ACMi1000HD
TECHNICAL DESCRIPTION

1 GENERAL DESCRIPTION

The supervision unit ACMi1000HD is designed to control a power supply system plant and performs battery charging process, alarm detection and reporting, full monitoring of the system statuses.

It is presented as a compact unit embedded in the rack which can be easily mounted, equipped with a graphical LCD display, a joystick (5 positions), a USB communication connector and two LEDs (Power and Fault).

The features provided by the ACMi1000HD module are:

- Control and monitoring of rectifier modules.
- Battery charging process.
- Battery capacity test.
- Battery connection test.
- Battery protection.
- Load management.
- Alarm detection and reporting.
- Real time clock.
- Communication for monitoring and configuration.
- Local Man/Machine Interface for monitoring and configuration.

The ACMi1000HD can be equipped with several options (extension boards for relays, modem, TCP/IP connectivity).

Data in this document is subject to change without notice and becomes contractual only after written confirmation

2 STANDARDS (CE MARKING)

- **Safety**
  EN 60950-1.

- **EMC (with the associated system)**
  Emission:
  EN 55022 level B
  . complies with EN 61000.6-3 (generic residential)
  . complies with EN 61000.6-4 (generic industrial)
  . complies with EN 61000.3-2 (harmonics)
  . complies with EN 61000.3-3 (flicker)

  Immunity:
  . complies with EN 61000.6-1 (generic residential)
  . complies with EN 61000.6-2 (generic industrial)
  . standards from EN 61000.4-2 to EN 61000-4-6
  . standard EN 61000.4-11

  Telecom standard
  . EN 300 386.

- **Environmental conditions:**
  Complies with EN 300 019
  . Transport EN 300 019-1-2 class 2.2
  . Storage EN 300 019-1-1 class 1.2
  . Operation EN 300 019-1-3 class 3.1E

- **Operating conditions:**
  Complies with EN 300 132-2 (Telecom standard).

- **ROHS 5.**

3 CHARACTERISTICS

3.1 ENVIRONMENTAL CHARACTERISTICS

- **Temperature**
  - Shipping and storage : -40°C to + 85°C.
  - Operating : -20°C to +70°C.

- **Humidity**
  - Shipping and storage : 5 to 95%.
  - Operating humidity : 20 to 95% non condensing.

- **Altitude**
  - Operating : - 60 to 2500 m.

- **Cooling**
  - Natural convection.

Data in this document is subject to change without notice and becomes contractual only after written confirmation

3.2 MECHANICAL CHARACTERISTICS

- Height: ~1 U (= 43.5 mm).
- Width: ~2 U (= 87.9 mm.
- Depth: 198.6 mm.
- Weight: ~150 g
- Degree of protection: IP 20
- Rear connector: 80 pins connector

3.3 ELECTRICAL CHARACTERISTICS

- **Power supply**
  - Nominal voltage : 18 VDC – 60 VDC
  - Input current : <100 mA @ 48 VDC.

