DELIVERING YOUR MESSAGE!

DIGITAL POWER AMPLIFIER

User Manual

MODEL

DPA8060
DPA4125
DPA4250
DPA2500

Revision History

v1.15

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1 About this manual

This user manual will explicitly describe the hardware installation and the software configuration, provides installers and users the necessary information to setup and configure the system.

1.1 Notice signs

WARNING
TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK,
DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.
NO USER SERVICEABLE PARTS INSIDE, REFER SERVICING
TO QUALIFIED SERVICE PERSONNEL.

** The above warning is located on the back of the unit.

Explanation of Graphical Symbols	
 The equipment or the property can be damaged, or persons can be lightly injured if the alert is not observed.	 To alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

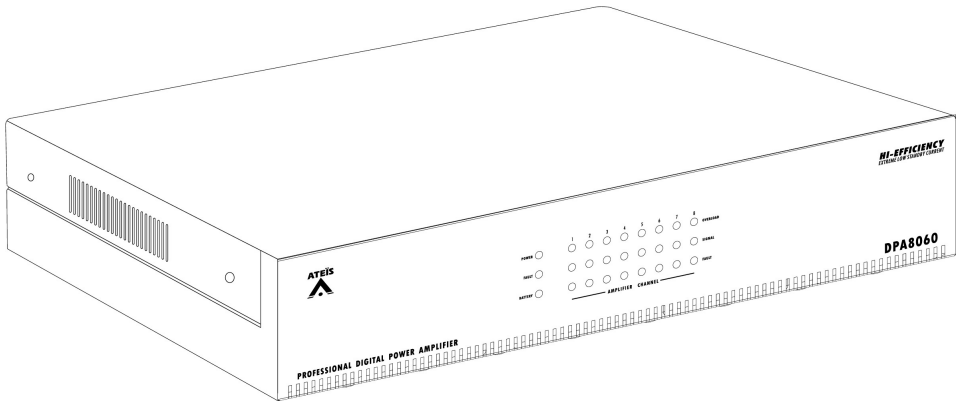
1.2 Safety instructions

- Do not expose the device to extreme temperatures, direct sunlight, humidity, or dust, which could cause fire or electrical shock hazard.
- Keep away water or other liquids from the device. Otherwise fire or electrical shock may result.
- Connect the power cord only to an AC outlet of the type stated in this manual or as marked on the unit. Otherwise fire and electrical shock hazard results.
- When disconnecting the power cord from an AC outlet always grab the plug. Never pull the cord. A damaged power cord is a potential risk of fire and electrical shock hazard.
- Avoid touching power plugs with wet hands. Doing so is a potential electrical shock hazard.
- Take care for correct polarity when operating the device from a DC power source. Reversed polarity may cause damage to the unit or the batteries.
- Avoid placing heavy objects on power cords. A damaged power cord is a fire and electrical shock hazard.
- Do not cut, scratch, bend, twist, pull, or heat the power cord. A damaged power cord is a fire and electrical shock hazard. Ask your ATEÏS dealer for replacement.
- Turn off the unit immediately, remove the power cord from the AC outlet and contact your ATEÏS dealer in any of the following circumstances, If you continue using the device, fire and electrical shock may result.
    - Smoke, odor, or noise getting out of the unit.
    - Foreign objects or liquids get inside the device.

- The unit has been dropped or the shell is damaged.

- Do not drop or insert metallic objects or flammable materials into the unit as this may result in fire and electrical shock.
- Do not remove the device's cover, as there are exposed parts inside carrying high voltages that may cause an electrical shock. Contact your ATEÏS dealer if internal inspection, maintenance or repair is necessary.
- Do not try to make any modifications to the device. This is a potential fire and electrical shock hazard.
- Avoid the device's ventilation slots to be blocked. Blocking the ventilation slots is a potential fire hazard.
- To prevent the unit from falling down and causing personal injury and/or property damage, avoid installing or mounting the unit in unstable locations.
- Leave enough space above and below the unit to provide good ventilation of the device. If the airflow is not adequate, the device will heat up inside and may cause a fire.
- Operate the device in an environment (indoor only) with a free-air temperature of between -5°C ~ +55°C (+23°F ~ +131°F).
- Turn off all audio equipment when making any connections to the device, and make sure to use adequate cables.
- Do not use benzene, thinner or chemicals to clean the device. Use only a soft, dry cloth.
- If the device is moved from a cold place (e.g., overnight in a car) to a warmer environment, condensation may form inside the unit, which may affect performance. Allow the device to acclimatize for about one hour before use.
- The components of DPA series products are complied with class 3K5 of "EN 60721-3-3:1995".

