is only applicable in systems with more than one rectifier.

If the percentage between minimum and maximum rectifier current to maximum rectifier is more than (33) over (34) sec. a failure bit is set.

$$\frac{(Rec\ I_{max} - Rec\ I_{min}) * 100\%}{Rec\ I_{max}} = LoadDis.$$

The load distribution usually is worse at low system load. So the Load distribution is only active, if current from one or more rectifier exceeds this (32) threshold over more than (34) sec. . This relates to the nominal current (35).

In systems with inverters but without static bypass switch (STS/UNB) the nominal voltage of the inverter (35) is sent via CAN-Bus to the inverters.

In the section „[Main set](#)“ the control process for battery charging is described.

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## 3.4.1.4 Battery

**Battery**

Tappoint(from-)

Battery 1: 12 40

Battery 2: 12

Battery 3: 12

Battery 4: 12

Battery 5: 12

Battery 6: 12

Battery 7: 12 44

Temper. sensor

Element 1:  0  1

Element 2:  0  1

Element 3:  0  1

Element 4:  0  1

Element 5:  0  1

Element 6:  0  1

Element 7:  0  1 41

Battery unsymm.: 2.5 V 43 Delay: 10 42

Hysteresis: 5 % 43 Vdiff Fuse case: 0.0 V

Itrigg fuse case: 0.5 A 43 Difference Ah: 10 %

Battery\_Tc

Tk (per cell): -2 mV/cK 45 Tk min: 0.0 °C 46

Tk max: 60.0 °C Base temp. Tcomp: 25 °C

For the analysis of the battery asymmetry the battery tapping point is sent via parameter **(40)**. The number of the cells up to the tapped point is counted from -Vbatt. If the difference of the measured and calculated asymmetry voltage value exceeds the value of the set „Battery unsymm.” **(41)**, a failure bit is activated.

If the tapping point is equal to the half of the number of cells of the battery (see section “Main set”), the calculation according to item a) is done.

Otherwise the calculation according to item b) is done considering a correction factor.



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#### Legend

Vtapp	=	Measured tapped voltage value against (-)
Vbatt	=	Measured battery voltage
Batc	=	Number of batteries (value to be configured)
Ctapp	=	Tapping point counted from (-), Value to be configured
Vplus	=	Calculated tapped voltage value against (+)

(a) Asymmetry calculation with tapping point at the center of the battery:

$$Diff = Vbatt - 2 \times Vtapp$$

If the difference (without consideration of sign) is greater than **(41)**, asymmetry is indicated.

(b) Asymmetry calculation with tapping point not at the center of the battery:

$$Vtapp2 = (Vbatt - Vtapp) + \frac{Vbatt}{Batc} * (Ctapp - (Batc - Ctapp))$$

Uabg2 is the battery tapping voltage against (+), calculated with consideration of a correction factor.

$$Diff = Vtapp - Vtapp2$$

If the difference (without consideration of sign) is greater than **(41)**, asymmetry is indicated.

The detection of an open battery fuse only is possible if the battery tap is located behind the battery fuse. If the difference between system- and battery voltage is greater than parameter "Vdiff Fuse case" **(42)** and the battery current less than parameter "Itrigg fuse case" **(43)**, the flag „Fuse open“ is activated in the signal matrix.

For the temperature compensation of the charge voltage the temperature sensor **(44)** of a battery has to be activated, e.g. Batt1.

The temperature coefficient **(45)** and the basis temperature **(46)** depend on the battery and have to be asked at the manufacturer.

Example:

$$V_{load} = V_{nom} + Tk * N_{cell} * \Delta t$$

with Tk = -4mV/cK; Ncell=24; Δt=+5°K

$$V_{load} = 54,3V + (-0,004) * 24 * 5$$

$$V_{load} = 53,8V \text{ at } 30^{\circ}C$$

**ATTENTION!** *Battery asymm. (41): For a set value of 2V the measured value may differ about +/- 1V from the calculated asymmetry voltage value.*



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### 3.4.2 Location specific parameters

#### 3.4.2.1 Installation

Installation	
Designation	TID
Material ID	MATID
Serial-No	SERNO
Hardware ID	HWID
...	...

The parameters to be entered at „Installation“ have no effect on the system function!

#### 3.4.2.2 Ethernet module

Ethernet module	
IP	192 . 168 . 32 . 181
Gateway	192 . 168 . 0 . 1
Netmask	255 . 255 . 255 . 0
Manager	192 . 168 . 0 . 1
SNMP-TrapReceiver1	192 . 168 . 32 . 181
SNMP-TrapReceiver2	0 . 0 . 0 . 0
SNMP-TrapReceiver3	0 . 0 . 0 . 0
SNMP-TrapReceiver4	0 . 0 . 0 . 0
SNMP-TrapReceiver5	0 . 0 . 0 . 0

The optional available SNMP agent (internal communication plug-in board) for the UPC3 takes over the set ethernet addresses after each change of the configuration.

IP, Gateway und Netmask have to be assigned via the network administrator.

Alarm messages via SNMP (Traps) can be sent to 5 different receivers.

The entry „SNMP-Manager“ currently is not analyzed.

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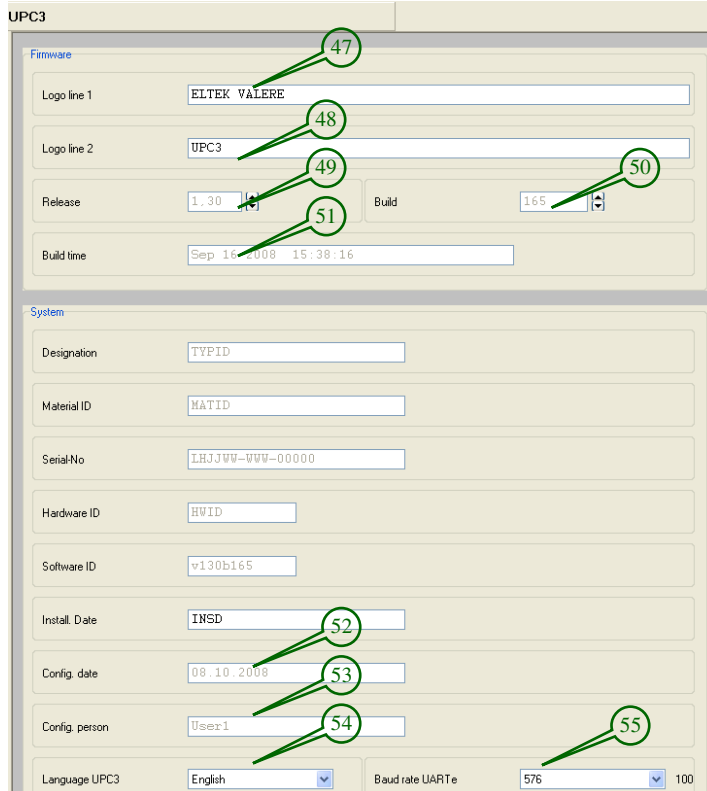
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### 3.4.2.3 UPC3



The screenshot shows the configuration interface for the UPC3 controller, divided into two main sections: Firmware and System.

**Firmware Section:**

- Logo line 1: ELTEK VALERE (47)
- Logo line 2: UPC3 (48)
- Release: 1.30 (49)
- Build: 165 (50)
- Build time: Sep 16 2008 15:38:16 (51)

**System Section:**

- Designation: TYPID
- Material ID: MATID
- Serial-No: LHJJVV-WVV-00000
- Hardware ID: HWID
- Software ID: v130b165
- Install. Date: INSD (52)
- Config. date: 08.10.2008 (53)
- Config. person: User1 (54)
- Language UPC3: English
- Baud rate UARTe: 576 (55)

The text, entered in Logo line 1 (47) and Logo line 2 (48) appears as info at the display of the unit.

The firmware version is indicated with the fields (49), (50), (51).

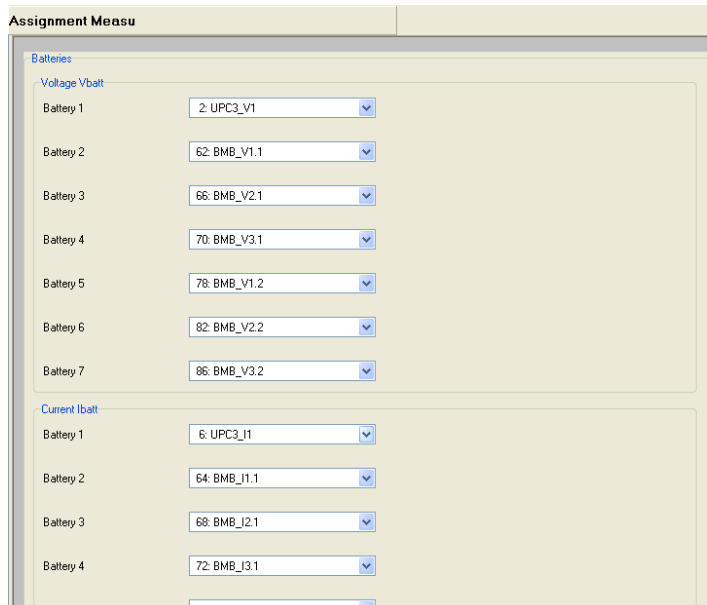
In the inscription fields „Config. Date“(52) and „Config. Person“(53) automatically the date and person of the last change of the configuration are entered

With parameter (54) the language to be used in the UPC3 is selectable.

Via the USB interface an RS 232 interface is modulated. There, the baud rate can be set (55). It is recommended to use the default baud rate 57600.

## 3.4.3 Measuring system

### 3.4.3.1 Assignment measured values



The screenshot shows the 'Assignment Measu' configuration interface, which allows for assigning measurement values to individual batteries.

**Voltage Vbatt Section:**

- Battery 1: 2-UPC3\_V1
- Battery 2: 62-BMB\_V1.1
- Battery 3: 66-BMB\_V2.1
- Battery 4: 70-BMB\_V3.1
- Battery 5: 78-BMB\_V1.2
- Battery 6: 82-BMB\_V2.2
- Battery 7: 86-BMB\_V3.2

**Current Ibatt Section:**

- Battery 1: 6-UPC3\_I1
- Battery 2: 64-BMB\_I1.1
- Battery 3: 68-BMB\_I2.1
- Battery 4: 72-BMB\_I3.1
- Battery 5: 80-BMB\_I1.2

In this menu it is possible to allocate to each individual measurement value of the UPC3 an user-defined input parameter. For example: Battery current = I1.

In the following several examples:

**1. example:** Three batteries, but only one measuring line to battery1 for voltage monitoring.

In this case you can allocate at “Voltage Vbatt”, Battery1 and Battery2 the same measurement source as for Battery1.

Voltage Battery1= UPC3\_U1  
 Voltage Battery2= UPC3\_U1  
 Voltage Battery3= UPC3\_U1

**2. example:** Two batteries but only one battery shunt.

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2a) The battery shunt is series connected to both batteries.  
 In this case the measured current is the total battery current.

Current Battery1 = UPC3\_I1  
 Current Battery2= undefined

2b) The battery shunt is connected within one battery string.

In this case the measured current is the current only of Battery1. For Battery2 the same input is to be allocated.

