

## INSTRUCTIONS FOR USE

### Pulse battery charger AP-800LCD

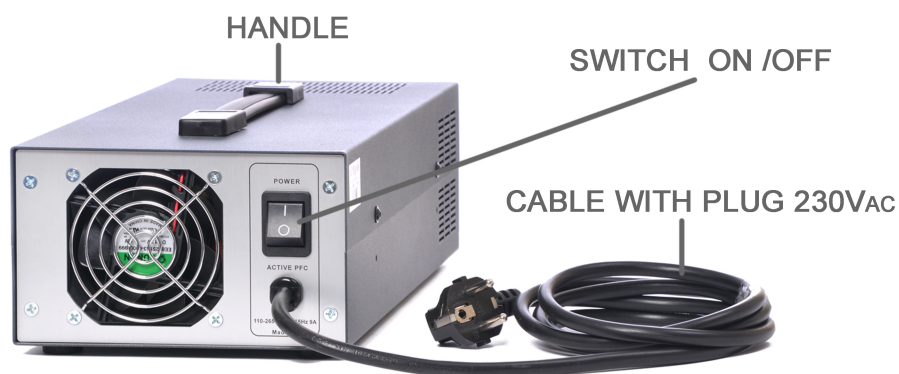
12V 50A, 24V 28A, 36V 19A, 48V 14A



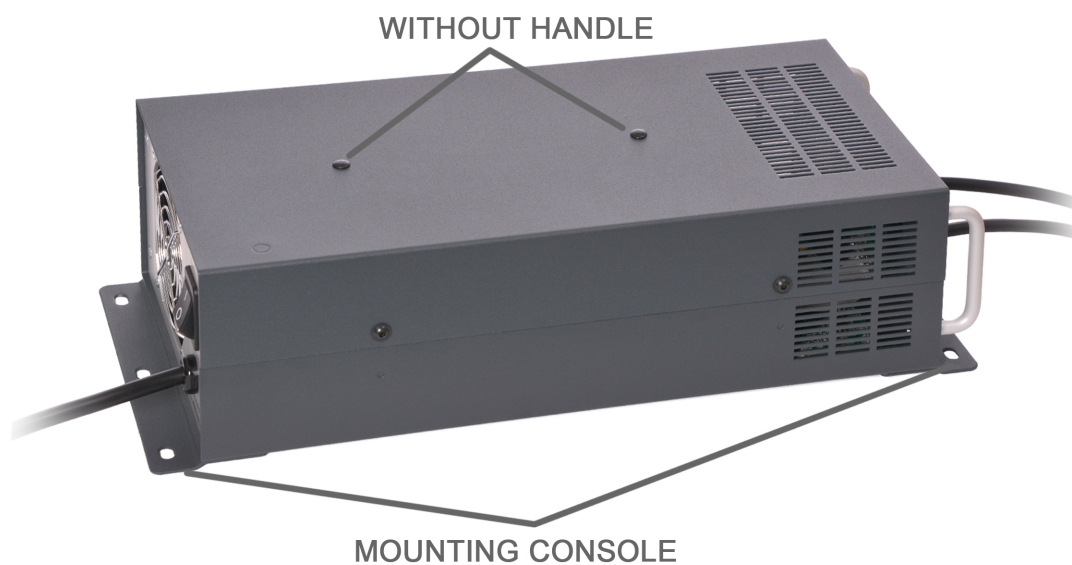
#### CHARGER CHARACTERISTICS

- **Pulsed or continuous charge current**
- Charger that can "listen" to the chemistry of the battery
- **Fast, smooth and battery friendly charging**
- Battery determines charging current by itself under supervision of Intelligent microprocessor pulse charging system
- **8 charging programs for different type of batteries**
- There is no warming up effect, which reduces battery life at overcharge
- **4 charging phase: bulk charge, absorption, equalization, float charge**
- Regenerate cells majorly, when they were charged improperly- Battery desulfatization effect
- **Pulse-charging prolong the battery life**
- Safe against short-circuit
- **Safe against wrong polarity by connecting battery on the charger**
- Simple signalling of green, red, yellow LED, acoustic buzzer and LCD screen
- Set the settings by turning and by pressing the selection button
- **"Burst Charge"** menu for completely discharged battery
- Working temperature range from 0° to 35°C
- Charging is independent of oscillations in the supply voltage (PWM technology)
- **Desktop or mounting version**

