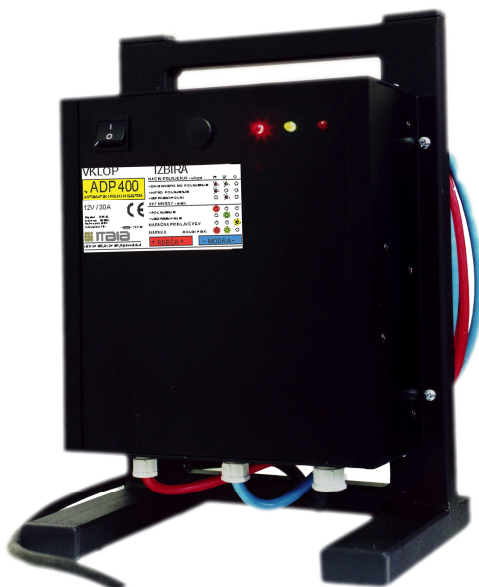


Operating Manual

Automatic-Diagnostic Lead-Acid Battery Charger ADP 400(s) / 800



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1 Safety Information and Caution

1.1. General

The device, connected and used in accordance with following instructions, is safe to use. All electrical parts are protected against water, dust and dirt by the relevant IP class. Housing prevents direct contact with any parts under voltage. Connection of the device must be done in accordance with local standards. Prior to commission control measurements must be preformed to ensure safe and correct operation.



! CAUTION: For any injury resulting from improper use, the user takes full responsibility.

BEFORE MOUNTING AND CONNECTION READ THIS MANUAL CAREFULLY!

THE CONNECTION OF DEVICE MUST BE DONE BY QUALIFIED PERSONNEL!

PRIOR TO CONNECTION, UNPLUG ELECTRICAL POWER!

DO NOT BLOCK ACCESS TO ELECTRICAL PARTS USED FOR EMERGENCY STOP, CLEANING AND MAINTENANCE!

METAL PARTS OF THE HOUSING MUST BE GROUNDED!

MAKE SURE NO WATER GETS IN TOUCH WITH PARTS UNDER VOLTAGE!

Fire-extinguishing Gear

In case of fire use CO₂ based fire extinguisher and other equipment following procedures in accordance with fire-safety regulations.

1.2. Safety Precautions

Safety precautions provide personal safety and long service life of the device. Any person taking part in mounting, connecting or maintaining the device must follow this manual and local safety regulation.

Before starting:

- Disconnect circuit breakers at input and output of the device and make sure there is no voltage present.
- Make sure power stays disconnected during the time of mounting and connecting.
- Take special care when working on a device installed in areas with high-voltage present.
- Check grounding connection.
- Provide protection against touching the parts under voltage.

Technical Support



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In case of malfunction please provide us with following information:

- type of the device,
- serial number,
- errors detected,
- overall time of operation,
- environmental conditions and
- application information.

We take no responsibility for proper operation and any consequence resulting from use in discordance with this manual. Safety measures must be provided by user working with the device.

Declaration of Conformity

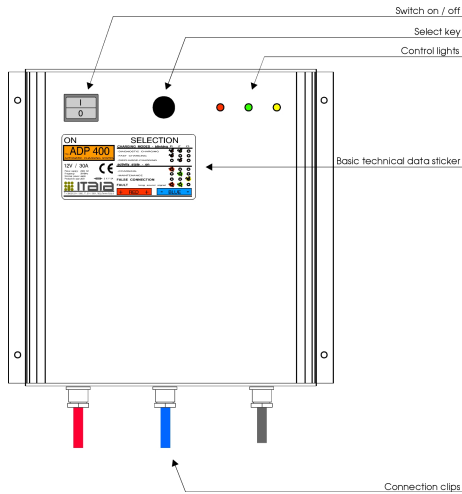
The device complies with relevant European directives (CE declaration of conformity):

- **Electromagnetic compatibility (ULRS, no. 132/2006)**
Directive 2004/108/EC and its amendments
- **Low voltage Directive (ULRS, no. 27/04)**
Directive 2006/95/EC and its amendments

2 Guideline for Connection and Use

2.1. Field of Use

Automatic charger ADP 400(s) / 800 is used for charging 12 or 24-volt Lead-Acid batteries. It ensures proper charging of battery and providing best capacity and service life of battery.



