# AKTAKOM

# DC Power Supply

# APS-3320L / APS-3320LS
# APS-3610L / APS-3610LS

## User's Manual

# CONTENTS

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# 1. SAFETY PRECAUTIONS

⚠️**Follow the safety precautions!**

1. Prior to the device use carefully read this User manual.
2. Do not use in the presence of visible damage.
3. Repair and maintenance of the unit may only be undertaken by a specialist service center.
4. Before connecting the device to the mains observe all safety precautions to avoid electrical shock.
5. Use only those accessories that are designed for use with this product.
6. Before connecting the device to the electric network make sure in the correspondence of the power supply voltage to the mains voltage!
7. Do not turn on or off the device with the connected load.
8. Do not allow liquids on the cover of the device.

Safety symbols:

▨ — high temperature      ⚡ — high voltage

# 2. DESCRIPTION

## 2.1. Assignment

APS-3320L / APS-3320LS / APS-3610L / APS-3610LS (hereinafter — device) DC Regulated Power Supply provides accurate stable DC power. It is ideal for test benches, laboratories, schools and repair facilities. The multi-turn voltage control knob helps the user accurately dial in precise voltage. It is easy to read digital outputs (voltage & current) through a large display accurately. This product is expertly manufactured by AKTAKOM. It incorporates SMT PC boards and a cooling fan for reliable performance.

## 2.2. Terms of use

1. Supply and input voltage and the operation conditions are in accordance with the technical characteristics section.
2. There should be no dust, acid fume, alkali and gases capable of causing corrosion in the storage and operation areas.
3. Fall and vibration are not admitted.
4. After being in limiting conditions (storage, transportation) the device cure time in normal (operation) conditions is not less than 2 hours.

## 2.3. Technical characteristics and features

- Output voltage: 0...30 V (APS-3320L, APS-3320LS) / 0...60 V (APS-3610L, APS-3610LS)
- Output voltage accuracy: ±(0.1% + 2 digits)
- Output voltage display resolution: 10 mV
- Output current: 0...20 A (APS-3320L, APS-3320LS) / 0...10 A (APS-3610L, APS-3610LS)
- Output current accuracy: ±(0.1% + 2 digits)
- Output current display resolution: 10 mA
- Output power: 600 W
- Ripple and Noise: 5 mV
- Load stability: ±(1% + 10 mV)
- Interface: USB Device, LAN
- Display: 2 LED displays
- Power supply: 110/220 V
- Dimensions: 10.4 x 5.5 x 14.2 in
- SMD technology
- Attractive digital display shows voltage and current
- Cooling fan
- High precision voltage regulation
- Proqressive current regulation
- Dual terminal system: Safety test style or expandable screw terminals

- Overload protection circuit
- Output polarity: positive or negative
- Remote control via USB or LAN
- Rugged reinforced metal frame construction

## 2.4. Accessories

1. Device...........................................................................................................................................1 pcs.
2. Power cord....................................................................................................................................1 pcs.
3. Measuring cable ..........................................................................................................................1 pcs.
4. User manual..................................................................................................................................1 pcs.
5. Package.........................................................................................................................................1 pcs.

*Note: Accessories of the device can be changed without notice. All declared functionality remains unchanged.*

## 2.5. Staff training

No special staff training for the device operation is required.

## 2.6. Controls



Fig.1. Front panel controls

1. Voltage indication
2. Current indication
3. +S output port
4. -S output port
5. -Output port
6. +Output port
7. -Output terminal
8. +Output terminal
9. Power switch
10. Output light
11. Output switch
12. Voltage adjustment rotary switch
13. Current adjustment pot
14. Additional output terminal*: earth terminal
15. Remote control indicator



Fig. 2. Rear panel

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16. Input port of the power cord
17. 110V / 220V switcher
18. LAN / USB sockets
19. Fuse holder
20. Cooling fan

*Additional output terminals are designed for the voltage drop compensation on the connecting leads when there is a sufficient distance of the load from the power supply. Connection scheme with the use of the additional output terminals is shown below in Fig. 3.
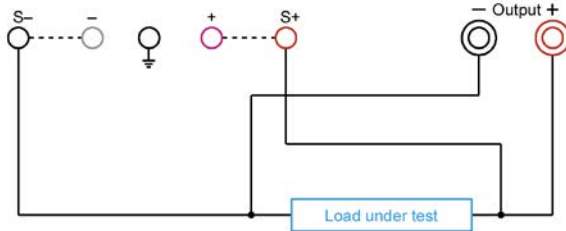


Fig. 3.

# 3. PREPARATION FOR WORK

1. Connect the power cord to the device.
2. Connect the device to AC network with the standard cable to the socket equipped with a protective earth bus.
3. Turn VOLTAGE adjustment rotary switch counterclockwise until it stops.
4. Turn on the device by pressing POWER. The device switching on should light the digital indicators of the output voltage and current.
5. If OUTPUT indicator is red than press LOAD button. In that case OUTPUT indicator should go out and the current indicator will display the set current value. By using CURRENT knob set the average current value.
6. Turn VOLTAGE adjustment rotary switch clockwise until it stops to check that the output voltage is increased to maximum. Then turn it counterclockwise until it stops to ensure that the output voltage is reduced to 0V.
7. Set VOLTAGE adjustment rotary switch to the middle position.
8. Turn CURRENT knob clockwise until they stop in order to ensure that the current limit value can be set from zero to a maximum value.

# 4. OPERATION

## 4.1. Work in the current stabilization mode

1. If OUTPUT indicator is red than press LOAD button. In that case OUTPUT indicator should go out and the current indicator will display the set current value.
2. By using VOLTAGE adjustment rotary switch set the required output voltage (at the same time nothing should be connected to the output terminals «+» and «-»).
3. By using CURRENT rotary switch set the maximum allowable current value (current limit value) for your load. If in the operating mode the load resistance change will cause the excess of the specified current limit, the device will automatically switch to the current stabilization mode and the output voltage will proportionally fall.
4. Connect the load to the device and press LOAD button. OUTPUT indicator should become red.
5. Before you disconnect the load press LOAD button. OUTPUT indicator will go out.
6. Before switching off the device, disconnect the load.

## 4.2. Work in the voltage stabilization mode

1. If OUTPUT indicator is red than press LOAD button. In that case OUTPUT indicator should go out and the current indicator will display the set current value.
2. Adjust VOLTAGE adjustment rotary switches in order to obtain the maximum allowable load

voltage on the device output. If in the operating mode the load resistance change will cause the excess of the specified voltage limit, the device will automatically switch to the voltage stabilization mode with setting on terminals «+» and «-» of the preset voltage value limit, and the output current will proportionally fall.

3. By using CURRENT rotary switch set the maximum allowable current value (current limit value) for your load.
4. Connect the load to the device and press LOAD button. OUTPUT indicator should become red.
5. Before you disconnect the load press LOAD button. OUTPUT indicator will go out.
6. Before switching off the device, disconnect the load.

# 5. SOFTWARE

## 5.1. Software overview

The standard package of the device includes AKTAKOM Power Manager (APM) and AKTAKOM Power Manager 21 Light (APM21 Light) software. AKTAKOM Power Manager (APM) Software offers wide opportunities for controlling the output voltage and stabilization current both in arbitrary (manual) and in functional modes. Functional control is a powerful APM software tool which allows you not only to automatically control the device via your computer but also to program it for the off-line mode operation in accordance with the predetermined algorithm. Functional control mode in APM software allows you to automatically control the output parameters (voltage or current) of the power supply according to the law set by the graphical and tabular editors. In the convenient graphical editor user may set 10 standard forms of parameter changes (including: sine, square, triangle, saw, flash, pulse, 2 types of exponent, 2 types of S-curves) as well as any arbitrary shape which can be described with a formula.

1. Software can be downloaded at www.tmatlantic.com after registering the equipment with a serial number. Therefore follow Product registration link on www.tmatlantic.com.
2. PC installation of AKTAKOM Power Manager and AKTAKOM Power Manager 21 Light software is instructed on www.tmatlantic.com and www.aktakom.com.
3. Please note! When you run AKTAKOM Power Manager and AKTAKOM Power Manager 21 Light software for the first time it will require an access key. This key can be received (copied) at www.tmatlantic.com after APS-3320L / APS-3320LS / APS-3610L / APS-3610LS registration. The key can be entered later, see Settings/Pass key menu.

## 5.2. PC connection

Connection to the PC is made via USB or LAN located on the rear panel of APS-3320L / APS-3320LS / APS-3610L / APS-3610LS. The first connection to your PC should be made via USB interface. This will help to install the network parameters of your local network for the connection to the device. Installation instruction for the network parameters is given in HELP file.

1. For the device automatic search and connection it is not recommended to run AKTAKOM Power Manager Software after the PC installation but at first to connect the USB cable of APS-3320L / APS-3320LS / APS-3610L / APS-3610LS to the PC and then to run the program agreeing with the device automatic search. You may connect the device to the PC manually, see HELP file.
2. Please note! When you run AKTAKOM Power Manager Software for the first time it will require an access key. This key can be received (copied) at www.tmatlantic.com after product registration. The key can be entered later, see Settings/Pass key menu. If you do not enter the key after you run the software this program will operate in demo-mode.
3. State (status) of the device remote control is indicated on the front panel with the connection indicator:
   a. in the manual control mode — the indicator is OFF;
   b. USB cable is connected (operation via USB) — the indicator is red;
   c. LAN cable is connected (USB cable is disconnected) — the indicator is green;
   d. there is "connected" mode set in the program (the device is operating in the remote control mode, the manual control is OFF) — the indicator is blinking in green or red color.
4. After interface connection, the network cable connection and active work of the local network the indicators of LAN socket should be blinking. Note: when you operate via LAN you need to DISCONNECT the USB cable.
5. USB interface takes priority. After you connect the USB cable the device can be controlled via the PC and the program connected via USB.

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6. Please note! Be careful! Disconnection of the USB or LAN cable or the controlling program will return the voltage and current values which were set manually using «LOAD» button and the rotary switches on the front panel (Fig 1: 11, 12, 13). Always before entering the remote control mode it's recommended to switch off «LOAD» button.

If you have any questions concerning the use of interfaces or the software check the detailed description and the section with frequently asked questions at www.tmatlantic.com and www.aktakom.com.

# 6. GENERAL INFORMATION

## 6.1. Technical service
NOTE! The following instructions are for qualified personnel only. To avoid electric shock, do not perform any other services other than those contained in the User manual.

## 6.2. Fuse replacement
When the fuse in the AC circuit gets out of order none of the LEDs are lit, and the power supply will not operate. Try to identify and eliminate the reason for the fuse blow, and only after that replace it with a fuse of the same type and with the same parameters. Fuse installation is made on the device rear panel.

## 6.3. Cleaning
Device cleaning should be done with a slightly damp flannel cloth soaked in soap solution. Before cleaning, make sure that the power cable of the device is taken off. If the device housing still has firm spots remained remove them with a cloth wiped with alcohol. After cleaning let the device dry completely. Avoid using solvents, such as benzene, etc.

## 6.4. Storage and transportation
Storage conditions: environment temperature: –20...+60 °C; relative air humidity is not more than 80 % with 25 °C. Transportation conditions: environment temperature: –20...+60 °C.

## 6.5. Technical support
For technical support visit www.tmatlantic.com.
Please send your questions and inquiries to: marketing@tmatlantic.com.

# 7. OPTIONAL SOFTWARE

Optional software:
1. AKTAKOM Power Manager 21 Professional (APM21 Pro)
2. APS-3xxxLx_SDK Software Development Kit.
3. APS-3xxxLx_SDK_Base Software Development Kit.

There are several advantages of APM 21 Pro vs APM 21 Light.
1. Template management
Aktakom laboratory power supplies can supply current with arbitrary parameters precisely set by the user, but in practice a number of parameters with fixed values are most often used - 1.5 Volts, 3.3, 9, 12 ... In APM21 Pro, you can make a list of your "favorite" values in advance voltage and current and then set them to the device with one click.
2. Command list management
Another important property of our power supplies is the ability to dynamically change the current output parameters. APM21 Pro can do this automatically. Set a list of commands to the device in advance, specifying the necessary parameters and time, save the list to a file and run it for automatic execution when you need it.
3. Customizable user interface
In addition to additional ways to control the device, the main window of the program also has a graph displaying the history of measurements received from the device. All this may seem redundant and cluttering for someone who plans to use the source for simple standard tasks. In this case, you can customize the user interface in a way that is convenient for you: hide and collapse all the blocks you don't need with special buttons and leave only the ones you need.
4. Saving data
If your lab's power supply is used for research, you may need to review instrument operation later. Therefore, we saved the history of events (displayed in the Protocol window) and measurement data

(displayed on the graph in the main window) to a file.

The APS-3xxxLx SDK is designed to help users in creating their own applications for the supported hardware. This SDK contains the device driver for controllable power supplies from the series of AKTAKOM Power Supplies APS-31xxL, APS-33xxL, APS-36xxL.
The driver contains all necessary functions for the device operation and represents dynamic-link library (DLL) Windows followed with the library header file in the C programming language, with LabWindows function tree and the tool library for LabVIEW which fully repeats it.
Additionally (in contrast to APS-3xxxLx_SDK_Base Software Development Kit) it contains the examples of programming in the following development environment: Borland C++ Builder, MS Visual C++, NI LabWindows/CVI and NI LabVIEW.
The driver library function can be also called from any programming environment with the ordinary for DLL method. As an example of such driver use there are projects for Borland C++ Builder 6, NI LabWindows/CVI and MS Visual C++ used.
The main advantage of the full SDK package is fast development of applications basing on the programming examples for different programming environments allowing you to use the proposed typical structure of the application.

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