Broadband Power Amplifier

PA3000 series

1. Preface

PA3000 series broadband power amplifier is an amplifier designed to amplify a small voltage signal into a high voltage and high current signal for driving high power load.

PA3000 is widely applied in the different scientific research fields including new materials, ultrasonic and piezoelectric ceramics, magnetic materials and components, sonar and acoustics, semiconductor testing, vibration and mechanical research.

PA3000 series have four models as shown below:

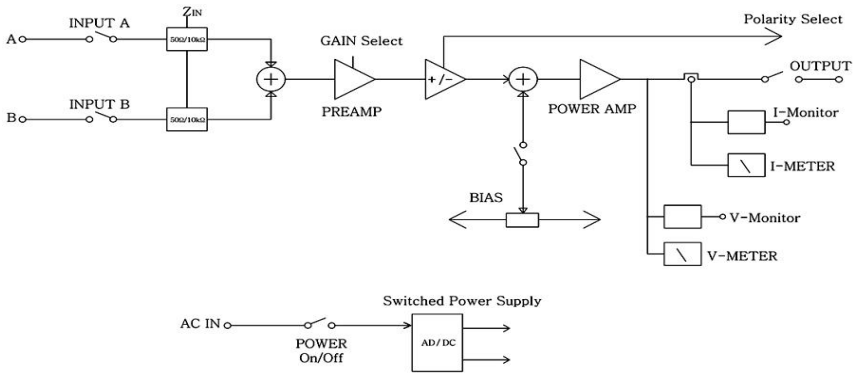
	PA3016	**PA3018**	**PA3026**	**PA3028**
Power bandwidth	DC-1MHz	DC-1MHz	DC-500kHz	DC-500kHz
Maximum output voltage	150Vpp/±75V	150Vpp/±75V	300Vpp/±150V	300Vpp/±150V
Maximum output current	2.5Arms/7App	5Arms/14App	1.25Arms/3.5App	2.5Arms/7App
Maximum output power	130VA	260VA	130VA	260VA
Slew rate	400V/μs	400V/μs	450V/μs	450V/μs

2. Features

- Maximum voltage 300Vpp
- Maximum current 5Arms
- High bandwidth 1MHz
- Simple and convenient panel design
- Well-designed and auto-recoverable output shortage and over-current protection function
- Dual meter indicate the RMS value of voltage and current output
- Dual channels monitoring voltage and current output waveform, no need for extra probe
- Dual channels signal input connector, users can superimpose these signals at will
- DC offset adjusting function
- Bridged amplifiers connection function, connecting two power amplifiers can output power up to 520VA
- Powered by a high efficiency switch power supply with low noises, small size, light weight and high reliability.

3. Composition

The functional block diagram of PA3000 series amplifier is shown below:



- The input circuit is consisted of completely same A/B circuits, and their signals are added. Users can easily connect or disconnect any one of them and choose 50Ω or 10kΩ as input impedance of the input channel.
- The voltage of this added input signal will be pre-amplified in a PREAMP. There are four options of gain you can choose, 10X/20X/50X/100X for PA3016/3018, and there are four options for PA3026/3028 as well, 20X/40X/100X/200X optional. There is a button for selecting phase polarity (in phase/out phase) on the back panel of the power amplifier.
- The output signal of the PREAMP will be added with the offset voltage and then power amplified by the power amplify circuit. The offset voltage will be controlled by a switch button and adjusting knob. The offset voltage range for PA3016/3018 is ±75V, and the offset voltage range for PA3026/3028 is ±150V.
- The OVLD light will be on when the output of the power amplifying circuit is overloaded.
- The voltage and current meter can indicate the effective value of the output voltage and current of the power amplifier, making it convenient for the user to understand the operating status of the power amplifier.
- Voltage and current double channel monitoring output, able to monitor the waveform of voltage and current.
- The main power supply of the power amplifier is a specially designed low noise switch power supply, and it is also small, light, and highly efficient.

4. Usage

The panel design of PA3000 series is simple and convenient, displaying all functions on the panel and making it convenient for users to start up with.

① Connect AC power supply to the AC socket (21), and turn on the power switch (1).

② User can easily connect the signals of one or two channels on (3) and (4) of BNC input connector, and

press button (2) and (5) to turn on required channel.

③ Press button (19) to set up input impedance, and the LED (18) will indicate current impedance level being 50Ω or 10kΩ.