Basic element of charging system is microprocessor-based switching module which converts mains voltage into voltage suitable for battery charging. Microcontroller supervises and controls parameters for proper and safe charging of batteries. Soft-start function eliminates glitches when being switched on.

Main features of switching modules comparing to regular transformers are:

- smaller dimensions,
- lower mass (up to 15 times less),
- less heat dissipation,
- better responding.

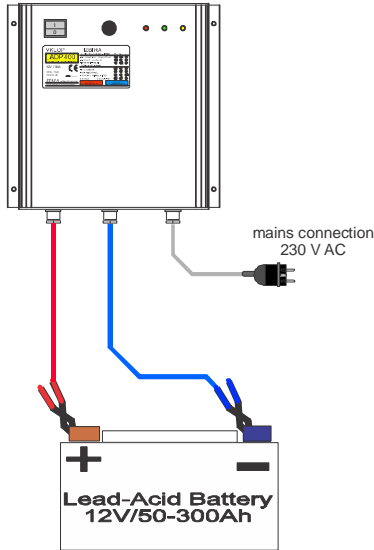
ADP charger provides three charging modes:

- automatic diagnostic charging
- fast charging
- discharge/charge mode

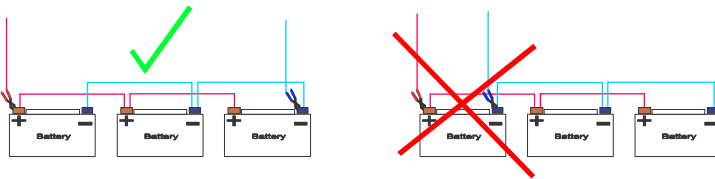
2. 2. Connection of Charger

The charger must be placed away from any heat sources, water and dirt. The place must be well ventilated and provided with heat exhaust. Mains power supply must be provided. The connection is shown in *Picture 1*.

Take care of the right polarity when connecting clips to the battery. When the charger is fully connected we can switch on the main switch.



Picture 1: Connection of battery charger to battery



Picture 2: Connecting multiple batteries

For optimal results all batteries must be the same type, age and condition.

2. 3. Indications and Handling

In each of 3 modes the charger checks battery connection, condition, voltage and capacity. Based on this data it defines charging time and current. Charging is set to optimal voltage and current. When the battery is full the charger goes into maintenance state. In this state it regularly checks charge and if needed adds some more charge to the battery. Time spent in this state can be unlimited. When the battery is disconnected it is always fully charged and in optimal condition. Charging/maintenance is indicated on control LED-s. The meaning of control lights and sound signals when charging is shown in *Table 1*.

CHARGING MODES	SOUND SIGNAL	RED	GREEN	YELLOW
Automatic – diagnostic Charging	-	blinking	blinking	-
Fast charging	-	blinking	-	-
Discharge – charging	-	-	blinking	-

ACTIVITY STATE	SOUND SIGNAL	RED	GREEN	YELLOW
Charging	-	ON	-	-
Maintenance	-	-	ON	-

	SOUND SIGNAL	RED	GREEN	YELLOW
FALSE CONNECTION	continuous sound signal	-	-	blinking
CHARGER FAULT	interval sound signal	ON	ON	-
BATTERY FAULT	interval sound signal	ON	ON	-

Table 1: Meaning of control lights and sound signals

You can always check charging mode during charging by pressing a button. After this, control LED shows charging mode for 10 seconds.

You can choose or change charging mode with double press on the button during charging, or pressing the button during the charging mode indication. Charging mode changes cyclic: Automatic charging – Fast charging – Discharge-charge charging.

If the battery is damaged or deteriorated, the charger will soon continue sound signal. At the same time red and green LED will light continuously. The same indication also shows the burned fuse in the charger.

2. 3. 1. Automatic-Diagnostic Charging

This mode is most frequently used and is chosen automatically when the charger is switched on. The mode can be changed at any time by pressing the corresponding button. After 10 seconds the charger begins charging – red LED is on. When the battery is fully charged the green LED turns on.

In this mode the charger checks battery connection, condition, voltage and capacity. Based on this data it defines charging time and current. Charging is set to optimal voltage and current. When the battery is full the charger goes into maintenance state. In this state it regularly checks charge and if needed adds some more charge to the battery. Time spent in this state can be unlimited. When the battery is disconnected it is always fully charged and in optimal condition. Automatic charging involves 3 stages: battery condition detection, battery charging and maintenance in fully charged condition.

