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UC 03 - control & monitoring unit

Innovation made in Germany



Represented by

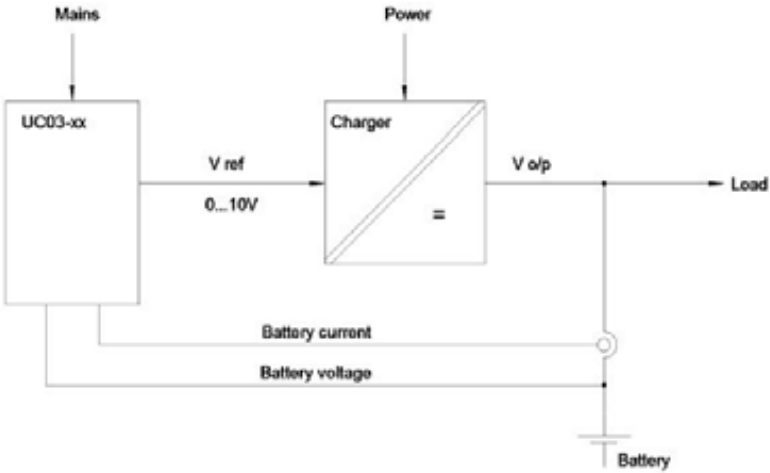
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UC 03 - General Description

The „UC 03“ unit controls and supervises the optimum charging of a battery, up to an entire UPS system. A battery charging in a basic way, with a switch mode AC / DC or DC / DC Charger, is shown in the following figure.



The charger output voltage is regulated inside the charger according to the input "Vref" signal. The gain factor between Vref and Vo/p is defined in the Specification of the Charger. The charger current limitation is also a function of the charger. The reference values, limitations and monitoring levels for charging a battery (ies) are configurable in the UC 03. The charging of the battery occurs according to the current / voltage characteristics, i.e. the battery is loaded in current limitation, until the appropriate voltage is reached. The following working conditions are processed by the UC 03:

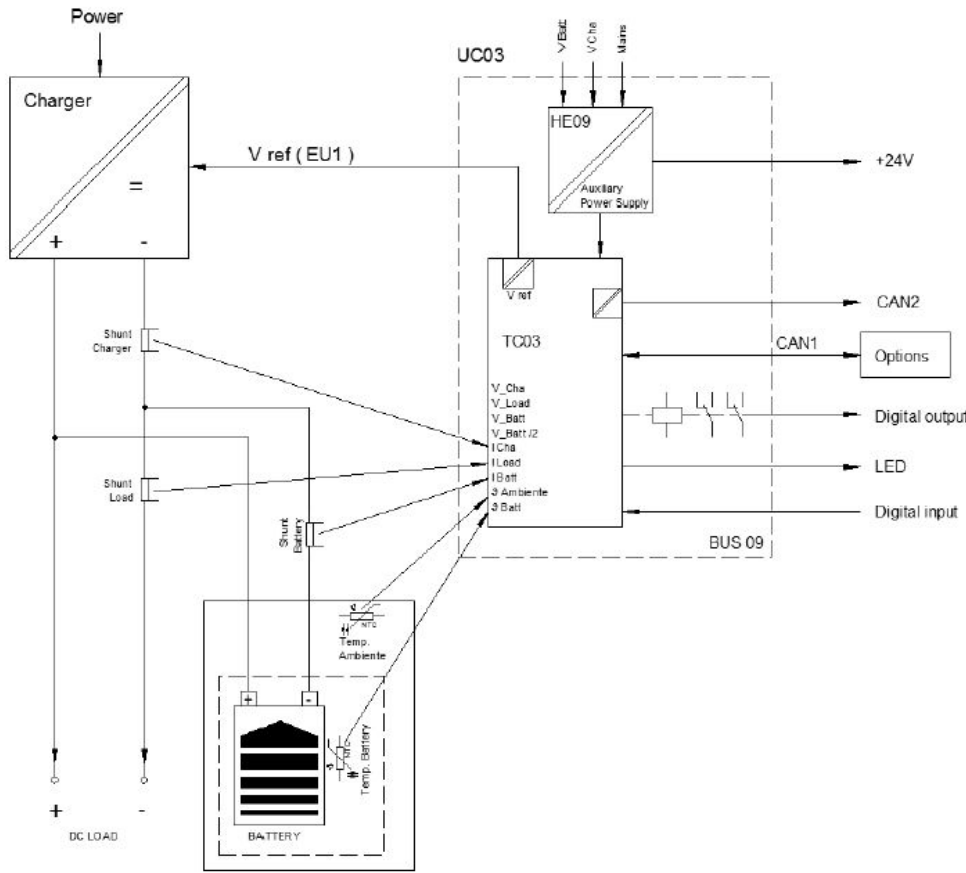
- Float Charge conforms to the recommended permanent voltage to hold the battery within a completely charged state.
- Equalize or Automatic Boost Charge: To charge the battery after a partial or deep discharge as quickly as possible, an increased voltage is provided. This mode is activated automatically via different functions, or manually via the front panel button.
- Manual Boost Charge: independently adjustable voltage, to regenerate an aged battery.

