UNI-T UAP500A Programmable AC Power Source User Manual

Contents

UNI-T UAP500A Programmable AC Power Source

Product Overview

Thank you for purchasing UNI-T programmable variable frequency AC power supply, this section includes the following contents:

Product Serie
This serie has two models UAP500A 500VA and UAP1000A 1000VA .
UAP500A/1000A is AC power supply, it can measure the low distortion sine wave output and the accuracy of power supply; It has advanced direct digital synthesizer (DDS) waveform generation technology and Sinusoidal Pulse Width Modulation (SPWM) technology with high-frequency stability and good continuity; Front panel has rotary knob and keypad to control and set the current and frequency; LCD is for full operating states; It can remote programming by RS-232C communication interface.

Characteristics

- Output constant voltage and continuously adjustable
- Over current/temperature/load and short circuit protection
- Advanced direct digital synthesizer (DDS) waveform generation technology with high-frequency stability and good continuity
- Build-in intelligent PC monitoring system All range adjustable output voltage 0-150V/0-300V step 0.01V
- Output frequency 45-250Hz step 0.01Hz;
- Remote control by RS-232C communication interface
- Provide reading of voltage, active power, frequency, and power factor
- Press the keypad to input parameters of voltage, frequency, cut-off current, high accuracy
- 9 sets of voltage, current, and frequency can be adjusted freely
- One key to switch high-low voltage output
- Input delay can be set as user’s custom

Front Panel

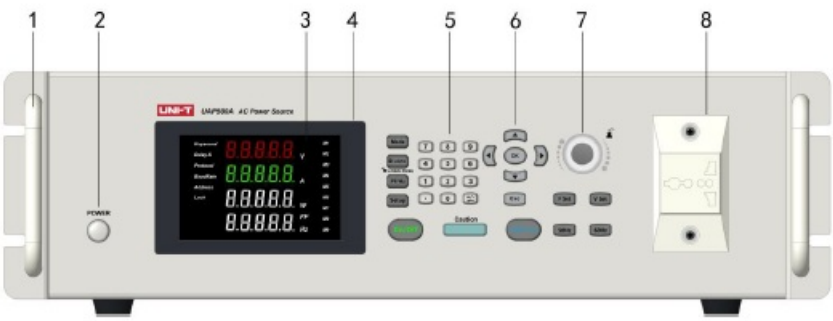


Figure 1.2.1 Front Panel （Take UAP500A as an example）

Table 1.2.1 Introduction of Front Panel

No.	Name and Picture	Description
1		Hand for move the instrument
2		For turn on/off power
3		VA screen for display reading and setting
4		Lens for protecting screen
5		Numeric keypad for setting parameter
6		Direction key for moving cursor or adjusting values of selected parameter
7		Rotary knob for adjusting parameter or moving cursor position
8		Multifunction socket, power output
-		9 mode (voltage, protective current, frequency), quickly switch to selected mode
		Lock keypad, long press 2-3s to unlock
-		Switch power factor and frequency
-		Setup key; key sound, output delay, protocol, baud rate, address, setting and view
-		Output/Power switch
-		Caution sign, it will be red sign if overload occurs
-		Switch high-low level
-		Return to last interface or exit

Rear Panel

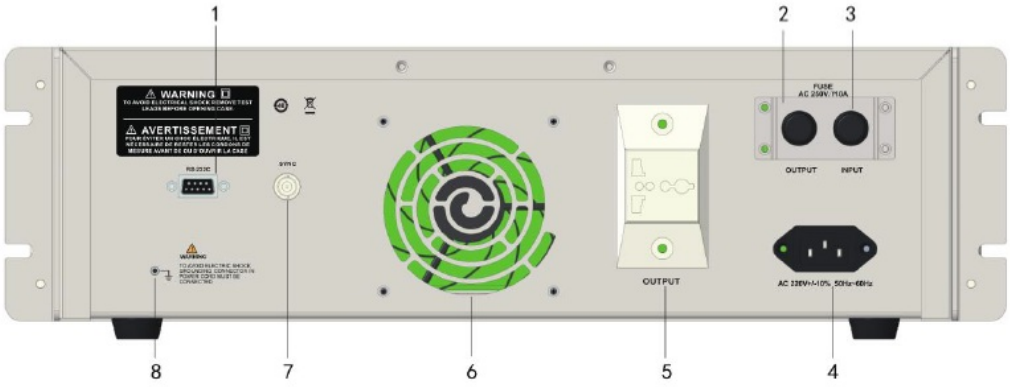


Figure 1-3-1 Rear Panel

Table 1-3-1 Rear Panel

No.	Name	Description
1	RS232 interface	External communication interface to realize remote control the power
2	Fuse	Output terminal fuse, 250V/10A
3	Fuse	Input terminal fuse, 250V/10A
4	Power socket	AC power input socket
5	Output	Power output terminal, multifunction socket
6	Ventilation hole	For dissipating heat
7	SYNC	SYNC will send pulse signal synchronously when output changes
8	Ground terminal	For ground connecting

Safety Information

Caution To avoid possible electric shock and personal safety problems, please follow the instructions below.

