CRISTEC
l'énergie embarquée

Manuel utilisateur des chargeurs de batteries HPOWER

User manual HPOWER battery chargers

HPOWER 12V/90A
HPOWER 24V/45A
HPOWER 24V/60A
HPOWER 24V/80A
HPOWER 24V/100A

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CONTENTS

1 PRECAUTIONS – WARRANTY

The CRISTEC equipment includes the following :

- A box containing the battery charger's electronic function.
- This user manual
- Specific packing

This document applies to battery chargers from the HPOWER range as listed on the cover (available in colour on our website www.cristec.fr).

The manual is intended for users, installers and equipment maintenance staff. Please read this manual carefully before working on the charger.

This manual should be kept safely and consulted before attempting any repairs because it contains all the information required to use the appliance.

This document is the property of CRISTEC; all the information it contains applies to the accompanying product. CRISTEC reserves the right to modify the specifications without notice.

1.1 PRECAUTIONS (WARNING) – PROVISIONS RELATING TO SAFETY

Material class I according to NF EN 60335-2-29 standards.

The requirements for installation are contained in the NFC 15-100 standards and in the specific standard “for pleasure boats – electrical systems – alternating current installations” ISO13297 reference.

The installation must be carried out by an electrician or a professional installer.

The AC network must be disconnected before starting any maintenance work on the equipment. Means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities,

or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

Main precaution

Before handling the charger, please read carefully this manual.

Precautions regarding electric shocks

Risk of electric shock and danger of death: it's strictly forbidden to interfere with the charger when under voltage.

Precautions regarding accidental earth leaks

The charger's PE terminal must be earthed and connected before any other terminal.

The charger must be closed before it is turned on with the screw provided for this purpose.

Accidental leakage current between phase and earth : standard NFC15-100 should be followed when installing.

Use the services of an electrician or professional installer to make the necessary connections. The charger should be connected to a system having a 30mA differential bi-polar differential circuit-breaker.

Accidental leakage current between the charge circuit and the earth : accidental current leakage at the earth must be detected by means of an independent protective device outside the charger (a residual current device or an insulation detector).

The installer should decide on the rating and nature of the protection according to the risks. Special precautions should be taken on any installation prone to electrolyse

phenomena. Regulations require the presence of a battery switch on the charger outputs of the + and the - poles.

Precautions regarding lightning

In areas highly exposed to lightning, it may be advisable to install a lightning arrestor upstream of the charger to safeguard it against irreversible damage.

Precautions regarding overheating of the appliance

This appliance is designed to be mounted on a vertical wall or partition as indicated herein.

It is imperative that there be a gap of 150mm around the charger. The installer must ensure that the temperature of the air at the input is lower than 65°C in extreme operating conditions.

Measures should also be taken to allow for the evacuation of hot air on either side of the charger.

It’s strictly forbidden to put any device on or against the charger.

The charger must not be installed near a heat source ; it should be installed in a well-ventilated area. The charger's air inlets and outlets must not be obstructed.

Attention hot surface : do not touch the charger during and after its operation (burn hazard).

Precautions regarding dust, seepage and falling water

The charger should be located so as to prevent penetration of damp, liquid, salt and dust, any of which could cause irreparable damage to the equipment and be potentially hazardous for the user.

The appliance should be installed in a dry and well-ventilated place.

Precautions regarding inflammable materials

The charger should not be used near inflammable materials, liquids or gases.

The batteries can emit explosive gases : please follow the manufacturer's instructions carefully when installing them.

Nearby the batteries : ventilate the area, do not smoke, do not use any open flame.

Other precautions

Never attempt to drill or to machine the charger's case : this may damage components or cause metal chips or filings to fall on the charger's board.

Do not do anything that is not explicitly stated in this manual.

1.2 WARRANTY

CRISTEC waives all liability if the installation rules and instructions for use are not observed.

The warranty is valid for 36 months.

The warranty applies if the origin of the failure is a fault internal to the charger due to CRISTEC.

The warranty applies for equipment returned to the Quimper plant (France).

The warranty, if confirmed by the expert's report, covers only:

- The repair (part(s) and labour)of faulty equipment returned to the Quimper plant (France). Only original parts recognized as being defective will be replaced under the warranty.
- Return shipping costs after repair (courier, by a carrier of our choice).
  The warranty, if confirmed by the expert's report, gives rise only to a repair of the equipment and not to a replacement of the equipment.

The warranty does not cover any other costs that may have been caused by the malfunction of the equipment, such as: shipping and packaging, disassembly, reassembly and testing costs, as well as all other costs not mentioned.

Our warranty on no account provides for any form of compensation. CRISTEC shall not be held liable for damage incurred as a result of using the battery charger.

The warranty does not apply if the origin of the failure is due to an external default (see below). In this case, a repair estimate will be issued.

Our warranty does not cover :

1. Failure to abide by this manual
2. Any mechanical, electrical or electronic alterations to the appliance
3. Improper use
4. Presence of moisture
5. Failure to comply with AC power-supply tolerances (i.e. overvoltage)
6. Incorrect connections
7. Falls or impacts during transportation, installation or use
8. Repairs carried out by anyone unauthorized by CRISTEC
9. The maintenance in the energy conversion area made by a non-authorized person by CRISTEC
10. Connection of any interface not supplied by CRISTEC
11. The cost of packaging and carriage
12. Apparent or latent damage sustained during shipment and/or handling (any such claims should be sent to the haulier)
13. Any unjustified return of equipment (no failure on the equipment)
14. Any other causes not listed above

2 OPERATING-PRESENTATION-INTERFACES

2.1 OPERATING PRINCIPLE

The design of the battery chargers in the HPOWER range is based on a high-frequency split converter that transforms the AC signal into regulated and filtered DC current. They can operate as a DC power supply.

Once the type of battery and type of charge has been selected, operation of the battery charger is entirely automatic (unless otherwise specified by the supplier or the manufacturer of the batteries). It can remain connected to the batteries and does not need to be disconnected when starting up an engine (marine application), because it is equipped with an integrated separator.

The appliance's output voltage is sufficient to recharge 1, 2 or separate 3 batteries (integrated charge distributor, separation of batteries). The charger's maximum output is the rated current distributed to each output according to the connected batteries banks.