4 LCD DISPLAY AND LEDS

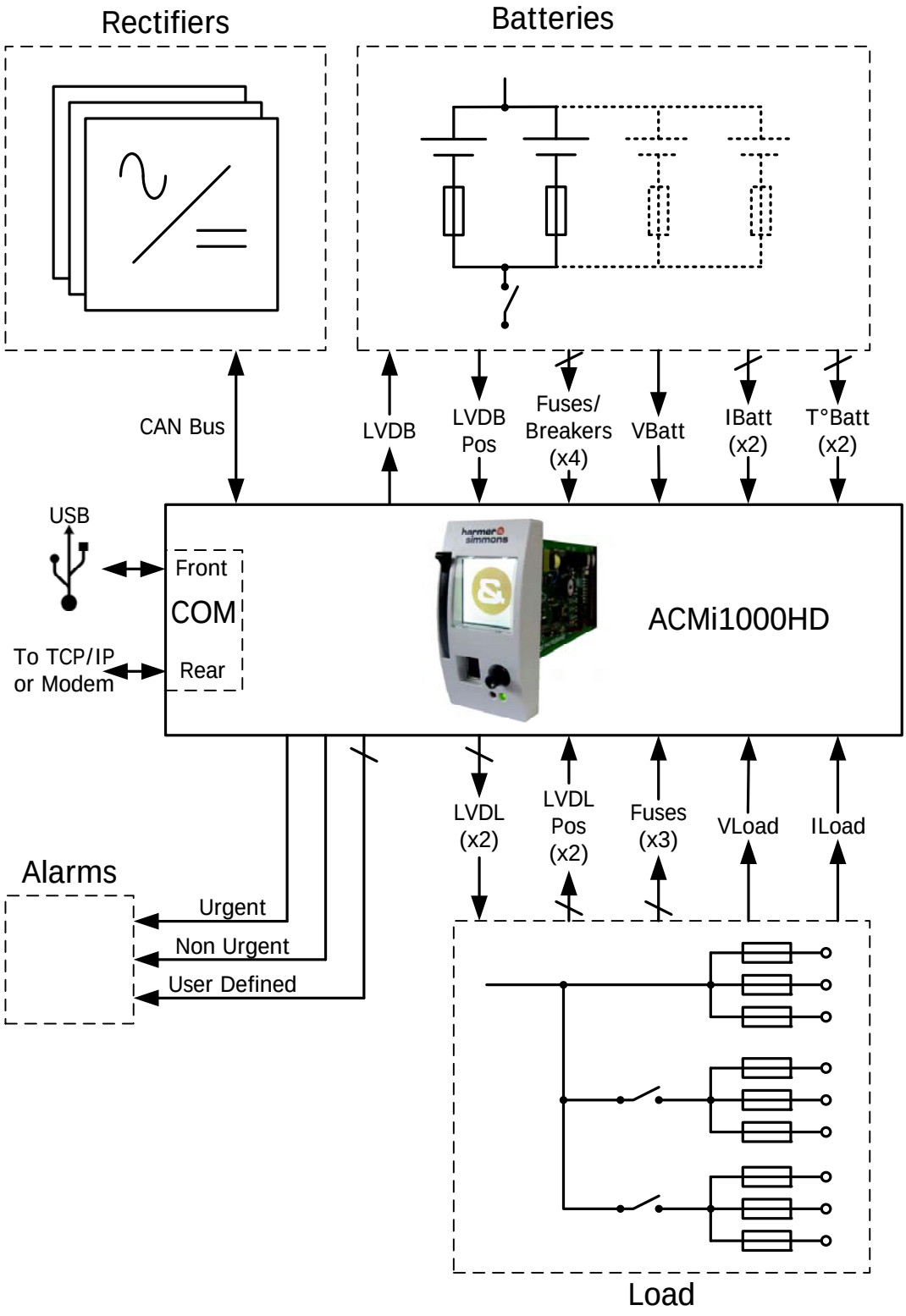
- Front view of the ACMi1000HD -

On the front panel there are:

- Green LED (power on): ACMi1000HD is supplied.
- Red LED (alarm): Flashing = Non urgent
  On = Urgent
- Back-lighted graphical LCD display: 128x128
- Joystick 5 positions to navigate in the menus.

Data in this document is subject to change without notice and becomes contractual only after written confirmation

5 DETAILED DESCRIPTION



- Synoptic: example of application -

Data in this document is subject to change without notice and becomes contractual only after written confirmation

Analogue inputs

8 analogue inputs for:

- DC bus voltage
- Load voltage
- Load current 1 & 2
- Battery current 1 & 2
- Battery temperature
- Ambient temperature.

Digital inputs

17 digital inputs used for:

- AC failure detection
- Battery fuses detection
- Load fuses detection
- Battery contactor position
- Load contactor detection
- Controller position
- General purpose (spares).

Digital outputs

9 digital outputs used for:

- Urgent alarm reporting
- Non urgent alarm reporting
- Battery LVD command
- Fixed spares (ex: high voltage shutdown, load LVD command, mains failure alarm…-user defined-).

5.1 RECTIFIER MANAGEMENT

The ACMi1000HD can manage up to 31 rectifiers. Each rectifier reports its full status to the ACMi1000HD module:

- Current
- Temperature
- Input AC voltage
- Alarm status:
  - Fan fail
  - Over Temperature
  - Over Voltage
  - Current limit
  - Etc.

The ACMi1000HD triggers:

- one individual alarm for each rectifier ("Rectifier n° x fail").
- a global alarm "Rectifier fail ≤ redundancy".
- a global alarm "Rectifier fail > redundancy".

The ACMi1000HD provides the DC bus voltage set point to the rectifiers through the CAN bus.

5.1.1 Efficiency optimizer – Sleep mode

In case of low load conditions, the ACMi1000HD module has the ability to force some of the rectifiers into a "*sleep mode*" (output current = 0) thus maintaining the operating rectifiers at the optimal current.
Rectifiers in *sleep mode* are randomly selected and a rotation is performed periodically to ensure a uniform aging of the modules.

Data in this document is subject to change without notice and becomes contractual only after written confirmation

5.2 BATTERY MANAGEMENT

The ACMi1000HD controls the charge and the discharge of the battery.

5.2.1 Battery charge control

There are three charging modes:

- Floating mode
- High rate mode
- Boost charge mode.

Floating mode

- The battery voltage is temperature compensated.
- The battery recharging current is limited.
- The compensation slope is programmable.
- The temperature bounds for the compensation are programmable.

High rate mode (mainly for lead-open battery)

- Floating mode + boost charge phase.
- High voltage level is fixed (non temperature compensation).
- Triggered automatically, periodically or manually (from the MMI or from a protocol command).
- Post-charge time to fully recharge the battery.