④ Select the gain . Press button (17) to decrease gain or button (15) to increase gain. LED (16) will indicate current gain status.

⑤ Press button (14) to switch on or off offset voltage (the button will be lighted if there's offset), rotating the knob (13) of multi turn potentiometer to set the required offset voltage. You can read the offset voltage value on voltage meter.

⑥ Press button (10) to turn on output connector (8), the button will be lighted.

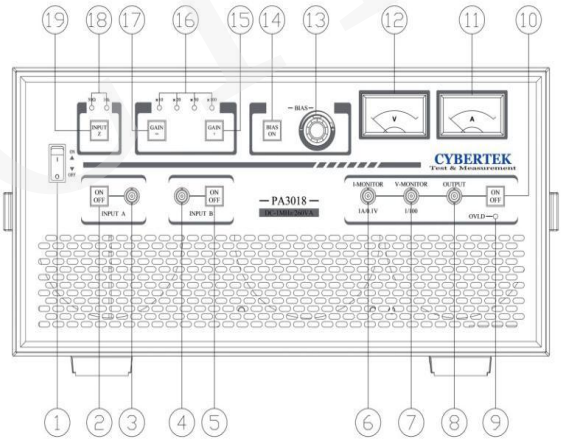
⑦ Voltage (12) and current (11) meter can indicate the effective value of voltage and current output.

⑧ Connect the voltage and current monitoring output BNC connector (7) and (6) to oscilloscope to monitor the waveform of output voltage and current.

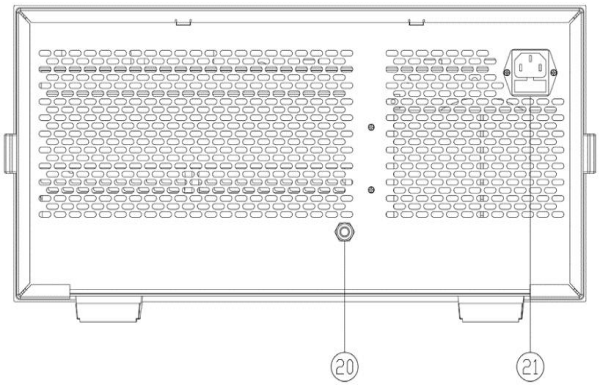
⑨If the output of power amplifier is overloaded, the power amplifier will automatically decrease the output voltage to protect the device and light up the OVLD indicator. The power amplifier will be automatically recovered and the OVLD lights off when overload is removed.

⑩ Press the polarity selection button (20) to invert the output signal from output connector (8), normally used when two power amplifiers are bridged.

