UNI-T®

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User's Manual

UAP500A/1000A Programmable AC Power Source

Perface

Thank you for purchasing this brand new product programmable variable frequency AC power supply. In order to use this product safely and correctly, please read this manual thoroughly, especially the safety notes.

Copyright Information

Warranty Service

The instrument has a warranty period of one year from the date of purchase. If the instrument is damaged due to improper operation by the user during the warranty period, the maintenance fee and the costs caused by the maintenance shall be borne by the user, and the instrument shall be maintained by the company for life.

If the original purchaser sells or transfers the product to a third party within one year from the date of purchase of the product, the warranty period of one year shall be from the date of the original purchase from UNI-T or an authorized UNI-T distributor. Power cords, accessories and fuses, etc. are not included in this warranty.

If the product is proved to be defective within the warranty period, UNI-T reserves the rights to either repair the defective product without charging of parts and labor, or exchange the defected 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.

The "customer" refers to the individual or entity that is declared in the guarantee. In order to obtain the warranty service, "customer "must inform the defects within the applicable warranty period to UNI-T, and perform appropriate arrangements for the warranty service.

The customer shall be responsible for packing and shipping the defective products to the individual or entity that is declared in the guarantee. In order obtain the warranty service, customer must inform the defects within the applicable warranty period to UNI-T, and perform appropriate arrangements for the warranty service. The customer shall be responsible for packing and shipping the defective products to the designated maintenance center of UNI-T, pay the shipping cost, and provide a copy of the purchase receipt of the original purchaser. If the products is shipped domestically to the purchase receipt of the original purchaser. If the product is shipped to the location of the UNI-T service center, UNI-T shall pay the return shipping fee. If the product is sent to any other location, the customer shall be responsible for all shipping, duties, taxes, and any other expenses.

Limited Warranty and Liability

The warranty is inapplicable to any defects, failures or damages caused by accident, normal wear of components, use beyond specified scope or improper use of 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).

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 purpose. 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.

Safety Information

⚠ Warning ⚠ Caution: To avoid possible electric shock and personal safety problem, please follow the instructions below.

Disclaimer	Please read the following safety information carefully beforestarting 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 provide by the factory to connect the instrument and power ground wire.
Operating voltage	Please make sure operating voltage 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 mode, check whether the conversion switch of 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 operating, 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 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 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	I	On (Power)
3~	Three Phase AC	O	Off (Power)
⏚	Grounding	⏻	Backup Power
⏚	Protective Grounding	⏚	Connect with Cabinet or Case
⊥	Signal Ground	⚠	Caution
⚡	Danger		

Environment-friendly Use Period

EFUP is the period of time before any of the RoHS substances are likely to leak out, causing possible harm to health and the environment. EFUP of this instrument is 40 years, it should be recycling system when exceed 40 years

Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC

Must not be discarded in the trash can.

1. Product Overview

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

1.1 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.

1.1.1 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, power factor
- Press keypad to input parameter of voltage, frequency, cut-off current, high accuracy
- 9 sets of voltage, current, frequency can be adjusted freely
- One-key to switch high-low voltage output
- Input delay can set as user custom