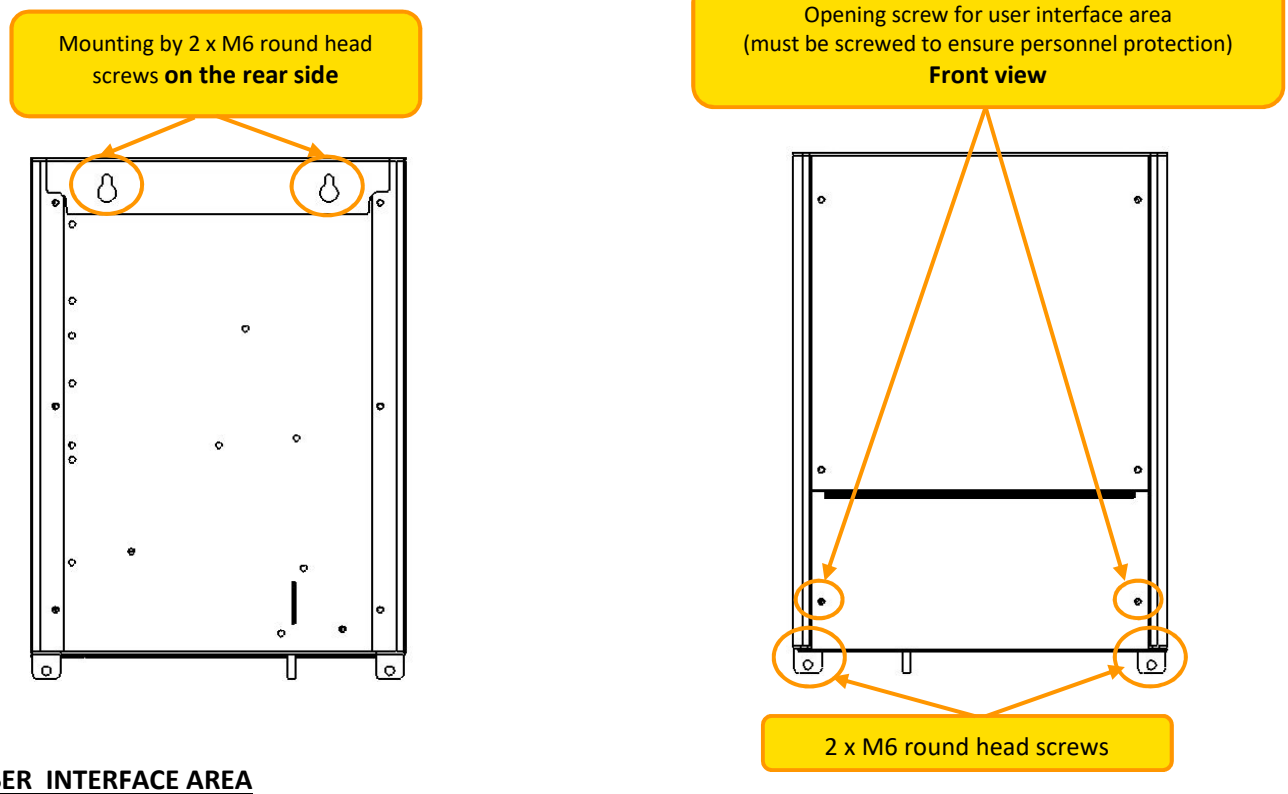
Each output can deliver the rated current.
Not all the outputs have to be connected. However, if only one output is used, we recommend interconnecting outputs +BAT 1, +BAT 2 and +BAT E to one another (optional).

2.2 OVERVIEW PRESENTATION

The chargers are divided into 2 zones :
The user interface zone
The energy conversion zone (all maintenance in this area is forbidden except with CRISTEC authorization, under penalty of warranty termination)

Fixing of the charger is made by 4 x M6 round head screws (screw head diameter less than 10 mm).

Center distance : Chargers HPO 12-90, 24-45, 24-60 and 24-80 - See appendix 2
Charger HPO 24-100 – See appendix 3



2.3 USER INTERFACE AREA

Chargers HPO - See appendix 1

3 INSTALLATION

This paragraph deals with installation of the equipment.

Installation and initial commissioning should be carried out by an electrician or professional installer in accordance with the standards currently in force (for pleasure boats the applicable international standard is ISO13297).

The installer should familiarize himself with this operating manual and inform users of the instructions for use and the safety warnings set out in the manual.

3.1 CHARGER OVERALL DIMENSIONS

Chargers HPO 12-90, 24-45, 24-60 and 24-80 – See appendix 2
Charger HPO 24-100 – See appendix 3

3.2 WIRING

3.2.1 Cable lead-in

The main cable lead-in is routed through a cable gland.

The battery cable lead-in is routed through cable bushings (which can be mounted in place of the cable glands).

The « options » cable lead-in (see section 3.4 Interfaces and accessories).

When connecting or disconnecting a cable, the charger's power supply must be turned off and the batteries electrically insulated from the charger.

The references for additional cables and connectors required for the appliance to operate efficiently are provided in the following paragraphs : failure to comply with these provisions renders the warranty null and void.

3.2.2 Cable from the public AC power supply network or generator

Disconnect AC network before any wiring and connecting of the connector.

All HPOWER battery chargers can operate automatically and equally on single phase networks from 90 to 265VAC and from 47 to 65Hz.

Generators
The CRISTEC battery chargers are designed to operate from a generator.

Be careful : In some cases, the generators can produce high over voltages, in particular during start-up phase. Before connecting the charger, please check its compatibility with the characteristics of the generator : power, voltage, overvoltage, frequency, current, etc.

It’s highly advised to disconnect the charger from the AC network during the generator starting phase.

Any damage to the charger due to a voltage surge will be excluded from the warranty.

Depending on cable lengths, the cross-section of **AC power cables** must be at least equal to or greater than the values provided in the table below :

Model	Minimum cross-section for 115VAC	Minimum cross-section for 230VAC
HPO 12-90 HPO 24-45 HPO 24-60	3 x 4 mm²	3 x 2,5 mm²
HPO 24-80 HPO 24-100	3 x 6 mm²	3 x 4 mm²

The type of cable (H07-VK, MX, etc.) should be defined by the installer according to the application type and applicable standards.
For applications where the electricity network may be either 115VAC or 230VAC, always choose the cross section recommended for 115VAC.
Always use cable markers without insulating collars in accordance with installation standards governing AC network input connections.
The rating of the upstream circuit-breakers should match the equipment's requirements.

Remarks :
The HPOWER chargers work as soon as they are powered on. (Input cable connected and powered)
The HPOWER chargers stop as soon as they are not under voltage (disconnected from AC network or installation circuit breaker in OFF position).

3.2.3 Battery cable

Disconnect batteries before any wiring and junction of the connector.

Please check the compatibility of voltage, current and setting according to the battery type before switching ON the charger.

Checking of the charge voltage
Before connecting the batteries to the charger, first check their polarity.
Equally check the battery voltage with a calibrated voltmeter. A too low voltage value on some types of batteries show irreversible damage and impossibility to recharge.
Any damage due to incorrect connections will be excluded from the warranty.

For battery cables up to **3 meters**, the cross-section of the battery cables should be at least equal to or greater than the values provided in the table below:

Model	Battery cable cross-section	Diameter of the terminal hole
HPO 12-90	25mm²	6mm
HPO 24-45	16mm²	
HPO 24-60	16mm²	
HPO 24-80	25mm²	
HPO 24-100	35mm²	8mm

The installer should choose the type of cable (H07-VK, MX, etc.) according to the type of application and the applicable standards.

The DC outputs must use a PHOENIX CONTACT connector type. If you do not have 3 batteries, the terminals non-used bank will remain unconnected.

3.2.4 Precautions regarding electromagnetic disturbance generated by the appliance

We recommend a minimum distance of 2m between the charger and any potentially sensitive equipment.

Use shielded cables for all the connections (*). The shielding should be earthed at both the transmitting and the receiving ends.

Keep cable length and shielding connections to a minimum.

Route cables as close as possible to conductive parts ("loose" cables or loops should be avoided – cables should be placed against the hull or walls).

Keep power cables separate from battery cables.

Keep power cables separate from control cables (at least 200mm).