Current Battery1 = UPC3\_I1  
 Current Battery2= undefined

Important default allocations:

UPC3_V 1	=	Battery voltage
UPC3_V 2	=	System voltage
UPC3_V 3	=	Asymmetry voltage
UPC3_I1	=	Battery current
UPC3_I2	=	Load current
UPC3_I3	=	General measurement value
UPC3_T 1	=	Temperature sensor T1 battery compensation
UPC3_T 2	=	General measurement value

In the following table all possible measurement sources are defined:

Index	Name	Default		Location	Description
		Parameter	Element		
0	UNDEFINED				deactivated
1	STANDARD	inexistent			If „Standard“ manually is allocated, the individual default value (see table column on the left) namely is used internally by the UPC3 but “Standard” is shown instead of an explicit allocation. Therefore it is recommended not to use the value “Standard” but to use an explicit allocation.
2	UPC3_V1	Voltage Vbatt	Battery 1	UPC3	Battery voltage, terminal V1
3	UPC3_V2	Voltage Vload		UPC3	System voltage, terminal V2
4	UPC3_V3	Tapp volt. Vtapp	Battery 1	UPC3	Battery tapping voltage, terminal V3
5	UPC3_Vi	Insulat voltage		UPC3	Insulation voltage, directly connected to the unit
6	UPC3_I1	Current Ibatt	Battery 1	UPC3	Battery current, terminal I1. Bidirectional measuring possible
7	UPC3_I2	Current Iload		UPC3	Load current, terminal I2. Only directional

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8	UPC3_I3	General currents	Element 1	UPC3	General current I3. Only directional
9	UPC3_T1	Battery-temperat	Battery 1	UPC3	Battery temperature sensor, terminal T1
10	UPC3_T2	General Temperat	Element 1	UPC3	General temperature, terminal T2
11	_not_usable				
12	_not_usable				
13	_not_usable				
14	_not_usable				
15	_not_usable				
16	_not_usable				
17	_not_usable				
18	UPC3_DIG1-8	Digital Inputs	Digital Input 1	UPC3	Digital inputs, from UPC3 to terminal block
19	_not_usable				
20	_not_usable				
21	_not_usable				
22	STS_1.1 (St	inexistent		STS	
23	STS_2.1 (Vm	inexistent		STS	
24	STS_3.1 (Va	inexistent		STS	
25	STS_4.1 (Io	inexistent		STS	
26	STS_5.1 (Vb	inexistent		STS	
27	STS_6.1 (fm	inexistent		STS	
28	STS_7.1 (fa	inexistent		STS	
29	STS_8.1 (Th	inexistent		STS	
30	MMB_VL1.1	Mains voltages	Element 1	MMB 1	Mains voltage L1
31	MMB_VL2.1	Mains voltages	Element 2	MMB 1	Mains voltage L2
32	MMB_VL3.1	Mains voltages	Element 3	MMB 1	Mains voltage L3
33	MMB_FLx.1	Mains frequence	Element 1,2,3	MMB 1	Mains frequency
34	MMB_IL1.1	Mains currents	Element 1	MMB 1	Mains current L1
35	MMB_IL2.1	Mains currents	Element 2	MMB 1	Mains current L2
36	MMB_IL3.1	Mains currents	Element 3	MMB 1	Mains current L3
37	_not_defin..				
38	MMB_VL1.2	Mains voltages	Element 4	MMB 2	Mains voltage L1
39	MMB_VL2.2	Mains voltages	Element 5	MMB 2	Mains voltage L2
40	MMB_VL3.2	Mains voltages	Element 6	MMB 2	Mains voltage L3
41	MMB_FLx.2	Mains frequence	Element 4,5,6	MMB 2	Mains frequency
42	MMB_IL1.2	Mains currents	Element 1	MMB 2	Mains current L1
43	MMB_IL2.2	Mains currents	Element 2	MMB 2	Mains current L2
44	MMB_IL3.2	Mains currents	Element 3	MMB 2	Mains current L3
45	_not_defin.				
46	DEB_stat.1	inexistent		DEB 1	Failure status board. Only internally used
47	DEB_2.1	Digital Inputs	Digital Inputs 2	DEB 1	Digital inputs of the digital input board 1
48	DEB_3.1	inexistent		DEB 1	Reserves. No function
49	DEB_4.1	inexistent		DEB 1	Reserves. No function
50	DEB_stat.2	inexistent		DEB 2	Failure status board. Only internally used
51	DEB_2.2	s. Beschreibung		DEB 2	The UPC3 is able to manage

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52	DEB_3.2	inexistent		DEB 2	a maximum of 16 digital inputs. With the use of two digital input boards one of them replaces the digital inputs of the UPC3. For this application "Digital Input 1 DEB_2.2" must be used for the measuring value allocation instead of "UPC3_DIG1-8".
53	DEB_4.2	inexistent		DEB 2	
54	RYB_stat.1	inexistent		RB 1	Failure status relay board1. Only internally used
55	RYB_2.1	inexistent		RB 1	Only internally used
56	RYB_3.1	inexistent		RB 1	Only internally used
57	RYB_4.1	inexistent		RB 1	Only internally used
58	RYB_stat.2	inexistent		RB 2	Only internally used
59	RYB_2.2	inexistent		RB 2	Only internally used
60	RYB_3.2	inexistent		RB 2	Only internally used
61	RYB_4.2	inexistent		RB 2	Only internally used
62	BMB_V1.1	Voltage Vbatt	Battery 2	BMB 1	
63	BMB_V4.1	Tapp volt. Vtapp	Battery 2	BMB 1	
64	BMB_I1.1	Current Ibatt	Battery 2	BMB 1	
65	BMB_T1.1	Battery temperat	Battery 2	BMB 1	
66	BMB_V2.1	Voltage Vbatt	Battery 3	BMB 1	
67	BMB_V5.1	Tapp volt. Vtapp	Battery 3	BMB 1	
68	BMB_I2.1	Current Ibatt	Battery 3	BMB 1	
69	BMB_T2.1	Voltage Vbatt	Battery 3	BMB 1	
70	BMB_V3.1	Tapp volt. Vtapp	Battery 4	BMB 1	
71	BMB_V6.1	Current Ibatt	Battery 4	BMB 1	
72	BMB_I3.1	Battery temperat	Battery 4	BMB 1	
73	BMB_T3.1	Voltage Vbatt	Battery 4	BMB 1	
74	_not_usable				
75	_not_usable				
76	_not_usable				
77	_not_usable				
78	BMB_V1.2	Voltage Vbatt	Batterie 5	BMB 2	
79	BMB_V4.2	Tapp volt. Vtapp	Batterie 5	BMB 2	
80	BMB_I1.2	Current Ibatt	Batterie 5	BMB 2	
81	BMB_T1.2	Battery temperat	Batterie 5	BMB 2	
82	BMB_V2.2	Voltage Vbatt	Batterie 6	BMB 2	
83	BMB_V5.2	Tapp volt. Vtapp	Batterie 6	BMB 2	
84	BMB_I2.2	Current Ibatt	Batterie 6	BMB 2	
85	BMB_T2.2	Battery temperat	Batterie 6	BMB 2	
86	BMB_V3.2	Voltage Vbatt	Batterie 7	BMB 2	
87	BMB_V6.2	Tapp volt. Vtapp	Batterie 7	BMB 2	
88	BMB_I3.2	Current Ibatt	Batterie 7	BMB 2	
89	BMB_T3.2	Battery temperat	Batterie 7	BMB 2	

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90	_not_usable			
91	_not_usable			
92	_not_usable			
93	_not_usable			
94	UMD2_1.1	See description (exclusively for CONB03, status signal not available)	Universal measurement controller, device 1. This is actually used with the board CONB03. This board has additional voltage and temperature inputs. Apart from that, these inputs are designed for universal usage.	
95	UMD2_2.1	See description (exclusively for CONB03 Voltage Vbatt Battery2)		
96	UMD2_3.1	See description (exclusively for CONB03 Voltage Vtapp Battery2)		
97	UMD2_4.1	See description (exclusively for CONB03 Temperature Battery2)		
98	UMD2_1.2	See description (exclusively for CONB03, status signal not available)		
99	UMD2_2.2	See description (exclusively for CONB03 Voltage Vbatt Battery3)		
100	UMD2_3.2	See description (exclusively for CONB03 Voltage Vtapp Battery3)		
101	UMD2_4.2	See description (exclusively for CONB03 Temperature Battery3)		
102	UMD2_1.3	see description		
103	UMD2_2.3	see description		
104	UMD2_3.3	see description		
105	UMD2_4.3	see description		
106	UMD2_1.4	see description		
107	UMD2_2.4	see description		
108	UMD2_3.4	see description		
109	UMD2_4.4	see description		
110	UMD1_1.1	see description	Universal measurement controller, device 2. These inputs are designed for universal usage. Currently not used.	
111	UMD1_2.1	see description		
112	UMD1_3.1	see description		
113	UMD1_4.1	see description		
114	UMD1_1.2	see description		
115	UMD1_2.2	see description		
116	UMD1_3.2	see description		
117	UMD1_4.2	see description		
118	UMD1_1.3	see description		
119	UMD1_2.3	see description		
120	UMD1_3.3	see description		
121	UMD1_4.3	see description		
122	UMD1_1.4	see description		
123	UMD1_2.4	see description		
124	UMD1_3.4	see description		
125	UMD1_4.4	see description		
126	UMD1_1.5	see description		
127	UMD1_2.5	see description		
128	UMD1_3.5	see description		
129	UMD1_4.5	see description		
130	UMD1_1.6	see description		
131	UMD1_2.6	see description		
132	UMD1_3.6	see description		

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133	UMD1_4.6	see description	
134	UMD1_1.7	see description	
135	UMD1_2.7	see description	
136	UMD1_3.7	see description	
137	UMD1_4.7	see description	
138	UMD1_1.8	see description	
139	UMD1_2.8	see description	
140	UMD1_3.8	see description	
141	UMD1_4.8	see description	
142	UMD1_1.9	see description	
143	UMD1_2.9	see description	
144	UMD1_3.9	see description	
145	UMD1_4.9	see description	
146	UMD1_1.10	see description	
147	UMD1_2.10	see description	
148	UMD1_3.10	see description	
149	UMD1_4.10	see description	
150	UMD1_1.11	see description	
151	UMD1_2.11	see description	
152	UMD1_3.11	see description	
153	UMD1_4.11	see description	
154	UMD1_1.12	see description	
155	UMD1_2.12	see description	
156	UMD1_3.12	see description	
157	UMD1_4.12	see description	
158	UMD1_1.13	see description	
159	UMD1_2.13	see description	
160	UMD1_3.13	see description	
161	UMD1_4.13	see description	
162	UMD1_1.14	see description	
163	UMD1_2.14	see description	
164	UMD1_3.14	see description	
165	UMD1_4.14	see description	
166	UMD1_1.15	see description	
167	UMD1_2.15	see description	
168	UMD1_3.15	see description	
169	UMD1_4.15	see description	
170	UMD1_1.16	see description	
171	UMD1_2.16	see description	
172	UMD1_3.16	see description	
173	UMD1_4.16	see description	
174	Systlbatt.1	inexistent	Calculated battery current. Result= Systlrect.- load current
175	Systlrect.1	inexistent	Total current of all rectifiers
176	Systload 1	inexistent	Calculated load current. Result= Systlrect. - battery current
177	_not_usable		
.	_not_usable		



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.	_not_usable		
.	_not_usable		
255	_not_usable		

#### 3.4.3.2 Assignment shunt

Assignment Shunt

Shunt (60mV)

UPC3_I1.1	60	A
UPC3_I2.1	60	A
UPC3_I3.1	60	A
-	60	A
BM_I1.1	60	A
BM_I2.1	60	A
BM_I3.1	60	A
BM_I1.2	60	A
BM_I2.2	60	A
BM_I3.2	60	A

The entered value proves that e.g. at a current flow of 60A a voltage value of 60mV falls at the shunt.

The shunt values of the 3 UPC3 input currents as well as the 6 shunts of the maximum 2 connectable battery monitoring boards (per board 3 channels) can be entered at this area.

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### 3.4.4 Thresholds

**Thresholds**

**Vbatt**

Vmax: 57.6 V (56)

Vwarn: 45.6 V (57) Without delay. Hysteresis from Vmin

Vmin: 43.2 V (58)

Vmax REC off: 57.6 V (59) Delay and hysteresis from Vmax

Delay(Vmax): 3 s (60) Delay(Vmin): 10 s (61)

Hysteresis(Vmax): 10 % (62) Hysteresis(Vmin): 10 % (63)

**Load Thresholds**

Vmax: 57.6 V (64) Delay and hysteresis from Vmax (Group Vbatt)

Vmin: 43.2 V (65) Vmin INV off: 43.2 V (66)

Vmin DCC off: 43.2 V (67) Delay(Vmin): 10 s (68)

Hysteresis(Vmin): 10 % (69) Lim Load current: 30 A (70)

Temperature high: 60.0 °C (71) Delay: 10 s

Hysteresis: 5 % (72) Battery Operation: -20 A

Delay: 10 s Hysteresis: 5 %

Rinsul error: 60 kOhm (73) Delay: 10 s

Hysteresis: 5 %

All adjustments in this group serve as generation of signal bits (with the exception of (59), (66) und (67).