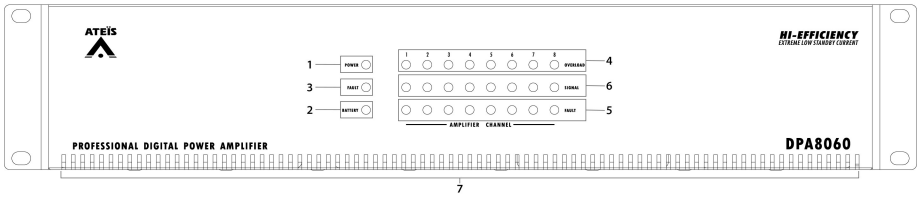
2 DPA digital power amplifier



The DPA is a class-D power amplifier with extremely low power consumption (0.2W per channel) during standby mode, and high amplification efficiency of 90%. A four-step setting switch can be configured to enable/disable the function of standby mode (power-save mode) when powered by AC mains; to request the LEDs on the front panel to comply to EN54-16; and to enable/disable the battery monitoring.

The amplifiers are powered by 100VAC ~ 240VAC 50/60Hz or 48VDC battery backup. Each model has the line inputs with individual volume gain, status LEDs (power, battery, fault, general fault, overload and signal) on the front panel, and the DPA models can bridge two channels to double the power wattage.

2.1 Front panel



The front panel of DPA2500/DPA4125/DPA4250/DPA8060 is identical, except the number of channel is different.

1. Power LED:

   This LED lights up if the DPA is powered by AC mains power.

2. Battery LED:

   This LED lights up if the DPA is powered by 48VDC power supply.

3. Fault LED:

   This LED lights up in yellow if one of the following situation occurs: output over-current, overheat, AC power fault, battery power fault (the [BAT-MNT] setting switch is set ON).

4. Overload LED:

   The overload LED will keep bright as soon as the output power exceeds the nominal value. In this situation, please check whether the speaker is connected correctly and still in good condition, also check if the level of input signal is over 0dB.

5. Channel fault LED:

   There will be two situations:

   (a)The LED light would keep bright when output was in overheat situation.

(b) The LED light would be slow flash When device was overheat.

6. Signal LED:

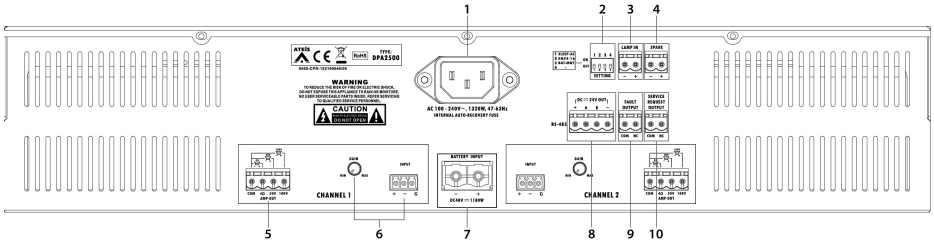
The LED lights up when detects the volume of audio signal in the channel.

7. Air inlet holes:

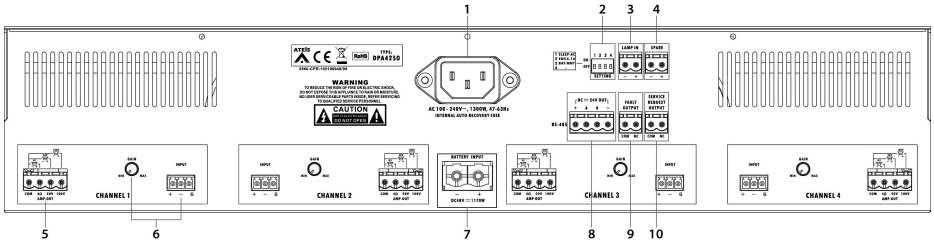
The DPA has a cooling fan that takes in air from the front panel and exhausts it from the rear panel. Please make sure that these inlet holes are not obstructed.