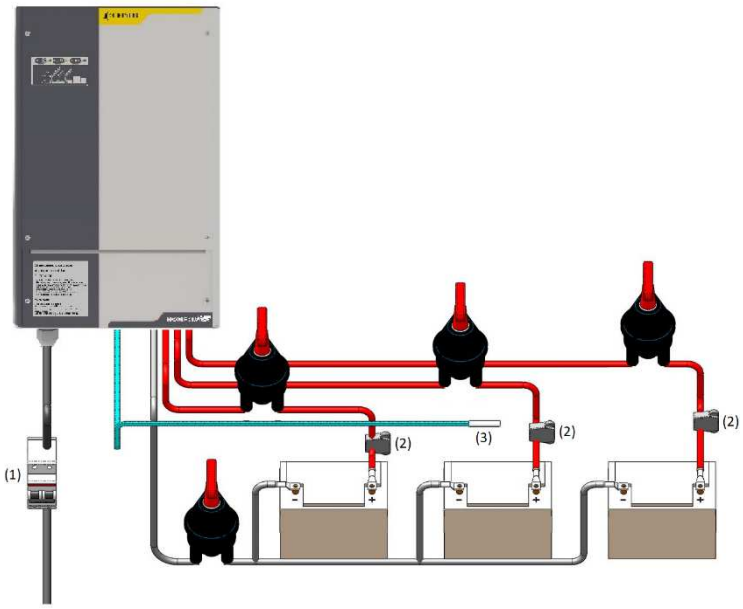
The cables should only supply power to this appliance; any deviation to power another appliance is prohibited.

(*) This is a recommendation for installation rather than an obligation. The installing electrician should decide whether or not to use shielded cable depending on the EMC environment.

3.2.5 Cabling principle

Typical installation

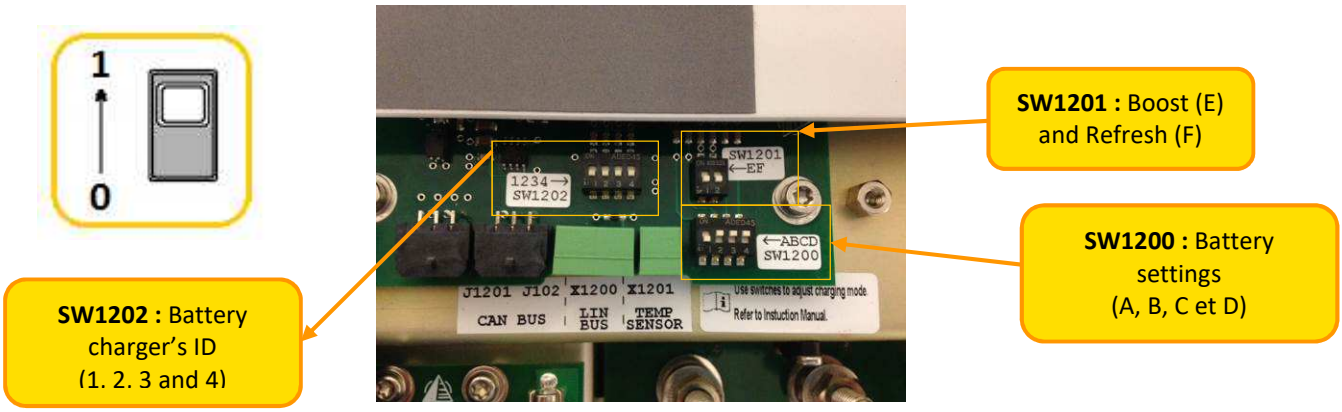
This installation requires a GFCI (Ground Fault Circuit Interrupter) **(1)**, appropriate fuses on batteries **(2)** and a battery compartment temperature probe **(3)**.



Other types of cabling – see appendix 4.

3.3 SWITCHES SETTING-ADJUSTMENT-INDICATORS

3.3.1 Description



The HPOWER chargers are equipped with switches to configure the charger according the battery type and the application (see section 3.3.2).

2 charging modes are available (**SW1201**) :

- The BOOST function enables a faster charge of the batteries. This function is timed controlled (see section 3.3.2) and is automatically switched off when the battery is fully charged : BOOST stops when batteries current < 20% of charger rated current. The BOOST function can also be disabled by means of a switch **(E)**.

- The REFRESH function enables to apply periodically a voltage step to maintain the battery, to promote its equalization and prevent from any sulphation. This function is activated by means of a switch (**F**).

When communication Bus (CAN Bus or LIN Bus) is used, a unique ID (idenfier) must be selected. This ID shall be selected from 0 to 15 (**SW1202**):

Switches setting				ID	Master/Slave positions LIN Bus only (Chargers in parallel)
1	**2**	**3**	**4**	**N°**	
0	0	0	0	0	
1	0	0	0	1	
FACTORY SETTING					
0	1	0	0	2	
1	1	0	0	3	
0	0	1	0	4	
1	0	1	0	5	Master
0	1	1	0	6	
1	1	1	0	7	
0	0	0	1	8	
1	0	0	1	9	
0	1	0	1	10	
1	1	0	1	11	
0	0	1	1	12	
1	0	1	1	13	Slave n°1
0	1	1	1	14	Slave n°2
1	1	1	1	15	Slave n°3

3.3.2 Setting according to the batteries type

Switches setting				Description of the battery type	FLOATING VOLTAGE*	BOOST VOLTAGE*	Maximum duration of BOOST at +/- 5% T_{BOOST}	Maximum duration of ABSORPTION at +/- 5% T_{ABS}
A	B	C	D					
0	0	0	0	**Opened type bat free electrolyte (wet)**	26,8V	28,2V	2H	4H
1	0	0	0	**Classic sealed type bat (Sealed Lead)**	27,6V	28,8V	2H	4H
FACTORY SETTING								
0	1	0	0	**GEL type bat**	27,6V	28,8V	2H	4H
1	1	0	0	**AGM type bat****	27,2V	28,8V	2H	4H
0	0	1	0	**Spiral type bat**	27,2V	28,8V	2H	4H
1	0	1	0	**Tin calcium lead bat**	28,8V	30,2V	2H	4H
0	1	1	0	**Wintering or standby sealed bat**	26,8V	26,8V	0H	0H
1	1	1	0	**Stabilized DC power supply**	24,0V	24,0V	0H	0H
0	0	0	1	**SPE1 open type bat**	26,4V	29,6V	2H	4H
1	0	0	1	**Lithium Iron Phosphate (LiFePO4) with BMS (***)**	27,6V	28,8V	6H	10H
0	1	0	1	**STORMLINE Bat**	27,4V	29,0V	2H	6H
0	1	1	1	Reserved for CAN Bus				
1	1	1	1	Reserved for remote display HPO-DISPLAY-R				

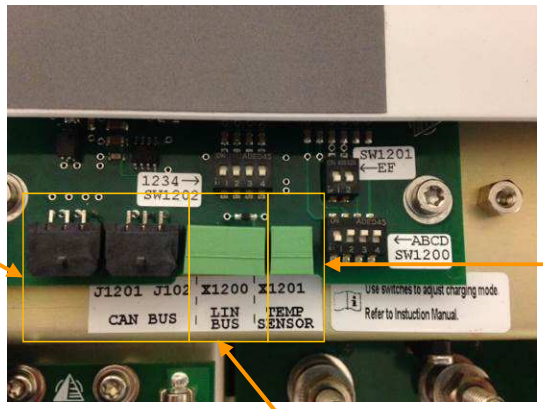
(*) Voltage on + BAT 1, + BAT 2 and + BAT E with 10% of the rated current and a tolerance of +/- 1%.
The voltages values must be halved for 12V batteries .

(**) REFRESH is not advised for certain types of AGM batteries

(***) Battery Management System

Some specific settings are possible – please consult us.

