

**HFK**

**HFT**

**HFTD**

## **User Manual**

**Manuale d'uso e manutenzione**

**Manuel d'utilisation et d'entretien**

**Manual de uso y mantenimiento**

**Gebrauchs- und Wartungsanleitung**

# 1. WARNINGS – SAFETY



- The charger is designed for charging conventional free acid batteries (PzS) and hermetic batteries (PzV, Gel, AGM).
- **WARNING:** The charger is set for a specific type of battery.  
Do not use Chargers set to charge open batteries to power closed batteries or vice versa.
- In order to reduce risks of explosion of the battery, please follow these instructions and those reported on the battery.
- Study all battery manufacturer's specific precautions.



- Before charging the battery read carefully the instruction.
- Keep the documents in a clean and dry place for future consultations.
- Perform periodic routine maintenance and repairs.
- In case of failure: identify the reason, act accordingly and use only original spare parts.



- Working in proximity of a lead acid battery is dangerous. batteries generate explosive gases during normal operation. it is therefore of utmost importance that each time, before using the charger, you read and follow the instructions provided.
- Explosive gases! avoid flames and sparks and provide proper ventilation of rooms.
- The battery charger is a device that can cause electric shock. it must be used only by personnel trained on electrical hazards.

## 1.1. Safety and Reference Rules

The battery charger complies with the Low Voltage directives (2014/ 35 / EU) and Electromagnetic Compatibility (2014/ 30 / EU).  
For safety, EN60335-1 and in particular 60335-2-29 apply  
The Charger is built in ISO9001 conditions.

## 1.2. Electrical information



Check electrical data on the product identification plate and make sure that they comply with your electrical system and the battery to be charged. Below you see the typical plate of a battery charger.



If the charger electric data were not in accordance with your electric system or your battery, you must NOT connect the charger. In case of malfunctions or failures, turn off the charger and do not try to arrange any repairing. Please call our technical department or closest service centre. Be as precise as possible in describing the problem occurred and always report the serial number of the charger. Any reparation or replacement of parts must be authorised in writing by our technical office.

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**Model :** HFT = 48V with I<sub>max</sub> 80A

**Serial Number :** 6-digit number for the unique identification of the Charger

Type **HFT 80/100 M B - G1 016** Vout **80 V** Iout **100 A**

Sn **260551 HFT 1020** Vac **400 V** Iac **16,32 A**

Vs. Cod. **3353053** Power **11293 VA** **50-60 Hz**



260551 HFT 1020

**DC output :** Nominal voltage of the battery (Vout 48V) and the current supplied at the nominal voltage (Iout 80Amax)

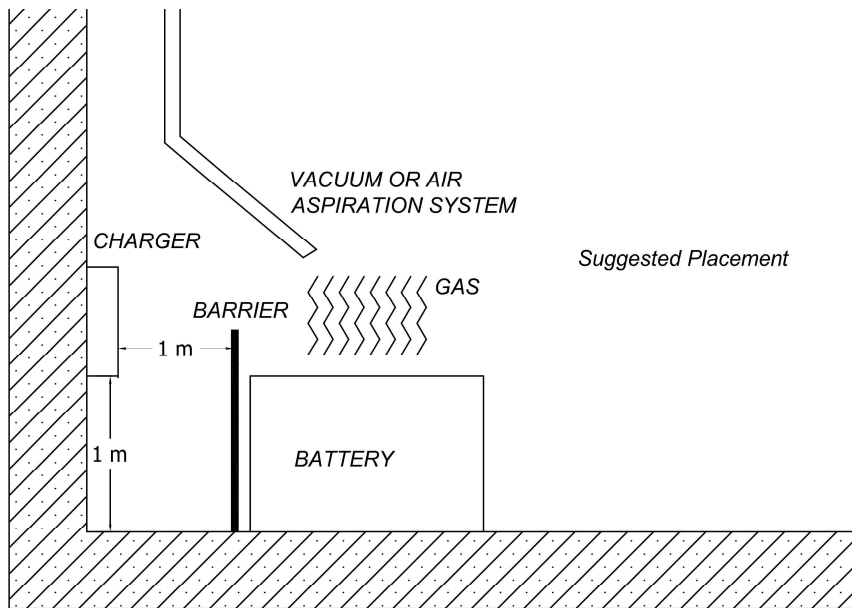
**AC input :** It shows the Nominal Voltage of the Main (Vac 400V), the Current absorbed (8.01A max), the Power (5.541VAmax) and the operating frequency (50-60Hz)

**Charging Profile :** 016 indicates a standard charge profile for Lead Acid Batteries (Pb). See *List of main charging profiles* for other profiles available

## 2. INSTALLATION and COMMISSIONING

Read carefully and apply the entire "Warnings and Safety" chapter.