The exceedance of the limit of the battery overvoltage „Vmax“ (56) or the under-run of the limit of the battery undervoltage “Vmin” (58) or battery warning voltage “Vwarn” (57) generate the respective failure bit in the signal matrix.

Parameter (59) defines when the rectifiers shall be switched off.

For (56) and (59) hysteresis (62) and delay (60) is to be used.

For (58) hysteresis (63) and delay (61) is to be used. For parameter (57) hysteresis is used too but without time delay.

For the monitoring of the system voltage, the values for Vmax (64) and Vmin (65) can be defined.


The parameters (66) and (67) define the threshold values voltage low for switching- off the inverters respectively the DC/DC converters.


The “Limit load current” (70), entered in the area “Main adjustments” generates an alarm bit in the failure matrix when the value is exceeded.


„Temperature high“(71) refers to all battery temperature sensors. Activating of each individual sensor takes place in the main menu “Batteries”.

„Battery Operation“(72) is visible via a negative current flow. Due to errors of measurement the threshold should not amount below 5% of the shunt value.

The measurement of insulation failures „Rinsul error“(73) is possible only in non earthed systems. The adjustment should accord with the system voltage, e.g. 48V system → 48kΩ Rinsul.

**ATTENTION!** Exceeds the battery voltage the set limit „Vmax“(59), all rectifiers get the command „OFF“ via CAN-Bus. 

**ATTENTION!** In systems without STS/UNB (mains bypass) all inverters get the “switch off” signal if the value is below the limit (66). If an STS/UNB (mains bypass) is used, the static bypass switch takes over the control of the inverters. 

**ATTENTION!** If the value is below the limit (67), all DC/DC converters get the „switch off“ signal via CAN-Bus. 

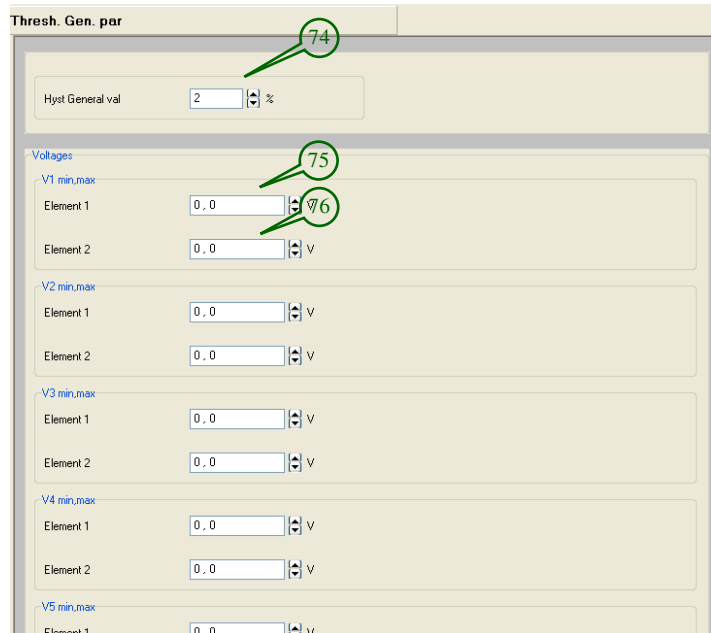
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### 3.4.4.1 Thresholds General parameters



The following general measurement channels are available at the UPC3:

6 x Voltage

4x Current

6x Temperature

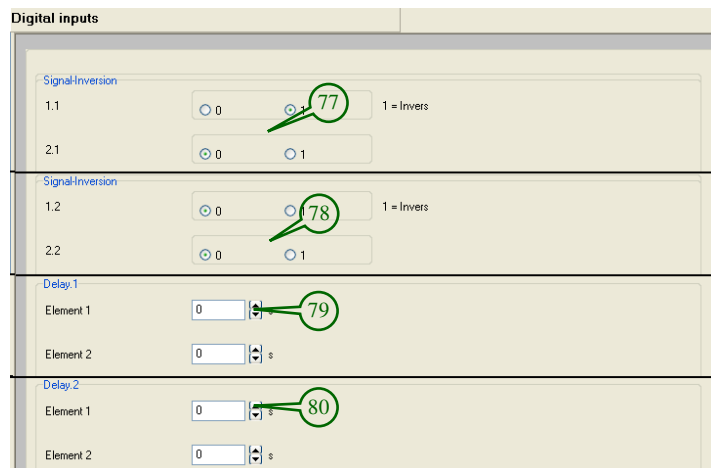
The measurement sources are allocated via „Assignment measured values“.

Each individual general parameter is used by the UPC3 when a text is configured (see: „Text general Parameter“).

For each individual parameter a min (75) and max (76) threshold is arranged. When the values are exceeded/under-run a signal bit is set. Hysteresis (74) is used for all general measurement values.

### 3.4.5 Alarm signalling

#### 3.4.5.1 Digital inputs



In the area „Digital inputs“, the eight internal (77) and eight external (78) digital inputs can be inverted and delay (79), (80) can be set.

The eight internal inputs (77) (1.1 bis 8.1) are available on the UPC3-Connection-Board.

The eight external inputs (78) (1.2 bis 8.2) are available if an external CAN-Board (DI8) is used.

For Info:

For two external DI8 boards an allocation of the digital inputs 1.1 - 1.6 and 2.1 - 2.6 is possible via „Assignment measured values“.

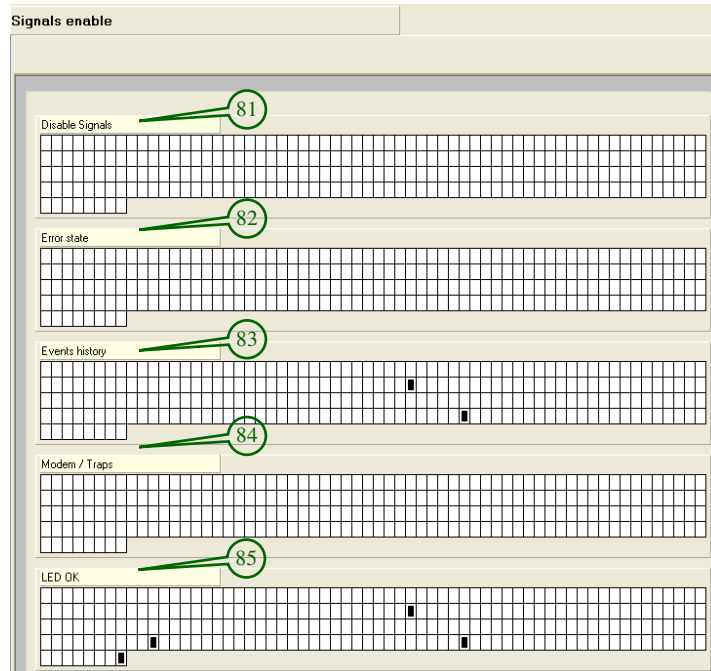
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## 3.4.5.2 Signals enable



In the area „Signals enable“, all external and internal failure-/signal bits can be enabled to an output. Thereby e.g. relays or SNMP traps can be activated.

For a list of all failure bits, see section [“List of failure/signal bits UPC3”](#).

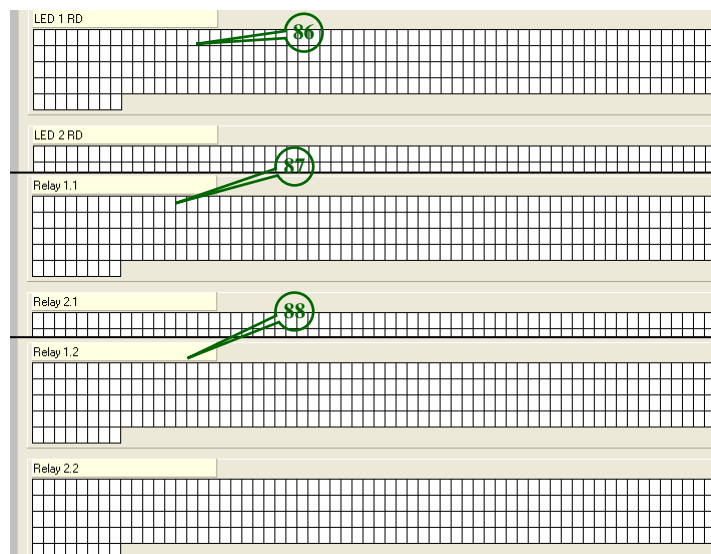
The list “Error state” (82) is of great importance. When a signal of the list get active, the red LED (front side UPC3) starts blinking. Furthermore the list “Error state” acts as mask for the generation of SNMP traps.

**REMARK: Only signals which have been activated at “Error state” (82) and “Modem/Traps” (84) are active and are reported.**

In the list „Disable Signals“(81), several signals can be disabled for all other lists.

All signals which have been activated in the list „Events History“(83) end up on the history memory of the UPC3. The history memory contains of maximum 250 messages and stores appeared as well as disappeared events/failures. The readout and reset takes place directly at the UPC3 unit or via the configuration software.

The red LED „Alarm“ on the front side of the UPC3 blinks at active signals in the error list. The green LED“✓“ can be parameterised via the list „LED Ok“(85). The error list as well as the list „LED OK“ contain the same content in the delivery status, but „LED Ok“ is inverted in the group signals switching mode (“Signals Sw mode”).



Via the signal lists „LED 1 RD“ (86) up to „LED 6 RD“ the functions of the six LEDs of the optional available UPC3 remote display are assigned.

The lists “Relay 1.1” (87) up to “Relay6.1” switch the internal relays K1 up to K6 of the UPC3. The contacts are available at the UPC3 connection board.

With the list “Relay 1.2” (88) up to “Relay 6.2” the relays of the optional available relays board (CAN-RYB) are activated.

For Info:

With the use of two RYB boards, the relay contacts 1.1 up to 6.1 conform to the second RYB board instead of the internal relays (see: “Count CAN devices”).

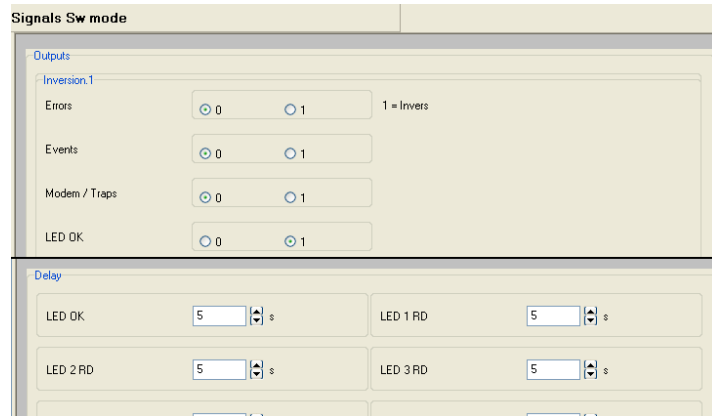
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### 3.4.5.3 Signals switch mode



**Signals Sw mode**

**Outputs**

**Inversion 1**

Errors  0  1 1 = Invers

Events  0  1

Modem / Traps  0  1

LED OK  0  1

---

**Delay**

LED OK  s

LED 1 RD  s

LED 2 RD  s

LED 3 RD  s

In the area „Signals Sw mode“, the configured lists can be inverted at their output or a time delay can be set. It is common practice to let a relay operate at failure free condition so that a cable break can be recognised as failure. Due to this fact, the relay output is inverted, e.g.

„Relay 1.1 = 1“.

If the green LED (✓) shall glow if **no** failure occurs, the LED must be inverted too.

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### 3.4.6 LVD/PLD function

LVD = Low Voltage Disconnect. This function mainly is used to protect batteries for total discharge. When the set under voltage limit is reached the battery is disconnected from the system by contactor.

PLD = Priority Load Disconnect. With this function it is possible to early disconnect “unimportant” loads at battery operation when the battery voltage under-runs voltage limit values. Consequently the backup time of prioritised loads is increased.