## CHARGER OVERVIEW (DESKTOP VERSION)



## MOUNTING VERSION (OPTION)



## HOW TO USE THE BATTERY CHARGER AP-800LCD

The battery charger is designed to charge only 12V, 24V, 36V ali 48V lead (Pb) batteries, depending on the type of charger. **Check if the charger and battery have the same voltage!**

▶	Plug the charger (230Vac cable) into the mains.
▶	Switch on the main supply switcher (POWER) on back of the charger.
▶	The device responds with a short beep and all three LED blinks briefly, captions appear on the screen, the charger is ready to charge.
▶	<b>BLACK</b> on – poll of the battery
▶	<b>RED</b> on + poll of the battery
▶	At correct connection device short beeps and the yellow LED starts blinking, on the screen appears heading value of current and voltage. The battery is charging.
▶	When the battery is full, GREEN LED indicator lights on.

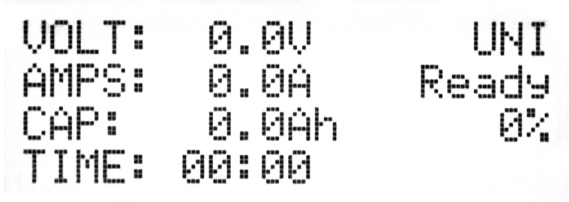
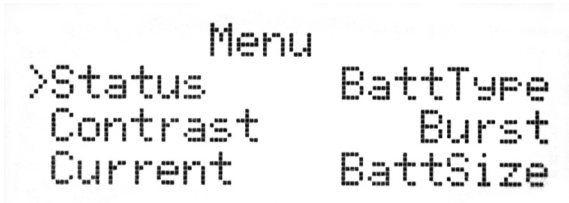
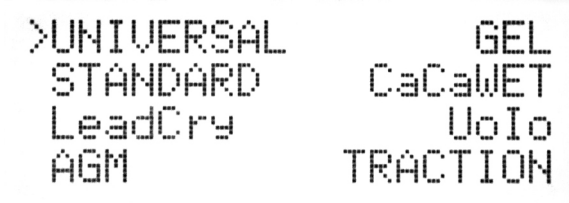

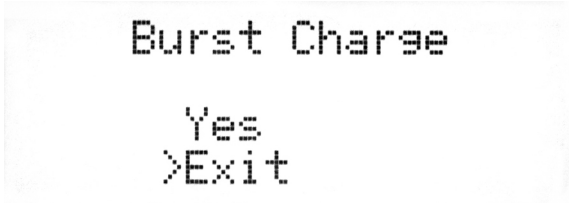
**Tip:** The battery is fully charged only a few hours after the green LED light is on and thee screen appears heading **"Float"** and the value of 100%. You can use the battery immediately after the green LED flashes when the charge is up to 90%, but it is recommended at least 1x per month to leave the battery on the charger to be fully charged.

**Warning:** If the battery is properly connected and all three LED blinks, but the charger does not charge, then the battery is over-discharged. In this case choose function »**Burst Charge**« (instruction - page 9).

## LEGEND OF LED SIGNALS WHILE CHARGING THE BATTERY

LED	LED activity	Charge phase	battery charge level
<b>RED, YELLOW, GREEN</b>	short blink all LEDs	charger is ready (Ready)	/
<b>YELLOW</b>	blinks	bulk charge (Bulk)	< 65%
<b>YELLOW</b>	continuously lit	absorption I charge (Abso1)	65..75%
<b>GREEN</b>	blinks	absorption II charge (Abso2)	75..90%
<b>GREEN</b>	2x fast blink	equalization charge (Equal)	90..95%
<b>GREEN</b>	continuously lit	float charge (Float)	>95%
<b>RED</b>	continuously lit	temperature off (Error)	/