2.2 Rear panel

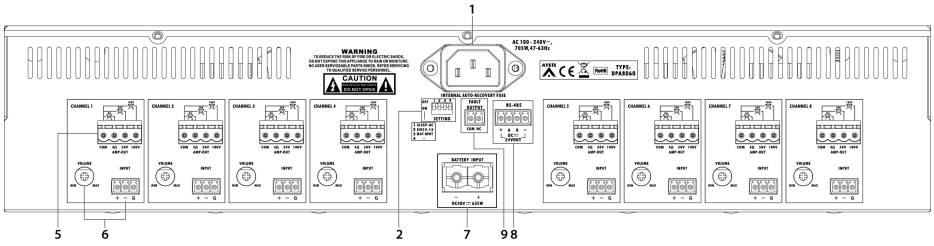
❖ DPA2500



❖ DPA4125/DPA4250



❖ DPA8060



The rear panel of DPA2500/DPA4125/DPA4250/DPA8060 is identical, except the number of channel is different, and the DPA8060 does not have Lamp input and Spare contact input.

1. AC mains power socket:

Connect the mains AC power to this power socket (100VAC ~ 240VAC, 50/60Hz with fuse). It accepts a standard mains power lead fitted with an IEC connector.

After the DPA amplifier is turned off, please wait 10 seconds before powering up the DPA amplifier again.

2. Setting switches:

- 1 SLEEP-AC: Set this switch in "ON/OFF" to enable/disable the standby function when the DPA is powered by AC.
- 2 EN54-16: Set this switch in “ON” to comply to the EN54-16 which the Overload and Signal LEDs will be disabled. Set "OFF" to enable the function of Overload and Signal LEDs.

- 3 BAT-MNT: Set this switch in "ON/OFF" to enable/disable the fault detection on 48VDC battery power. If this switch is set "ON" and the DPA is not connected to 48VDC battery, the GEN-Fault LED on the front panel will light up. If this switch is set "OFF" and the DPA is not connected to 48VDC battery, the GEN-Fault LED on the front panel will not light up.

Once the [BAT-MNT] setting switch is "ON", the General Fault contact is open when a battery power fault occurs (DPA2500/4125/4250 only).

- 4: Reserved for further usage.

3. Lamp input (DPA2500/4125/4250):

   This contact input is for testing all the LEDs on the front panel. During the testing, the LEDs will flash to check if any of them is malfunction.

4. Spare contact input (DPA2500/4125/4250):

   Reserved for further usage.

5. Channel 1~8 output:

   Each channel delivers 60W (DPA8060), 125W (DPA4125) / 250W (DPA4250) / 500W (DPA2500), and both EU and US types are available as different models.

   - EU type: 100V/ 50V/ 4ohm
   - US type: 70V/ 35V/ 4ohm

6. Channel 1~8 inputs & volume gain:

   There is a balanced terminal and a gain control for each input channel.

7. 48VDC battery backup connector:

   When AC mains is not present, this 48VDC battery power input can be used for power backup by connecting to the battery charger such as BCU-4830A/BCU-4875A. The Battery LED will light up if DPA is powered by 48VDC battery.

8. RS485:

   This interface is for internal maintenance use (24V/0.2A).

9. Fault contact output:

   This amplifier fault contact is NC (normally close) contact. When the following faults has occurred, this contact is open.

   - Output over-current
   - Overheat
   - AC power fault
   - Battery power fault (once the [BAT-MNT] setting switch on rear panel of DPA is set "ON".)
   - Features of fail-safe, dry contact, single-pole SPST switch and supporting 1A at 24VDC voltage.