Because the three areas for LVD, PLD1 and PLD2 nearly are identical, in the following the areas exemplarily are explained on the basis of the LVD function.



The parameter „**Source select**“ (92) decides on the general LVD/PLD functionality. The selection “0” (OFF) deactivates the LVD/PLD function. Selection “1” (V1= battery voltage), “2” (V2= system voltage) or “3” (V3= battery tapping point) refer to “**Low limit OFF**” (89) and “**Low limit ON**” (90) to the particular measuring voltage. Selection “4” switches the LVD/PLD function depending on battery operation (see thresholds); the voltage thresholds are inoperable. Selection „5“ (Mains error) only makes sense in conjunction with the connection of an external Mains Monitoring Board (MMB), optional.

At under-run of **Low limit OFF** threshold a signal is generated which can be allocated to any output (relay).

Example LVD:

The selection source V1 (default battery voltage) and the “LVD active” signal is allocated to the LVD relay (e.g. K1).

The LVD contactor (energized by relay) switches off, when the battery voltage under-runs the limit „**Low limit OFF**“ (89) and the Drop delay has been elapsed. The reactivation of the contactors takes place when „**Low limit ON**“ (90) has been exceeded. For the LVD function this takes place directly, for the PLD function when “**Connect delay**” (93) has been elapsed.

Due to the fact that the power load disconnection directly increases the battery voltage, the hysteresis between the switch-off voltage “**Low limit OFF**” (89) and the switch-on voltage “**Low limit ON**” (90) must be great enough to avoid a direct activation of the contactors.

The LVD/PLD optocoupler outputs of the UPC3 are activated via “Source select”. The optocouplers switch on when the threshold **Low limit OFF** is under-run (active load throw-off). If the optocouplers are used please comply with the maximum allowable operating parameters.

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## 3.4.7 Special functions

### 3.4.7.1 Enable

In the area „Enable“, special functions can be enabled at the UPC3.

Is a parameter set to „0“, the function is disabled. Is a parameter set to „1“ or greater, the function is enabled.

A **battery test (94)** can be started/stopped by different ways at the UPC3. Possibilities:

- Start/stop via front buttons/menu of the UPC3

- Start via date & time
- Start day to day
- Start/stop via an external command e.g. SNMP, configuration software
- Start/stop via digital input

Similar to the battery test the **boost charge (96)** can be started/stopped by different ways:

- Start/stop via front buttons/menu of the UPC3

- Start when battery voltage falls below the set value in menu **“boost charge”**
- Start after battery operation. If the current comes out from the Battery and it is over an adjustable value in the menu **“Thresholds”** then the UPC detects battery operation
- Start after mains failure (optional MMB)
- Start/stop via an external command e.g. SNMP, configuration software
- Start/stop via digital input
- Start after **battery test end (BtstE)** by declaration of the final criteria

For enabling via digital input: At Element1 **(95), (97)** „[1]Start“ is to be set. At Element2 „[2]Stop/Inhibit“ is to be set. The internal digital inputs 1-8 of the UPC3 can be used for this.

With enabling the parameter „Hand-op. charge“ **(98)** the manual control of the default voltages of the rectifiers is possible.

Enabling „System test“ **(100)**: For the configuration see „Main menu, System test“.

Enabling „Energy balance“ **(99)**: The flown current into the battery is accumulated, the value (Ah) is shown on the display.

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Insulation measurement:

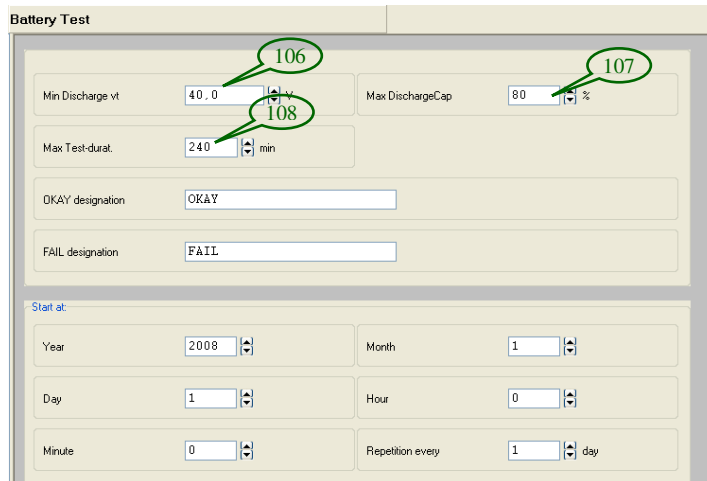
When „Rinsul measure“ **(101)** is enabled, the half of the battery voltage is connected to the casing of the UPC3 via a high-resistance resistive voltage divider. With differential measurement to this voltage, it is detected whether an insulation failure is present or not.

With parameter „Rinsu by dig inp“ **(102)** an additional condition for start and stop can be attached. „Start“ has priority. That means, that the insulation measurement is done when both inputs are configured and enabled.

Modem:

For the automatic initialization of internal/external modem, parameter **(103)** or **(104)** is to be set to „1“. The modem settings are to be done in the “Main menu, Modem”.

### 3.4.7.2 Battery Test

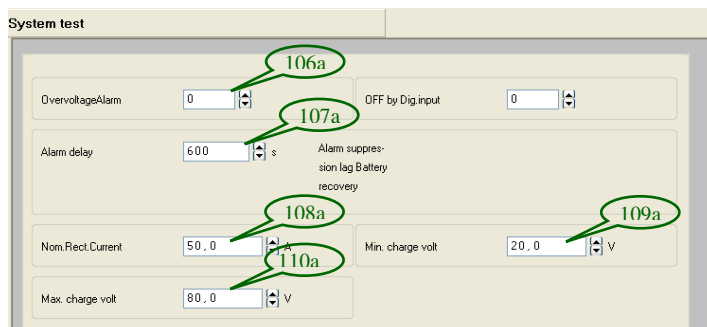


An activated battery test either can be stopped manually or automatically with exceeding a break-off criterion.

The automatic break-off criteria „Max DischargeCap“ **(107)** (e.g. 80% of the battery capacity discharged) and „Max Test-durat.“ **(108)** (e.g. 240 min battery operation kept up) stop the battery test without failure, whereas the under-run of the minimum discharge voltage „MinDischarge vt“ **(106)** stops the test with a failure.

The reset of the battery failure bit is possible by restart of the unit; deleting is possible with the buttons or by a successfully completed battery test.

### 3.4.7.3 System test



During a system test the automatic rectifier control is put out of action; the control of the rectifier voltage is surrendered to the user.

The voltage default value can be regulated between the thresholds **(109a)** and **(110a)**.

With the parameter „NomRectCurrent“ **(108a)** the maximum current default value for the rectifiers can be changed for the test.

Parameter **(106a)** indicates, whether the following signals and alarms respectively should be suppressed during the test:

$V_{batt} < V_{min}$ ,  $V_{batt} > V_{max}$ ,  $V_{batt} < V_{warn}$ ,  $V_{load} < V_{lmin}$ ,  $V_{load} > V_{lmax}$ , Battery unsymmetry (see „[Thresholds](#)“)

After finishing the system test, the suppression of the alarms can be extended with parameter **(107a)**. This makes sense e.g. when the system during system test operated off thresholds and after finishing the test still operates off thresholds. Because the automatic control takes place with 0.1V steps second by



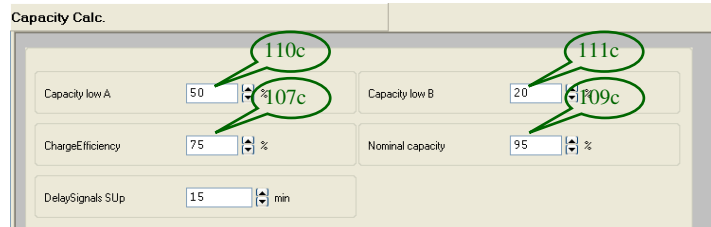
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second, it may be takes some time till the system operates within the set alarm thresholds.

### 3.4.7.4 Capacity Calculator



In this area, the configuration of the capacity calculator is done. The capacity calculator works exclusively with lead acid batteries.

The capacity calculator calculates the expected available capacity of the batteries (on the basis of a fully charged battery). A fully charged battery is detected by the UPC3 when the battery charge voltage  $\geq$  the charging end voltage for a minimum of 150 seconds. This voltage results from the parameters [System parameters \(26\)](#). At this condition the percentages (109c) is assumed as available capacity.

Subsequently the charge current is permanently estimated and resulting from that the still available capacity is calculated. The estimation of the discharge/charge current relates to the current I10. I10 is the 10<sup>th</sup> part of the current related to the nominal battery capacity.

Example: Nominal capacity= 50Ah >> I10= 5A.

Underlain is the estimation of the discharge/charge current because it is not linear to the available capacity.

The factorization of the discharge/charge current is factory preset to 50%.

Calculation: (Default 50 relates to factor=1) see below.

P= Factor 50 %

Ib= measured battery current

I10 (A)= Nominal capacity (Ah)/ 10 h

$$F = \frac{ib * (130 - p)}{i10 * (30 + p)}$$

At Ib= I10:

Parameter	0	5	10	30	50	70	90	95	100	%
Faktor	4.33	3.57	3.00	1.66	1.00	0.60	0.33	0.28	0.23	1

#### Estimation of the discharge current

Calculation (example):

Battery 50 Ah

Nominal capacity 95% (109c)

Capacity= 47,5 Ah

Example: From the fully charged battery 20A are withdrawn for more than 1 minute.

$$F = \frac{20A * (130 - 50\%)}{5A * (30 + 50\%)}$$

$$F = 4$$

$$I_{est} = Ib * F$$

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$$I_{est} = 20 * 4$$

$$I_{est} = 80$$

$$47,5 \text{ Ah} * 3600 - 60 * 80 / 3600 = 46,166 \text{ Ah}$$

### Estimation of the charge current

At charging the estimation is the other way round.

P= 50%

$$F = \frac{ib * (130 - p)}{i10 * (30 + p)}$$

$$Fl = \frac{9 - F}{8}$$

$$I_{est} = Ib * Fl * (ChargeEfficiency / 100)$$

Additional, parameter **(107c)** (ChargeEfficiency) is introduced, because more energy is necessary to charge a battery.

When the parameters **(110c)**, **(111c)** are under-run, in each case a signal is generated.

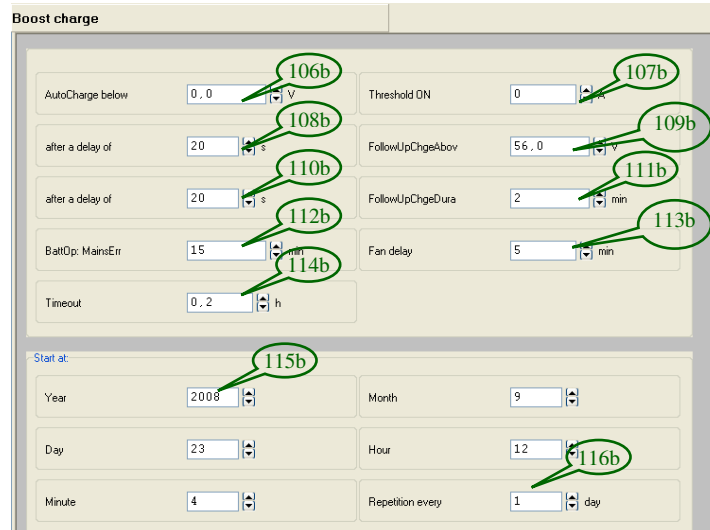
### 3.4.7.5 Boost charge

Boost charge

AutoCharge below	0,0	V	Threshold ON	0	sec
after a delay of	20	s	FollowUpChgeAbove	56,0	V
after a delay of	20	s	FollowUpChgeDura	2	min
BattOp: MainsErr	15	min	Fan delay	5	min
Timeout	0,2	h			

Start at:

Year	2008	Month	9
Day	23	Hour	12
Minute	4	Repetition every	1 day



In general the enabling of the boost charge function is described in the section „Enable“. In this area the threshold values for the start of an automatic boost charge is to be set.