In all three working conditions the maximum battery charge current is limited.

The following essential functions are carried out by the UC 03:

- Generating a "Reference value" for the output voltage of the Charger (= battery voltage) according to the above modes.
- Charging the battery with temperature compensation.
- Limitation of the battery charge current (the max. Charger output current is limited inside the Charger).
- Automatic and manual activation of the different modes.
- 2 line LCD display for actual voltage, current, temperature and status or failure information.
- different monitoring functions (programmable)
- CAN or MOD Bus Interface (Option)
- Optional extensions available

Block Structure



Front Panel

LCD panel:

- 1 line for showing the mode
- 2 line for actual voltage and current

Operation:

arrow up and down: switch over to the different charge modes
arrow left and right: shift between actual voltage and current of Charger, Battery and Load

LED:

green LED is lighting in normal operation
red LED is lighting according to the programmed configuration



The manufacturer reserves the right to deviate from technical details given.

Monitoring

- All of the measured voltages, currents and temperatures are monitored and can be interpreted as an "alarm" or as a "failure" messages, if they exceed a programmed threshold level. Threshold levels, global release and allocations to a relais or LED has to be programmed. Status, alarm and failure messages are also sent via the digital interface.
- Over- and/or undervoltage detection of charger output, battery or load voltage.
 - Battery unsymmetrical: a defective battery cell can be recognized by comparing the measured "V_Batt /2" value with the calculated half "V_Batt" voltage. Any other cell ratio are also possible, as a max and min threshold value for "Battery unsymmetrical" is configurable.
 - Monitoring of the charger-, battery- or load current
 - Monitoring of battery and ambient temperature
 - Grounding fault
 - Mains voltage and frequency
 - Internal auxiliary voltages

Operation

Control or Regulation of the battery voltage
In a single application, the charger output voltage is identical to the battery voltage. Depending on the application, there could be some components (decoupling diodes, fuses) or long connecting wires between charger and battery. Because of the voltage drop and Offset, it would be useful, to regulate the charger output voltage or the battery voltage by the UC 03.
Temperature compensation
In the degree in which the temperature rises, the electrochemical activity increases in a battery. General to ensure an optimum life time of the battery, the charging voltage can be programmed as a function of temperature. The compensation factor can be set between -40mV ... +20mV per Cell (default: -3mV/°C/cell), according to the Specification of the battery manufacturer. Also the temperature range for compensation is defineable (default: -5°C ...+40°C).
Limitation of the battery current (I-Batt)
The max. charge current into the battery is adjusted at the factory to I-Batt = 0.2 x C5. (C5 = battery capacity @ 5hours) Depending on the battery, another max. battery current can be programmed. The measurement of the battery current occurs by a 60mV (or 100mV) shunt.
Charger current limitation
The charger has its own current limitation. Nevertheless, a current limitation for the charger can also be programmed in the UC 03. In case of exceeding this value, the "Vref" signal is reduced accordingly.