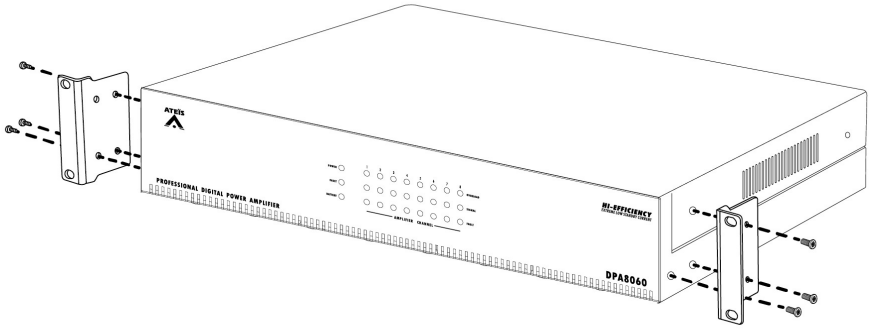
10. Service request contact output (DPA2500/4125/4250):

    The service request contact is NC (normally close). When this contact output is open, it indicates the hardware is damaged/broken, please contact your dealer to deal with this problem.

    - Features of fail-safe, dry contact, single-pole SPST switch and supporting 1A at 24VDC voltage.

3 Hardware installation

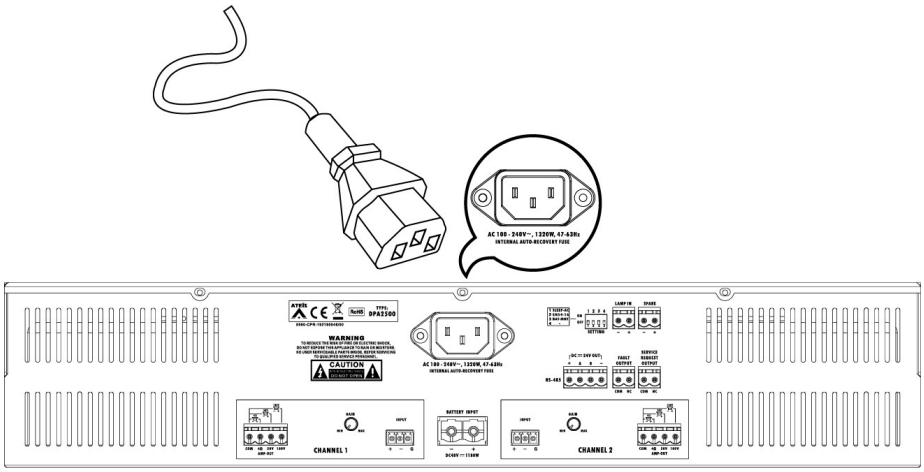
3.1 Mounting



The DPA power amplifier is suitable for 19-inch 2U rack-mounting installation. Attach the two rack-ears to the DPA using the supplied four screws.

Consider leaving enough ventilation space above and below the unit. Do not mount the amplifier directly above the heat generating devices like power supplies or power amplifiers.