2. 3. 2. Fast Charging

Fast charging is done with the fastest yet safe current and it provides the biggest possible change in the smallest amount of time. After charging, the charger goes into maintenance state (same as in automatic mode). The mode can be changed at any time by pressing the corresponding button. After 10 seconds the charger begins charging.

This mode is recommended to use only on rare occasions when the time limit is very short. Battery life can be greatly reduced when using this mode frequently.

2. 3. 3. Discharge – Charge

This mode is the best way to maintain optimal capacity and life service of the battery but can be very time consuming. After connection, the battery is safely discharged completely and then slowly charged with optimal charge. This mode eliminates the so called memory effect on batteries resulting from improper charging or discharging.

The mode can be changed by pressing the corresponding button. After 10 seconds the charger begins the discharge-charging process.

2. 4. Guidelines for Safe and Proper Use of Charger

- Charging of the battery must be done indoors or in weather protected areas.
- Proper ventilation of the room must be provided when charging.
- Connect the charger to a grounded main supply socket only.
- Use the charger for charging of Lead-Acid batteries only.
- Battery capacity should be between 45 and 300 Ah, 12 or 24 V.
- When parallel charging of multiple batteries, they should all be of the same type, age and condition.
- **CAUTION!** Charger surface can become hot during charging

3 Maintenance

3.1. Checking and Maintenance

It is recommended to:

- check the device for any visible damage (max. 1 month interval),
- fill the cleaning liquid to the washer tank if installed (max. 1 month interval),
- clean the housing (1 year interval),
- recalibrate (3 year interval).

Note!

The device requires regular checks and maintenance. Keep your maintenance and service log up to date. Shorten check intervals if required.

- Maintenance personnel must be qualified for the job;
- Maintenance contractor company must provide education and training;
- Regular testing and checking must be exercised as described in this manual and local standards;
- Any maintenance activity must be noted in the log.

3.2. Servicing

- Servicing can only be done by authorised qualified personnel.
- Keep a servicing log.

Servicing for the time of warranty is provided by manufacturer exclusively. After that time it can be done by an approved maintenance contractor.

3. 3. Troubleshooting

Error	Possible cause	Action
No LED is lit.	- Burned fuse.	- Change fuse. - Call service.
Charger is not charging	- Burned fuse.	- Change fuse. - Call service.
Red and green LEDs are lit. Interval sound signal.	- Deteriorated battery. - Burned fuse.	- Change battery. - Change fuse. - Call service.
Red and green LEDs are blinking	- Poor battery connection.	- Check battery connection.
Yellow LED is blinking. Continuous sound signal.	- False battery polarity connection	- Check polarity

Do not try to open or repair the charger yourself. In case of burned fuse replace it with one of the same type and rating.

3. 4. Spare Parts

Parts that need to be changed must be replaced with original or functional equivalent parts approved by the manufacturer.

4 Technical Specifications

Basic technical data is visible on the front side sticker.

ADP 400 12V / 30A

Nominal voltage	AC 230 V
Nominal power	400 W
Temperature range	-20 °C do +50 °C
Efficiency rate	> 90 %
Output voltage	DC 6-16 V
Max. output current	30 A
Max. peak current	60 A
Steering	Microcontroller
Battery connection clips (D/P)	3 m / 10 mm2
Mains connection(D)	10 m / 3x0,75 mm2
Casing	Aluminium
IP protection	IP 54
Size	210 x 220 x 100 mm
Weight	4 kg

ADP 400s 24V / 15A

Nominal voltage	AC 230 V
Nominal power	400 W
Temperature range	-20 °C do +50 °C
Efficiency rate	> 92 %
Output voltage	DC 6-30 V
Max. output current	15 A
Max. peak current	30 A
Steering	Microcontroller
Battery connection clips (D/P)	3 m / 10 mm ²
Mains connection(D)	10 m / 3x0,75 mm ²
Casing	Aluminium
IP protection	IP 54
Size	210 x 220 x 100 mm
Weight	4 kg

ADP 800 12V / 60A – 24V / 30A

Nominal voltage	AC 230 V
Nominal power	800 W
Temperature range	-20 °C do +50 °C
Efficiency rate	> 88 %
Output voltage	DC 6-30 V
Max. output current	30 A
Max. peak current	60 A
Steering	Microcontroller
Battery connection clips (D/P)	3 m / 10 mm ²
Mains connection(D)	10 m / 3x0,75 mm ²
Casing	Aluminium
IP protection	IP 54
Size	210 x 220 x 110 mm
Weight	5,5 kg

4. 1. Environmental Conditions

Maximum environmental temperature is +50°C; 24 hour average temperature must not exceed +35°C. Lowest environmental temperature is –40°C. Relative air humidity must not exceed 50% at maximum temperature. Higher humidity is allowed at lower temperature (e.g. 95% at +20°C).