### 2.1. Choice of location and mechanical positioning



Put the battery charger in a suitable place to allow an adequate air circulation, far from any heat source.

Install HFK and T models vertically so that the air enters from the sides and flows downwards

The air vents must not be obstructed. Ensure that there is enough clearance around the charger to ensure proper air circulation. Do not place it near heat sources.

Place the cabinet on a non-inflammable surface such as stone, concrete or metal.

Chargers are electrical devices and must be well secured to prevent accidental drops.

Make sure that the switch off (OFF) of the battery charger is clearly visible and easily reachable.

### 2.2. Control of the AC Main

- Make sure that the system has been built according to the regulations in force in the country.
- The electrical connection must be carried out by specialized personnel.  
We recommend that you hire personnel who can issue a "declaration of conformity" for the work performed.  
The declaration must include the efficiency of the connection to the ground installation, the verification of the electrical capacity of the plug and the system to which it is connected.
- Electrical safety is guaranteed only when the power plug is correctly connected to an efficient ground system.
- Check that the system can sustain the power of the battery charger (VA) and that the mains voltage and frequency agree (Volt and Hz) to the rating plate of the battery charger.
- Make sure that the charger is protected with appropriate delayed fuses. In case, consult our tables.

### 2.3. Control of the Battery and the Charger

- Check that the mains and battery cables are integer and perfectly insulated and do the same with the plugs of both mains and battery.  
**ATTENTION:** Assembly or replacement of the plug-socket of the battery charger must be carried out by specialized personnel.
- Ensure good insulation of the battery and power cables to the ground.
- Make sure the "polarity" of the battery cables agrees with the charger.
- Check that the battery is suitable for the charger as both voltage (V) and capacity (Ah)
- The battery must be ready to be charged, cleaned and with a correct electrolyte level (PzS).

### 3. CHARGER OPERATION

#### 3.1 Charger powering and battery recharge

1. Connect the charger to the battery and then to the mains  
By connecting only the battery the charger does not turn on and display is off.
2. Switch the AC Mains on. Do not use extensions, spiral cables, reducers, etc. as they can cause damage to the charger.
3. The Board initializes AUTOMATICALLY the charge in 5-7 sec.

#### 3.2 Charging stop and battery disconnection

##### STOP PROCEDURE WHILE CHARGING (INCLUDING FLOATING)

1. Press the Stop button (P4) twice: 1<sup>st</sup> time OFF is displayed, 2<sup>nd</sup> time STOP is displayed and all LEDs out
2. Switch the AC mains OFF (not necessary in case of a new battery connection\*\*)
3. Disconnect the battery plug.



WARNING: By disconnecting the battery first, unwanted electric arcs are possible.  
\*\*In case of a new battery connection minor electric arcs are still possible

##### STOP PROCEDURE AT THE END OF THE CHARGE

1. Disconnect the battery plug. Wait for 5 secs \*\*\*
2. Connect the new battery

To put the charger out of service, switch the AC mains OFF  
\*\*\* minor electric arcs are still possible

### 4. VISUALISATION







#### Initializing

The display shows A.T.I.B followed by the Firmware revision (5.14.0 or higher): charger is ready  
All LEDs light up (1 1 1 1), the display shows 8.8.8.8. and the Buzzer emits a sound for 1 sec: the charge begins










