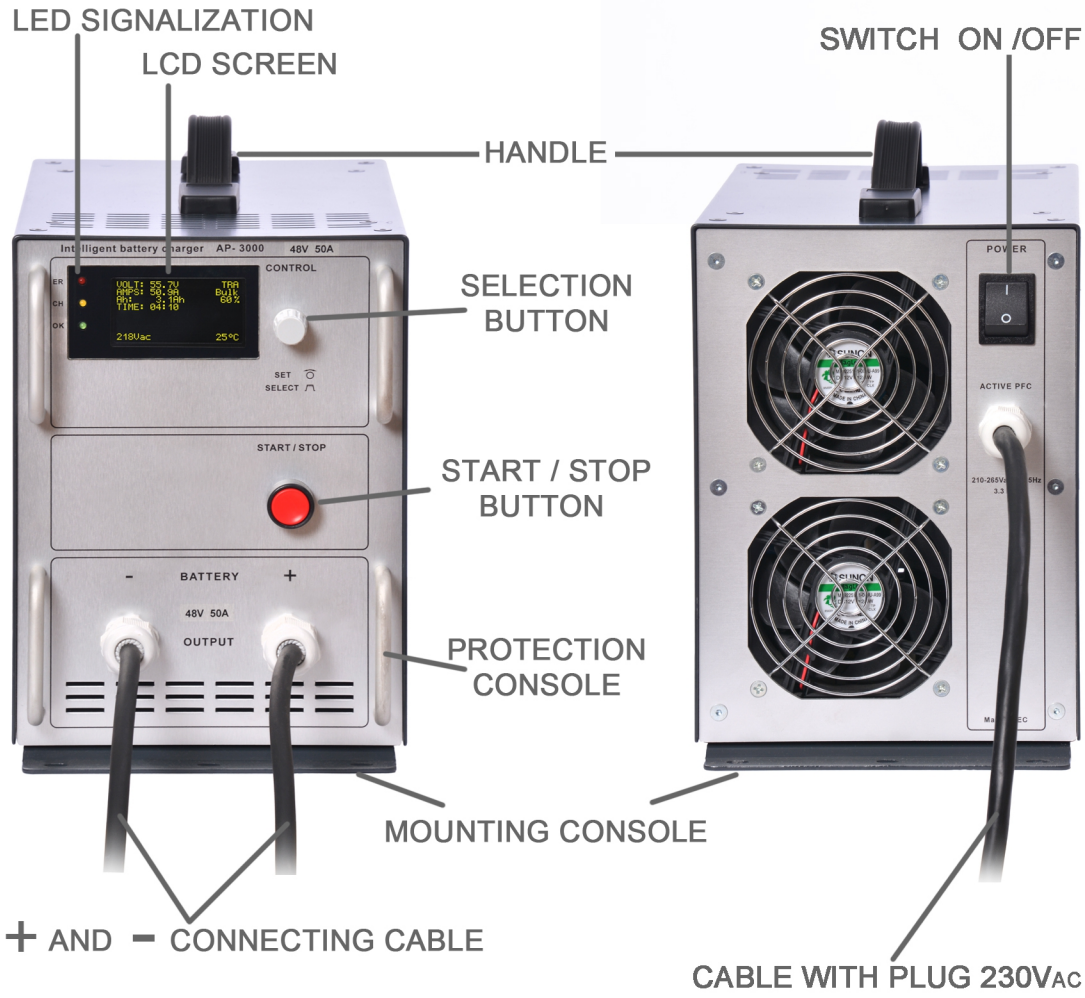
INSTRUCTIONS FOR USE

Pulse battery charger AP–3000

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 OLED screen
- Set the settings by turning and by pressing the selection button
- **"Burst Charge"** menu for completely discharged battery
- Working temperature range from 0º to 35ºC
- Charging is independent of oscillations in the supply voltage (PWM technology)
- **Desktop or mounting version**

CHARGER OVERVIEW (DESKTOP VERSION)



CONNECTING CABLE AND CLIPS

Cable with plug 230VAC

Connecting cable with crocodile clips (option)

Anderson connector (option)

HOW TO USE THE BATTERY CHARGER AP-3000

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.
▸	**BLACK** on **–** poll of the battery
▸	**RED** on **+** poll of the battery
▸	Press the red button START/ STOP, 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.