Disclaimer	Please read the following safety information carefully before starting to use the instrument. Uni-Trend will not be responsible for the personal safety and property damage caused by the user's failure to comply with the following terms.
Instrument Grounding	To prevent the risk of electric shock, please use the cable provided by the factory to connect the instrument and power the ground wire.
Operating voltage	Please make sure the operating voltage is under rated range of 10%, to avoid damage the instrument.
Input voltage	Read all the marks on the instrument before connecting. The instrument provides 220V two kinds of AC input modes, check whether the conversion switch of the variable frequency power supply matches with input power and ensure that the fuse is installed in place. Otherwise, the variable frequency AC power supply may be damaged.
Do Not use the instrument in an explosive atmosphere	Do not use the instrument in flammable and explosive gas, steam or dusty environment. The use of any electronic equipment in such an environment is a risk to personal safety.
Do Not open the cover	Please do not open the instrument case, non-professional maintenance personnel should not open the instrument cover to repair the instrument. There is still an undischarged charge in a period of time after the instrument has been turned off, which may pose a risk of electric shock to persons.
Do Not use abnormal instrument	When the instrument is in operation, do not touch the bare connect wire, spare input terminal and the circuit is in testing. When the instrument is over DC 60V or AC 30V, be careful with an electric shock.
Do Not use the instrument in an explosive atmosphere	If the instrument is not working properly and its danger is unpredictable, please disconnect the power cord and do not use it again or try to repair it by yourself.

Do Not use the instrument over this manual	If use the instrument over this manual, the protective measures will be out of effect. It is strictly prohibited to use this instrument in life support system or any other equipment with safety requirements.
Do Not replace or perform unauthorized modification	To make sure the security of the programmable variable frequency AC power supply, please do not replace the components or perform any other unauthorized modifications. Do not use the instrument if the cover has been removed or loosened, it may cause a hazard.

Safety Mark

	DC	N	Netrual/Zero Line
	AC	L	Live Line
	Both Direct and Alternating Current		On (Power)
	Three Phase AC		Off (Power)
	Grounding		Backup Power
	Protective Grounding		Connect with Cabinet or Case
	Signal Ground		Caution
	Danger		

Inspection and Installment

Packing List

Befor using the instrument

1. Check whether the appearance of the product is damaged, scratched or has other defects.
2. Check whether the instrument accessories are missing according to the packing list.
   If it is damaged or the accessories are missing, please contact Uni-Trend Instrument Sales Department or the distributor immediately.

Name	Quantity	Remarks
Programmable Variable Frequency AC Power Supply	1	UAP500A/UAP1000A the model is subject to the actual order.
Power Line	1	
RS232 communication Line	1	
Back-up Fuse	2	250V/10A input and output terminal fuse
User's Manual	1	Electronical copy, it can download from UNI-T's official website

Power Requirements
UAP500A/1000A can only be used in following conditions

Parameter	Requirements
Voltage	AC 220±10% V or AC 110±10% V
Frequency	50/60Hz
Fuse	Input voltage 250V/10A Output voltage 250V/10A

- The three-core power cord is provided. Please make sure that the ground wire of the three-phase socket is properly grounded before use.
- 250V/10A fuse is selected and installed for the instrument.
- The instrument with two spare fuses.
- When replacing the fuse, please remove the external power cord first, then open the fuse slot under the power interface, take out the old fuse and replace it with a new one, and install the fuse slot back after completion.

Operating Environment

UAP500A/1000A variable AC power supply only can used in normal temperatures and non-condensing environments. The following is the environmental requirements for the general environment
Ventilation fans speed will intelligently change with the temperature of the cooling fin.
The installment place should not have gases, vapors, chemical deposits, dust, dirt and other explosive and corrosive media that may seriously affect the instrument.
The installment place should be free of serious vibration or bumps.