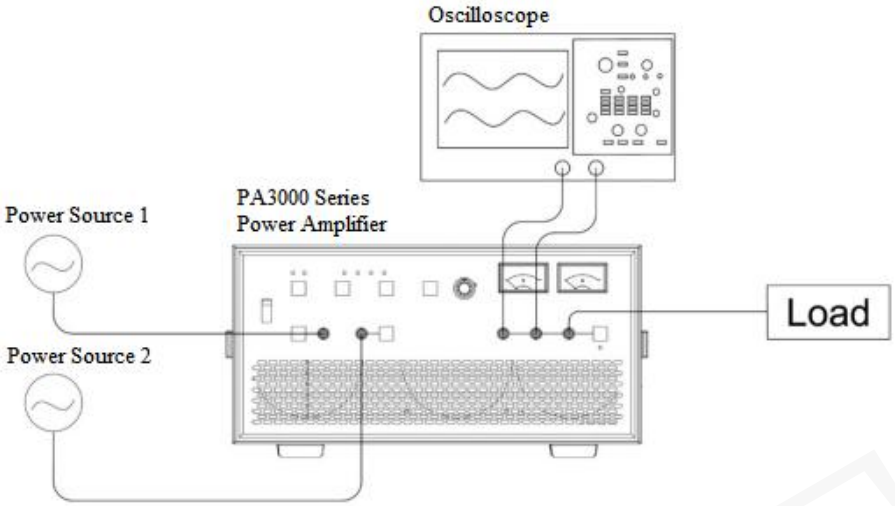
PA3000 Series Front Panel



PA3000 Series Back Panel

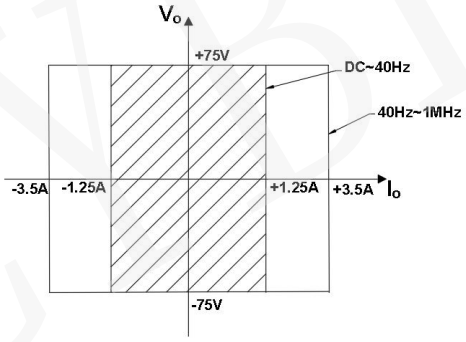


Typical Application of PA3000 Power Amplifier

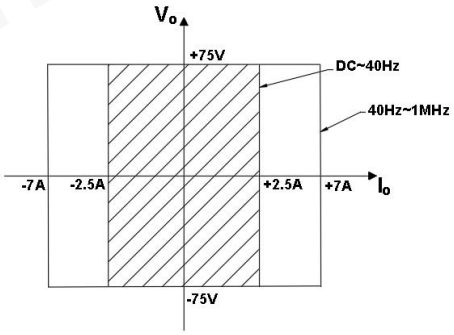


5. Output Feature and Over-current Protection Technology

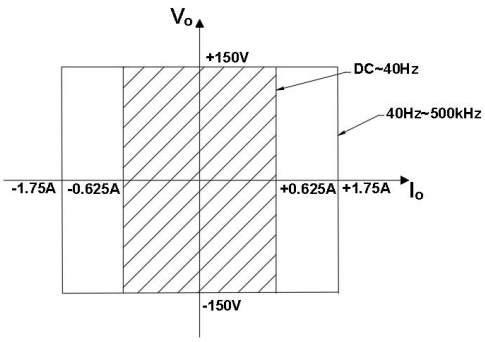
PA3000 series power amplifier has unique self recoverable output over-current protection function. To maximize the output power of the PA3000 series power amplifier, the protection limits of DC and AC are different. PA3000 series' optional power output zone is shown below. The shaded area represents the power output range within DC-40Hz frequency range, which applies current average value protection technology. The outer area represents the power output range above 40Hz, and it applies the peak value protection technology of the output current, thus its output power is far beyond the former.



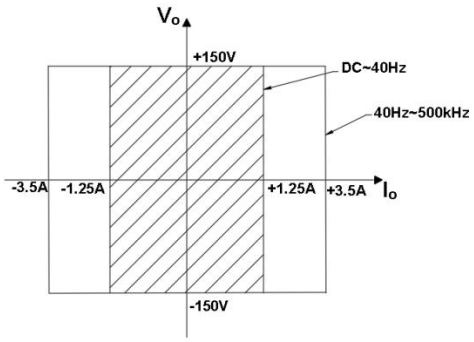
PA3016



PA3018



PA3026



PA3028

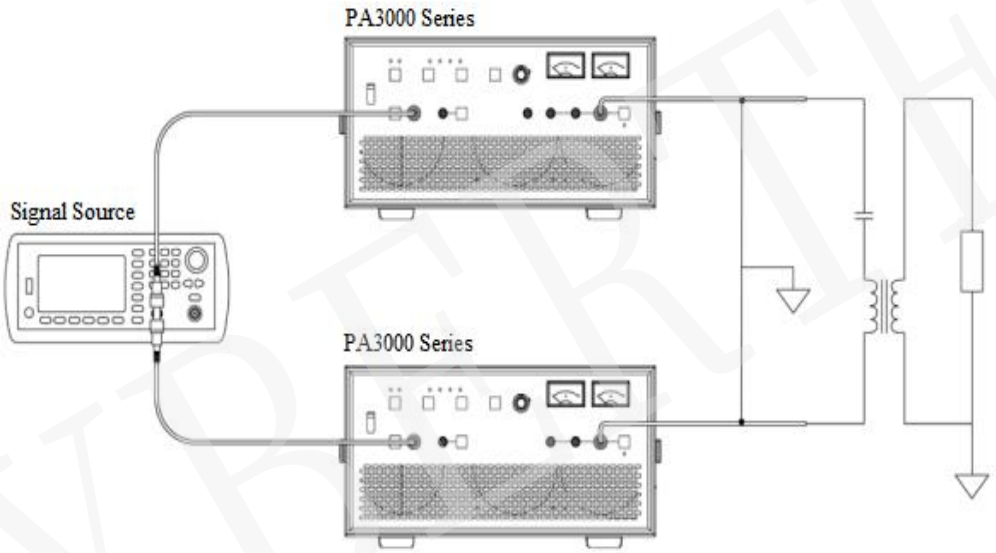
6. Bridge

To increase the output power of the amplifier, you can use full bridge method connecting two PA3000 power amplifiers of the same model to double the output voltage and output power.

Divide the signal source into two and separately connect to the signal input connectors of host and slave, adjust the host output signal to in phase and the slave output signal to out phase. Set the input impedance of power amplifiers to 10K, and set the gain to be same.

Connect the output connector of the power amplifier to each side of the load. Please be aware that the output will be floating in this full bridge connection. The output circuit of one power amplifier is half bridge structure and the output voltage is to ground.

You can also change the full bridge floating ground connection to to ground connection by an isolated transformer for the convenience of the users as shown below:



7. Technical Specifications

Model		PA3016	PA3018	PA3026	PA3028
Power Bandwidth		DC-1MHz	DC-1MHz	DC-500kHz	DC-500kHz
Output specifications	Maximum output voltage	150Vpp/±75V	150Vpp/±75V	300Vpp/±150V	300Vpp/±150V
		RL=25Ω 50Vrms(40Hz-500kHz) 40Vrms(20Hz-1MHz)	RL=12.5Ω 50Vrms(40HZ-500kHz) 40Vrms(20HZ-1MHz)	RL=100Ω 100Vrms(40Hz-200kHz) 40Vrms(20Hz-500kHz)	RL=50Ω 100Vrm(40HZ-200kHz) 40Vrms(20Hz-500Hz)
		RL=75Ω ±75V(DC-100kHz) ±70V(DC-500kHz)	RL=37.5Ω ±75V(DC-100kHz) ±70V(DC-500kHz)	RL=300Ω ±150V(DC-50kHz) ±140V(DC-200kHz)	RL=150Ω ±150V(DC-50kHz) ±140V(DC-200kHz)

		±55V(DC-1MHz)	±55V(DC-1MHz)	±55V(DC-500kHz)	±55V(DC-500kHz)
	Maximum output current	2.5Arms/7App (40Hz-1MHz)	5Arms/14App (40Hz-1MHz)	1.25Arms/3.5App (40Hz-500kHz)	2.5Arms/7App (40Hz-500kHz)
		±1.25A (DC-40Hz)	±2.5A (DC-40Hz)	±0.625A (DC-40Hz)	±1.25 A (DC-40Hz)
	Slew rate	400V/μs	400V/μs	450V/μs	450V/μs
	Output impedance	≪0.25Ω+0.8μH	≪0.125Ω+0.4μH	≪1Ω+3.2μH	≪0.5Ω+1.6μH
	DC offset	±75V		±150V	
	Voltage current monitor	Voltage and current double channels output monitoring Voltage attenuation coefficient 1/100 Current attenuation coefficient1A/0.1V			
	Voltage current meter	Voltage current meter RMS value indication			
Input	Input form	A/B two channels (Can be added), A/B for the output is in phase			
	Input impedance	50Ω/10kΩ optional			
	input voltage	±10V Maximum			
Gain		10/20/50/100 optional		20/40/100/200 optional	
Maximum output power (sine wave)		130VA	260VA	130VA	260VA
Maximum output power (Square wave)		262.5W	525W	262.5W	525W
Power supply		220V±10%，50/60Hz			
Maximum power consumption		300W	600W	300W	600W
Dimensions		420(W)x360(L)x210(H) mm			
Weight		9KG	10KG	9KG	10KG

8. Safety Instruction

Warning

☞ The maximum output voltage of PA3000 series can reach up to 300Vpp/±150V, wrong operation could cause severe shock accident.

- ☞ Please strictly abide to the safety rule of the lab during operation and connect cables after you turn off the power supply of power amplifier.
- ☞ The device must be installed in dry and insulated environment.
- ☞ Please contact us immediately if you find any malfunction in the device, do not repair on your own.

9. Packing List

Packing List	
PA3000	1
power supply cable （CK-318）	1
BN cable (CK-320A)	3
Instruction Manual	1
Warranty card	1

CYBERTEK
SHENZHEN ZHIYONG ELECTRONICS CO., LTD
Addr: Room A1702, Building 4, TianAn Cyber Park, HuangGe North Road, LongGang District, ShenZhen City, China
Tel: +86-400 852 0005 / +86-755-86628000
Q Q: 400 852 0005
Email: cybertek@cybertek.cn
Url: http://www.cybertek.cn

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