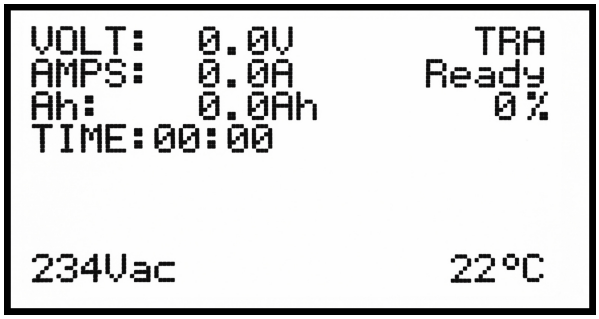
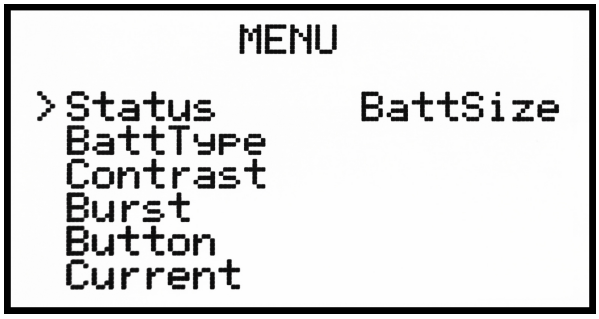
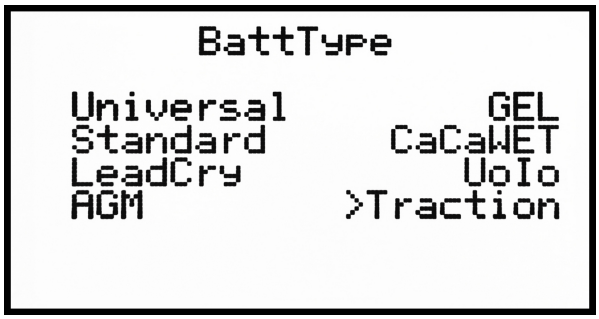
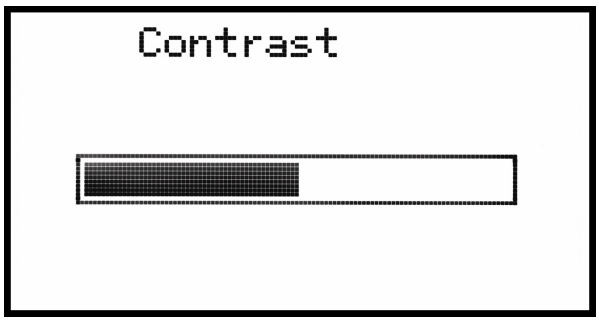
Tip: The battery is fully charged only a few hours after the green LED light is on and thee screen appears heading **"Float"** and the value of 100%. You can use the battery immediately after the green LED flashes when the charge is up to 90%, but it is recommended at least 1x per month to leave the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