Display	Led		Description	
-- 00	LED 1 Yellow flashing	Stage 0.0	Ramp phase 5secs before charging cycle	20-80%
-- 10	LED 1 Yellow steady	Stage 1.0	Bulk Charge. Before gassing point	80-90%
-- 80	LED2 Yellow steady	Stage 2.0	Absorption Charge at constant voltage (gassing point)// Absorption phase (= 2,4Vcl)	90-99%
-- 90	LED2 Yellow flashing	Stage 3.0	Final Charge at constant current	100%
End 4	LED 3 Green flashing	Stage 4	Floating Charge – Fixed voltage.	100%
End 5 End 0	LED 3 Green flashing	Stage 4	Floating Charge – Pulsed current. (End 5-ON x5sec_ End 0-off x5sec).	100%
End	LED 3 Green steady	End	Charger Off. Full Charge. Battery can be disconnected	
Endb	LED 3 Green steady	End	Charger Off. Very short charge. Probably already charged or sulfated battery	
!A it	Led4 Red flashing	Wait	Charger off. A Time Delay has been programmed	
ONLY FOR MULTIVOLTAGE VERSION				
Co 1 Co 2 Co 3 Co 4	LED 1 Yellow steady	Desolfation setting	See voltage limits table (section dedicated to multivoltage setting)	

## 5. SETTINGS

(P1) 	(P2) 	(P3) 	(P4) 
VALIDATE VALUES ON THE Programming Mode	Scroll the Parameters backwards	Scroll the parameters forwards	Stop the Charger (in two steps, first OFF then STOP)

The EASY MODE allows to set up main charging parameters (FOR ANY OTHER SETTING PROCEDURE PLEASE ASK OUR TECHNICAL DEPT.)

3. --	2. --	0.--
Charging Curve	Nominal Current (Amp)	Battery Capacity (Ah)

Turn on the charger connecting the AC mains (do not connect the battery)	
After a few seconds the charger sounds and the display shows <b>bAt</b> .	
Press 	for a few seconds until - - - appears
Press 	4 times to enter the password 2222 EASY MODE
Press  	to scroll parameters
Press 	to select the parameter. The no. related to the parameter starts to blink
Press  	to scroll parameters
Press 	to undo
Press 	to confirm the value. The no. related to the parameter stops blinking

**To check the setting:**

Disconnect the AC mains

Wait for a few seconds

Connect only the AC mains

The charger sounds and the display shows **bAt**.

Press  and/or  to scroll parameters to be checked.

**List of parameters:**

Turning on the charger and scrolling with the >> key (P3) you can see the following parameters divided into 3 sections (information).

	Set 0 (P 1111)	Description		Information
PU	Navigator	It is the parameter that appears at power up. Show information on the status of the battery charger and the alarm condition (see paragraph "Error list").		Charger Status
U	Battery Voltage	It shows the Battery Voltage	Volt	Electrical Value In Real Time During the Charge
A	Battery Current	Current supplied by the Charger during charging	Amps	
C	Ah Totals	Capacity accumulated during the entire charge	Ah	
c	Ah stage 1+2	Capacity accumulated in Stage 1 + 2	Ah	
t	Duration of the charge	Time elapsed since the beginning of the Charge	hh:mm	
n	Completed Cycles	Total number of charging cycles	number	Utility, Information and diagnostics
N	Partial Cycles	Total number of partial charging cycles	number	
E	Error Code	Numerical identification code (see "Error list") eg: E10	number	
-	Countdown "d."	It shows the remaining time if the Countdown has been set	hh:mm	
0.	Battery Ah	Set value of the Battery Capacity (C5)	Ah	Charger Setting (permanent Information)
1.	Battery voltage	Voltage of the battery to be charged	Volt	
2.	Charging current	Nominal Current of the Charger	Amps	
3.	Charging Profile	Code of the Charging Profile	number	
h	Max charge hours	Number of absolute maximum hours of charge	hh	
Co. (*)	Selected combination	Combination Code in which the charger is working (see "Voltage limits")	number	
x.xx.x	Firmware revision	Firmware Revision Number (may change)	5.14.0	

\* Only for multivoltage versions

**List of main charging profiles:**

Here is a list of some of the most common Charging Profiles. There are many others. In the case request the list to our Technical Office

Charging curve code		Max F1	Vgas	Time F2	I2%	Time F3	V f3	Post	Vman	Battery suggested
		I1	I2	I3	I4	I5	I6	I7	I8	
16	WUIU	500	2,40	180	4,0	180	2,85	2	2,28	Pb
116	WUIa	500	2,40	180	4,0	180	2,85	0	2,28	Pb
226	WUoU	500	2,35	180	2,0	0	2,65	2	2,24	Gel
328	Wua	600	2,35	240	2,0	0	2,65	0	2,24	Gel
36	WUIU	500	2,43	180	2,0	180	2,65	2	2,26	AGM




**5.1. MULTIVOLTAGE SETTINGS (only for MultiVoltage HFK-M e HFT-M)**

CONNECT THE CHARGER ONLY TO THE VAC MAINS
SWITCH ON THE CHARGER (DO NOT CONNECT THE BATTERY)
THE MOST IMPORTANT PARAMETER IS PARAMETER NUMBER 3.