1.2 Front Panel

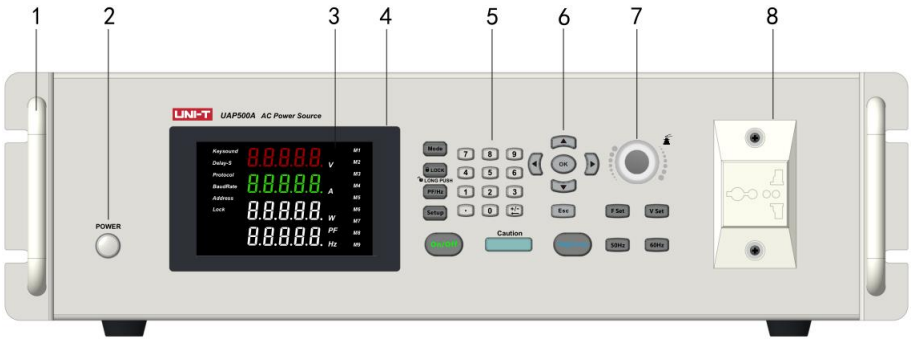


Figure 1.2.1 Front Panel （Take UAP500A as an example）

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

1.3 Rear Panel

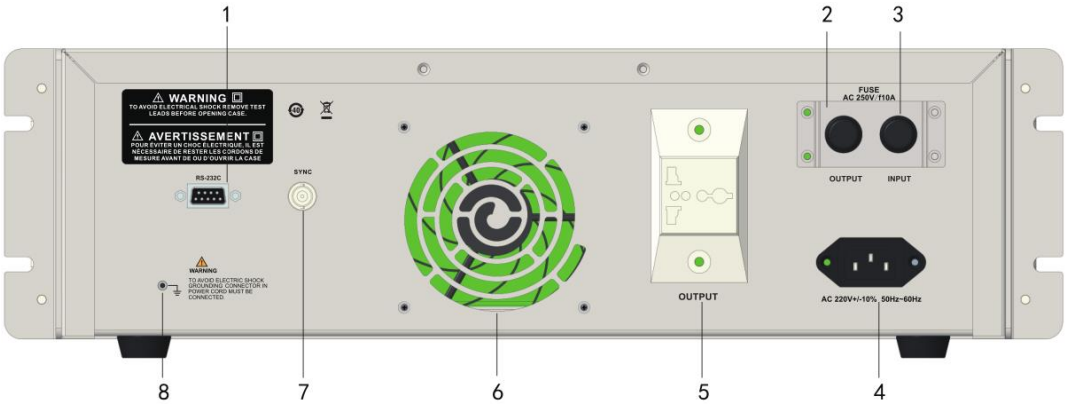


Figure 1-3-1 Rear Panel

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

2. Inspection and Installment

2.1 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

2.2 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

- Three-core power cord is provided. Please make sure that the ground wire of 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.

Warning: Please do not use the damaged power cord to avoid danger.

2.3 Operating Environment

UAP500A/1000A variable AC power supply only can used in normal temperature and non-condensing environment. The following is the environmental requirements for general environment
Ventilation fans speed will intelligent change with the temperature of 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

2.4 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 stuck the ventilation holes, and clean the outer shell regularly to make sure the instrument can work stably.

2.5 Packing

Original Packing

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

Other Packing

If the orginal packing materials are missing, please pack the instrument as follows,
1. Use bubble bag or EPE foamto wrap the instrument
2. Put the instrument in multilayer cardboard box which can stand 150kg pressure
3. The instrument must around with shockproof marterials, thickness about 70 -100mm
4. Seal the cardboard box properly
5. Indicate "fragile", "please be careful when handling it" in the package.

3. Measurement Display

3.1 Power On

Turn on the variable AC power supply properly and inspecting 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 be display "INIT" and self-test progress bar.

2. After initialization, 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 power voltage is matched with supply voltage, otherwise it may cause damage to the instrument.

Please make sure the mian power plug insert into the protective ground power socket, do not use a patch panel without a protective ground.

3.2 Introduction of Screen Display

Enter measuring mode, VA screen will display as follows,

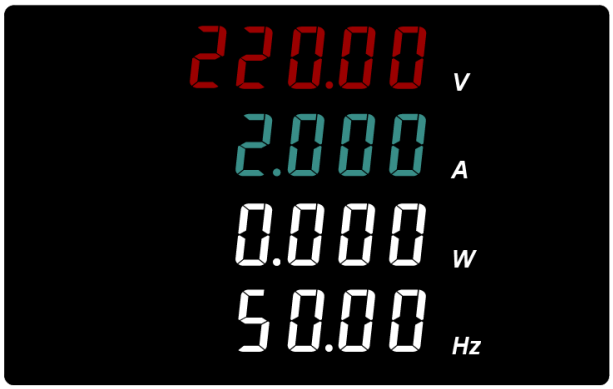


Figure 3-2 Measurement Display

3.2.1 Operating Indicator

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

4. Measurement Setup

This section

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

4.1 Parameter Setup

4.1.1 Output Voltage

Press【rotary knob】or【V Set】, voltage value start to blink and then to enter voltage 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.

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.

4.1.2 Protective Current

Press【rotary knob】or【V Set】, current value start to blink, press low direction to enter 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 tested current exceed the protective current, power will decrease voltage output till output is disabled.

4.1.3 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 frequency to 50Hz or 60Hz directly.