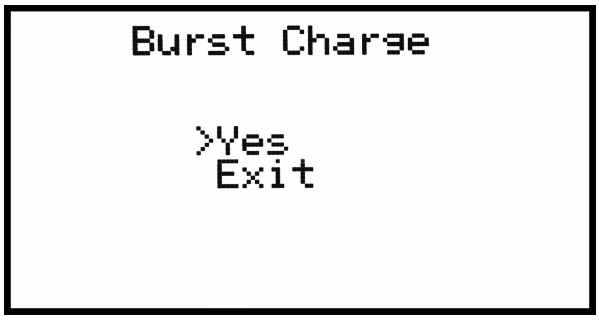
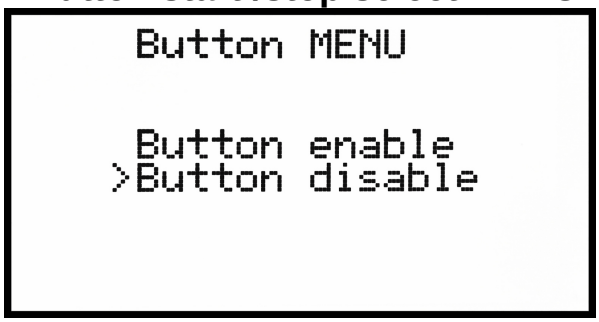
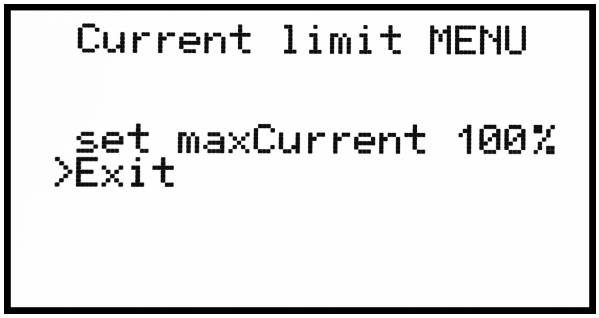
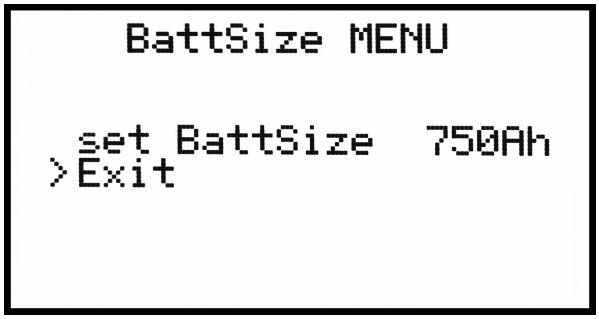
Warning: If the battery is properly connected and all three LED blinks, but the charger does not charge, then the battery is over-discharged. In this case choose function »**Burst Charge**« (instruction - page 9).

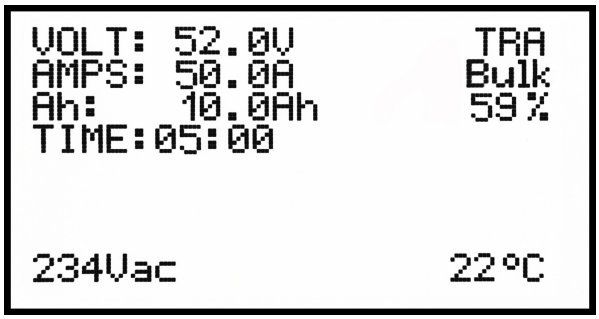
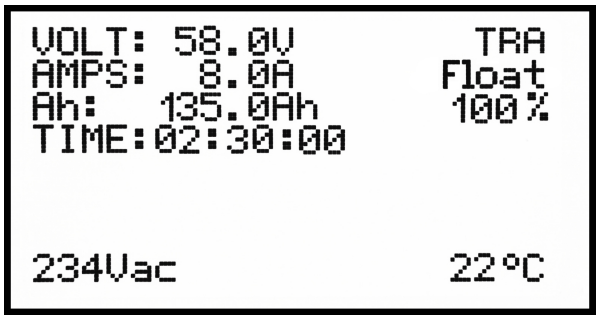
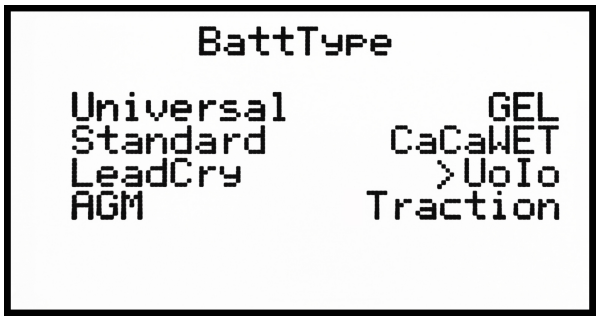
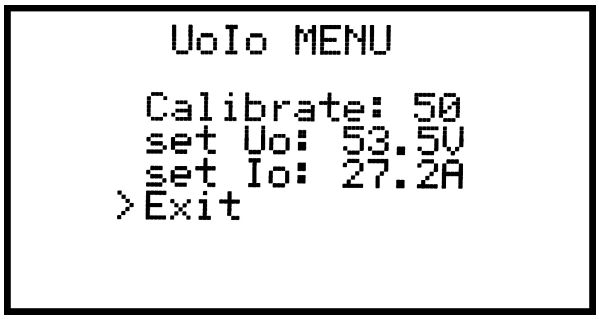
LEGEND OF LED SIGNALS WHILE CHARGING THE BATTERY