Choose one of the three profiles following your needs:

- 3. **DsM** (manual desulphation)
- 3. **DsA** (automatic desulphation)
- 3. **016** (example of charging profile for lead acid) (SEE CHARGING PROFIL LIST PAGE 10)

To find a parameter, just scroll using << and >>  
 to allow modification, push M  
 parameter will start to blink  
 to modify parameters, use << and >>  
 to confirm modification, push M

DsM	DsA	016 (*)
		
Desulphation system with manual setting of the voltage	Desulphation system with automatic detection of the voltage	Standard charging profiles (*) see the above list
will allow you to set parameters:	will allow you to set parameters:	will allow you to set parameters:
1=battery voltage (set nominal voltage of battery) 2=charging current (set about 2% of battery capacity) h=timer (24h suggested)	2=charging current (set 2% of battery capacity) h=timer (24h generally is what we suggest) Voltage is detected automatically	1=battery voltage (set nominal voltage of battery) 0=Ah battery capacity 2=charging current (HFT up to 65A – HFK up to 25A)

ONCE ALL THE PARAMETERS ARE SET JUST CONNECT THE BATTERY: CHARGER WILL START AUTOMATICALLY

**VOLTAGE LIMITS**

**Threephase version HFT**

Display	Battery	Limits Vmin	Limits Vmax	Amp max (batt)	
[0 1	2; 4V	1,5 V	7 V	30A (2;4V)	
[0 2	6; 8; 10; 12V	5 V	17 V	15A (6; 8V)	65A (10; 12V)
[0 3	24; 36V	16 V	54 V		65A (24; 36V)
[0 4	48; 60; 72; 80V	40 V	120 V	50A (48V)	65A (60; 72; 80V)

**Singlephase version HFK**

Display	Battery	Limits Vmin	Limits Vmax	Amp max (batt)		
[0 2	6; 8; 10;12; 24V	5 V	35 V	10A (6,8;10V)	50A (12; 24V)	
[0 3	36; 48V	29 V	73 V		50A (36; 48V)	
[0 4	60; 72; 80; 96V	56 V	140 V	15A (60V)	25A (72; 80V)	15A (96V)

## 6. TROUBLE SHOOTING

### 6.1. Error List

	Type	Display	LED	When	Description	(#)
--	Charger OFF		( - - - - )		Mains are OFF. Check the Power plug connection, the main system switch and the AC Input Fuses	x
E0	No Error	- - -	x x x x	No Error	Charger could be Idle or Charging.	x
E1	No Battery	bAŁ	( - - - - )	Before Charging	Battery voltage is missing. Battery not connected, Voltage too low (10%Vnom) or Internal DC fuse blown. The battery plug is broken or the output cables are damaged.	x
E2	Battery Undervoltage	bAŁŁ	( 1 - - L )	Before Charging	Battery Connected, but below the minimum threshold (60%Vnom) Low battery voltage or incorrect battery.	RF
E3	Battery Problem	bAŁ l	( - 1 - L )	During Charging	95% Nominal voltage of the battery not reached (after 1 minute) during charging. Low battery, too big for the charger or low input current current during charging	RF
E12	Battery Overvoltage	bAŁ9	( - 1 1 L )	Connecting the Battery	Battery voltage above the maximum threshold. (145% Vnom). Wrong or sulfated battery If the Battery voltage is higher than the maximum value (Vel MAX) the Charger will not start	RF
E8	Battery Overvoltage	bAŁ7	( 1 1 1 1 )	During Charging	103% exceeded (Voltage set). Battery is fully charged. Overcharge security system	RYG
E4	Overtemperature 1 (IGBT)	Ł l	( - - 1 L )	During Charging	Thermal probe intervention 85 ° C for overheating Fans dirty, hardened, blocked or not working or high ambient temperature or incorrect charger placement	RF
E5	Overtemperature 2 (output Diode)	Ł dl	( - - 1 L )	During Charging		
E6	Overtemperature 3 (output Diode)	Ł d2	( - - 1 L )	During Charging		
E7	Max Time Stage 1	Ł 11Ł	( 1 - - 1 )	After many hours	Exceeding Maximum time Stage 1, battery too big for the charger or the Mains is too low. Wrong setting of the charger	R
E20	MAX Charging Time	ŁoŁŁ	( 1 1 - 1 )	After many hours	Maximum global charging time exceeded.	R
E10	Min Current	ŁŁŁ	( - 1 1 L )	(*) During Charging	The current has dropped to too low values. Battery sulfated or with problems. False contact in the battery plug	RF
E11	Power Fail (1phase missing)	11A 1n	( 1 1 1 L )	During Charging	A phase is missing in a three-phase system. Blown fuse, AC cable disconnected or faulty in the wall switch	RF
E14	Pressure switch Error (only Air system version)	A 1r	( - - 1 L )	(*) During Charging	The pressure switch signals a pressure drop in the air insufflation system.	R
E16	Capacitor Error	Łond	( - - - - )	During Charging	(only HFk models) The output capacitors are not charged. Relay Output Open.	R
E19	Power on Delay	11A ŁŁ	( - - - L )	Before Charging	The countdown is in progress for delayed start.	RF
E21	Stop with P4	5ŁoP	( - - - - )	During Charging	Charger stopped with STOP (P4)	(--)
E22	Reached time "h"	Łndd	( - - 1 - )	At the End of the Charge	It is not an Error (MultiVoltage) Reached the time set in "h"	G



