# HF1-NA 24V 13A IUIa Wet/Gel LC

**PART #909.8296.000**
**PART #909.8297.000**
**PART #146.4525.000**

## ELECTRONIC BATTERY CHARGER
## ELEKTRONISCHES LADEGERÄT
## CARICA BATTERIE ELETTRONICO
## CHARGEUR DE BATTERIE ELECTRONIQUE
## CARGADOR DE BATERÍAS ELECTRÓNICO

OPERATING MANUAL
BENUTZER-HANDBUCK
MANUALE OPERATIVO
MANUEL D'USAGE
MANUAL OPERATIVO

**Attention: read carefully the operating manual before using the battery charger.**

**Achtung: Bitte lesen Sie das Benutzerhandbuch mit Aufmerksamkeit, bevor Sie das Ladegerät benutzen.**

**Attenzione: leggere attentamente il manuale operativo prima di utilizzare il carica batterie.**

**Attention: lire attentivement le manuel d'usage avant d'utiliser le chargeur de batterie.**

**Atención: leer atentamente el manual de instrucciones antes de utilizar el cargador de baterías.**

# ELECTRONIC BATTERY CHARGER OPERATING MANUAL

## *TECHNICAL FEATURES OF THE HF1-NA SERIES*

The innovative characteristics of the HF1-NA range of battery chargers are the following:

1. Advanced technology **High frequency** system.
2. Charging process fully controlled by microprocessor.
3. Universal input voltage: 100-240 Vac
4. Charging process start in the "soft start" mode.
5. Automatic reset upon connection of a new battery and automatic start of a new charging cycle.
6. Protection against polarity inversions, short-circuits, over-voltages or anomalies by means of an output relay.
7. Battery to battery charger connection without sparks on the output terminals with obvious advantages for the active safety, thanks to the recognition of the battery voltage downstream the normally open output relay.
8. Signaling of possible anomalies by red LED flashing.
9. Insensitive charge parameters in case of ±10% network voltage oscillations.
10. Efficiency > 85%.
11. Output ripple at maximum charge lower than 100mV.
12. Start of the charge cycle even with 2V batteries.

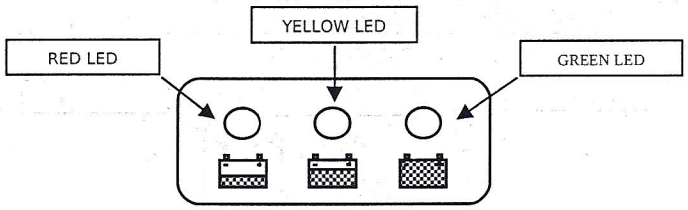
## *OPERATING PRINCIPLE OF THE HF1-NA*

On switching on a new battery charger of the HF1-NA series, the charger will check the battery voltage and decide whether to start the charging process. If the battery is not connected to the battery charger, the red LED will flash. If the result of the test is positive after 1 second the charging of the battery can start, with the red LED on. The output relay closes and the current of the first phase rises slowly till the nominal value programmed is reached. If the user disconnects the battery from the battery charger during the charging process, after a few seconds the battery charger will re-initialize and prepare to start a new charging process.The progress of the charging process is shown by three LED's: red, yellow and green, as in the whole range of the battery chargers. The green LED shows the end of the charging or the last phase in case of deep charging process; in the former case, the relay is opened to disconnect galvanically the battery from the battery charger.

## *VISUAL SIGNALS*

Please find in the following table a list of the visual signals of the HF1-NA series.

| SIGNAL (LED) | MEANING |
|---|---|
| Red LED on | First phase of charge in progress |
| Yellow LED on | Second phase of charge in progress |
| Green LED on | End of charge or maintenance phase |
| **ANOMALIES** | |
| Yellow LED flashing | UNSUITABLE BATTERY OR BATTERY NOT CONNECTED OR OUTPUT SHORT CIRCUIT |
| Red LED flashing | SAFETY TIMER EXCEEDED<br>INTERNAL SHORT CIRCUIT |



## BATTERY CHARGER CONFIGURATION

The HF1-NA battery chargers can charge both lead-acid (WET) batteries and sealed gel and agm (GEL) batteries. A switch (1) placed on the battery charger front panel (see figure 1) allows for the selection of the type of battery to be charged. When the switch is in the WET position, the battery charger will charge lead-acid batteries. When the switch is in the GEL position, the battery charger will charge sealed gel and agm batteries of any make (or Discover AGM batteries only on part # 909.8296.000). The only exception is with the gel batteries by the company Exide-Sonnenschein. To charge these batteries, it is necessary not only to put the external switch for the selection of the type of battery in the GEL position, but also to put the internal dipswitch No.2 in the OFF position.