Environment	Environmental Requirements
Operating Environment	0℃~40℃
Operating Humidity	20%~80% non-condensing
Storage Temperature	-10℃~60℃
Altitude	≤2000m
Degree of Pollution	II

Cleaning

To avoid electric shock, please unplug the power cord before cleaning.
Clean the housing and the panel with a soft damp cloth, and make sure it is completely dry. Do not clean the interior of the instrument.
Caution Do not use solvent (alcohol or gas) to clean the interior of the instrument.
Do not stick the ventilation holes, and clean the outer shell regularly to make sure the instrument can work stably.

Packing

Original Packing
Please keep all the original packing materials to pack the instrument, if the instrument need to send back to factory for maintenance. And please contact with UNI-T technical support before sending it. Make sure all the accessories, such as power cord is sent back and mark the failure phenomenon and reasons. In addition, please indicate “fragile”, and “please be careful when handling it” in the package.

Other Packing

If the original packing materials are missing, please pack the instrument as follows,

1. Use bubble bag or EPE foam to wrap the instrument
2. Put the instrument in a multilayer cardboard box which can stand 150kg of pressure
3. The instrument must be around with shockproof materials, a thickness about 70 -100mm
4. Seal the cardboard box properly
5. Indicate “fragile”, and “please be careful when handling it” in the package.

Measurement Display

Power On

Turn on the variable AC power supply properly and inspect it as follows,

1. Connect the power cable correctly, press the power button on the front panel to active the instrument. Press On/Off, Caution, High/Low key, screen will display “INIT” and a self-test progress bar.
2. After initialization, the screen will display the current state.
   The completion of the correct power-on self-test indicates that the instrument meets the factory standards and it can be used normally by the user.
   Caution Before operating the variable AC power supply, please read safety information carefully.
   Warning Please make sure the power voltage is matched with the supply voltage, otherwise it may cause damage to the instrument.
   Please make sure the mian power plug is inserted into the protective ground power socket, do not use a patch panel without a protective ground.

Introduction of Screen Display

Enter measuring mode, VA screen will display as follows,

Figure 3-2 Measurement Display

Operating Indicator

UAP500A/1000A variable AC power supply has On/Off key with output indicator. Press On/Off key, the indicator becomes green which means output is enabled; press On/Off key again to disable the output and the indicator will also be off.
High/Low key with indicator. Press High/Low key, the indicator becomes blue which means in high mode; press High/Low key again to switch high to low mode and the indicator will be off; 0-150V is low mode, and 150V-300V is high mode. Press the High/Low key to switch low to high mode, and the indicator should be blue before setup.

Measurement Setup

This section is to introduce the main function of the variable frequency AC power, for user to learn more about how to operate the instrument.

Output Voltage

Press rotary knob or V Set , voltage value start to blink and then to enter voltage setup
Press the right and left direction key to select the required and specific digit;
Rotate rotary knob to set the required voltage value, press OK or rotary knob to confirm the voltage setting.
Note 0-150V is low level, 150V-300V is high level. When the setting is low level, press the High/Low key to switch low to high level, and the indicator should be blue and then set voltage value of high level.

Protective Current

Press rotary knob or V Set current value start to blink, press low direction to enter the current setup; press right and left direction key to select the required and specific digit;
Rotate rotary knob to set the required current value, press OK or rotary knob to confirm the voltage setting.
Note In output mode, when the tested current exceeds the protective current, power will decrease voltage output till output is disabled.

Output Frequency

Press F Set frequency value start to blink and then to enter frequency setup;
Press right and left direction key to select the required and specific digit;
Rotate rotary knob to set the required voltage value, press OK or rotary knob to confirm the voltage setting.
In addition, press 50Hz or 60Hz button can set the frequency to 50Hz or 60Hz directly.

Output

Set setting the above parameters, connect the load, press On/Off key, the indicator becomes green, press On/Off key again, turn off output and the indicator will also be off.

Mode Selection

Press Mode use up/down direction key to select the required mode, and press OK to use the parameter of the current mode.

Parameter of Mode

Press Mode key as shown in the figure below, M1 appears on the screen, select the mode which need to set the parameters M1-M9 by using the up/down direction key; Take M1 as an example, long press Mode key till the voltage value and M1 start to blink to enter the setting mode, it can set the output voltage and frequency, protective current as 4.1 parameter setup, press OK or rotary knob to keep the setting.
Note If there are three parameters should be set, do not press OK or rotary knob key after setting the voltage, use up/down direction key key to select and set the next parameter, it can complete the setting of the three parameters in succession.