Sea-level elevation must not exceed 2000 metres. When using above 1000 metres consider lower air dielectricity and different cooling conditions.

4. 2. Transport and Stocking

Transport the device in the original packing if possible. When that is not available use protective air bubble foil and protect exposed areas with Styrofoam. If needed place it on wooden pallets.

Temperature while transporting and stocking should be between -25 °C and +55 °C.

Avoid stocking for longer periods of time. After transporting and mounting allow the device at least 1 hour time to settle down before commission. In case that the device is not to be used for a longer period of time, store it in a dry, well ventilated place at room temperature!

4. 3. Disposal

Lifetime of the device significantly depends on the way of use, installation, maintenance and working conditions. Production year is visible on the sticker on the back side. Dispose a deteriorated or ruined device to a place for industry electronic-components disposal according to local regulation.

Components particularly dangerous for the environment (batteries, chemicals, etc.) should be disposed to special places.

5 CE Declaration of Conformity

CE declaration of conformity ensures that the device is safe to use and has been checked and tested to the specified standards. CE statement is enclosed.

ES - IZJAVA O SKLADNOSTI CE DECLARATION OF CONFORMITY
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Manufacturer (name, address):*Proizvajalec (naziv, naslov):*

ITAIA d.o.o.
Litostrojska 44/d
1000 Ljubljana

We declare under our sole responsibility that
s polno odgovornostjo izjavljamo, da

product: Power supply
proizvod: Napajalnik

(type, model):
(tip, model):

ADP 400, ADP 400S
ADP 800

is in conformity with the provisions of the following regulations:
ustreza zahtevam naslednjih predpisov:

- **Low voltage Directive (Uradni list RS, no. 27/04)**
Low voltage directive 2006/95/EC and its amendments
- **Electromagnetic compatibility (Uradni list RS, no. 132/2006)**
EMC directive 2004/108/EC and its amendments

[SIST EN 60335-1:2003 +A11:2004 +A1:2005](#)

[SIST EN 60335-2-29:2004](#)

[SIST EN 61204:1999](#)

[SIST EN 60529:1997 +A1:2000](#)

[SIST EN 61204-3:2002](#)

Household and similar electrical appliances-Safety-Part1
Household and similar electrical appliances-Safety-Part2
Low-voltage power supply devices, d.c.output-Performance characteristics and safety requirements
Degrees of protection provided by enclosures
Low-voltage power supply devices, d.c.output-Part3:EMC

and complies with the requirements of the following standards:
in izpolnjuje zahteve naslednjih standardov:

Year of affixing of CE mark:

Leto, ko je bil CE znak nameščen na proizvod: 2007


Ljubljana, Slovenija

Peter Strmčnik, direktor
Ime in priimek, funkcija
Name, surname, position

Limited Warranty Conditions

Our products are workmanship and materials fault free and will work according to specification for a minimum time of warranty (1 year). We provide spare parts and servicing for at least 5 additional years. We will respond to failure notice immediately (7 days at maximum) and fix it within 48 working days.

During the warranty period we take full responsibility and costs (transport not included) for removal of any malfunction due to faulty materials or workmanship. After this period we charge servicing according to used time and replaced parts.

Warranty related obligations come in power with full payment.

Warranty obligations cease to exist:

- in case of improper use or use in discordance to this manual;
- in case of mechanical damage;
- in case of consequential damage due to failure or damage of other devices,
- in case of natural or environmental cause (e.g. lightning discharge, flooding, fire, etc.),
- if the device has been repaired by unauthorized personnel,
- if there are unoriginal spare parts built in the device,
- if there are changes made to the device or their parts without written approval of the manufacturer.

Servicing obligations cease to exist:

- if the device has been ruined,
- if the device has been repaired by unauthorized personnel,
- if there are unoriginal spare parts built in the device,
- if there are changes made to the device or their parts without written approval of the manufacturer,
- for the time of overdue payment for previous services.

Sale Data: _____

Serial number: _____



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