If the battery voltage fall below **(106b)** over **(107b)** sec. than the boost charge will be active.

(Require the enable „Boost charge over Start voltage“ s. „Enable“)

If battery operation is over **(112b)** min than boost charge will be active.

(Require Enable „Boost charge over battery operation“ s. „Enable“)

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Boost charge can also start automatically at a setting **(115b)** date and time.  
 (Require enable Boost charge over Date + Time“ s. „Enable“)

The parameter **(116b)** defines the repeat interval in days.

e. g. start boost charge at 1.1.2009 um 8:05

Repeat 3 days

The boost charge execute at:

1.1.2009 at 8:05, 4.1.2009 at 8:08, 7.1.2009 at 8:05 a. s. o.

(Additional require the enable „Boost charge over Duration (daily) „Enable“)

If only the enable “Boost charge over Date + Time” and not the enable „Boost charge over Duration (daily)” is configured than the UPC ignore the date and the boost charge start at setting time.

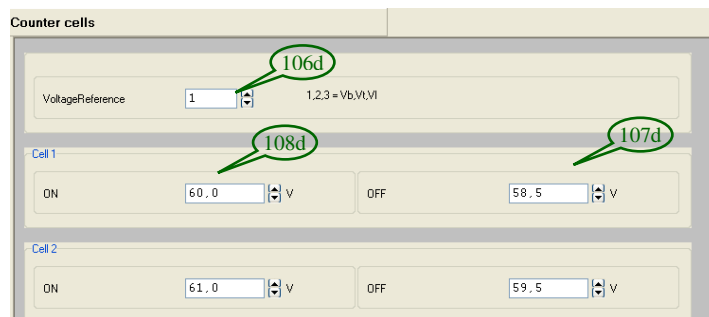
Boost charge finish:

When the battery voltage exceeds the parameter **(109b)** over **(110b)** second during a boost charge, the set additional charge time **(111b)** starts. After the expiration of this time the boost charge is finished

A maximum boost charge time can **(114b)** set additional.

If an optional fan tableau is available than the fans can run over an **(113b)** additional time after boost charge finish.

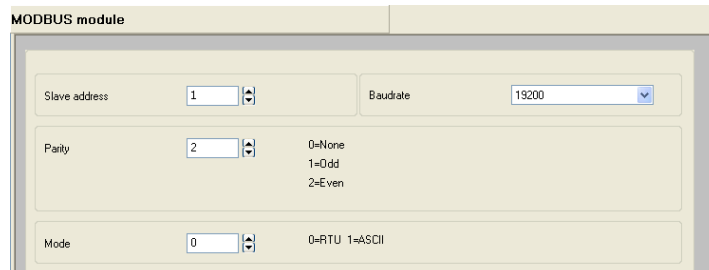
#### 3.4.7.6 Counter cells



Counter cells in USV systems shall protect the consumer load against overvoltage, e.g. during a boost charge. First of all the voltage reference **(106d)** (1=Vbatt; 2=Vtapp; 3=Vload) and following the ON and OFF threshold is set.

When the assigned voltage exceeds the ON threshold **(108d)**, a signal bit „counter cell 1“ is activated and at following under-run of the OFF threshold **(107d)** deactivated.

#### 3.4.7.7 MODBUS module



For the internal communication interface an optional MODBUS module is available. After each change of the configuration the MODBUS module automatically collects the parameters „Slave address“, „Baud rate“, „Parity“ and „Mode“ from the UPC3 controller.

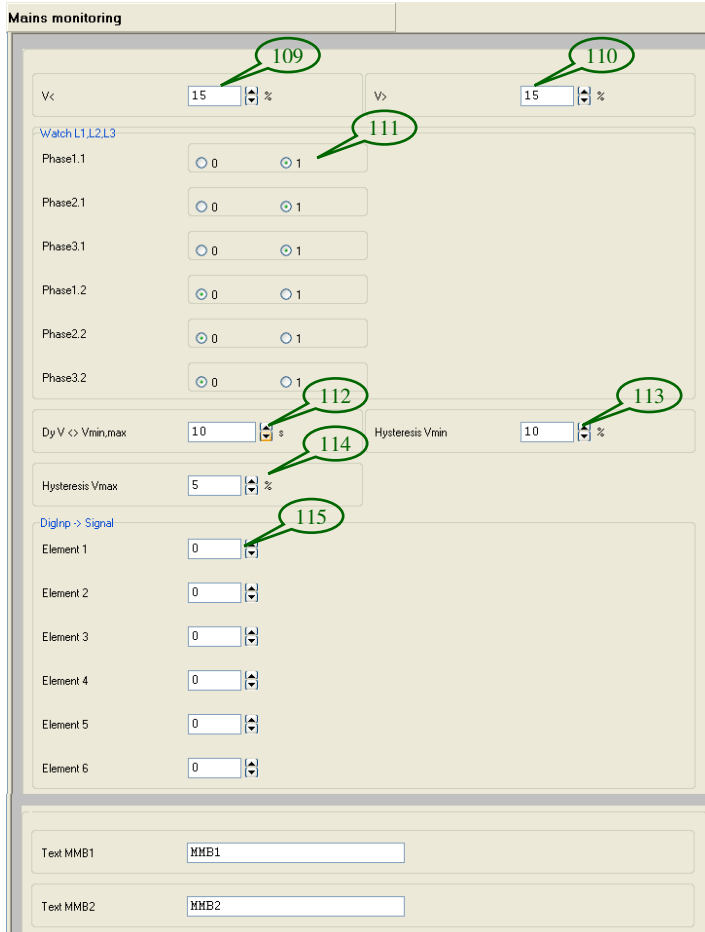
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### 3.4.7.8 Mains monitoring



**Mains monitoring**

V<  % V>  %

**Watch L1,L2,L3**

Phase1.1  0  1

Phase2.1  0  1

Phase3.1  0  1

Phase1.2  0  1

Phase2.2  0  1

Phase3.2  0  1

Dy V < Vmin,max  s Hysteresis Vmin  %

Hysteresis Vmax  %

**DigInp > Signal**

Element 1

Element 2

Element 3

Element 4

Element 5

Element 6

Text MMB1

Text MMB2

In conjunction with an optional available external mains monitoring board (CAN MMB) or an external voltage alarm, the UPC3 is able to detect a mains failure or phase break down. The mains failure is available as signal and can be also used as source for „PLD/LVD“ function.

With the use of a MMB the voltages of each phase are measured.

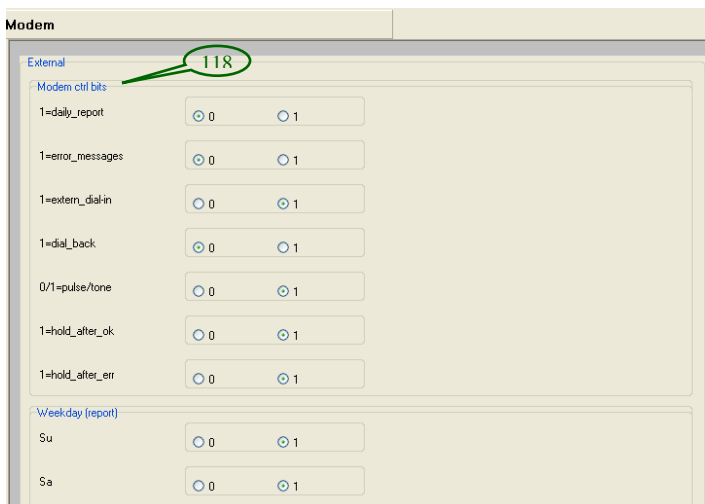
The threshold values V< (109) and V> (110) are related to the nominal voltage of the inverters, set in the area „comb parameters“.

When these values are exceeded/under-run, with inclusion of the parameters (112), (113) und (114) mains failure is detected.

The monitoring of single phases can be enabled/disabled with parameter (111). Phases 1.1 to 3.1 belong to the MM board 1, the phases 1.2 to 3.2 belong to the MM board 2.

If an external voltage alarm is used: With parameter (115) the digital input connected to the voltage alarm can be defined.

### 3.4.7.9 Modem



**Modem**

**External**

**Modem ctrl bits**

1=daily\_report  0  1

1=error\_messages  0  1

1=extern\_dial-in  0  1

1=dial\_back  0  1

0/1=pulse/tone  0  1

1=hold\_after\_ok  0  1

1=hold\_after\_err  0  1

**Weekday (report)**

Su  0  1

Sa  0  1

For remote control, the UPC3 can be extended with an optional internal or external modem. An external modem can be used exclusively with an UPC3 with serial interface (USB not possible).

The activating of the modem operation takes place in the parameter group „Enable“.

For the standard modem operation (communication with configurator software), the „extern\_dial-in“ must be activated (bit=1). All the rest of the bits are set to „0“ (default).

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### Explanation of modem control bits (“Modem ctrl bits”)(118)

#### Daily report

The modem automatically dials the entered telephone number (125) according to the configured values „weekday” and time (119). After a connection has been released the modem disposes an “Okay” string. If „hold\_after\_ok” is set to „0”, the UPC3 subsequently disconnects the modem connection.

#### Error message

If an error signal occurs in the UPC3 which has been assigned to the output „modem” (group „signals enable”), the modem automatically dials the entered telephone number (125) after the time delay has been elapsed (122). After a connection has been released the modem disposes an “Error” string. If „hold\_after\_err” is set to „0”, the UPC3 subsequently disconnects the modem connection.

#### Standby dialling (=extern\_dial-in)

If „extern\_dial-in” is activated, it is possible to dial into the system (enter password, see parameter „password”). “Extern\_dial-in” excludes „call-back”.

#### 0/1= pulse/tone

Pulse- or tone dialling

#### Hold after Ok

See daily report.

#### Hold\_after\_err

See error message.

#### Cable\_mode

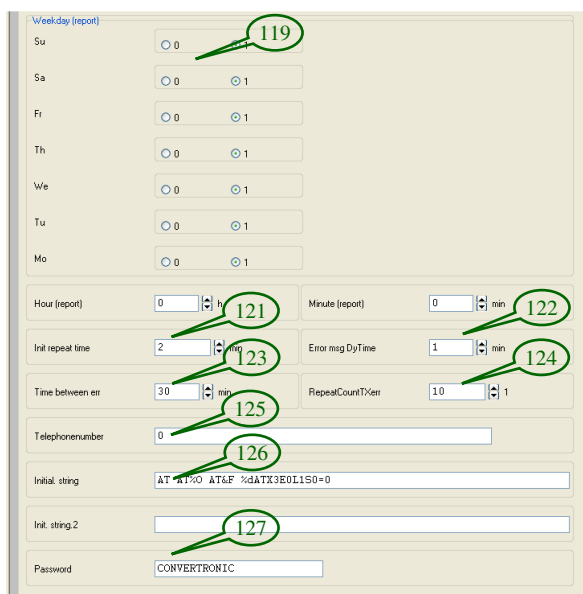
Not available!

#### Auto\_answers

Not available!

#### No\_state\_displ

The display of the modem state is hidden from the display. Not recommended!



The screenshot shows a configuration window titled "Weekday (report)". It contains several input fields and radio buttons, many of which are circled in green and labeled with callout numbers:

- 119**: Points to the "Su" radio button.
- 121**: Points to the "Hour (report)" spinner box.
- 122**: Points to the "Minute (report)" spinner box.
- 123**: Points to the "Init repeat time" spinner box.
- 124**: Points to the "Error msg DyTime" spinner box.
- 125**: Points to the "Time between err" spinner box.
- 126**: Points to the "Initial string" text box containing "AT AT%O AT&F %dATX3E0L1S0=0".
- 127**: Points to the "Init\_string2" text box.

Other visible fields include "Sa", "Fr", "Th", "We", "Tu", "Mo" (each with 0/1 radio buttons), "RepeatCountTXerr" (spinner box), "Telephonenumber" (text box), and "Password" (text box containing "CONVERTRONIC").

Via the parameter „RepeatCountTXerr”(124) is set how often the UPC3 should try to dial the telephone number (see „Error message”).