3.2 Connect to AC mains power

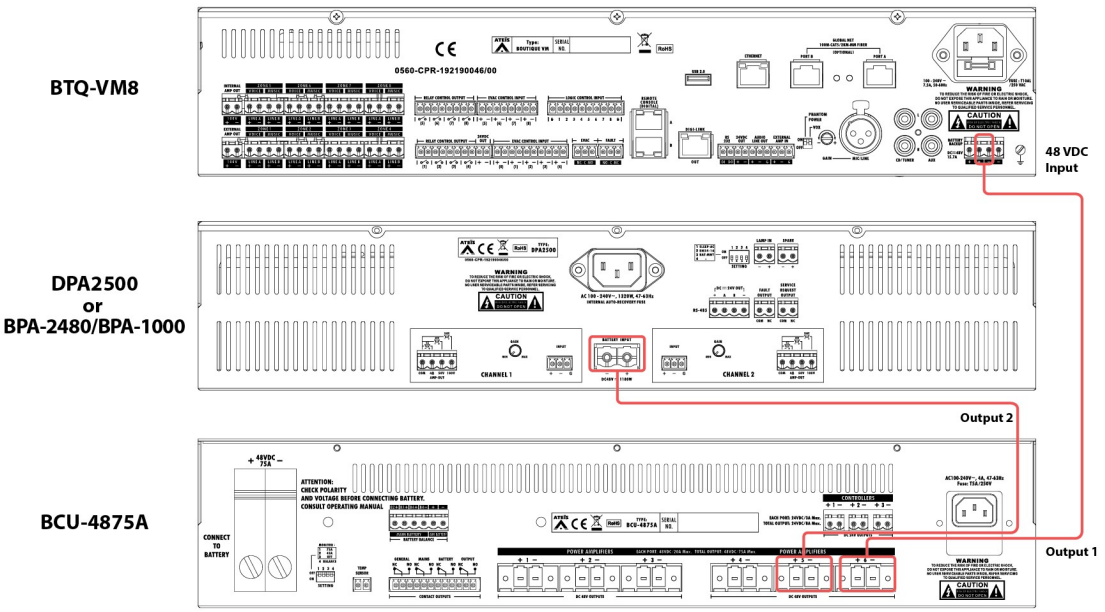


1. The DPA has a 100VAC ~ 240VAC mains power supply, please make sure the voltage is applicable for your country's main voltage.
2. Connect the power cord to the DPA and plug it into the mains outlet.

3.3 Connect to battery charger (power sharing)

The connection diagram below is using the BOUTIQUE system for example.

For DC battery backup power sharing, connect the BCU-4830A/BCU-4875A battery charger to BTQ-VM4/8 controller and DPA power amplifier.



⚠ Users "MUST" follow the orders below to connect the BTQ-VM4/8 and BPA/DPA with BCU-4830A/BCU-4875A battery charger(compliant EN 54-4).

1. Connect the four 12VDC batteries to BCU-4830A/BCU-4875A battery charger.
2. Connect the 48VDC backup power input terminals of BTQ-VM4/8 or BPA/DPA to the 2 output terminals on BCU-4830A or the 6 output terminals on BCU-4875A.
3. Plug in the AC mains power of BTQ-VM4/8 and BPA/DPA.
4. Plug in the AC mains power of BCU-4830A/BCU-4875A.

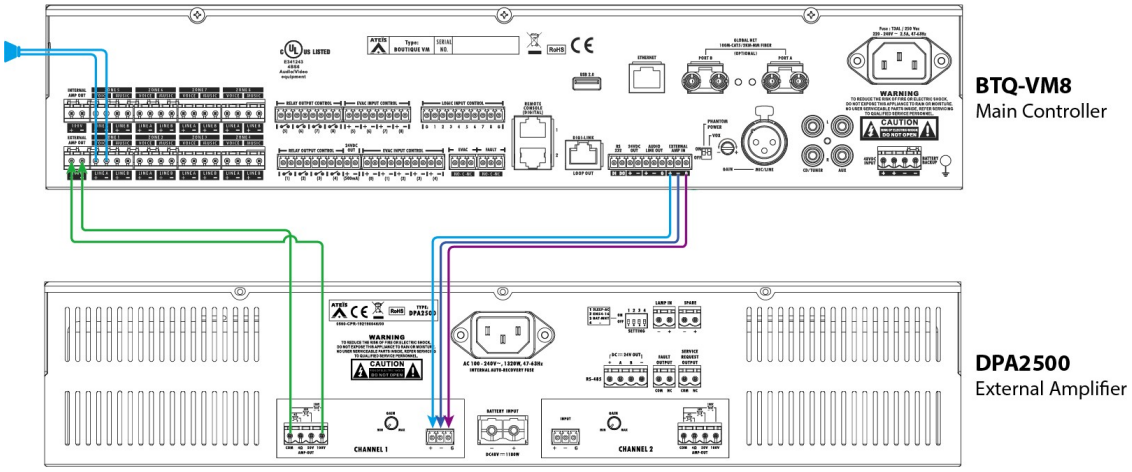
⚠ Once the 48VDC battery backup input of BTQ-VM4/8 is connected to BTQ-VM4/8 directly without connecting to AC mains power, it may cause large inrush current. Therefore, install a soft starter device, which protects the electric components and PCB boards of BTQ-VM4/8 from sudden inrush current. Please choose the correct soft starter device, which fulfills to support the max. DC power consumption (full power) of BTQ-VM4/8.