3.4 INTERFACES AND ACCESSORIES



J1201 et J102 : CAN Bus

X1201 : Battery temperature probe

X1200 : CRISTEC LIN Bus :
- Remote display (HPO-DISPLAY-R)
- Parallel operation control

3.4.1 Temperature compensation

STP-HPO-2.8 and STP-HPO-5.0 temperature probes enable the compensation of Absorption voltage and Floating Voltage depending on the ambient temperature of the battery room.
The coefficient used is -18mV/°C for 12V model and -36mV/°C for 24V models.

Temperature is not compensated when Wintering (or standby sealed bat), Stabilized DC power supply and Lithium Iron Phosphate (LiFePO4) with BMS settings are selected.

3.4.2 CAN Bus

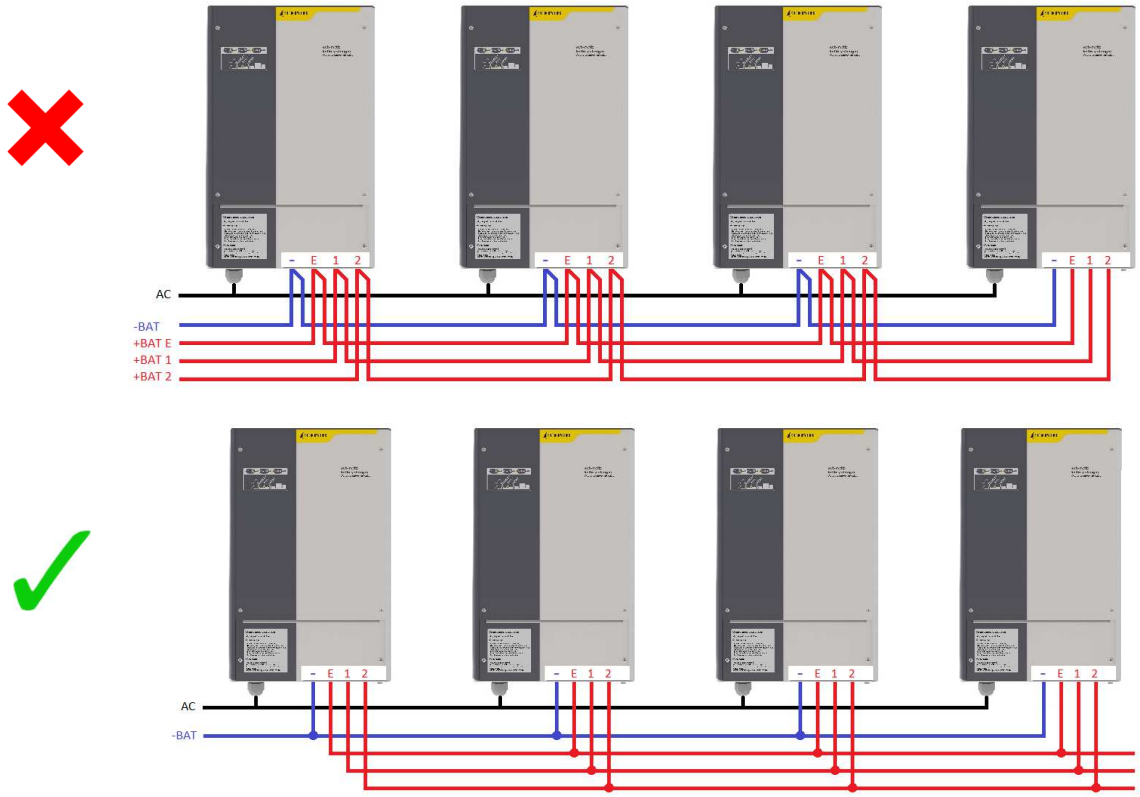
The battery charger offers two receptables matching with connectors Molex Microfit 3.0, 6 circuits (reference 43025-0600).

Documentation n°1512940REGA (hardware and software specification)
Is available upon request.

3.4.3 Parallel operation

It is possible to connect up to 4 battery chargers of same model in parallel :

Step 1 : Power wiring : -BAT, +BAT E, +BAT 2 et +BAT 1 outputs shall be connected between each other. DC output wiring must be equipotential : same length and cable cross-section.



Step 2 : Control wiring : the battery charger offers a receptable matching with connector Phoenix Contact MCV 1.5/4-ST-3.5, 4 circuits (reference 1840382). The cable employed must be insulated. It must be a multi-conductor cable, section 1,5mm². Its length between two battery chargers must not exceed 1 meter. The parallelisation cable and accessories are available as an option.

Step 3 : Select a unique Master charger, the others are Slaves (see ID selection table, section 3.3.1) ;

Step 4 : Verify that settings of battery chargers are similar (see settings selection table, section 3.3.2) ;

Step 5 : Start the battery chargers : parallel control is automatic and active when « Com » led is blinking. (see indicators, section 3.4.7).

3.4.4 Factory setting

The charger's factory settings are:

Sealed type battery (lead sealed)
BOOST in ON position
REFRESH in OFF position

This setting is a compromise for satisfactory recharging of different technologies of batteries :

- Opened classic lead
- Sealed, Gel or AGM
- Spiral sealed
- Lithium Iron Phosphate (LiFePO4) with BMS

To define the charge in function of your battery, please refer to the chart, paragraph : 3.3.2.

The installer should set the switches (AC input and DC output shall be disconnected) depending on :

- the type of battery (contact the battery manufacturer if necessary)
- the intended usage
- the cross-section and length of the output cables
- whether or not the boost function is required

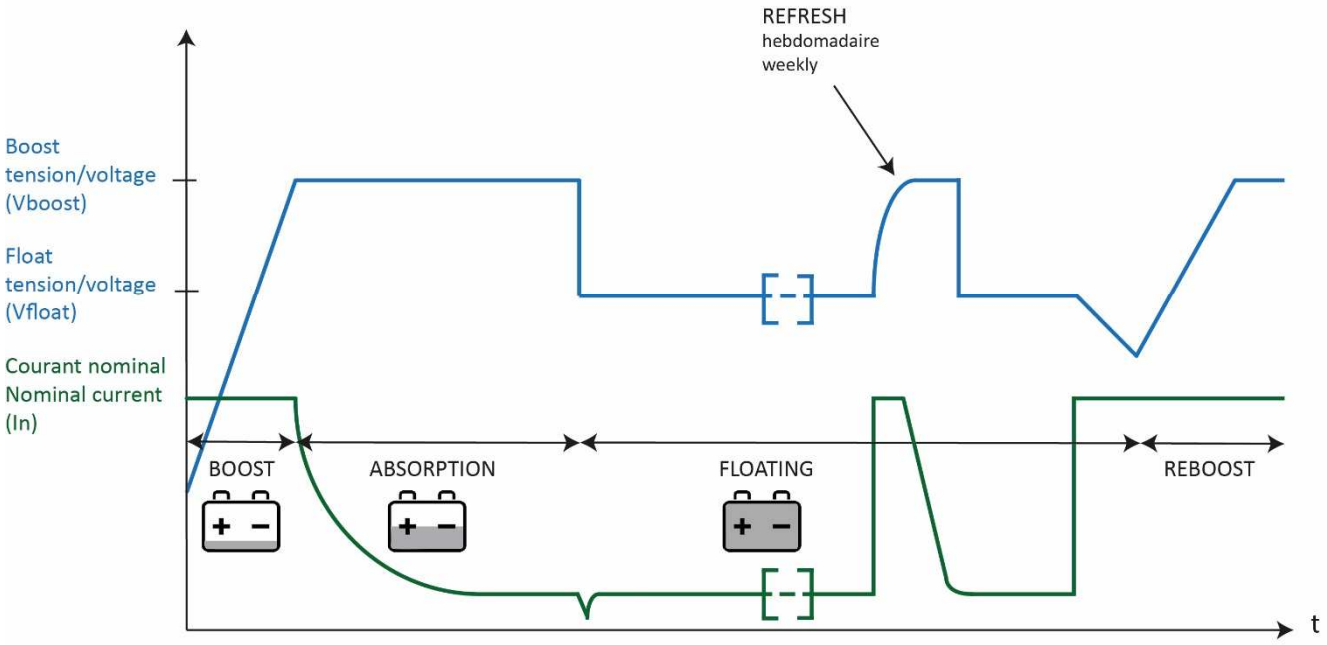
For special batteries, call in a professional installer, who will make the specific settings in accordance with the battery manufacturer's specifications and according to the specifics of the installation.

CRISTEC is not liable for any damage caused to the batteries or for inefficient recharging.

3.4.5 Charging curve

BOOST in ON position

With this setting the HPOWER charger delivers a 5-step charge curve IUoU + automatic weekly recycling (switch E) + return to automatic BOOST : BOOST, ABSORPTION, FLOATING + REFRESH, REBOOST.



V BOOST : BOOST voltage[1]
V FLOAT : FLOATING voltage[1] (voltage with no BOOST)
T BOOST : BOOST maximum duration[1]
T ABS : ABSORPTION maximum duration[1]

BOOST phase :

Starts up automatically when the charger is turned on if the battery is flat. The current is then at maximum output.

ABSORPTION phase :
Begins when the voltage has reached the maximum BOOST level. The current level starts falling.

These two phases combined last a maximum of TBOOST+TABS (depending on setting). If the current falls below 20%[2] of rated current, the FLOATING phase automatically kicks in. Duration and current intensity depend on how charged the battery is.

FLOATING phase :
Starts after TBOOST or if output current has reached 20%[2] of the charger's rated current. The voltage switches to the FLOATING value and the rated current continues to drop.

[1] See table : paragraph 3.3.2
[2] 12% of rated current when setting Lithium Fer Phosphate avec BMS is selected

REFRESH phase :
It is an automatic weekly cycle (Inhibited or not by means of switch F) in order to optimize the battery life duration. It will occur only after a complete recharge cycle (BOOST, ABSORPTION and FLOATING).The charger will generate automatically a safe timed voltage step every 7 days whatever the position of BOOST switch.

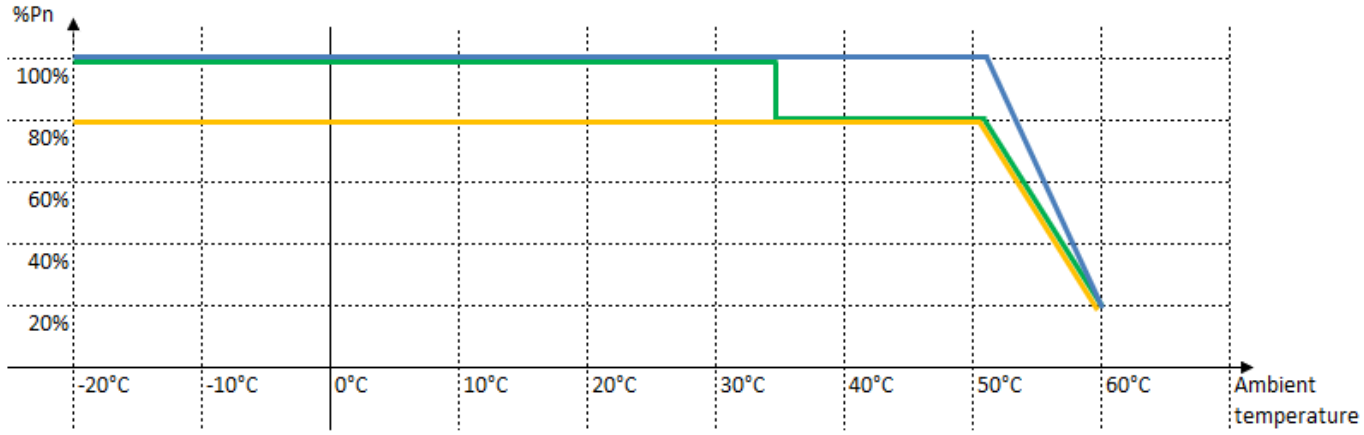
Phase REBOOST :
Automatic phase consisting in coming back to a BOOST voltage if the DC utilizations require it (i.e. after a complete recharge cycle BOOST, ABSORPTION and FLOATING if a some DC constant consumptions are detected the charger will restart a new complete charge cycle including a BOOST phase).
This REBOOST phase will be authorized after measuring certain battery voltage during a determined time.

BOOST in OFF position

With this setting, the CDS4 charger produces a single-stage UI type charge curve. It generates a constant voltage, supplying the current required by the battery(ies). Recharging time depends on the state of the battery, and is longer than when the BOOST is in the ON position.

3.4.6 Thermal derating

The curve below presents the power derating according to ambient temperature and AC input voltage :

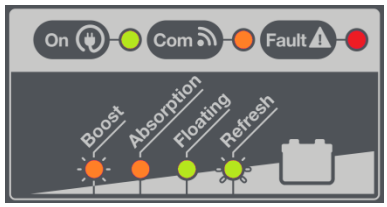


Ve = 230Vac
Ve = 115Vac
Ve < 95Vac

%Pn: Percent of battery charger's rated output power.

3.4.7 Indicators

The following led indicators are visible on the front of the appliance for monitoring.



INDICATORS	STATE	MEANING
GREEN LED "On"	On	Charger is ON
	Off	No or poor quality AC current
		Input fuse is blown
		Internal charger malfunction
ORANGE LED "Boost "	Blinking	Charger in BOOST phase (switch E = '1')
ORANGE LED "Absorption"	On	Charger in ABSORPTION phase (switch E = '1')
GREEN LED "Floating"	On	Charger in FLOATING phase
GREEN LED "Refresh"	Blinking	Charger in REFRESH phase (switch F = '1')
ORANGE LED "Com"	Blinking	Communication is running (LIN Bus or CAN Bus)
RED LED "Fault"	On	Charger abnormal operation: - Output short-circuit ; - The Charger voltage (before distribution) is below 11V ± 5% (for 12V models) or 22V ± 5% (for 24V models) for more than 10 seconds (active during Floating phase only) ; - Battery temperature probe is < -10°C or > 50°C ; - Failure of fan.

4 EQUIPMENT MAINTENANCE AND REPAIRS

4.1 OVERVIEW

This paragraph deals with equipment maintenance and repairs. Proper operation of the product and its service life are dependent on strict compliance with the following recommendations.

4.2 EQUIPMENT MAINTENANCE

Disconnect the battery charger from the AC network and the batteries before starting any maintenance work.

If appliances are in a dusty atmosphere, vacuum-clean them regularly, since dust deposits may adversely affect heat dissipation.

Check the state of battery regularly.

Nuts and screws should be tightened annually to ensure efficient operation of the appliance (particularly in rugged conditions: vibrations, shocks, high variations in temperature etc.).

4.3 EQUIPMENT REPAIRS

Disconnect the battery charger from the AC power network and disconnect the batteries before undertaking any repairs.

When fuses have blown, only use fuses of the type and size recommended in this manual.

Please contact CRISTEC or their distributor for any other repairs.

Any repair without CRISTEC prior agreement entails an exclusion of warranty.

5 TECHNICAL SPECIFICATIONS

HPO 12V 90A

Part Number	HPO12-90
Model	12V/90A
recommended battery bank (Ah)	700-1200Ah
Input	
Voltage	from 90 to 265VAC single-phase automatic
Frequency	from 47 to 65Hz automatic
Input current consumption 230/115VAC	6.0/16.0A
Recommended power for a generator	1600W
Power factor	1
Efficiency	87% typical
Input fuses	2 x 20A 250V (6,3x32) (F1/F2)
Output	
Number of battery bank	3 (including one for the engine): +BAT E, +BAT 1, +BAT 2 (integrated Mosfet splitter) and 1 negative -BAT Each bank can be used individually and deliver the rated current
Connection on throaded rods	M6
Total rated current (+/-7%) / Rated power	90A/1282W
Charging curve	IU or IUoU through internal dip switches (Boost, Absorption, Floating – factory setting). Selectable automatic Refresh
Battery type	Lead sealed as factory setting - Gel, AGM, Calcium Lead, LiFePO4, DC power-supply mode, etc. Specific request on demand
Boost voltage	14.4VDC for Lead sealed battery (factory setting)
Floating voltage	13.8VDC for Lead sealed battery (factory setting)
Regulation tolerance before output Mosfet splitter and fuse	< 1% (at rated conditions)
Peak to peak ripple and noise	< 1% (at rated conditions)
Automotive output fuse mounted in series in minus pole -BAT	3 x 35A/32V
Environment	
Cooling	Electric fan controlled in temperature and current
Sound level	< 50dBa at 1m
Operating temperature at 230VAC	Rated charge from -20°C to +50°C, derating above 50°C. Automatic charger switch off above 60°C ; automatic restart when temperature decreases
Storage temperature	From -20°C to +70°C
Relative humidity	up to 96% without condensation
Casing	
Material	Painted Aluminium
Dimensions (length, height, depth) / Weight	270 x 360 x 130 mm / 6.8kg
Fixing screw (wall)	4 x M6 round head screws
Protection factor	IP23
PCB protection	Water-repellent varnish
Standards	
CE / EMC	EN61204-3
CE / Security	EN60335-2-29
Protections	
	- Against leaking input surges by VDR rupture (voltage dependent resistor) - Not covered by warranty - Against output polarity reversal by fuse rupture - Against short-circuit and surge - Against abnormal overheating by cutting off the charger
Options	
Temperature probe	Output voltage compensation : -18mV/°C
Parallel mouting	Up to 4 units with balancing and charge control
Remote control touch screen front	HPO-DISPLAY-R
Isolated CAN-BUS Interface	Fully integrated as standard

HPO 24V 45A, 24V 60A, 24V 80A, 24V 100A

Part Number	HPO24-45	HPO24-60	HPO24-80	HPO24-100
Model	24V/45A	24V/60A	24V/80A	24V/100A
recommended battery bank (Ah)	300-600Ah	500-800Ah	700-1000h	800-1300Ah
Input				
Voltage	from 90 to 265VAC single-phase automatic			
Frequency	from 47 to 65Hz automatic			
Input current consumption 230/115VAC	6.0/16.0A	9.0/20.0A	11.0/20.0A	15.0/30.0A
Recommended power for a generator	1600W	2100W	2800W	3520W
Power factor	1			
Efficiency	87% typical			
Input fuses	2 x 20A 250V (6,3x32) (F1/F2)	2 x 25A 250V (6,3x32) (F1/F2)		2 x 32A 250V (6,3x32) (F1/F2)
Output				
Number of battery bank	3 (including one for the engine): +BAT E, +BAT 1, +BAT 2 (integrated Mosfet splitter) and 1 -BAT Each bank can be used individually and deliver the rated current			
Connection on throaded rods	M6			M8
Total rated current (+/-7%) / Rated power	45A/1282W	60A/1710W	80A/2280W	100A/2850W
Charging curve	IU or IUoU through internal dip switches (Boost, Absorption, Floating – factory setting). Selectable automatic Refresh			
Battery type	Lead sealed as factory setting - Gel, AGM, Calcium Lead, LiFePO4, DC power-supply mode, etc. Specific request on demand			
Boost voltage	28.8VDC for Lead sealed battery (factory setting)			
Floating voltage	27.6VDC for Lead sealed battery (factory setting)			
Regulation tolerance before output Mosfet splitter and fuse	< 1% (at rated conditions)			
Peak to peak ripple and noise	< 1% (at rated conditions)			
Automotive output fuse mounted in series in minus pole -BAT	2 x 30A/32V	3 x 25A/32V	3 x 35A/32V	4 x 30A/32V
Environment				
Cooling	Electric fan controlled in temperature and current			
Sound level	< 50dBa at 1m			
Operating temperature at 230VAC	Rated charge from -20°C to +50°C, derating above 50°C. Automatic charger switch off above 60°C ; automatic restart when temperature decreases			
Storage temperature	From -20°C to +70°C			
Relative humidity	up to 96% without condensation			
Casing				
Material	Painted Aluminium			
Dimensions (length, height, depth) / Weight	270 x 360 x 130 mm / 6.8kg			270 x 410 x 130 mm / 9.0kg
Fixing screw (wall)	4 x M6 round head screws			
Protection factor	IP23			
PCB protection	Water-repellent varnish			
Standards				
CE / EMC	EN61204-3			
CE / Security	EN60335-2-29			
Protections				
	- Against leaking input surges by VDR rupture (voltage dependent resistor) - Not covered by warranty - Against output polarity reversal by fuse rupture - Against short-circuit and surge - Against abnormal overheating by cutting off the charger			
Options				
Temperature probe	Output voltage compensation : -36mV/°C			
Parallel mouting	Up to 4 units with balancing and charge control			
Remote control touch screen front	HPO-DISPLAY-R			
Isolated CAN-BUS Interface	Fully integrated as standard			

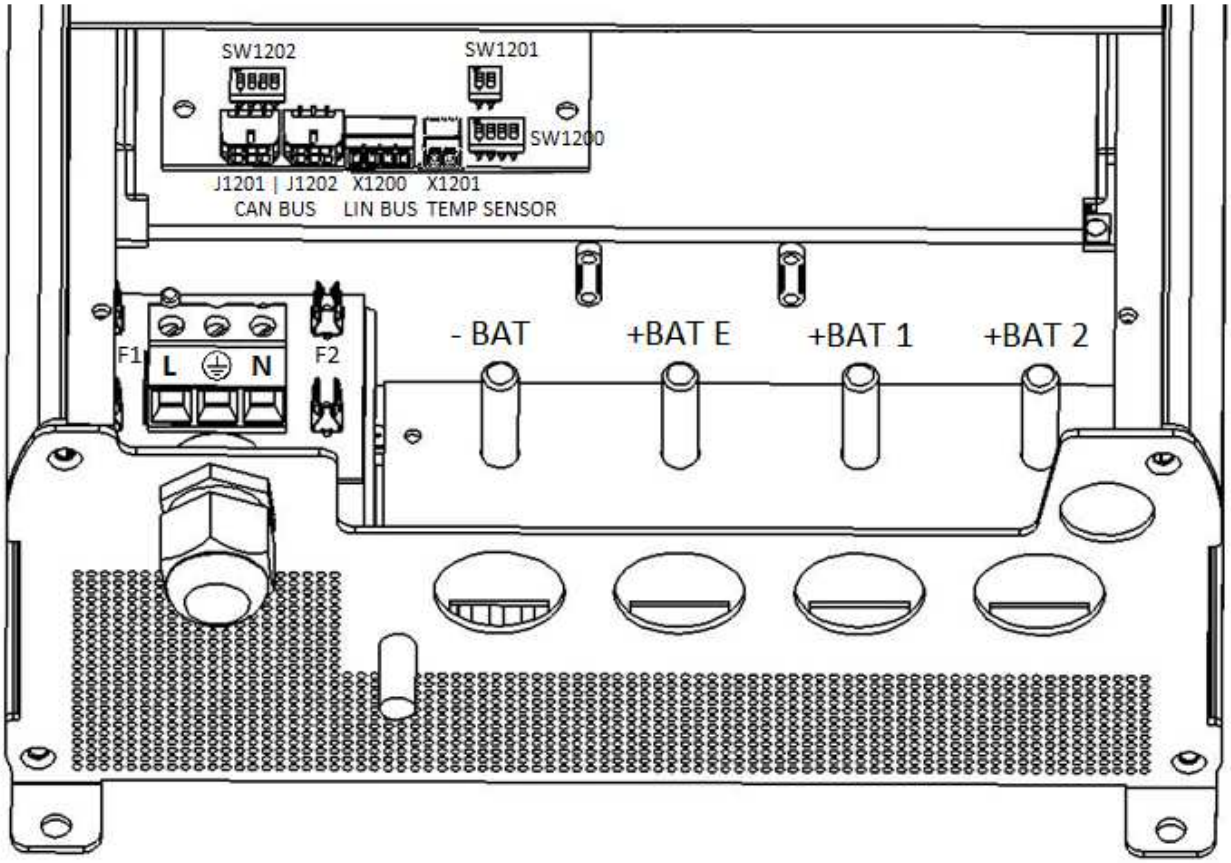
Annexe

Appendix

ANNEXE 1 / APPENDIX 1

Entrée / Input :

- L : Phase / Phase
- ⏚ : Terre / Earth
- N : Neutre / Neutral



Sorties / Outputs :

- (-Bat) -Batterie / -Battery
- (+Bat E) +Batterie de démarrage / +Engine battery
- (+Bat 1) +Batterie service 1 ou auxiliaire 1 / +Service battery 1or auxiliary 1
- (+Bat 2) +Batterie service 2 ou auxiliaire 2 / +Service battery 2 or auxiliary 2

Fusibles / Fuses :
F1, F2 : Fusible d'entrée / Input fuse
F700, F701, F702 (HPO 12-90, 24-45, 24-60, 24-80) : Fusible de sortie / Output fuse
F1, F2, F3, F4 (HPO 24-100 only) : Fusible de sortie / Output fuse

Valeurs et type : voir chapitre "spécifications techniques" / values and type : see chapter "technical specifications"

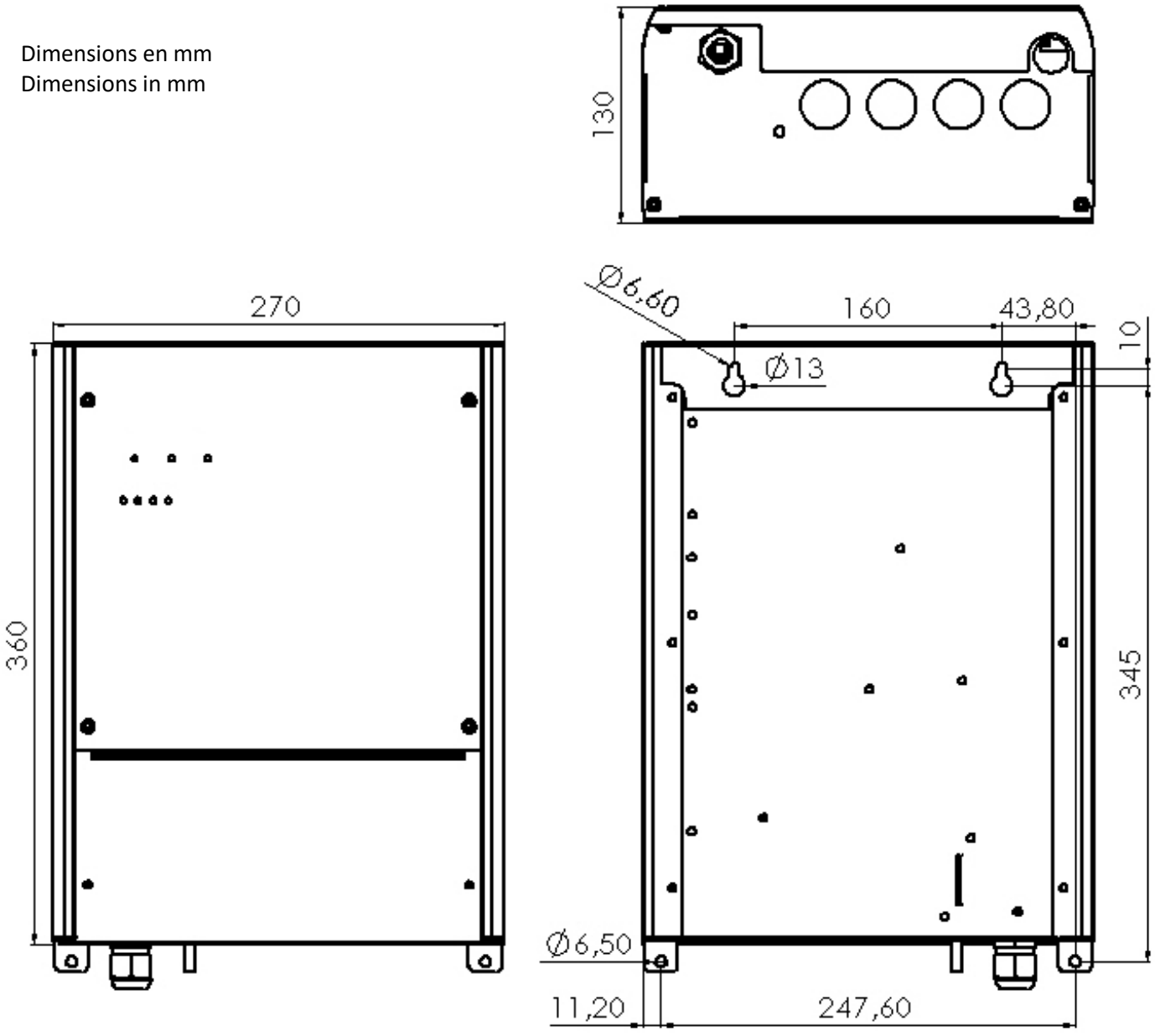
ANNEXE 2 / APPENDIX 2

HPO 12-90, 24-45, 24-60, 24-80

Positionner le chargeur à la verticale, connection vers le bas. Le non respect de cette position peut entrainer une diminution de la puissance disponible, une perte de degré d'IP.
Zone de dégagement de 150mm autour du chargeur pour ventilation et ouverture du chargeur.
Ne rien déposer sur le chargeur.

Place the charger vertically, connection downwards. Failure to respect this position may cause a decrease in available power and a loss of IP level.
A clear area of 150mm all around the charger for proper ventilation and opening of the charger.
Never put anything on the charger.