## STATUS ON LCD SCREEN

<p><b>Status menu</b></p> 	<p>Immediately after the device is switched on, the status menu displays:</p> <p>Voltage (<b>VOLT</b>) Current (<b>AMPS</b>) Emitted charge (<b>CAP</b>) Charging time (<b>TIME</b>) Battery type select (<b>UNI</b>,...) Phase of charging (<b>Ready</b>,...) Battery charge in %</p>
<p><b>Main menu</b></p> 	<p>By pressing the button, the system enters the »<b>Main menu</b>«. By turning the button, can be set the desired section and select by pressing the button. Menu choices: »<b>Status</b>«, »<b>BattType</b>« (Battery select menu), »<b>Contrast</b>« (Contrast menu), »<b>Burst</b>« (Menu for forced charging), »<b>Current</b>« (Current Limit Menu) and »<b>BattSize</b>« (Battery Size Menu).</p>
<p><b>Battery select menu</b></p> 	<p>By turning the button from side to side, the cursor can move to the wanted section. Pressing the button can confirm the new-selected battery. After that short beep can be heard, the system moves to the main menu. Charge programs are: <b>Universal (UNI)</b>, <b>GEL</b>, <b>Standard (STA)</b>, <b>CaCaWET (WET)</b>, <b>LeadCrystal (LC)</b>, <b>Uolo (U-I)</b>, <b>AGM</b> and <b>TRACTION</b>. The program will keep selected settings after the device is turned off.</p>
<p><b>Contrast menu</b></p> 	<p>By turning and by pressing the button, can be set maximum visibility of the screen. The choice stays after device is turned off.</p>
<p><b>Menu for forced charging</b></p> 	<p>If we charge a fully discharged battery with a voltage below 6V, the system will not start charging, therefore we choose the »<b>Burst Charge</b>« menu then »<b>Yes</b>« and <b>press button</b> to confirm choice to activate forced charging with the single-pulse. (After the beep, we automatically return to the main menu.) If necessary, repeat the entire procedure several times, up to 100x.</p>



<p><b>Status menu (charge)</b></p> <pre> VOLT: 14.7V      UNI AMPS:  3.3A      Equal CAP:   0.0Ah     90% TIME:  00:03 </pre>	<p>Situation on the screen just before the battery is full. Phases of charging are: <b>Ready</b>, <b>Bulk</b> (bulk charge), <b>Abso</b> (absorption), <b>Equal</b> (equalization), <b>Float</b> (maintenance).</p>
<p><b>Status menu (float)</b></p> <pre> VOLT: 13.7V      UNI AMPS:  0.9A      Float CAP:   0.7Ah     100% TIME:  21:01 </pre>	<p>Situation on the display when the battery is fully charged (<b>Float</b>). After the battery charger is disconnected from the value of the charge (<b>CAP</b>) and the charging time (<b>TIME</b>) remains in memory. At the restarting of charging both the value will be deleted.</p>
<p><b>Battery select menu (U-I)</b></p> <pre> VOLT: 14.7V      U-I AMPS:  2.2A      Bulk CAP:   0.8Ah     100% TIME:  22:49 </pre>	<p>Linear charging current selection <b>U-I</b>. The desired voltage <b>U-o</b> and maximum current <b>I-o</b> can be set in the submenu »<b>Uolo Menu</b>«.</p>
<p><b>Uolo menu</b></p> <pre>       UoIo MENU setUo: 14.4V  Ca:50 setIo: 50.3A  Cb:20 &gt;OK </pre>	<p>Use the selection button to choose the desired voltage <b>Uo</b> (12.0V-17.0V) and <b>Io</b> (1.8A-50.3A). Finally, confirm with <b>OK</b> to leave the menu.</p> <p><b>Do not change</b> value of <b>Ca</b> and <b>Cb</b> !</p>
<p><b>Current Limit menu</b></p> <pre>       Current Limit set maxCurrent 100% &gt;Exit </pre>	<p>In »<b>Main menu</b>« select »<b>Current</b>«. In this section can be set maximum Current of the device in the range of 20..100% according to his nominal current. For 12V 50A charger that means setting within the limits of 10A in 50A with steps by 5A.</p>
<p><b>Battery Size menu</b></p> <pre>       Battery Size set BattSize 250Ah &gt;Exit </pre>	<p>In »<b>Main menu</b>« select »<b>Battery size</b>«. In this section you can set Battery Size in <b>Ah</b>. You can set within the limits of 50Ah and 1000Ah.</p>