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

STATUS ON THE OLED SCREEN

Status menu 	Immediately after the device is switched on, the status menu appears: voltage (**VOLT**), current (**AMPS**), emitted charge (**CAP**), charging time (**TIME**), battery type select (**TRA**,…), charger status (**Ready**,…), battery charge in % and ambient temperature.
Main menu 	By pressing the button, the system goes into main menu. By turning the button, we set the wanted section and choose it by pressing a selection button. Choosing menus: »**Status**«, »**BattType**« (battery type), »**Contrast**« (display contrast), »**Burst**« (menu for forced charging), »**Current**« (max. current) in »**BattSize**« (battery size menu).
Battery Tipe menu 	By turning the button in one and the other side, put the cursor on the proper place. By pressing on the button confirm the new selected type of battery. Then It's hear a short beep and the system goes into main menu. Charging programs are: Universal (**UNI**), **GEL**, Standard (**STA**), CaCaWET (**WET**), LeadCrystal (**LC**), **U-I**, **AGM**, Traction (**TRA**). The charging program is still selected after switching off the device.
Contrast menu 	By turning and by pressing the button, can be set screen brightness in »**Contrast**« menu. Reduced brightness levels extends the lifetime of the screen.

Menu for forced charging 	If we charge a fully discharged battery with a voltage below 6V, the system will not start charging, therefore we choose the »**Burst Charge**« menu then »**Yes**« and **press button** 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..
Button start /stop select MENU 	The Start / Stop key can be used to start charging after the battery and charger have been connected. **»Button enable«**. When set to »**Button disable**«, the start of charging is activated when the + and - are connected to the battery.
Current limit MENU 	By turning and by pressing the button select »**Current**«. In »**Current limit MENU**« can set limit of the charging current in the range of 20 to 100%, based on the rated charging current.
Battery size MENU 	In »**Battery size MENU**«, can select battery size within the limit between 50 in 1000Ah

Status menu (charge) 	Picture of display apprears, when the battery is charged. Following charging phases are: **Ready**, **Bulk** (main charge), **Abso** (absorption), **Equal** (equalization) and **Float** (maintenance).
Status menu (float) 	Picture of display appears, when the battery is fully charged (**Float**). After the battery charger is disconnected from the battery, value of the charge (**CAP**) and the charging time (**TIME**) stay in memory. At the recharging both the value will be cleared.
Battery select menu (U-I) 	If you want to charge with a constant - linear current UoIo (non pulsed) in Battery select menu select „**UoIo**“ caption. The wanted voltage $\mathbf{U_0}$ and maximum current $\mathbf{I_0}$ can be selected in the submenu »**UoIo Menu**«.
UoIo MENU (linear current) 	By turning and by pressing the button select wanted voltage **Uo** (48.0V-68.0V) and **Io** (1.8A-50.3A). Finally, confirm with **OK** to leave the menu. Heading **Ca** (calibration of the reference voltage Uo) in **Cb** (calibration value) **do not change!** **For servis intervention only.**

CHARGING PROGRAMS

UNIVERSAL (UNI) universal program, used for unrecognised types of batteries
STANDARD (STA) standard Pd program, used for older types of Pb batteries
CaCaWET (WET) Pb CaCaWET program, is used for wet hermetic start battery
AGM Pb with acid swab , used for hermetic AGM batteries
GEL Pb GEL electrolyte program, used for hermetic GEL batteries
LeadCry (LC) Crystal Pb-LC (SIPBE) program, used to lead Si crystal battery
TRACTION (TRA) Pb Traction program, used for Traction Lead with liquid electrolyte
Uolo (UI) 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.