4.1.4 Output

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

4.1.5 Mode Selection

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

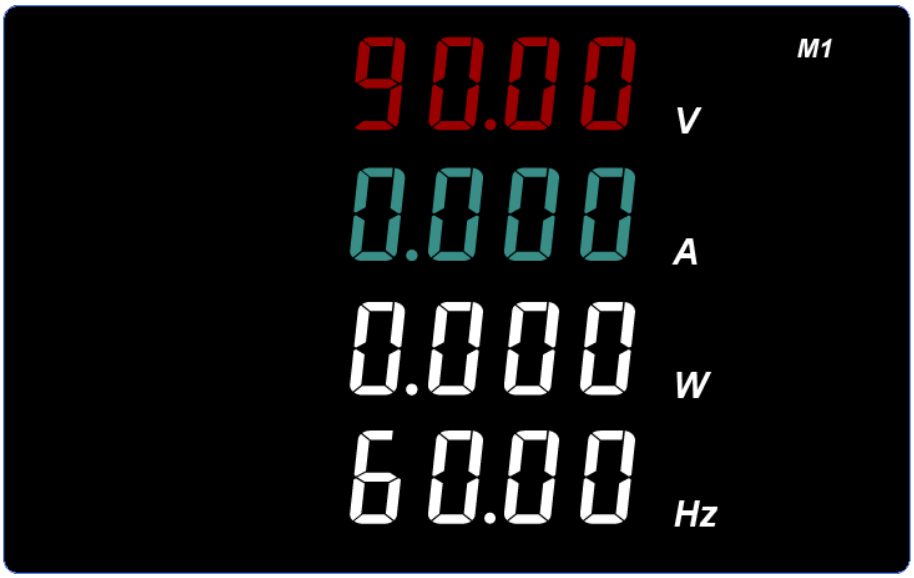
4.2 Mode Setup

4.2.1 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.



5. System Setup

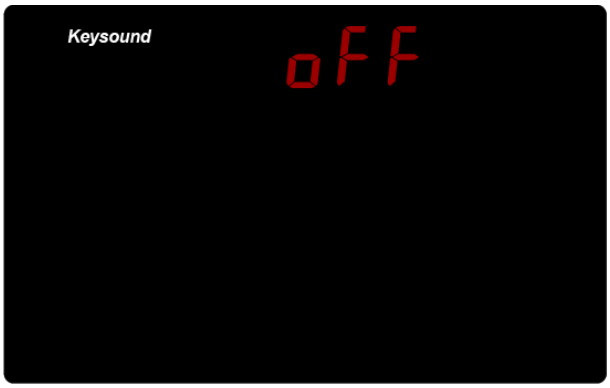
This section is to introduce the system function of the variable frequency AC power, which includes the following contents:

5.1 System

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

5.1.1 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 changed by direction key or rotary knob.

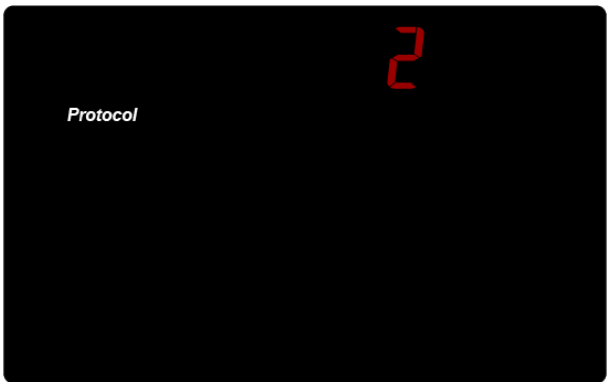


5.1.2 Output Delay

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

5.1.3 Protocol

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

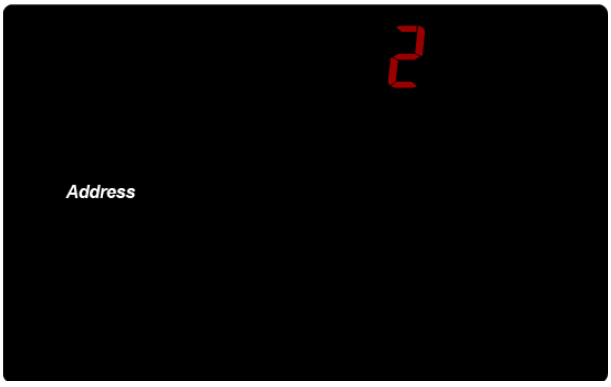


5.1.4 Baud Rate

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

5.1.5 Address

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



6. 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:

6.1 RS-232C

UAP500A/1000A varaiable 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.

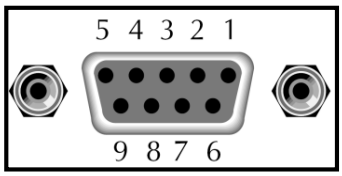
Note: In actual use, the varaiable AC power supply only uses three of the pins 2.3.5 to communicate with the instrument.

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）

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

RS-232 Connect Terminal



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".

7. 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.
Guarantee period of accuracy: one year
Recommended calibration frequency: 1 time/year

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