## CHARGING PROGRAMS

<b>UNIVERSAL (UNI)</b>	universal program, used for unrecognised types of batteries
<b>STANDARD (STA)</b>	standard Pd program, used for older types of Pb batteries
<b>CaCaWET (WET)</b>	Pb CaCaWET program, is used for wet hermetic start battery
<b>AGM</b>	Pb with acid swab , used for hermetic AGM batteries
<b>GEL</b>	Pb GEL electrolyte program, used for hermetic GEL batteries
<b>LeadCry (LC)</b>	Crystal Pb-LC (SIPBE) program, used to lead Si crystal battery
<b>TRACTION (TRA)</b>	Pb Traction program, used for Traction Lead with liquid electrolyte
<b>Uolo (UI)</b>	continuous charge current, U and I can set

## CHARGING VOLTAGE RELATING TO CHARGE PHASE

The table below shows the charging voltage per cell in the battery. The charging voltage per cell are indicated for each charging profile or for each type of battery and charging phase.

	(Bulk) V/cel	(Absorption I) V/cel	(Absorption II) V/cel	(Equalization) V/cel	(Float) V/cel
<b>Universal</b>	1.. 2,355	2,430	2,397	/	2,20..2,30
<b>Standard</b>	1.. 2,355	2,460	2,410	2,490	2,25..2,30
<b>CaCaWET</b>	1.. 2,355	2,600	2,550	2,660	2,25..2,30
<b>AGM</b>	1.. 2,355	2,470	2,450	2,510	2,25..2,38
<b>GEL</b>	1.. 2,355	2,400	2,380	/	2,25..2,30
<b>Lead crystal</b>	1.. 2,355	2,460	2,380	/	2,316..2,325
<b>Traction</b>	1.. 2,355	2,580	2,400	2,630	2,28..2,32

## DESCRIPTION OF CHARGE PHASE

Charge phase:		Description:
<b>Bulk</b>	<b>BULK CHARGE</b>	Charges the battery up to 65%, delivering a lot of energy to the battery in a short time.
<b>Abso 1</b>	<b>ABSORPTION I</b>	The charge is slowed down so that the battery absorbs more energy. The battery reaches 65..75% of the capacity.
<b>Abso 2</b>	<b>ABSORPTION II</b>	Charge current is gradually reduced. The battery reaches 75..85% of the capacity.
<b>Equal</b>	<b>EQUALIZATION</b>	At this phase, levels between different filled cells are equalized. The battery reaches 90..95% of the capacity.
<b>Float</b>	<b>FLOAT CHARGE</b>	Keeps the battery at 100% of the capacity without causing damage to the battery. Also, can not over-charge the battery.

## CHARGING WITH LINEAR CURRENT

For special purposes where we need a stable voltage and current for charging (example: car tuning), device also offer this option. Charging current is linear. We can set it in the section »**Battery Type**« by select »**Uolo**«. In the submenu »**Uolo Menu**«, which automatically displays on screen, set the desired voltage and current, and confirm with »**OK**«. The system automatically enters the »**Status menu**« and on the upper right corner of the screen we see the inscription »**U-I**«.

There are technical limitation of the device, it is not possible to set the (for example) voltage of 17V and current 50.3 at the same time. Below are examples for 12V, 24V, 36V and 48V chargers.

### Charger 12V 50A

Selected voltage <b>Uo</b>	Max selected current <b>Io</b>
>16.5V	10.5A
16.0V	12.2A
15.5V	15.8A
15.0V	29.8A
14.8V	40.2A
<14.8V	50.3A

### Charger 24V 28A

Selected voltage <b>Uo</b>	Max selected current <b>Io</b>
>33.0V	6.0A
32.0V – 33.0V	6.8A
31.0V – 32.0V	8.7A
30.0V – 31.0V	17.0A
29.6V - 30.0V	22.2A
<29.6V	28.1A

### Charger 36V 19A

Selected voltage <b>Uo</b>	Max selected current <b>Io</b>
>49.5V	3.5A
48.0V – 49.5V	4.2A
46.5V – 48.0V	5.3A
45.0V – 46.5V	10.1A
44.0V - 45.0V	13.6A
<44.0V	17.3A