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

DESCRIPTION OF CHARGE PHASE

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

CURRENT LIMIT MENU

It happens that the line fuse in installation does not allow such a large consumption of energy from the network (example 10A fuse), as it needs Charger AP-3000. One of the reasons may be a aggregate, which is too weak, or the battery is too small for such a large charging currents. Power of the charging current in this case can be reduced in **»Current limit MENU«** to 20% of nominal. A step of reduction the charging current is 10%. In the case of setting the charging current to 20% of the power consumption of the network more than 650W.

BATTERY SIZE MENU

The battery, which is filled can be small (less than 50Ah) or large, over 1000Ah. Depending on the size of the battery, the ability to receive el. energy during the absorption phase is very different. The charging profile therefore adjusts to the size of the battery during the absorption, equalization and maintenance phases. To make sure that battery charging is really optimal, select the size (capacity) of the battery in the »**BattSize MENU«**

BUTTON START/ STOP (BUTTON MENU)

Start/stop button can be used to start charging when the battery and charger are connected. In the menu, the key is activated by selecting **»enable«**. Before disconnected the battery from the charger, when charging has been completed, press the button again. If we want a button will be deactivated, in this case the charging will begin immediately when the battery and charger are connected, then select **»disable«** in the menu.

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 »**UoIo«**. In the submenu »**UoIo 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 constraints of the device, which is not possible to set, for example voltage of 62V and current 50A at the same time. An example relates to 48V battery charger.

Selected voltage **Uo**	Max selected current **Io**
>66.0V	10.5A
64.0V	12.2A
62.0V	15.8A
60.0V	29.8A
59.2V	40.2A
<59.2V	50.0A

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.

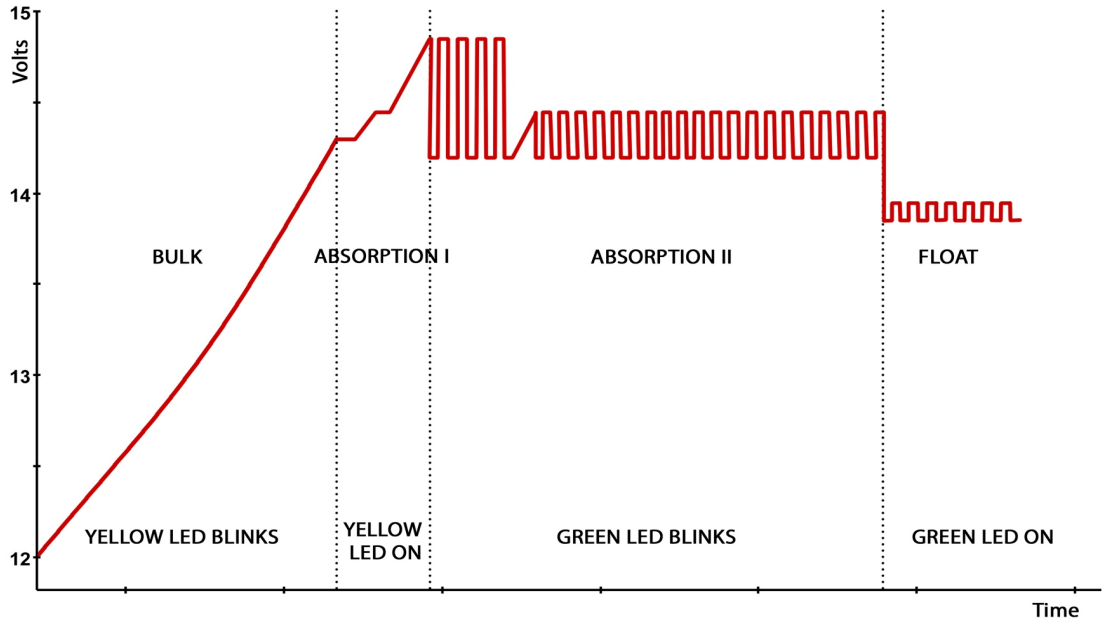
Charger model:	AP-3000 12V	AP-3000 24V	AP-3000 36V	AP-3000 48V
Start charge at:	**6V**	**12V**	**18V**	**24V**