#### Initial.string (126):

AT AT%O AT&F %dATX3E0L1S0=0

This is set in the configuration of the UPC3. This instruction set is executed from the left to the right and transferred to the modem. Specific features are the tokens “%” (e.g. %O, %d). Those are not transferred but are commands which are executed via the UPC3.

A blank and the end of the string effects the transfer of a CR LF (ENTER KEY at PC).

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The Initial.string (see above) works nearly with all standard modems and should be changed only in exceptional cases. For the AT commands which are understood from your modem please see the attendant manual. Important! The modem must not answer self acting (ATS0=0), otherwise the pass word is avoided.

Token (UPC3 commands)

%m Sending without \r\n and waiting for answer from the modem  
%d 1 s pause  
%p 0.25 s pause  
%t40 Timeout 40 s Default 5 s (1-99 s)  
%t Timeout 320 ms min = 320 ms  
%t0 ditto  
%t100 ditto  
%t400 Timeout 400 ms 320 .. 999 ms  
%O Waiting for OK\r\n modem message  
%C Waiting for CONNECT\r\n ditto  
%0 Waiting without check Default  
%% results in % as normal character

Communication operation of the string AT AT%O AT&F %dATX3E0L1S0=0  
(/r/n = carriage return line feed)

Explanation of the AT commands:

AT → &F= Factory setting  
X3= Do not wait for dial tone  
E0= 0 Deactivates echo of sent bytes  
L1= Loudspeaker active, sound level 1  
S0=0 Modem answers not self acting

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### 3.4.7.10 Remote Display Panel (RDP)

In this area the Remote Display Panel (RDP) is configured. On the panel definite block diagrams are used. For more information about the RDP please read the RDP user manual.

With parameter „Enable RDP“ **(128)** the panel is enabled.

With parameter „StartUp action“ **(129)** is defined how the UPC3 system shall act after a restart.

„0=none“ >> no command to the CAN devices. The actual condition “ON” respectively “OFF” is kept.

“1=CAN devices ON“ >> CAN devices explicitly get the ON command.

“2=CAN devices OFF“ >> CAN devices explicitly get the OFF command.

Parameter „Enable Switches“ **(130)** and „Enable Modules“ **(131)** give information to the RDP which digital inputs respectively CAN modules are to be used by the panel.

For more information about the RDP configuration please read the RDP user manual.

## 3.4.8 Enabling of signalling/text

### 3.4.8.1 Text digital inputs

It is possible to assign individual texts to the digital inputs of the UPC3. These texts then also appear in the failure/event list or in the trap message of the SNMP-Agent.

For each individual digital input two texts are available. Text 1 is used if a signal is active, text 2 is used if a signal is inactive.

The texts **(140)**, **(142)** are related to the digital inputs of the UPC3, the texts **(141)**, **(143)** are related to the optional digital input board D18.

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### Example 1:

To the digital input 1.1 a switch is connected via a normally open contact; the input is not inverted by configuration.

First case: Switch not activated

No signal is generated, status text input 1.1 of **(140)** is used.

Second case: Switch activated

A signal is generated, status text fail input 1.1 of **(142)** is used.

### Example 2:

To the digital input 1.2 a switch is connected via a normally closed contact; the input is not inverted by configuration.

First case: Switch not activated

A signal is generated, status text fail input 1.2 of **(142)** is used.

Second case: Switch activated

No signal is generated, status text input 1.2 of **(140)** is used.

### Example 3:

To the digital input 1.3 a switch is connected via a normally closed contact; the input is inverted by configuration.

First case: Switch not activated

A signal is not generated, status text input 1.3 of **(140)** is used.

Second case: Switch activated

A signal is generated, status text fail input 1.3 of **(142)** is used.

The other text groups are parameters exclusively for the texts to be shown on the UPC display.

The modul ident texts are read out via CAN-Bus from the connected CAN devices (e.g. rectifiers) and cannot be parameterized with the configurator.

### 3.4.8.2 Text Relay output

Text Relay outp	
Relays UPC3	
1.1	Relay1.1 <b>(144)</b>
2.1	Relay2.1
Relays RB	
1.2	Relay1.2 <b>(145)</b>
2.2	Relay2.2
Relays UPC3 fail	
1.1	FAIL 1.1 <b>(146)</b>
2.1	FAIL 2.1
Relays RB fail	
1.2	FAIL 1.2 <b>(147)</b>
2.2	FAIL 2.2

The texts are used in the menu Relay Status of the UPC3. The parameters **(144)**, **(146)** are used for the internal relays of the UPC3; the parameters **(145)**, **(147)** are used for the optional relay board. (Specific feature: If two relay boards are used, the parameters **(144)**, **(146)** are related to the second relay board, see "Count CAN devices").

When the signal (e.g. relay 1.1) is active, the fail text **(146)**, **(147)** is used. When the signal is inactive, the text **(144)**, **(145)** is used.

Either the signal can be directly used for the relay or it can be used in inverted status (see "[Signals switch mode](#)").



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### 3.4.8.3 Text Battery parameters

**Text Batt param**

Battery 1

Text Batt1 Vbatt       Text Batt1 Ibatt

Text Batt1 Vtapp       Text Batt1 Temp

Battery 2

Text Batt2 Vbatt       Text Batt2 Ibatt

Text Batt2 Vtapp       Text Batt2 Temp

>>User defined texts, used for the batteries.

### 3.4.8.4 Text System parameters

**Text Syst param.**

Text Vload       Text Iload

Text Vinsul       Text Rinsul

>>User defined texts, used for the system

### 3.4.8.5 Text General parameters

**Text Gen. param.**

Voltages

Text V1

Text V2

Text V3

Text V4

Text V5

Text V6

>>User defined texts, used for the general measuring values. If no text is keyed in, the measuring value is disabled and is not used in the UPC3.

### 3.4.8.6 Text Batt identification

**Text Batt ident**

Type single bick

Manufactory

Material ident.

Install. date

>>Additional information about the batteries.

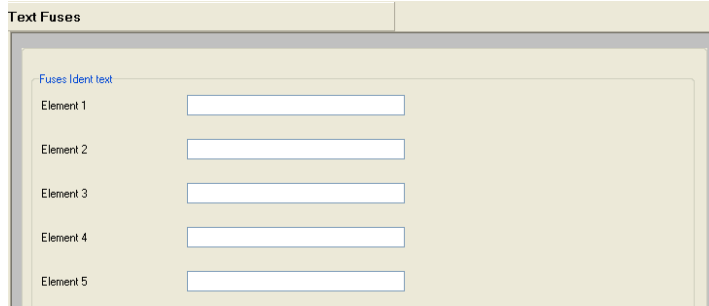
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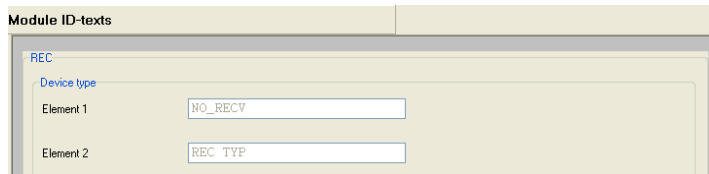
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### 3.4.8.7 Texts Fuses



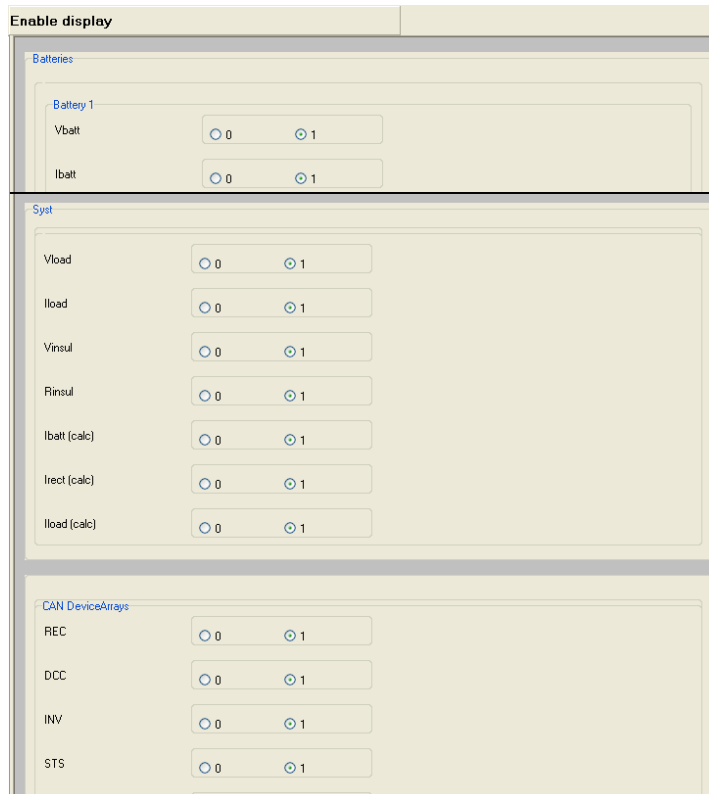
>> These texts are used in combination with fuse monitoring boards.

### 3.4.8.8 Module ID texts



>> All texts are for information and can not be changed. The UPC3 automatically receives the texts from the connected modules.

### 3.4.8.9 Enable display



>> If parameter „0“ is set, the respective indications are blanked on the UPC3 display.

A blanked out feature either has no effect to the system function nor to the SNMP-Agent.

Features which are not available according to the system configuration are not manually to be blanked.

Example: If one battery is connected and parameterized, exclusively one battery is shown on the display.

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#### 4 Table of failure/signal bits UPC3

Signal no.	Signal text	Reference to parameter	Description
0	Fuse 1	<a href="#">(22),Text fuses</a>	Fuse, monitored via fuse monitoring board
1	Fuse 2	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
2	Fuse 3	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
3	Fuse 4	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
4	Fuse 5	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
5	Fuse 6	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
6	Fuse 7	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
7	Fuse 8	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
8	Fuse 9	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
9	Fuse 10	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
10	Fuse 11	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
11	Fuse 12	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
12	Fuse 13	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
13	Fuse 14	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
14	Fuse 15	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
15	Fuse 16	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
16	Fuse 17	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
17	Fuse 18	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
18	Fuse 19	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
19	Fuse 20	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
20	Fuse 21	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
21	Fuse 22	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
22	Fuse 23	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
23	Fuse 24	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
24	Fuse 25	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
25	Fuse 26	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
26	Fuse 27	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
27	Fuse 28	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
28	Fuse 29	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
29	Fuse 30	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
30	Fuse 31	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
31	Fuse 32	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
32	Fuse 33	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
33	Fuse 34	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
34	Fuse 35	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
35	Fuse 36	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
36	Fuse 37	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
37	Fuse 38	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
38	Fuse 39	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
39	Fuse 40	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
40	Fuse 41	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
41	Fuse 42	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
42	Fuse 43	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
43	Fuse 44	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
44	Fuse 45	S. a. signal no. 0	Fuse, monitored via fuse monitoring board

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Signal no.	Signal text	Reference to parameter	Description
45	Fuse 46	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
46	Fuse 47	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
47	Fuse 48	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
48	Fuse 49	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
49	Fuse 50	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
50	Fuse 51	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
51	Fuse 52	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
52	Fuse 53	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
53	Fuse 54	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
54	Fuse 55	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
55	Fuse 56	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
56	Fuse 57	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
57	Fuse 58	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
58	Fuse 59	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
59	Fuse 60	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
60	Fuse 61	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
61	Fuse 62	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
62	Fuse 63	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
63	Fuse 64	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
64	Fuse 65	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
65	Fuse 66	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
66	Fuse 67	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
67	Fuse 68	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
68	Fuse 69	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
69	Fuse 70	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
70	Fuse 71	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
71	Fuse 72	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
72	Fuse 73	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
73	Fuse 74	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
74	Fuse 75	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
75	Fuse 76	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
76	Fuse 77	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
77	Fuse 78	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
78	Fuse 79	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
79	Fuse 80	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
80	Fuse 81	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
81	Fuse 82	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
82	Fuse 83	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
83	Fuse 84	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
84	Fuse 85	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
85	Fuse 86	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
86	Fuse 87	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
87	Fuse 88	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
88	Fuse 89	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
89	Fuse 90	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
90	Fuse 91	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
91	Fuse 92	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
92	Fuse 93	S. a. signal no. 0	Fuse, monitored via fuse monitoring board
93	Fuse 94	S. a. signal no. 0	Fuse, monitored via fuse monitoring board

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Signal no.	Signal text	Reference to parameter	Description
94	Fuse 95	See above, signal 0	Fuse, monitored via fuse monitoring board
95	Fuse 96	See above, signal 0	Fuse, monitored via fuse monitoring board
96	Dig. input 1.1	<a href="#">(140)</a> , <a href="#">(142)</a> , <a href="#">(77)</a> , <a href="#">(79)</a>	Internal digital input
97	Dig. input 2.1	<a href="#">(140)</a> , <a href="#">(142)</a> , <a href="#">(77)</a> , <a href="#">(79)</a>	Internal digital input
98	Dig. input 3.1	<a href="#">(140)</a> , <a href="#">(142)</a> , <a href="#">(77)</a> , <a href="#">(79)</a>	Internal digital input
99	Dig. input 4.1	<a href="#">(140)</a> , <a href="#">(142)</a> , <a href="#">(77)</a> , <a href="#">(79)</a>	Internal digital input
100	Dig. input 5.1	<a href="#">(140)</a> , <a href="#">(142)</a> , <a href="#">(77)</a> , <a href="#">(79)</a>	Internal digital input
101	Dig. input 6.1	<a href="#">(140)</a> , <a href="#">(142)</a> , <a href="#">(77)</a> , <a href="#">(79)</a>	Internal digital input
102	Dig. input 7.1	<a href="#">(140)</a> , <a href="#">(142)</a> , <a href="#">(77)</a> , <a href="#">(79)</a>	Internal digital input
103	Dig. input 8.1	<a href="#">(140)</a> , <a href="#">(142)</a> , <a href="#">(77)</a> , <a href="#">(79)</a>	Internal digital input
104	Dig. input 1.2	<a href="#">(20)</a> , <a href="#">(141)</a> , <a href="#">(143)</a> , <a href="#">(78)</a> , <a href="#">(80)</a>	External digital input via CAN-Bus
105	Dig. input 2.2	<a href="#">(20)</a> , <a href="#">(141)</a> , <a href="#">(143)</a> , <a href="#">(78)</a> , <a href="#">(80)</a>	External digital input via CAN-Bus
106	Dig. input 3.2	<a href="#">(20)</a> , <a href="#">(141)</a> , <a href="#">(143)</a> , <a href="#">(78)</a> , <a href="#">(80)</a>	External digital input via CAN-Bus
107	Dig. input 4.2	<a href="#">(20)</a> , <a href="#">(141)</a> , <a href="#">(143)</a> , <a href="#">(78)</a> , <a href="#">(80)</a>	External digital input via CAN-Bus
108	Dig. input 5.2	<a href="#">(20)</a> , <a href="#">(141)</a> , <a href="#">(143)</a> , <a href="#">(78)</a> , <a href="#">(80)</a>	External digital input via CAN-Bus
109	Dig. input 6.2	<a href="#">(20)</a> , <a href="#">(141)</a> , <a href="#">(143)</a> , <a href="#">(78)</a> , <a href="#">(80)</a>	External digital input via CAN-Bus
110	Dig. input 7.2	<a href="#">(20)</a> , <a href="#">(141)</a> , <a href="#">(143)</a> , <a href="#">(78)</a> , <a href="#">(80)</a>	External digital input via CAN-Bus
111	Dig. input 8.2	<a href="#">(20)</a> , <a href="#">(141)</a> , <a href="#">(143)</a> , <a href="#">(78)</a> , <a href="#">(80)</a>	External digital input via CAN-Bus
112	V1 <> Vmin/max1	<a href="#">Assignment measured values</a> , <a href="#">Thresholds general parameters</a>	General measured values, voltage 1
113	V2 <> Vmin/max2	s.a. signal no.112	General measured values, voltage 2
114	V3 <> Vmin/max3	s.a. signal no.112	General measured values, voltage 3
115	V4 <> Vmin/max4	s.a. signal no.112	General measured values, voltage 4
116	V5 <> Vmin/max5	s.a. signal no.112	General measured values, voltage 5
117	V6 <> Vmin/max6	s.a. signal no.112	General measured values, voltage 6
118	I1 <> Imin/max1	s.a. signal no.112	General measured values, current 1
119	I2 <> Imin/max2	s.a. signal no.112	General measured values, current 2
120	I3 <> Imin/max3	s.a. signal no.112	General measured values, current 3
121	I4 <> Imin/max4	s.a. signal no.112	General measured values, current 4
122	T1 <> Tmin/max1	s.a. signal no.112	General measured values, temperature 1
123	T2 <> Tmin/max2	s.a. signal no.112	General measured values, temperature 2
124	T3 <> Tmin/max3	s.a. signal no.112	General measured values, temperature 3

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Signal no.	Signal text	Reference to parameter	Description
125	T4 <> Tmin/max4	s.a. signal no.112	General measured values, temperature 4
126	T5 <> Tmin/max5	s.a. signal no.112	General measured values, temperature 5
127	T6 <> Tmin/max6	s.a. signal no.112	General measured values, temperature 6
128	Vbatt < Vmin(B1)	<a href="#">(58)</a>	Exclusively for number of batteries ≥ 1
129	Vbatt < Vmin(B2)	<a href="#">(58)</a>	Exclusively for number of batteries ≥ 2
130	Vbatt < Vmin(B3)	<a href="#">(58)</a>	Exclusively for number of batteries ≥ 3
131	Vbatt < Vmin(B4)	<a href="#">(58)</a>	Exclusively for number of batteries ≥ 4
132	Vbatt < Vmin(B5)	<a href="#">(58)</a>	Exclusively for number of batteries > 5
133	Vbatt < Vmin(B6)	<a href="#">(58)</a>	Exclusively for number of batteries ≥ 6
134	Vbatt < Vmin(B7)	<a href="#">(58)</a>	Exclusively for number of batteries ≥ 7
135	_not used(B8)		
136	Vbatt > Vmax(B1)	<a href="#">(56)</a>	Exclusively for number of batteries ≥ 1
137	Vbatt > Vmax(B2)	<a href="#">(56)</a>	Exclusively for number of batteries ≥ 2
138	Vbatt > Vmax(B3)	<a href="#">(56)</a>	Exclusively for number of batteries ≥ 3
139	Vbatt > Vmax(B4)	<a href="#">(56)</a>	Exclusively for number of batteries ≥ 4
140	Vbatt > Vmax(B5)	<a href="#">(56)</a>	Exclusively for number of batteries ≥ 5
141	Vbatt > Vmax(B6)	<a href="#">(56)</a>	Exclusively for number of batteries ≥ 6
142	Vbatt > Vmax(B7)	<a href="#">(56)</a>	Exclusively for number of batteries ≥ 7
143	_not used (B8)		
144	Vbat < Vwarn(B1)	<a href="#">(57)</a>	Exclusively for number of batteries ≥ 1
145	Vbat < Vwarn(B2)	<a href="#">(57)</a>	Exclusively for number of batteries ≥ 2
146	Vbat < Vwarn(B3)	<a href="#">(57)</a>	Exclusively for number of batteries ≥ 3
147	Vbat < Vwarn(B4)	<a href="#">(57)</a>	Exclusively for number of batteries ≥ 4
148	Vbat < Vwarn(B5)	<a href="#">(57)</a>	Exclusively for number of batteries ≥ 5
149	Vbat < Vwarn(B6)	<a href="#">(57)</a>	Exclusively for number of batteries ≥ 6
150	Vbat < Vwarn(B7)	<a href="#">(57)</a>	Exclusively for number of batteries ≥ 7
151	---		
152	Vbat > VmaxR(B1)	<a href="#">(59)</a>	Vmax Rec off, excl. for number of batteries ≥ 1
153	Vbat > VmaxR(B2)	<a href="#">(59)</a>	Vmax Rec off, excl. for number of batteries ≥ 2
154	Vbat > VmaxR(B3)	<a href="#">(59)</a>	Vmax Rec off, excl. for number of batteries ≥ 3
155	Vbat > VmaxR(B4)	<a href="#">(59)</a>	Vmax Rec off, excl. for number of batteries ≥ 4
156	Vbat > VmaxR(B5)	<a href="#">(59)</a>	Vmax Rec off, excl. for number of batteries ≥ 5
157	Vbat > VmaxR(B6)	<a href="#">(59)</a>	Vmax Rec off, excl. for number of batteries ≥ 6
158	Vbat > VmaxR(B7)	<a href="#">(59)</a>	Vmax Rec off, excl. for number of batteries ≥ 7
159	---		
160	T > Tmax (Batt1)	<a href="#">Battery</a>	Exclusively for number of batteries ≥ 1
161	T > Tmax (Batt2)	<a href="#">Battery</a>	Exclusively for number of batteries ≥ 2
162	T > Tmax (Batt3)	<a href="#">Battery</a>	Exclusively for number of batteries ≥ 3
163	T > Tmax (Batt4)	<a href="#">Battery</a>	Exclusively for number of batteries ≥ 4
164	T > Tmax (Batt5)	<a href="#">Battery</a>	Exclusively for number of batteries ≥ 5
165	T > Tmax (Batt6)	<a href="#">Battery</a>	Exclusively for number of batteries ≥ 6
166	T > Tmax (Batt7)	<a href="#">Battery</a>	Exclusively for number of batteries ≥ 7
167	---		
168	Asymmetrical(B1)	<a href="#">(41)</a>	Exclusively for number of batteries ≥ 1
169	Asymmetrical(B2)	<a href="#">(41)</a>	Exclusively for number of batteries ≥ 2
170	Asymmetrical(B3)	<a href="#">(41)</a>	Exclusively for number of batteries ≥ 3
171	Asymmetrical(B4)	<a href="#">(41)</a>	Exclusively for number of batteries ≥ 4
172	Asymmetrical(B5)	<a href="#">(41)</a>	Exclusively for number of batteries ≥ 5
173	Asymmetrical(B6)	<a href="#">(41)</a>	Exclusively for number of batteries ≥ 6

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Signal no.	Signal text	Reference to parameter	Description
174	Asymmetrical(B7)	<a href="#">(41)</a>	Exclusively for number of batteries $\geq 7$
175	_not used (B8)		
176	Fuse open (B1)	<a href="#">Battery</a>	Exclusively for number of batteries $\geq 1$
177	Fuse open (B2)	<a href="#">Battery</a>	Exclusively for number of batteries $\geq 2$
178	Fuse open (B3)	<a href="#">Battery</a>	Exclusively for number of batteries $\geq 3$
179	Fuse open (B4)	<a href="#">Battery</a>	Exclusively for number of batteries $\geq 4$
180	Fuse open (B5)	<a href="#">Battery</a>	Exclusively for number of batteries $\geq 5$
181	Fuse open (B6)	<a href="#">Battery</a>	Exclusively for number of batteries $\geq 6$
182	Fuse open (B7)	<a href="#">Battery</a>	Exclusively for number of batteries $\geq 7$
183	_not used (B8)		
184	Battery oper(B1)	<a href="#">(72)</a>	Exclusively for number of batteries $\geq 1$
185	Battery oper(B2)	<a href="#">(72)</a>	Exclusively for number of batteries $\geq 2$
186	Battery oper(B3)	<a href="#">(72)</a>	Exclusively for number of batteries $\geq 3$
187	Battery oper(B4)	<a href="#">(72)</a>	Exclusively for number of batteries $\geq 4$
188	Battery oper(B5)	<a href="#">(72)</a>	Exclusively for number of batteries $\geq 5$
189	Battery oper(B6)	<a href="#">(72)</a>	Exclusively for number of batteries $\geq 6$
190	Battery oper(B7)	<a href="#">(72)</a>	Exclusively for number of batteries $\geq 7$
191	_not used (B8)		
192	Relay1.Q		Virtual relay 1, set via SNMP
193	Relay1.Q'		Virtual relay 1, set via SNMP, output inverted
194	Relay2.Q		Virtual relay 2, set via SNMP
195	Relay2.Q'		Virtual relay 2, set via SNMP, output inverted
196	Relay3.Q		Virtual relay 3, set via SNMP
197	Relay3.Q'		Virtual relay 3, set via SNMP, output inverted
198	Relay4.Q		Virtual relay 4, set via SNMP
199	Relay4.Q'		Virtual relay 4, set via SNMP, output inverted
200	Vload < Vmin	<a href="#">(65)</a>	
201	Vload > Vmax	<a href="#">(64)</a>	
202	Vload < Vmin_INV	<a href="#">(66)</a>	
203	Vload < Vmin_DCC	<a href="#">(67)</a>	
204	Insulation error	<a href="#">(101)</a> , <a href="#">(73)</a>	Insulation error
205	Insul. mea. runs		Insulation measuring runs
206	REC Error		Rectifier error
207	REC No CAN		Rectifier no CAN reception
208	REC Redundancy	<a href="#">(14)</a>	Redundancy error
209	REC Load	<a href="#">(30)</a>	Rectifier load limit
210	REC Load distrib	<a href="#">(33)</a>	Number of rectifiers > 1
211	DCC Error		DC/DC converter error
212	DCC No CAN		DC/DC converter no CAN reception
213	DCC Redundancy	<a href="#">(15)</a>	DC/DC converter redundancy error
214	DCC Load		DC/DC converter load limit
215	DCC Load distrib		Number of DC/DC converter > 1
216	INV Error		Inverter error
217	INV No CAN		Inverter no CAN reception
218	INV Redundancy	<a href="#">(16)</a>	Inverter redundancy error
219	Boost ch Timeout	<a href="#">Boost charge</a>	Boost charge time limit reached
220	Boost charge	<a href="#">Boost charge</a>	Boost charge active
221	Battery test	<a href="#">Battery test</a>	Battery test active
222	Battery test err	<a href="#">Battery test</a>	Battery test interrupted with error „undervoltage“



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Signal no.	Signal text	Reference to parameter	Description
223	Fan (boost chge)		Fan boost charge
224	Counter cell 1	<a href="#">Counter cells</a>	Signal counter cell 1
225	Counter cell 2	<a href="#">Counter cells</a>	Signal counter cell 2
226	Difference Ah		
227	Lim Load current		Load current is greater than adjusted limit, e.g. 80%
228	Capacity low A	<a href="#">Kapaz.-Rechner</a>	Battery capacity A
229	Capacity low B	<a href="#">Kapaz.-Rechner</a>	Battery capacity B
230	LVD active	<a href="#">LVD/PLD Funktion</a>	
231	PLD1 active	<a href="#">LVD/PLD Funktion</a>	
232	PLD2 active	<a href="#">LVD/PLD Funktion</a>	
233	Tsensor lim Batt		
234	Tsensor limit		
235	Fan Rack: Error		Fan rack
236	Fan Rack: No CAN		Fan rack
237	STS: Error state		
238	STS: No CAN		
239	MMB: Error state		
240	MMB: No CAN		
241	BMB: Error state		
242	BMB: No CAN		
243	DEB: Error state		
244	DEB: No CAN		
245	RB: Error state		
246	RB: No CAN		
247	FMB: Error state		
248	FMB: No CAN		
249	UMD2: ErrorState		
250	UMD2: No CAN		
251	UMD1: ErrorState		
252	UMD1: No CAN		
253	RD1: Error state		
254	RD1: No CAN		
255	RDP: Error state		
256	RDP: No CAN		
257-	---		
260	---		
261	1.L1 V<>Vmin,max	<a href="#">mains monitoring</a>	MM board 1 L1 < Vmin or < Vmax
262	1.L2 V<>Vmin,max	<a href="#">mains monitoring</a>	MM board 1 L2 < Vmin or < Vmax
263	1.L3 V<>Vmin,max	<a href="#">mains monitoring</a>	MM board 1 L3 < Vmin or < Vmax
264	2.L1 V<>Vmin,max	<a href="#">mains monitoring</a>	MM board 2 L1 < Vmin or < Vmax
265	2.L2 V<>Vmin,max	<a href="#">mains monitoring</a>	MM board 2 L2 < Vmin or < Vmax
266	2.L3 V<>Vmin,max	<a href="#">mains monitoring</a>	MM board 2 L3 < Vmin or < Vmax
267	---		
268	---		
269	---		
270	Diesel operation	<a href="#">(4)</a>	
271-	---		
287	---		



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## 5 Technical specifications UPC3 and UPC3S

Type	UPC3-24	UPC3-48/60	UPC3-110	UPC3-220
Article code	301-003-498.02	301-003-598.02	301-003-798.02	301-003-898.02
Type S (small version)	UPC3-24S	UPC3-48/60S	UPC3-110S	UPC3-220S
Article code	301-003-497.02	301-003-597.02	301-003-797.02	301-003-897.02
Supply voltage range	18V <sub>DC</sub> -35V <sub>DC</sub>	35V <sub>DC</sub> -75V <sub>DC</sub>	80V <sub>DC</sub> -160V <sub>DC</sub>	180V <sub>DC</sub> -300V <sub>DC</sub>
Voltage measuring range	0-100V <sub>DC</sub>	0-100V <sub>DC</sub>	0-300V <sub>DC</sub>	0-300V <sub>DC</sub>
Current measuring range	0-60mV (shunt value programmable)			
Power consumption	approx. 3W			
Voltage measuring inputs	3			
Current measuring inputs	1x ±60mV; 2x 0- 60mV			
Temperature measuring input	2x (sensor KTY81-220)			
Digital inputs	8 (isolated)			
LCD display	2x 16 characters; background lighted			
LED indications	Operation (green); System OK (green); Isolation (yellow); Alarm (red)			
Relay outputs	6 (isolated; max. 0.5A @ 60V <sub>DC</sub> ); expandable with CAN node DCC-RB6 to max. 12 relays			
Interfaces:				
USB interface	USB connector			
CAN interface	Proprietary CAN protocol			
LVD/PLD-drive	3x optocoupler output for control of max. 3pcs. LVD relay or 1pc. LVD and 2pcs. PLD relay			
Modem connection	Internal analogue modem socket (modem board optional)			
SNMP connection	Internal SNMP adapter socket (SNMP adapter optional)			
Controller functions	Desired value for compensation of charge voltage, boost charge voltage, battery test voltage; boost charge mechanism (power, voltage and time related), LVD control, PLD control; time controlled battery test; charge current limitation; dropping diode (counter cell) control (2 stages), manual charge, system test			
Monitoring functions	Entire battery voltage, unsymmetrical battery voltage, battery charge current, battery operation; isolation fault (internally switchable via software), battery voltage low, battery voltage high, CAN-Bus status, CAN connected module status; external alarm loops			
Event history function	Yes; active fault text message; flash based stack memory of last 250 faults/events with time stamp			
Battery test memory	Yes; storage of last 3 battery test results; storage of the last battery test curve			
RTC with time and date	Yes			
Control buttons	4; UP/DOWN/ENTER/ESC			
Main processor	16Bit Fujitsu			
Languages	German, English, Swedish; other versions loadable on demand			
Ambient temperature	Operation: -20°C to +55°C; non condensing; Storage: -40°C to +85°C			
Cooling	Convection cooling			
Climatic conditions	according to IEC 721-3-3 class 3K3/3Z1/3B1/3C2/3S2/3M2			
Max. installation altitude	≤ 1500m			
Audible noise	<30dBA			
Type of construction (small version)	¼ x 19", 3U (1/6 x 19", 3U)			
Dimensions (Dimensions small version)	106.3/133/326.5 mm (71/128/280 mm) W/H/D			
Weight (Weight small version)	approx. 1.8kg (approx. 1.3kg)			
Type of enclosure / Protection class	IP20 (front panel) / 1			

# DC Controller

## UPC3

V1.30.166

User manual

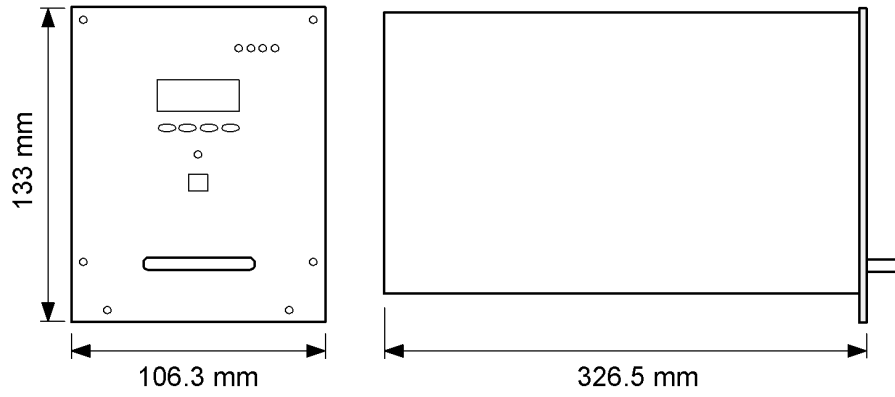
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Colour (front panel)	RAL 7035; black imprint
CE conformity	yes
Compliance to safety standards	EN60950-1; VDE0100 T410; VDE0110; EN50178; EN60146
Compliance to EMC standards	EN55011/22 class "B"; EN61000-4 T2-5
Connections	1x DIN41612-M-connector 2x32-pole

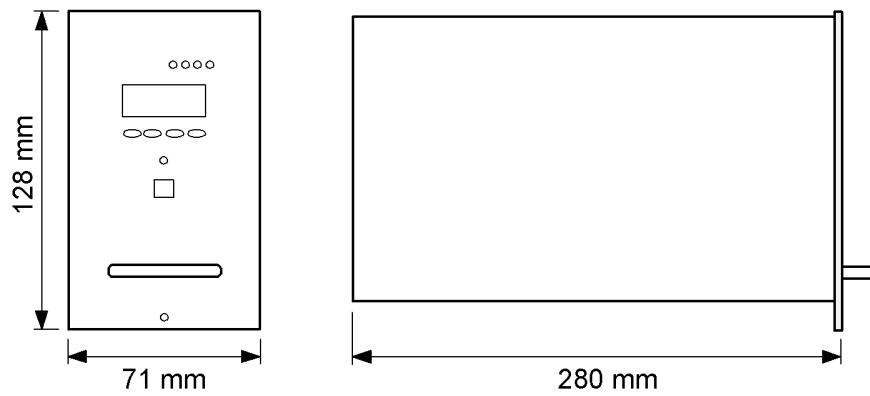
## 5.1 Options

Article code	Designation
302-UP3-MMT.00	Configuration software "Multi Management Tool" (MMT)
302-003-RDD.00	Remote display for door mounting; connection via CAN interface
302-DCC-CB1.00	Connection board CONB_HS_01
302-DCC-0MM.00	Mains monitoring board 1/3 phase; DIN rail module; connection via CAN interface
302-DCC-0BM.00	Battery monitoring board DCC-BMB (for one additional battery string; U, U/2, I, T); DIN rail module. A maximum of six DCC-BMB modules is applicable
302-DCC-DI8.00	Signalling board with 8 digital alarm inputs; DIN rail module; connection via CAN interface
302-DCC-0RB.00	Relay board with 6 isolated signalling outputs; DIN rail module; connection via CAN interface
302-DCC-0FM.00	Fuse monitoring board (20 fuses, 24-60 VDC, 1-pole); open frame
302-UP3-SMP.00	SNMP adapter ; plug-in board; connection via Ethernet 10Base-T
302-UP3-OSW.02	SNMP (Win) monitoring software
302-UPC-MOB.00	Mod-Bus
300-UPC-PRO.00	Profi-Bus
302-UP3-0AM.00	Analog modem; plug-in board; connection via analogue phone line; Western RJ11
302-UP3-OSW.01	Analog modem remote software
302-TMP-KTY.04	Temperature sensor KTY81-220 T092 including a connecting cable, 4 m in length; 2 wires à 0,34 mm <sup>2</sup>

## 5.2 Dimensional drawings UPC3 & UPC3S



Module dimensions UPC3



Module dimensions UPC3S

## 6 Known bugs

The texts of "General parameters" (measure values) should have a maximum number of four characters. Otherwise the UPC cut them at random.









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