(\*) When the system enters these errors, it performs some restart cycles to solve the problem.

(#) 3-color remote LED. R = Red Y = Yellow G = Green F = Flashing (5 sec ON - 1 sec OFF)

## 7. MAINTENANCE



The maintenance operations have to be made by specialised personnel, in compliance with safety rules. At our offices, you can find the "Routine and extraordinary maintenance forms".

**WARNING: If you detect a problem and you cannot take immediate action to solve it, please make sure the charger is identified as not working and "NOT to be used".**

### 7.1. Preliminary recommendations

- Please read carefully the section "WARNING AND SAFETY" at the beginning of this manual and 1.2 section referring to electrical information
- Before performing maintenance or repairs make sure the power plug and the battery are both disconnected.

### 7.2. Routine Maintenance

Perform maintenance every 3 months or any time it is necessary.

- Clean carefully the AC and battery cables. Check they are not damaged or burnt. In this case, replace them immediately.
- Check the AC mains and battery plugs. If they are crushed or burnt or damaged, replace them immediately.
- Electrical equipment must not be exposed to dust and humidity. Clean the battery charger. Should it be too dirty or damp, put it in a safer place. The same is valid for the battery.

### 7.3. Extraordinary Maintenance

Perform maintenance every year or when a problem occurs (i.e. burning fuse) or you notice a fault.

- Follow the checklist of "Routine maintenance".
- Open the Battery Charger. Clean carefully the dust on each component: the printed circuits by a clean brush, on the other components by a blow of compressed air; stay at 20 cm (8 inch) at least.
- Check the screws and electrical connections are well tightened. The use of a thermal imaging camera is an excellent way to understand if there are loose connections or weak points where you must intervene. The charger should be on for at least 10 minutes before you make measurements.
- Check the fuses, the fuse holders and the moving mechanical parts (contactor).
- Request in advance replacement parts that are not available at your site.

## 8. WARRANTY

Duration	A.T.I.B. Elettronica guarantees these products for one year. Extended guarantee must be defined in advance.
Starting date	The delivery date from A.T.I.B. Elettronica is considered the starting date of the warranty.
Covering	<ul style="list-style-type: none"> <li>• Defective components will be repaired or replaced free of charge</li> <li>• Labour is free of charge nearby our factory. If carried out nearby at customer/users's site it will be on chargeable basis.</li> <li>• Delivery costs of replacement components are at consignee's expense.</li> </ul>
Loss of right	Warranty is not valid in case of: <ul style="list-style-type: none"> <li>• Instructions stated in this manual and on the charger front panel are not observed.</li> <li>• Improper use, violation or modification of the charger.</li> <li>• Charger being used out the permitted ranges specified.</li> <li>• Charger being used outside the defined parameters in accordance with product specifications.</li> <li>• The number of charging cycles exceeds 600 per year.</li> <li>• Evidence that both ordinary and extraordinary maintenance were not carried out on the charger.</li> </ul>