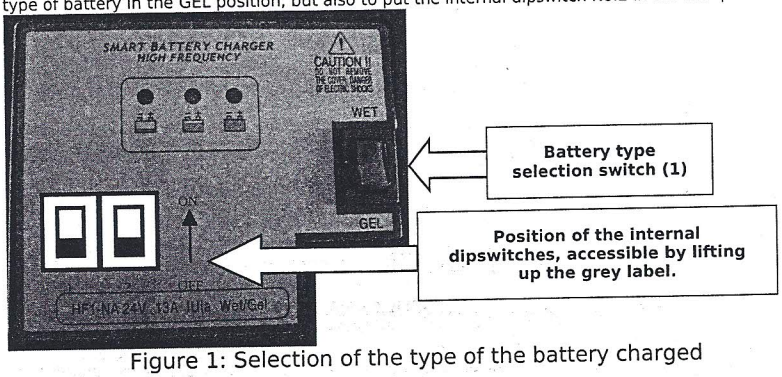



Figure 1: Selection of the type of the battery charged

## KONFIGURATION DES BATTERIELADEGERÄTES

Mit dem Batterieladegerät HF1-NA können sowohl Blei-Säure-Batterien (WET) als auch hermetische Gel- oder AGM-Batterien (GEL) geladen werden. Mittels Schalter (1) auf dem Frontpaneel des Ladegerätes (siehe Abbildung 1) kann zwischen den beiden unterschiedlichen Batterietypen gewählt werden. Wird der Schalter in Position WET gebracht, können Blei-Säure-Batterien geladen werden. Wird der Schalter dagegen in Position GEL gebracht, können hermetische Gel- oder AGM-Batterien von jedem Herstellers geladen werden (oder Discover AGM-Batterien nur für part # 909.8296.000). Die einzige Ausnahme besteht für Gel-Batterien der Fa. Exide-Sonnenschein bei der nicht nur der externe Schalter für die Wahl des Batterietyps in Position GEL gebracht werden muß, sondern auch der interne Dipswitch Nr. 2 in Position OFF.

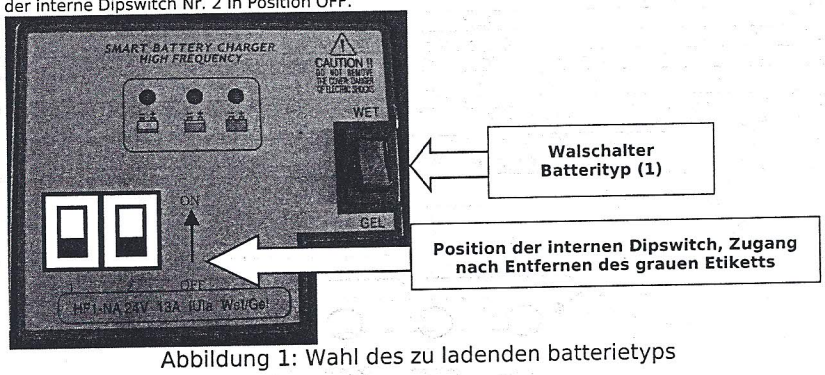
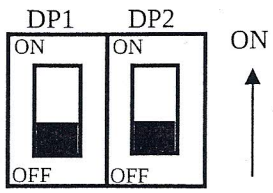



Abbildung 1: Wahl des zu ladenden batterietyps

HF1-NA 24V 13A IUIa Wet/Gel DIPSWITCH CONFIGURATION


EXTERNAL SWITCH




| EXTERNAL SWITCH | INTERNAL DIPSWITCH | | LED CODE(*) | CHARGING CURVE |
|---|---|---|---|---|
| POSITION | DIP1 | DIP2 | Battery LEDs | |
| WET | WHAT EVER | WHAT EVER | 2 flashes of RED | IUIa-ACD for Lead-Acid (WET) batteries |
| **GEL/AGM** | **ON** | **ON** | **2 flashes of GREEN** | **IUU0-GEL for generic Gel and AGM batteries (default for #909.8297.000 #146.4525.000)** |
| **GEL/AGM** | **ON** | **OFF** | **2 flashes of RED&GREEN** | **IUIa-AGM for DISCOVER AGM batteries (default for #909.8296.000)** |
| GEL/AGM | OFF | ON | 2 flashes of YELLOW&GREEN | IUU0-OPTIMA for OPTIMA batteries |
| GEL/AGM | OFF | OFF | 2 flashes of YELLOW | IUIa-GEL for EXIDE SONNENSCHEIN Gel batteries |

(*) the LED code is shown by the battery status LEDs every time the charger is powered on, before to start the charging cycle.