System Setup

This section is to introduce the system function of the variable frequency AC power, which includes the following

contents:

System
Press Setup key on the panel and then enter <System Setup> page.

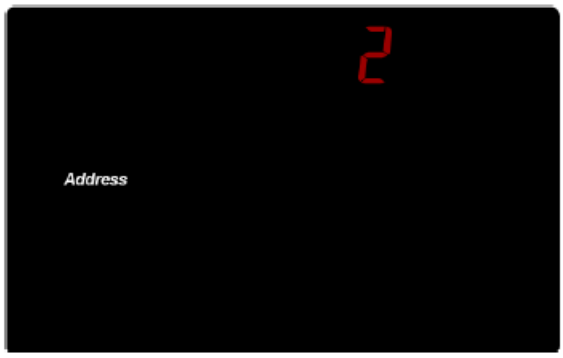
Key Sound
Press Setup key will display the following interface, OFF presents turn off-key sound, ON presents turn on key sound. Key sound can also be changed by direction key or rotary knob.

Output Delay
Press Setup key twice to enter the output delay interface, use the numeric keypad or rotary knob to set time, and press OK or rotary knob to confirm the setting.

Protocol
Press Setup key three times to enter the protocol interface, use a rotary knob or up/down direction key to change the setting, and press OK or rotary knob to confirm the setting
This variable frequency AC power supply provides SCPI and MODBUS protocol
0 presents communication closed, 1 presents SCPI protocol, 2 presents MODBUS protocol.

Baud Rate
Press Setup key four time to enter the baud rate interface, use rotary knob or up/down direction key to change the setting, and press OK or rotary knob to confirm the setting;
Baud Rate has 4800, 9600, 19200 and 38400 to choose.

Address
Press Setup key five times to enter the address interface, use rotary knob or up/down direction key to change the setting, and press OK or rotary knob to confirm the setting;
This setting is only for MODBUS protocol address is available for 1-250.



Introduction of Communication Interface and Terminal

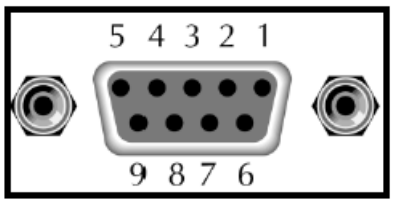
This section is to introduce the communication interface of the variable frequency AC power supply, which includes the following contents:

RS-232C
UAP500A/1000A variable AC power supply has a DB9 main connector at the end, which can be connected to the COM port of a computer using the RS-232 standard communication cable. It can realize remote control.
Note: In actual use, the variable AC power supply only uses three of the pins 2.3.5 to communicate with the instrument.
It is recommended that to avoid electrical shocks, please turn off the instrument power when plugging and unplugging the connector.
Table 6-1 Pin Definition of COM Interface RS232

Product Information

The UAP500A/1000A is a programmable variable frequency AC power supply manufactured by Uni-Trend Technology (China) Co., Ltd. The product is protected by patent rights in China and other countries, including issued and pending patents. The instrument has a warranty period of one year from the date of purchase.

Pin No.	Symbol	Description	RS-232 Connect Terminal
1	—	Vacant	
2	TXD	Send data	
3	RXD	Receive data	
4	—	Vacant	
5	GND	Signal ground	
6	—	Vacant	
7	—	Vacant	
8	—	Vacant	
9	—	Vacant	



Communication settings are mainly used to set the communication method between the varaiable frequency AC power supply and the host computer. The varaiable frequency AC power supply communicates with the host computer through RS232. Before connecting to the host computer, please make sure that the corresponding communication parameters are selected in the system settings, taking the SCPI protocol as an example:

Communication Setup	Setting	Description
Protocol	1	Set communication mode to SCPI protocol
BaudRate	4800/9600/19200/38400	Set the baud rate of RS232 Note standard upper computer is only available for baud rate 4800 and above

Note For secondary development, refer to SCPI protocol and MODE BUS protocol in the document “UAP500A/1000A Programming Manual”.