Interfaces

a) Digital Inputs
There are 6 digital Inputs available. Activation occurs by an external contact between the dig. Input and GND. The function of the dig. Inputs are programmable via the configurator; some examples: <ul style="list-style-type: none">DI-ACTIVATE FLOAT: activates Float charge, if this Input is connected to GND temporarily.DI-ACTIVATE EQUALIZE: activates Equalize charge, if this Input is connected to GND temporarily.DI-INHIBIT BOOST: deactivates the Equalize and the Boost charge. The UC 03 will switch back to Float charge immediately.
b) Outputs
<ul style="list-style-type: none">4 free configurable relay (K1 to K4) for status, alarm or failure messages;2 LEDs on the front plate: OPERATION: illuminates green during normal operation. ALARM: if a programmed ALARM or failure condition occurs.
c) Analog inputs
The following signals can be measured via differential Inputs: <ul style="list-style-type: none">a. Battery half voltage (V_Batt /2)b. Battery voltage (V_Batt)c. Charger output voltage (V_Cha)d. Load voltage (V_Load)e. Battery current (I_Batt)f. Charger output current (I_Cha)g. Load current (I_Load)h. Battery temperature (Temp_Batt)i. Ambient temperature (Temp_Amb)j. Mains Voltage

Optional Extensions

- 1.) Serial dig. Interface:
 - CAN Bus (I/O -10)
 - CAN Bus (I/O -11)
 - 2.) Relay Board: up to 2 x 8 Relays (RELO5)
 - 3.) Digital Inputs: up to 8 additional inputs (INP)
 - 4.) LED display: Status or alarm informations can be given with up to 18 LED on the LED05 display.
 - 5.) LCD display: The front panel of the UC03 with the LCD-display and the keypad is also available for mounting on the cabinets front door.
- The extensions 2.) to 5.) are connected to the UC03 via internal CAN Bus (CAN1).

Specifications: UC 03

Power Supply	All sorts of auxiliary power supplies are generated internally by the board "HE 09-00" The HE 09-00 consists of 2 independent power supplies. One is powered by the 230V mains and the other by the battery voltage or the charger output voltage.
Current measurement	Differential measurement on a 60mV (100mV) Shunt. The 3 current measurements can be done in the (-)line or (+) line. Max voltage difference between the 3 Shunts: 4VDC Twisted pair wires should be used for the connection between Shunt and UC 03.
Voltage measurements	Differential measurement of the Battery voltage, Charger voltage and Load voltage. "V_Batt /2" relates to "V_Batt (-)" Adaptation: via BUS 09-01 for battery voltages < 100V or via BUS 09-02 for battery voltages > 100V
Reference value for V o/p	0 ... + 10V; for corresponding V o/p, see Specification of the converter. The reference value is related to "com" and is galvanically isolated from GND. Isolation voltage: 1000VDC
Dig. Inputs	6 external contact to GND (active if contact is closed)
Relay contacts	Each Relay has two galvanically isolated changeover contacts max. 250Vac / 3A; 30Vdc / 3 A min. 4Vdc / 10mA
CAN Interface	CAN 1: internal Interface; related to 0(24V) CAN 2: customer Interface: isolation voltage to GND: 2500V DC
Ext. temperature sensor	PT 1000
AC Input	230V +/- 20%, 50/60Hz
DC Input on "V-CHA" or on "V-BATT"	Wide range 20VDC to 100VDC with BUS 09-01 100V to 300VDC with BUS 09-02
Power output for external optional extensions	24 V DC / 0,4 A (0,1A @ DC Input 20...24VDC); this output is galvanically isolated.
Operating temperature	- 20°C to +55°C
Storage temperature	- 40°C to +85°C
Isolation test	acc. acc. to EN/IEC 61010-2-201 / EN/IEC 61010-1 a. Inputs – outputs: 2100V DC b. 24 V output – int. aux. outputs: 2100V DC c. Inputs – PE: 2100V DC d. Outputs – PE: 700V DC
Safety / Construction	acc. acc. to EN/IEC 61010-2-201 / EN/IEC 61010-1
RFI – interference	acc. to EN 55022, class A
Cooling	natural convection
Dimensions:	UC 03- 01 : see mech. Drawing 200 x 172 x 141,5 (H x W x D)