MAINS VOLTAGE IS TOO LOW

In the event of a low supply voltage, all voltages below 210Vac count for this, the charging current is gradually reduced to 35% of the rated value. This happens at 90Vac. The device can therefore also be used in environments where the mains voltage fluctuates. Current from the grid will never exceed 16A. The system automatically protects itself from destruction, as does the network installation and the 16A mains fuse. The charging current decreases gradually, as the table below shows. The mains voltage is displayed in the status menu on the left below. If the charger is in standby mode and not fully charged, the power supply is displayed with considerable error. After charging the charger, the voltage measurement error is minimal.

Uac[V]	210	200	190	180	170	160	150	140	130	120	110	100	90
Ibat[%]	95	90	85	80	75	70	65	60	55	50	45	40	35

CHARGING DIAGRAM



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-3000, 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.

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.

TECHNICAL DATA

Model		AP-3000 12V 135A	AP-3000 24V 100A	AP-3000 36V 75A	AP-3000 48V 50A
Output	THE MAIN CHARGE	14,6V yellow LED	29,2V yellow LED	43,8V yellow LED	58,4V yellow LED
	MAINTENANCE VOLTAGE	13,6V green LED	27,2V green LED	40,8V green LED	54,4V green LED
	PULSED CURRENT-EFF	100A	100A	75A	50A
	BATTERY CAPACITY	200Ah (min)	150Ah (min)	100Ah (min)	50Ah (min)
	BATTERY TYPE	GEL, AGM, liquid electrolyte CA/CA, traction, universal, standard, crystal SiPb, U-I			
	CHARGING MODE	intelligent pulse charging, 20Hz			
	CHARGING PHASES	bulk / absorption I / absorption II / equalization/ float / maintaining			
Input	MAINS VOLTAGE	90Vac-265Vac under 210Vac, the charging current is automatically reduced / show bottom left			
	MAINS FREQUEANCY	40-65 Hz			
	POWER FACTOR	> 0,97 at all volt. range, Active PFC			
	EFFICIENCY	91%	92%	93%	94%
	INPUT CURRENT	15Aeff at 215Vac 13,5Aeff at 230Vac			
	INRUSH CURRENT	cold start 23A			
	LEAKAGE CURRENT	< 4,5mA / 240Vac, klasa I			
Protect	SHORT CIRCUIT	save, no voltage on output, if battery is not connect			
	START CHARGING AT	6V	12V	18V	24V
	WRONG POLARITY	save, active protect, acustic buzzer active and red LED is on, error on display			
	OVER TEMPERATURE	automatically disconnect charge current and red LED is on, error on display			
	COOLING	active with fan, multi-level operation			
Environment	VORKING TEMPERATURE	0-35 °C, shows on the bottom right on the display			
	IP PROTECTION	IP20			
	TEMPERATURE COMP.	+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 in -4mV/°C/cel., if temp >25°C			
Other	WEIGHT	10 kg			
	DIMENSIONS	330 x 180 x 245 mm (D x Š x V)			
	SIGNALS	red, yellow, green LEDs & buzzer sound, OLED graphic display, selecting button			
	USE AREA	electric vehicles, forklifts, river and lake vessels, industry ...			
	VERSION	table and 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
Battery is connected but the charger is not charging, all LED blinking. The screen shows right voltage.	- button Start/ Stop in on	- press Start/ Stop button

WARNING!

- **The charger is designed for indoor use (do not expose the charger to rain).**
- **Charger AP3000 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-3000 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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Slovenia

Tel.++386 (0)1 7869-037 Fax++386 (0)1 7869-038
e-mail: 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:

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name and surname of the seller:

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signature of the seller:

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date of sale:

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stamp: