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**Designing Off Delay Timer Switch for Water Pump Control**



**Troubleshooting LED Strip Using a Power Supply with Voice Guide Software**
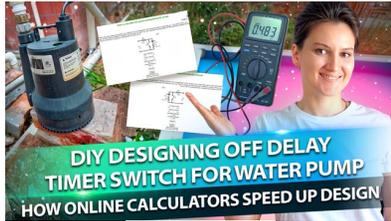


**Fixing LED Light Fixture Part 3: Unforeseen causes of broken LED lights**



**LED Repair Tutorial Part 5**





# User's Manual

# PROGRAMMABLE DC POWER SUPPLY
## APS-7306L/LS



Thank you for choosing AKTAKOM Power Supply.

**BRIEF PRODUCT INTRODUCTION**

APS-730XL/LS series single-channel programmable power supplies are designed to supply wireless devices with stabilized voltage or current, while used in debugging processes, repair and laboratory research in normal climate conditions.

Power Supply APS-7306L/LS in addition to stand-alone control (control and monitoring from the front panel) can be operated remotely by computer via USB 1.1 interface and LAN, or by a mobile device (IPod, IPhone, any Android-based mobile devices) via Ethernet.

**INSTRUCTIONS**

• Never put any heavy objects on this device;
• Never crash or otherwise damage the device;
• Never allow the device to get damaged from a static discharge;
• Don't block the cooling fan exit;
• Don't turn on the device when it is connected to the power;
• Never disassemble it unless under the supervision of the professionals.

**WARNING**

The power cord must be properly grounded to avoid the electric shock.

## Service

**Updates and technical support**

The software for power supplies is constantly being improved and supplemented in accordance with the requirements of the operating system. To update the software and receive AKTAKOM proprietary technical support, you can visit our website on the Internet: www.tmatlantic.com.

You can also send your questions, wishes and suggestions by: marketing@tmatlantic.com.

| Switch to manual control mode | "Res" command sent from a software or turn the power supply off and on | "Res" command sent from a software or turn the power supply off and on |
|---|---|---|
| Displaying the history of load voltage and current values | **Yes** | No |
| Work according to a given schedule of current and voltage values | **Yes** | No |
| Saving and importing current and voltage schedules | **Yes** | No |
| Current time clock | On/Off | On/Off |
| Button names | On/Off | On/Off |
| Help | **Yes** | **Yes** |
| Language support | EN ES | EN ES |
| News | On/Off | On/Off |

| Model | **APS-7306L/LS** |
|---|---|
| Output voltage | 0-30V |
| Output current | 0-5A |
| Output power | 150W |
| LED display | 2 |
| Channel | 1 |

**TECHNICAL PARAMETERS**

These parameters are tested under 77 ± 9°F (25±5°C) and after 2s power on.

**Power effect:** CV≤0.01%+3mV (AC±5%)

**Load effect:** CV≤0.01%+2mV

**Ripple and noise:** ≤2.0mVrms

**Output accuracy:** V: 0.5%+20mV

I: 0.5%+10mA

**Read-back accuracy:** V: 10mV

I: 1mA

**Types of protection:** over current, over voltage, over temperature

**Working environment:** 32~104°F (0~40°C)

**Humidity:** less than 80%

**Dimensions:** 4.5x7.5x9.5 in / 115x190x240 mm

**Weight:** 11.7 lb / 5.3 kg

**Power supply:** 110V by default /220V, 60Hz

**ATTENTION**

• Only use the rated input voltage;

• Never operate at a high temperature and the cooling fan exit cannot be blocked;

 •Please make sure that the fuse with rated parameters is used.

## DIAGRAMS OF PANELS

**Front Panel**

1. Power: on/off button
2. Off/On: output on/off
3. MEN: memory save
4. M1-M3: memory recall
5. Voltage/Current: select between voltage or current
6. OCP: over current protection
7. CC indicator: constant current mode
8. CV indicator: constant voltage mode
9. Voltage display (volt)
10. Current display (ampere)
11. Voltage/Current: select between voltage or current for adjustment
12. Output terminals-
13. Earth (ground) terminal
14. Output terminals+



Fig. 1
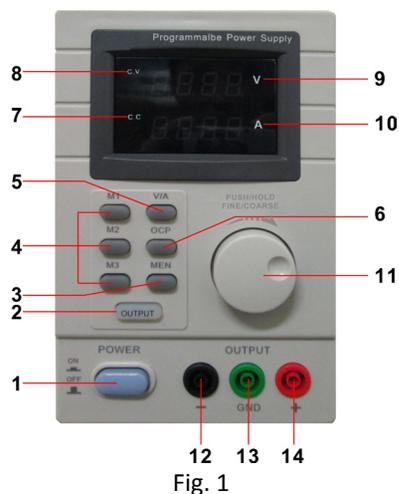
### Aktakom Power Manager Max Pro Software

Optional, available for purchase from www.tmatlantic.com. Aktakom Power Manager Max Pro is application software to control APS-7306L/LS from a PC using an USB cable or a local area network (LAN). This software offers some advanced features, such as control templates, command lists, customizable user interface, event log, voice guide.

## Software Comparison Table
**Aktakom Power Manager Max vs Aktakom Power Manager Max Pro**

| Software Function | Max Pro | Max |
|---|---|---|
| Connection, communication | USB, LAN | USB, LAN |
| Load voltage indication | **Yes** | **Yes** |
| Load current indication | **Yes** | **Yes** |
| Load power indication | **Yes** | No |
| Indication of operation under load | **Yes** | No |
| Operating mode indication | VC/CC | VC/CC |
| Digital input of voltage and current values | **Yes** | **Yes** |
| Regulator for entering voltage and current values | Horizontal - Sliding | Horizontal - Sliding |
| Output on/off button | **Yes** | **Yes** |
| Preset fixed voltage values | **Yes** | **Yes** |
| Preset fixed current values | **Yes** | **Yes** |
| Voice guide | **Yes** (ON/OFF), Eng. | **Yes** (ON/OFF), Eng. |
| Activate remote control mode | Any first command sent from a PC to a power supply using USB or LAN | Any first command sent from a PC to a power supply using USB or LAN |

The button with a clock icon shows or hides the clock display on the keypad. "Hints" button shows or hides the keys caption text.
"News" button shows or hides Aktakom news feed.
"Info" button displays the information about the program and connected device.
"Help" button recalls the help file.

**Presets list edit**
The appearance of the dialog box in the picture below.
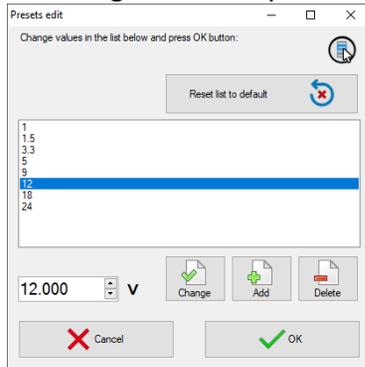


Fig. 19. Presets list editor

The list of presets (shortcut buttons) is a list of Voltage or Current values, which can be set on the device "with one touch". In dialogue editing presets in addition to the list itself, the program displays the following buttons:
Reset list to default - return the contents of the list to default values.
Change - replace the selected line of the list with the entered value.
Add - add a new value to the list.
Delete - remove the current line from the list. Cancel - close the dialog without saving changes.
OK - save changes and close the dialog.

**Rear Panel**

13. Cooling Fan
14. Power cable connection plug
15. LAN port
16. USB port
17. Sync input (APS-7306LS only)
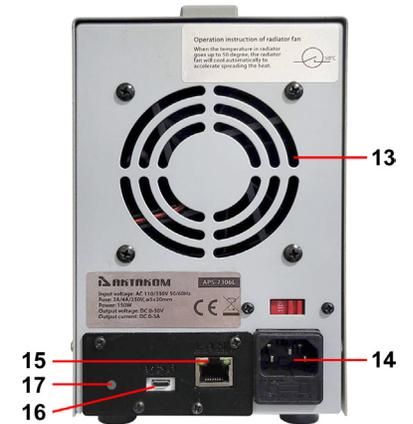


Fig. 2

**Connecting the sync input of AKTAKOM APS-7306LS power supply with remote control**

Sync input is a 2.5 mm audio jack stereo. The counterpart is a 2.5 mm audio jack plug. The scheme of this plug for synchronization signaling, see fig. 3.
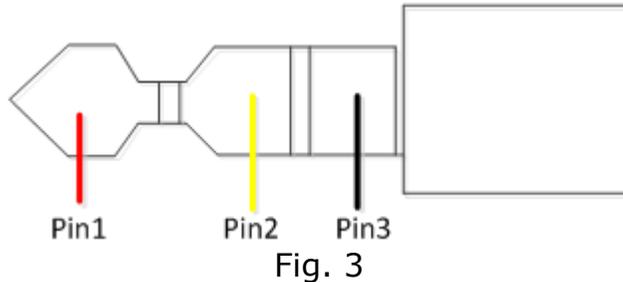

Fig. 3

Pin1: Sync input
Pin2: Reserved
Pin3: Common wire

Parameters of the synchronization control pulse are shown in fig. 4.
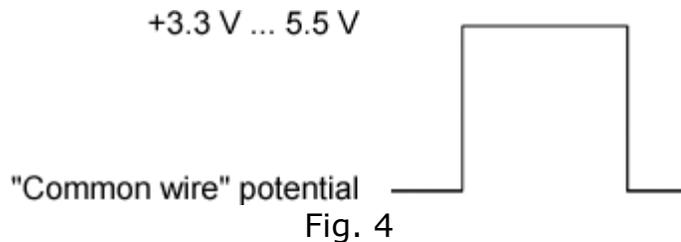

Fig. 4

Note! In APS-7306LS the signal of pin 2 input of the sync connector is also used to reset network settings to default.

- Inversion. The device outputs turn off if the synchronization line is in the upper state, and turn on if the synchronization line is in the lower state.

Restart:
- Continue. Multiple mode. After processing the detected synchronization event the startup system returns to the start waiting state.
- Single mode. After processing the detected synchronization event the startup system stops operating. To switch it to the start waiting state press the restart key.

Counter:
- It is used in multiple mode ("Continue"). If set to zero the synchronization is restarted an unlimited number of times. If set to the number greater than zero the synchronization is restarted the specified number of times and thereafter it turns off as in a single mode.

Synchronization state indicator:
- Grey color. The synchronization system is off.
- Yellow color. The synchronization system is in the start waiting state.
- Green color. The synchronization system has detected a start event and sent a start command.
- Red color. The synchronization system is stopped and requires the user's command to process the next start event.

Note:
Enable/Disable outputs button has priority over the synchronization settings. When the output is allowed (the button is pressed), the synchronization will control the outputs state, but if it is disabled (the button is released, off), the outputs will be always disabled regardless of the synchronization state.
Upper panel buttons of the main window:
"Exit" button terminates the program operation.
"Connect" button recalls the power supply connection window.

To change the password check box "Replace password to new".
If the USB interface is used and more than one power supply is connected to the computer, a dialog for selecting the desired device from the list will appear (Fig. 18).
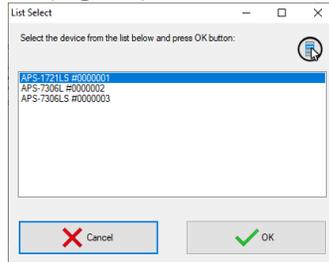


Fig. 18. Select USB device

After the device connection its current state will be displayed in Measurements block.

Constant voltage and current mode is controlled by the elements of Control block. To switch on/off the output use Exit key.

Synchronization block allows you to use the synchronization input capabilities for the device models equipped with it.

Trigger type:

- No. Synchronization is not used.
- Rise. The device outputs switch their state when there is a transition detected from the lower state of the synchronization line to the upper one.
- Fall. The device outputs switch their state when there is a transition detected from the upper state of the synchronization line to the lower one.
- Any. The device outputs switch their state when there is any transition detected on the synchronization line – from the lower state to the upper one and vice versa.
- Set. The device outputs turn on if the synchronization line is in the upper state and turn off if the synchronization line is in the lower state.

**The Power Supply can operate in several control modes:**

 MANUAL MODE.

 CONTROL MODE WITH BUILT-IN MEMORY.

 REMOTE CONTROL MODE OF APS-730XL/LS BY COMPUTER VIA USB INTERFACE.

 REMOTE CONTROL MODE OF APS-730XL/LS BY COMPUTER VIA LAN INTERFACE.

 REMOTE CONTROL MODE OF APS-730XL/LS BY COMPUTER VIA WEB INTERFACE.

 REMOTE CONTROL MODE OF APS-730XL/LS BY COMPUTER VIA LXI class C (LAN extensions for Instrumentation) INTERFACE.

 **MANUAL MODE**

1. Output Voltage Adjustment: Press the **V SET** key**,** the value of voltage setting will be displayed on the voltage display; and the setting will flicker. Repress **V SET** and the selection of the setting values will be changed. Turn the knob and the setting value of the output voltage will be adjusted while the setting flickers. Stop

turning for a few seconds the setting will stop flickering and the power will return to the initial status.

2. Output Current Adjustment: Press the **I SET** key, the value of current setting will be displayed on the current display; and the setting will flicker. Repress **I SET** and the selected place of the setting values will be changed. Turn the knob and the setting value of the output current will be adjusted while the setting flickers. Stop turning for a few seconds, the setting will stop flickering and the power will return to the initial status.

3. Over current protection: Press the **RECALL** key and the storage direction will flicker. At this time, press **OUTPUT** and it will stop flickering, then the power is in the mode of over current protection; that is, the over current protection starts then the current is up to the set value; Switch off the output voltage and the over current protection light [OCP] is on. Eliminating the mode of the over current protection: press the **RECALL** key and the storage direction will flicker. At this time, press **OUTPUT** and it will stop flickering, then the power supplies will exit from the over current protection mode.

## CONTROL MODE WITH BUILT-IN MEMORY

Storage Selection: Press the **RECALL** key and the storage direction light will flicker, which indicates the current storage data. Then press the ↓ key and the next parameters of voltage and current can be selected; press ↑ and the previous parameters can be selected. In any storage direction, the relevant storage units can be stored then the parameters of voltage and current are set.

When the application is running the power supply connection window will open:



Fig. 16. Connection dialogue

Select the necessary interface type (USB or LAN), enter the settings for the network connection (IP, port, login) and press OK key to connect to the power supply.

You will see the connection state in the main program window, "Connection state" block.

In case of successful connection the program will remember the settings and next time it will try to use them to reconnect to the device.

To restore the connection break in the program operation click "Connect" button in the main window. Also use this window to record the network settings to the power supply memory. To do this open "Connection" window after the device connection via USB, enter the necessary settings in IP, port, login fields and click "Write LAN options to power supply." When recording you will need to enter a password (default password: AULNetPass).
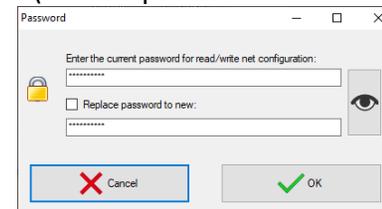


Fig. 17. Password dialogue
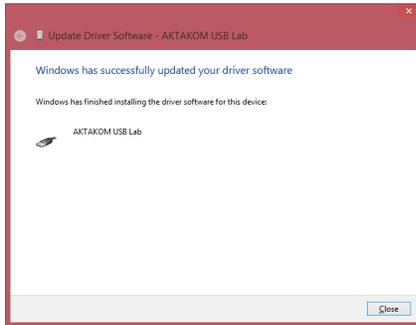
As a result there should be the following images:
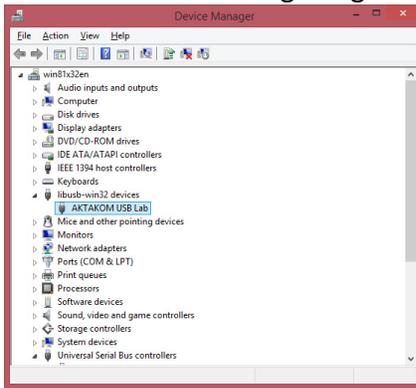


At this stage the driver may be considered ready for further work.

**Application description**
**Application operation description**
Main program window view:



Fig. 15. Application main window



## REMOTE CONTROL MODE VIA WEB INTERFACE

Remote control mode allows you to operate a power supply via Web interface using your preferred Internet browser.
Note: to operate APS-7306L/LS power supply via LAN (Web, LXI) interface disconnect USB cable from the device.
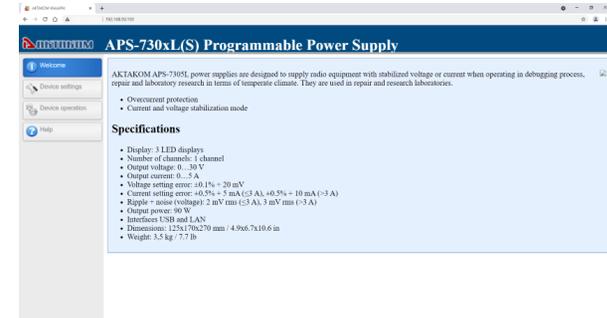


Fig. 5. Device Specifications



Fig. 6. Device Settings
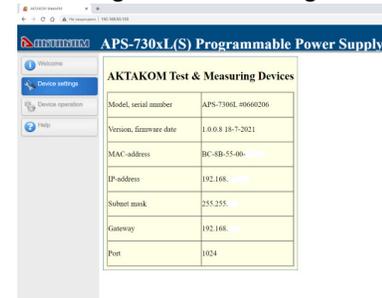


Fig. 7. Connection Settings
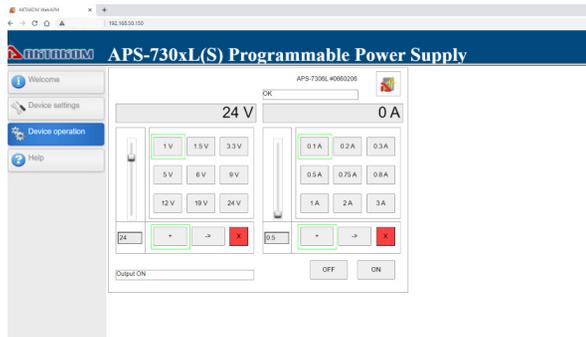
Fig. 8. Main Interface
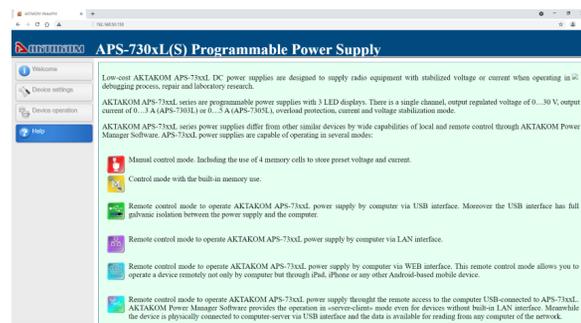

Fig. 9. Help

After closing the web page (terminating the session), the APS-7306L/LS power supply remains in the state of executing the last control command received via LAN. To finish working with the APS-7306L/LS, you need to turn it off. This is a safety measure to protect the equipment connected to the power supply output in case of an accidental loss of communication between the software and the power supply.

**LXI class C.**

LXI (LAN extensions for Instrumentation) is a flexible high-speed standard for communication protocols for measuring and collecting data for devices using a universal LAN (Ethernet) interface, developed by the industry LXI consortium. The main goal of the LXI consortium is to ensure compatibility of newly developed control and measuring devices by various manufacturers.
Note: to operate APS-7306L/LS power supply via LAN (Web, LXI) interface disconnect USB cable from the device.

Open its properties (with double click), click Update Driver. You will see the following window:
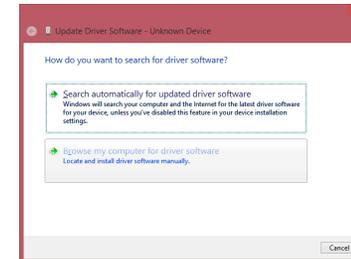


Select "Browse my computer for driver software" and afterwards specify the location of the driver folder:
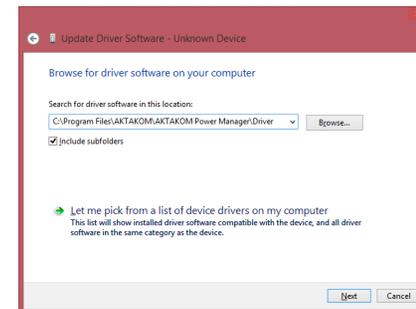


Press Next to start installation:



Wait till the installation is completed. Press Close:
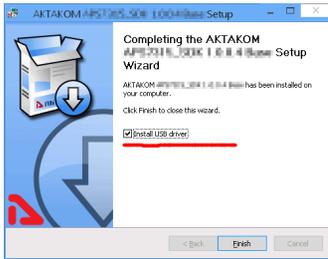
If you refused the automatic driver installation or it has failed due to some reasons you may install the driver manually later. Driver installation process is shown below.

**Manual installation of USB driver (for Windows 8)**
Enter Windows as an administrator, connect the device to the PC. Select Control panel from Start menu, chose System (or just press Win+Pause combination on the keyboard):
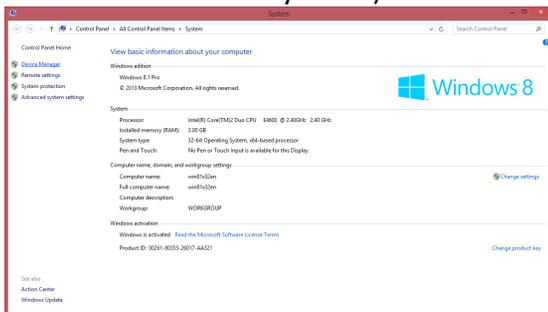


Select Device manager. Find AKTAKOM USB LAB device (it will be marked with a warning icon since the driver has not been installed for it yet):
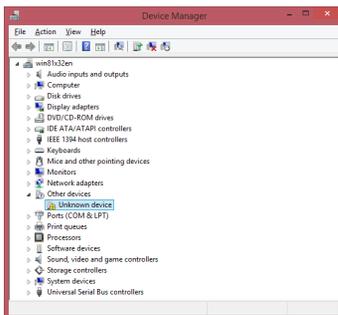


**VOICE GUIDE**

The software for this power supply is multifunctional and interactive, it features the voice guide. Your power supply will literally tell you what current or voltage it is outputting! The voice guide announces all voltage current changes and power supply output status. This feature is very convenient because it allows you to work in the laboratory without paying attention to the power supply indicators.

The "Voice" button selects a Windows voice guide that will announce application events to you. Select the "No voice" option to disable the voice guide. Voice guidance works in all languages installed in the operating system on your PC.

## PRODUCT REGISTRATION

Please register on https://www.tmatlantic.com before the software installation and the device configuration for remote control mode operation.


Fig. 10
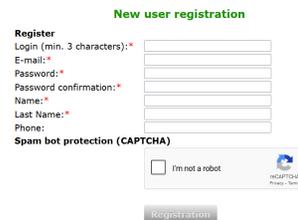

Fig. 11

And then download the program installer following the recommendations on the web site www.tmatlantic.com

contract. On termination of the contract you are obliged to destroy all copies of the program which you have.

13. The present license contract regulates the use of updates, addenda, which could be offered to you by the Rightholder after your purchasing the initial copy of the program, if these updates and addenda are not accompanied by special conditions. The conditions of the present contract could be modified for other version of the program.

14. The present license contract does not give any rights in respect of any trademarks, belonging to the Rightholder or third party.

### PC requirements

Computer used for the device work should meet the following minimal requirements:
- USB-port;
- Installed Windows 7 or higher operating systems.

### Setting-up procedures

### Hardware installation

To setup the device first switch it off, connect the PC USB port to the appropriate connector of the controllable power supply with the help of A-B type USB cable.

### Software installation

Find and run the installation program and then follow the further instruction accordingly.

When the installation process is finished, a program group was created with the shortcuts for the device program and it's Help. You can run them with the help of "Start" menu. Before the device use you should install the USB interface driver. During the software installation all necessary files will be placed into the program working folder, into the Driver subfolder, and after that the setup program will suggest you to install the driver automatically.

Attention! Not all previously released devices and new versions of the program are compatible.

Programs, which copies are being distributed in the following way could have a demo version, which is being distributed in the same way as it is described in the subparagraph "b" of the present paragraph.

b. Separate from the device a copy is downloadable from the manufacturers or distributor website.

8. The copy of the program is distributed "AS IS".

a. THERE ARE NO GUARANTIES ENCLOSED AND PROVIDED.

b. YOU USE THE PROGRAM ON YOUR OWN ACCOUNT. THE COPY OF THE PROGRAM IS PROVIDED " IN THE WAY LIKE IT IS" WITHOUT ANY GUARANTEES, EVIDENT OR IMPLIED, INCLUDING, BUT NOT BEING LIMITED, BY IMPLIED WARRANTIES OF THE CONSUMER PROPERTIES OR OF FITNESS FOR CERTAIN PURPOSES.

c. THE RIGHTHOLDER DOES NOT GUARANTEE, THAT THE FUNCTIONS OF THE PROGRAM WOULD MEET ALL YOUR REQUIREMENTS, THAT THE PROGRAM WOULD WORK FAIL-SAFE OR THAT ERRORS WOULD BE DEBUGED. IF THE ERRORS IN THE PROGRAM WOULD CAUSE YOU DAMAGE, ALL REPAIR COSTS, MAINTENANCE AND SYSTEMS RECOVERY COSTS ARE BORNE BY YOU (BUT NOT THE RIGHTHOLDER.)

d. UNDER NO CIRCUMSTANCES THE RIGHTHOLDER IS RESPONSIBLE FOR ACCIDENTAL, DIRECT OR INDIRECT, MATERIAL OR ANY OTHER KIND OF DAMAGE (INCLUDING THE LOSS OF PROFIT, LOSS OF THE BUSINESS INFORMATION AND OTHER FINANCIAL LOSSES, REGARDLESS OF THEIR SIZE).

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10. This license agreement does not require any additional fee in addition to conditions listed in paragraph 7.

11. The present license contract is concluded for the term equal to the validity term of the exclusive right on the program.

12. The Rightholder has the right to terminate the license contract in case of noncompliance with the terms and conditions of the

## ADJUSTMENT OF REMOTE CONTROL MODE OF APS-730XL/LS BY COMPUTER VIA USB INTERFACE



Fig. 12

Connect the power supply to the power outlet using the power cable.



Fig. 13

Switch on the power.
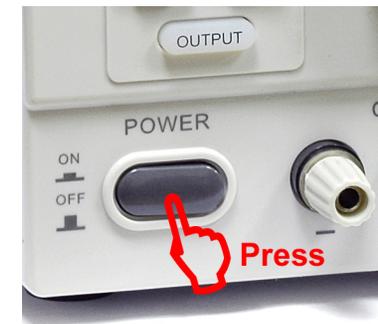
Connect the USB cable to the relevant inputs of the power supply and the PC.
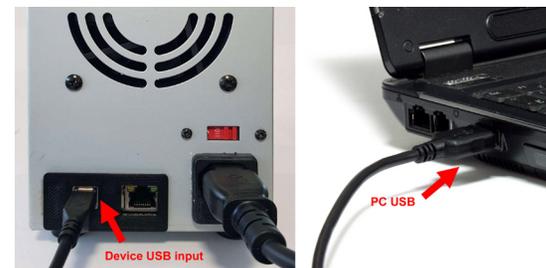


Fig. 14

## Aktakom Power Manager Max software

Aktakom Power Manager Max is application software to control APS-7306L/LS from a PC using an USB cable or a local area network (LAN). This software provides control of output voltage and current in arbitrary (manual) mode as well as external trigger function (synchronization). With the voice guide feature your power supply will literally tell you what current or voltage it is outputting!

Install **Aktakom Power Manager Max** software to your PC.
You can download the software from www.tmatlantic.com.
To download the Aktakom Power Manager Max software, go to www.tmatlantic.com, log in with your username and password. If you have not previously registered on www.tmatlantic.com, follow the link "Registration" and specify all the necessary data.
Then select your device from the list and enter its serial number. ATTENTION! Serial number must be entered exactly as it appears on the device, with all the letters, numbers and other characters. Next, you need to register your AKTAKOM product if you have not done so already, and accept the License Agreement, then you will be provided with links to the files available for download.

**License contract**

1. The present license contract is made between You and the Rightholder of the exclusive right on the present program, specified in the Operations manual to the device to which, or with which, the program was purchased (hereinafter referred to as "Rightholder"). The conclusion of contract does not result in the lapse of exclusive right on the program to you.
2. While installing, making a copy, uploading, carrying out an access or somehow using the program, you understand and agree with the conditions of the present license contract. If you do not agree with the conditions of the present license contract, delete all program files from your information storage devices and stop using the program.
3. You have the right to install, use, display and run only one copy of the program for only one device to which, or with which, the program was purchased, the quantity of PCs at which the program can be installed is not limited. It is restricted to use the program for several devices.
4. You do not have the right to decompile, disassemble, create new versions, and make alterations in all parts of the program.
5. You do not have the right to sell, rent, on loan or somehow pass the copy of the program, as well as to gain from the distribution of the program. You are not allowed to distribute this program together with any commercial programs and printing.
6. You are allowed to make one backup copy, and you have the right to use it only for archival purposes and for replacement of the legally acceptable purchased copy in cases, when this copy is lost, destroyed or get unsuitable to use. Herewith the copy of the program cannot be used for other purposes and must be destroyed if the possession of the copy of such program is not lawful any more.
7. Lawful purchased copy of the program is a copy, which is obtained by one of the following ways:
a. With a set together with the device, downloadable from the manufacturers or distributor website.
The cost of the copy of the program is included in this case in the cost of the device. In case of loss of such a copy of the program it is not subject to free replacement. On the issue of the new version of the program the Rightholder can provide you on your demand with the access to copy the new version of the program from the web site in Internet, additionally indicated by the Rightholder. After getting the updates it is restricted to use the program, which is the base for getting updating.