Technical Index

This section includes:

- Main Technical Index
- Matters of Calibrating Parameter

Table 7-1 Main Technical Index of UAP500A/1000A

Model		UAP500A	UAP1000A
Capacity		500VA	1KVA
Modulating Mode		SPWM(sine wave pulse modulation)	
INPUT			
Phase		1φ2W	
Voltage		220V±10%	
Frequency		47Hz – 63Hz	
OUTPUT			
Phase		1φ2W	
Voltage		0-150VAC/0-300VAC AUTO	
Frequency		45-250Hz(0.01Step)	
Maximum Current	L=120V	4.2A	8.4A
	H=240V	2.1A	4.2A
Load Regulation		1%	
T.H.D		3%(low level 120V,high level240V, with resistive load)	
Frequency Stability		0.01%	
Display		Voltage Vrms, Current Arms, Frequency Fre, Power Wattage, Power FactorPF	
Voltage Resolution		0.01V	
Frequency Resolution		0.01Hz	
Current Resolution		0.001A	
Memory		M1~M9(V_F_A	
Measurement Accuracy	Voltage	±0.5%FS+5dgt	
	Current	±0.5%FS+5dgt	
	Frequency	±0.01%FS+5dgt	
	Power	±0.5%FS+5dgt	
Setup Accuracy	Voltage	±1%FS	
	Frequency	±0.1%FS	

Accuracy of Power Factor	±(0.4 reading+0.1%FS)	
Communication Interface	RS232C	
Cut-off current	0-Max Current maximum current maximum capacity/240V that is P/240	
Output Protection	Over Current Over Temp Over Load Short Circuit Warning	
Weight(Kg)	17.5kg	20.7kg
Full Container Load kg	21.1kg	24.3kg
Size W×H×D(mm)	430×132×483	
Operating Environment	0-40℃ 20-80%RH	

Remark
Environment requirement of accuracy: 23℃±5 degree 20%-80%RH. The guaranteed period of accuracy: one year
Recommended calibration frequency: 1 time/year

Warranty Service

If the product is proven to be defective within the warranty period, UNI-T reserves the right to either repair the defective product without charging of parts and labor or exchange the defective product to a working equivalent product (determined by UNI-T). Replacement parts, modules and products may be brand new, or perform at the same specifications as brand-new products. All original parts, modules, or products which were defective become the property of UNI-T. Power cords, accessories and fuses, etc. are not included in this warranty.

- a) Repair damage caused by installation, repair or maintenance of personnel other than service representatives of UNI-T;
- b) Repair damage caused by improper use or connection to incompatible equipment;
- c) Repair any damages or failures caused by using a power source not provided by UNI-T;
- d) Repair products that have been changed or integrated with other products (if such change or integration increases time or difficulty of repair).

The warranty is formulated by UNI-T for this product, replacing any other express or implied warranties. UNI-T and its distributors refuse to give any implied warranty for marketability or applicability for special purposes. For violation of the warranty, repair or replacement of defective products is the only and all remedial measure UNI-T provides for customers.
No matter whether UNI-T and its distributors are informed of any possible indirect, special, occasional or inevitable damage in advance, they assume no responsibility for such damage.

Limited Warranty and Liability

The warranty is inapplicable to any defects, failures or damages caused by accident, normal wear of components, use beyond the specified scope or improper use of the product, or improper or insufficient maintenance. UNI-T is not obliged to provide the services below as prescribed by the warranty: a) Repair damage caused by installation, repair or maintenance of personnel other than service representatives of UNI-T; b) Repair damage caused by improper use or connection to incompatible equipment; c) Repair any damages or failures caused by using power source not provided by UNI-T; d) Repair products that have been changed or integrated with other products (if such change or integration increases time or difficulty of repair).

Product Usage

In order to use the UAP500A/1000A safely and correctly, please read the user manual thoroughly, especially the safety notes. The customer refers to the individual or entity that is declared in the guarantee. In order to obtain the warranty service, the customer must inform the defects within the applicable warranty period to UNI-T, and perform appropriate arrangements for the warranty service.

When using the product, ensure that it is within the specified scope and frequency. Do not use power sources not provided by UNI-T to avoid damages or failures. If the product is defective, contact UNI-T for repair or exchange of the defective product. Power cords, accessories and fuses are not included in the warranty. Improper use or insufficient maintenance of the product may cause defects, failures, or damages that are not covered by the warranty. To prevent this, follow the instructions in the user manual and perform proper maintenance of the product.

When selling or transferring the product to a third party within one year from the date of purchase of the product, inform them that the warranty period of one year shall be from the date of the original purchase from UNI-T or an authorized UNI-T distributor.

Documents / Resources

	UNI-T UAP500A Programmable AC Power Source [pdf] User Manual UAP500A Programmable AC Power Source, UAP500A, Programmable AC Power Source, AC Power Source, Power Source, Source

References

- UNI-T Voltage Meter, Multimeter, Oscilloscope | UNI-T-UNI-T Voltage Meter, Multimeter, Oscilloscope | UNI-T