Exceptional boost charge mode

- Triggered manually.
- Maintained for a defined time.
- Boost level is fixed (non temperature compensation).

5.2.2 Battery discharge test

This test allows to estimate the battery capacity. The test can be triggered periodically or manually. The ACMi1000HD controls the rectifier output voltage so that the battery discharges at constant current. A duration counter is armed.
When the battery voltage decreases below the "end of test" threshold, the duration is compared to a reference duration.

An alarm is raised when a battery test fails.
Built-in securities prevent a test to start when the battery is not fully charged.
Battery test events are stored in a dedicated history with full time stamping.

5.2.3 Battery connection test

This test can be triggered periodically and/or manually.

This test checks that the battery is present and is properly connected to the load. Rectifier voltage is decreased for a short time and the battery current is checked (battery must be discharging into the load).

If the battery does not deliver any current, an alarm is raised.

Data in this document is subject to change without notice and becomes contractual only after written confirmation

5.3 ALARM MANAGEMENT

Each alarm of the ACMi1000HD can be individually configured.

The following alarms are managed:

- Configuration error
- Calibration error
- Interpreter error
- Backplane EEPROM error
- AC fail
- Long AC fail
- DC voltage high
- DC voltage low
- Rectifier fail (≤ redundancy)
- Rectifier fail (> redundancy)
- Can bus lost
- Battery fuse 1
- Battery fuse 2
- Battery fuse 3
- Battery fuse 4
- Battery LVD open
- Battery LVD feedback
- Battery voltage low
- Battery voltage sensor
- Battery current sensor
- Battery temperature sensor 1
- Battery temperature sensor 2
- Battery regulation
- Battery high rate fault
- Battery discharge test failed
- Battery connection test failed
- Battery not full
- Battery low capacity
- Battery on discharge
- Battery high temperature
- Battery low temperature
- Battery life counter
- Non essential load 1 disconnected
- Non essential load 2 disconnected
- Load 1 LVD feedback
- Load 2 LVD feedback
- Essential load fuse open
- Non essential load 1 fuse blown
- Non essential load 2 fuse blown
- Load over current
- Load voltage sensor
- Load current sensor
- Alarm spare x (x = 1 to 10)
- Rectifier n° i not detected
- Overvoltage on rectifier n° i
- Fan failure on rectifier n° i
- Major fault on rectifier n° i
- Current limit on rectifier n° i
- Derating mode on rectifier n° i
- Minor alarm on rectifier n° i
- Extension board n° i failure
- Spare alarm bitfield n° i.

**** Spares alarms: can be defined (user configurable conditions).***

Alarm events (activation / de-activation) can be stored in an history log with full time-stamping. History depth is 511 events. The history can be consulted and flushed from the local Man-Machine Interface and from the Wini1000 PC software.

Data in this document is subject to change without notice and becomes contractual only after written confirmation

5.4 COMMUNICATION

- **Hardware**
  - USB connector.
  - PSTN Modem (option).
  - GSM Modem (option).
  - TCP/IP server (option).

- **Protocols**
  - Harmer & Simmons proprietary protocol on RS232.
  - ModBUS protocol.
  - Modem management with auto-dial feature.
  - TCP/IP connectivity (with NCS options): SNMP/Web/Telnet.

6 PACKAGING AND PRODUCT REFERENCE

6.1 PACKAGING

Spare unit : in cardboard box.
The spare unit comes with a “User’s manual” embedded in the carboard box.

6.2 PACKING TABLE

The given table applies for the “spare unit” version.

ACMi1000HD **packed dimensions and weight**		
W x D x H	mm	150 x 210 x 60
Gross Weight	kg	< 1 kg
Volume	m^3	0.002

6.3 PRODUCT REFERENCE

Designation	H&S’s Code
ACMi1000HD spare unit	3AW17198AAAA0x
ACMi1000HD	3AW01204ABAAxx

Data in this document is subject to change without notice and becomes contractual only after written confirmation

7 ASSOCIATED PRODUCTS

Designation	H&S's Code
Wini1000 software (1 license , CDROM, cable)	B00821920000
TCP/IP Option	To be defined
PSTN Modem Option	To be defined
GSM Modem Option	To be defined
WinSite software (1 license)	B00820540000

8 SUPPLIER

Harmer & Simmons
A division of AEG Power Solutions
10, rue Jean Perrin BP359
37173 Chambray Les Tours Cedex
FRANCE
Phone : 33(0)247808860
Fax : 33(0)247280719

Internet : www.harmerandsimmons.com

Harmer & Simmons offers installation, customization and technical support services. Contact your local re-seller.

Autorizovaný distribútor pre Slovensko:

Rhea elektro s.r.o.
Elektrárenská 1/12440
831 04 Bratislava
Tel.: +421 2 49101914, -18
E-mail: info@rhea-elektro.sk
www.rhea-elektro.sk

Data in this document is subject to change without notice and becomes contractual only after written confirmation