### Charger 48V 14A

Selected voltage <b>Uo</b>	Max selected current <b>Io</b>
>66.0V	2.9A
64.0V – 66.5V	3.4A
62.0V – 64.0V	4.4A
60.0V – 62.0V	8.3A
59.2V – 60.0V	11.2A
<59.2V	14.1A

## SELECTION OF CHARGING CURENT AND BATTERY SIZE

Select the maximum of charging current in the section »**Current limit**«

size of battery:		maximum current:
smaller batteries:	between 5..20Ah	within the limits of 10..20A
medium battery	up to 70Ah	within the limits of 20..40A
larger batteries	larger than 70Ah	within the limits of 50A

Starting batteries can receive current:

$$I = 1 \times C \quad (I = \text{charging current, } C = \text{capacity of Battery in Ah})$$

Stationary and maintenance batteries can receive a smaller current, that is:

$$I = C/4 \quad (I = \text{charging current, } C = \text{capacity of Battery in Ah})$$

In the menu »**Battery size**«, set the battery size in Ah. If we set a lower value than it really is, then the charging time will be a bit longer. The battery will be charged at a bit higher level and opposite.

## DESCRIPTION OF THE PULSE BATTERY CHARGING TECHNOLOGY

Pulse charging system is electrode specific charging system; it is new technology of battery charging. It presents a small revolution on this area, because the results in practice are drastically better. With this technology is possible very fast and very precise charging, because only electrochemical condition of battery "dictates" the charging phase and charging current, which is momentarily correctly for the battery.

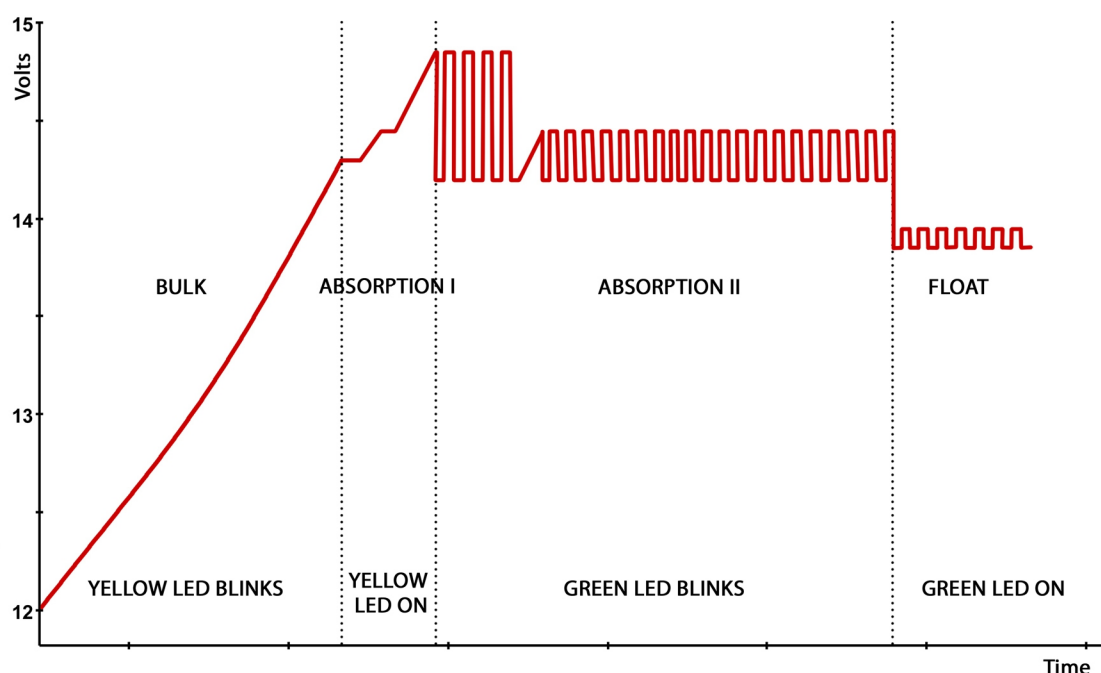
**When charging with pulse charger AP-800LCD, does not come to the gasification of the electrolyte and warming up, that destroys (breaks) cell lead-acid batteries. So as a result, pulse charging majorly prolong battery life and shortens the charging time.**

Theoretically, acid battery can be charged with 2,5 times higher current than default current is. This means that 100Ah battery can be charged in less than 30 minutes, if we can use current source of 250A. For example, if starter battery of a vehicle is empty, it is possible to start the engine after approximately 5 minutes, if AP-800LCD is used.

We can say that pulse charging technology works as transformer between battery chemistry and signals that commands the charge. Each battery is "treated" individually. Your experience with this charging method please send to [info@eyra-elektronika.si](mailto:info@eyra-elektronika.si).



## CHARGING DIAGRAM



## HOW AND WHEN TO USE THE BURST CHARGING

When charging an overdischarged battery which has a voltage below 6V (at 12V charger), the system does not start charging, even though the charger is properly connected. In this case, choose the heading »**Burst Charge**«, then »**Yes**« and **press button** to confirm choice to activate forced charging with the single-pulse. (After the beep, the setting automatically returns to the main menu.)

If necessary, repeat the entire procedure several times, up to 100x. Repeat until a voltage of 6V is reached at 12V charger (For the other chargers, see table below). From then on the system automatically starts charging.

Charger model:	AP-800 12V	AP-800 24V	AP-800 36V	AP-800 48V	AP-800 60V	AP-800 72V
Start charge at:	<b>6V</b>	<b>12V</b>	<b>18V</b>	<b>24V</b>	<b>30V</b>	<b>36V</b>

# TECHNICAL DATA

Model		AP-800 12V 50A	AP-800 24V 28A	AP-800 36V 18A	AP-800 48V 14A
Output	Bulk charge voltage	14,6V yellow LED	29,2V yellow LED	43,8V yellow LED	58,4V yellow LED
	Float charge voltage	13,7V green LED	27,4V green LED	41,1V green LED	54,8V green LED
	Pulse current-eff	50A	28A	19A	14A
	Battery capacity	50Ah (min)	25Ah (min)	20Ah (min)	15Ah (min)
	Battery type	GEL, AGM, CaCaWET, traction, universal, standard, Lead crystal, U-I			
	Charging mode	intelligent pulse charging, 20Hz			
Input	Charge phases	bulk / absorption I / absorption II / equalization / float			
	Mains voltage	180V-265Vac			
	Mains frequency	40-65 Hz			
	Power factor	> 0,97 at all volt. range, active PFC			
	Efficiency	91%	92%	93%	94%
	Input current	8.5Aeff at105Vac, 5Aeff at180Vac, 4Aeff at 230Vac			
Protect	Inrush current	cold start 23A			
	Leakage current	< 3,5mA / 240Vac, class I			
	Short circuit	Save, no voltage on output if battery is not connect			
	Start charge at	6V	12V	18V	24V
	Reverse polarity	save, active protect, acoustic buzzer active, error on LCD			
	Over temperature	automatically disconnect charge current and red LED is active, error on LCD			
Environment	Cooling	active with fan, 5 speeds			
	Working temperature	0-35 °C			
	IP protect	IP20			
Other	Temperature compensation	+2mV/°C /cel, if temp < 15°C and -2mV/°C/cel, if temp > 25°C, for SiPb battery: +4mV/°C/cel, if temp<15°C and -4mV/°C/cel., if temp >25°C			
	Weight	4kg			
	Dimensions	350 x 170 x 100 mm (D x Š x V)			
	Signals	red, yellow, green LEDs & buzzer sound, LCD 20x4 character, encoder + button			
	Use area	nautic, industry, workroom, labs, el. vehicle, el. scooter, el. vessels, car service...			
Assembling	Assembling	desktop or wall mounting			

Model		AP-800 60V 11A	AP-800 70V 10A		
Output	Bulk charge voltage	73V yellow LED	87,6V yellow LED		
	Float charge voltage	68V green LED	81,7V green LED		
	Pulse current-eff	11A	10A		
	Battery capacity	15Ah (min)	10Ah (min)		
	Battery type	GEL, AGM, CaCaWET, traction, universal, standard, Lead crystal, U-I			
	Charging mode	intelligent pulse charging, 20Hz			
Input	Charge phases	bulk / absorption I / absorption II / equalization / float			
	Mains voltage	180V-265Vac			
	Mains frequency	40-65 Hz			
	Power factor	> 0,97 at all volt. range, active PFC			
	Efficiency	95,00%	95,00%		
	Input current	8.5Aeff at105Vac, 5Aeff at180Vac, 4Aeff at 230Vac			
Protect	Inrush current	cold start 23A			
	Leakage current	< 3,5mA / 240Vac, class I			
	Short circuit	Save, no voltage on output if battery is not connect			
	Start charge at	30V	36V		
	Reverse polarity	save, active protect, acoustic buzzer active, error on LCD			
	Over temperature	automatically disconnect charge current and red LED is active, error on LCD			
Environment	Cooling	active with fan, 5 speeds			
	Working temperature	0-35 °C			
	IP protect	IP20			
Other	Temperature compensation	+2mV/°C /cel, if temp < 15°C and -2mV/°C/cel, if temp > 25°C, for SiPb battery: +4mV/°C/cel, if temp<15°C and -4mV/°C/cel., if temp >25°C			
	Weight	4kg			
	Dimensions	350 x 170 x 100 mm (D x Š x V)			
	Signals	red, yellow, green LEDs & buzzer sound, LCD 20x4 character, encoder + button			
	Use area	nautic, industry, workroom, labs, el. vehicle, el. scooter, el. vessels, car service...			
Assembling	Assembling	desktop or wall mounting			

## TROUBLESHOOTING

Error	Cause	Solution
The charger is connected to the mains, power switch is ON, LED not blinks and the screen does not work.	- there is no mains voltage 230Vac	- ensure supply voltage 230Vac
Battery is connected but the charger is not charging, all LED blinking. The screen shows a low voltage.	- to low voltage on the battery (over-discharged battery)	- use START HELP button
Red LED is on and the LCD Screen displays »Error«.	- devices has overheated - to high ambient temperatures - fan error	- reduce the ambient temperature - service intervention - clean up fan

## WARNING!

- The charger is designed for indoor use (do not expose the charger to rain).
- Charger AP800 48V/14A can not use unauthorized person!
- During charging ensure adequate ventilation!
- Never hold with hand red and black crocodile + and – and push BURST button!
- We recommend disconnecting the battery from the car if the CaCaWET or Traction charging program is used.
- The charger AP-800LCD has a built-in security feature that stops the automatic charging start if charger detects an over-discharged battery. **Over-discharged battery could be in damage.** In this case, choose the »Burst Charge« menu then »Yes« and **press the button** to activate forced charging with the single-pulse. If necessary, repeat the entire procedure several times, up to 100x, until a voltage of 6V is reached at 12V charger (For the other chargers, see technical data), then the system automatically starts charging. **From this moment on, the user is obliged to control the charging of batteries. Because in case of a defect on the battery, it can overheat, begin to gasify and in extreme cases may happen an explosion and /or a fire.**

## SERVICE AND GUARANTEE

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e-mail: [info@eyra-elektronika.si](mailto:info@eyra-elektronika.si) <http://www.eyra-elektronika.si>

## GUARANTEE STATEMENT

### Guarantee conditions:

1. The guarantee is valid for 24 months from the date of sale.
2. The guarantee repairs are carried out exclusively by an authorized service center.
3. The guarantee applies only to the charger, and not to any other device connected to this module.
4. The guarantee and liability does not include any fees, postal costs, damages and any costs related to the failure of this device.
5. The guarantee does not apply to batteries, mechanical damage or lightning strikes.
6. The guarantee does not apply if the device was mounted or used in violation of the instructions.
7. The guarantee does not apply if an unauthorized person interferes with the device.
8. If, during the guarantee period the device is not repaired within 45 days from the date of receipt in our service center, we are obliged to replace it with a new one.
9. The guarantee period shall be extended for the period of repair.
10. The original invoice must be submitted for the enforcement of the guarantee.

seller :

**company:**

.....

**name and surname of the seller:**

.....

**signature of the seller:**

.....

**date of sale:**

.....

**stamp:**