Dimensions en mm
Dimensions in mm



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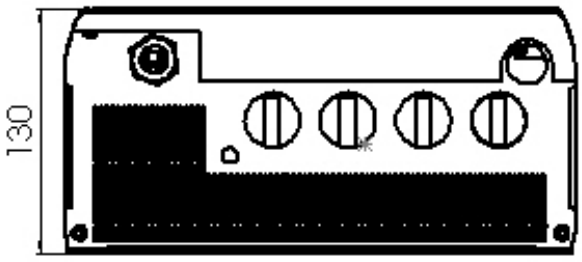
ANNEXE 3 / APPENDIX 3

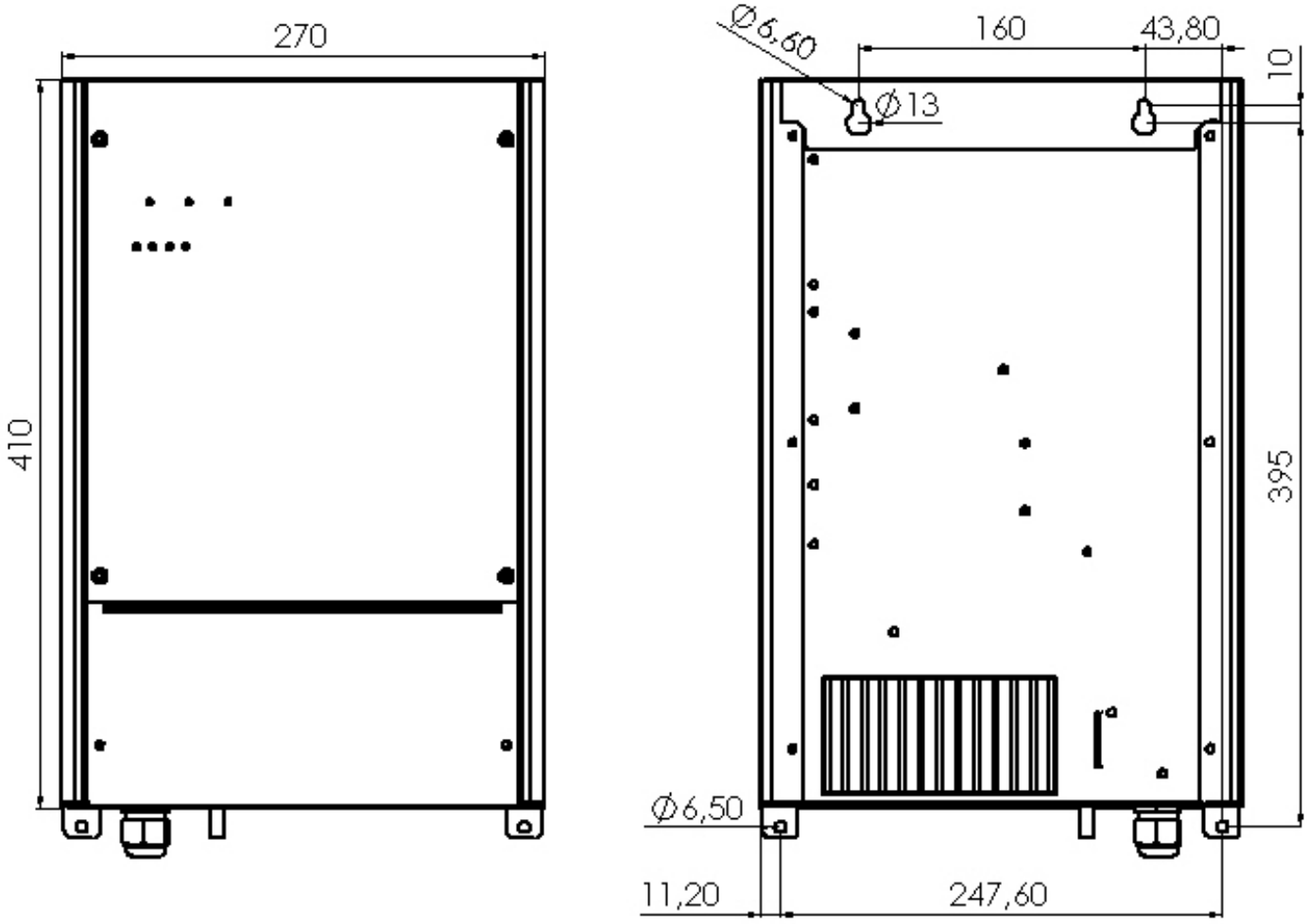
HPO 24-100

Positionner le chargeur à la verticale, connection vers le bas. Le non respect de cette position peut entrainer une diminution de la puissance disponible, une perte de degré d'IP.
Zone de dégagement de 150mm autour du chargeur pour ventilation et ouverture du chargeur.
Ne rien déposer sur le chargeur.

Place the charger vertically, connection downwards. Failure to respect this position may cause a decrease in available power and a loss of IP level.
A clear area of 150mm all around the charger for proper ventilation and opening of the charger.
Never put anything on the charger.

Dimensions en mm
Dimensions in mm





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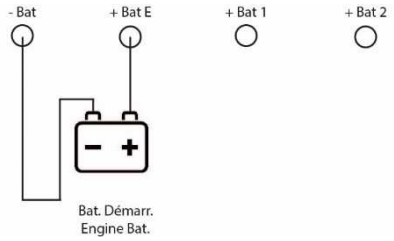
ANNEXE 4 / APPENDIX 4

Autres Cablages / Other type of installation

- Batterie de démarrage / +Engine battery

❶

Montage 1 Batterie de démarrage
Mounting 1 Engine Battery



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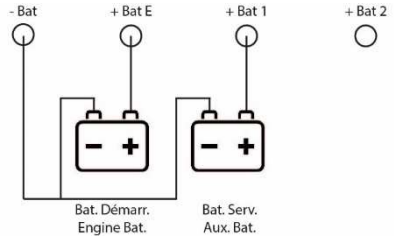
Montage 1 Batterie de démarrage + 1 Batterie Service
Mounting 1 Engine Battery + 1 Auxiliary Battery



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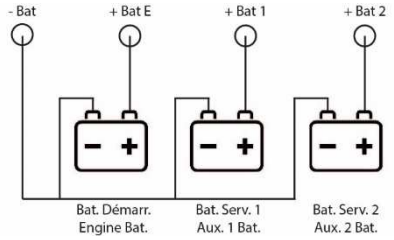
Montage 1 Batterie de démarrage + 2 Batteries Service
Mounting 1 Engine Battery + 2 Auxiliary Batteries



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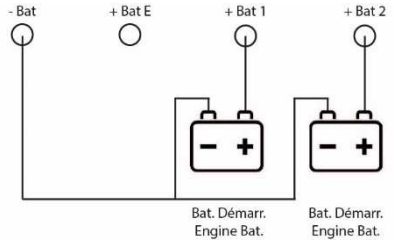
Montage 2 Batteries de démarrage
Mounting 2 Engine Batteries



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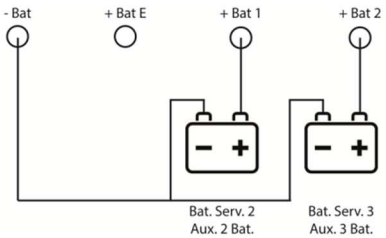
Montage 2 Batteries Service
Mounting 2 Auxiliary Batteries



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Montage 3 Batteries Service
Mounting 3 Auxiliary Batteries