3.4 Audio input/audio output

1. Connect the External Amplifier Input (G, -, +) on BTQ-VM8 controller to the Balanced Audio Input (G, -, +) on DPA amplifier.
2. Connect the Amplifier Output (COM, 100V) on DPA amplifier to the External Amplifier Output (100V) on BTQ-VM8 controller.

⚠ Please note the connection of amplifier output on DPA is varies with EU (100V, 50V, 4 ohm) and US types (70V, 35V, 4 ohm).

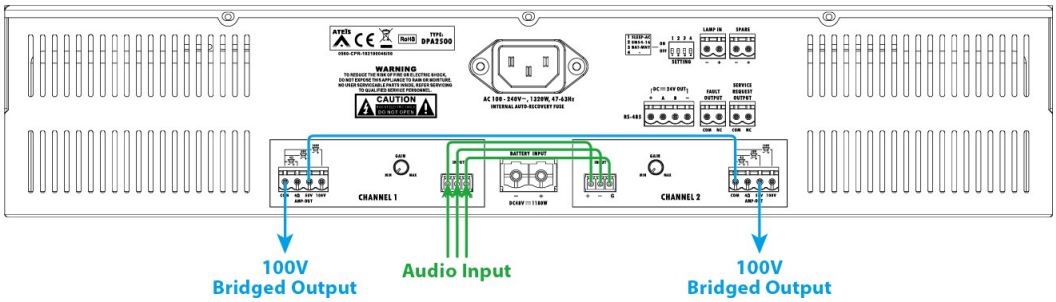
3. Connect and loudspeakers on BTQ-VM8 controller.



3.5 Bridged output

Bridge the two channels of DPA amplifier such as 500W x 2CH. (DPA2500) to 1000W x 1CH.; or bridge each two channel of DPA8060 (60W x 8CH.) to 120W x 4CH. Please see the instruction as below:

1. Connect an audio input on Channel 1.
2. Bridge the audio input on Channel 1 to the audio input on Channel 2.
3. Connect the [50V pin] audio output of Channel 1 to [COM pin] audio output of Channel 2.
4. Set the volume of gain knob on Channel 1 to the maximum volume.



3.6 Cable type recommendations

3.6.1 Main cable

Use the supplied mains cable that came with the multifunction power supply or an equivalent.

3.6.2 Loudspeaker cable

When selecting cables and wire gauge take into account the length and loudspeaker load to avoid excessive power loss. Make sure that the signal level at the end of the loudspeaker line has not dropped with more than 2dB (this is approximately 20%), as this will also affect proper operation of the end-of-line device. The table shows the required wire size for copper wires, to keep the loss at the end of the loudspeaker line below 2dB, when all the load is at the end of the cable. In practice the load will be more distributed and then the attenuation will be less than 2dB. Round up the actual load power and cable length to the next number in the table. Copper clad aluminum (CCA) wires are cheaper but have a higher resistance than copper for the same diameter. When using CCA cables, take the next bigger wire size from the table.

❖ Example

1. A 150W loudspeaker load on a loudspeaker line of 480m in a 100V system. Round up to table values 200W and 500m. This requires 1.5mm2 copper wires or 2.5mm2 CCA wires.

2. A 150W loudspeaker load on a 1200ft loudspeaker line in a 70V system. Round up to table values 150W and 1312ft. This requires AWG 14 copper wires or AWG 12 CCA wires.

- When selecting cables and wire gauge take into account the maximum loudspeaker cable capacitance specified for the amplifier.
- When end-of-line supervision is used, take into account the maximum loudspeaker cable capacitance specified for the end-of-line device.
- For compliance to UL 62368-1 all loudspeaker wiring must be Class 2 (CL2); this requirement does not apply for compliance to EN/IEC 62368-1.

Conversion										
mm^2		0.5	0.75	1	1.5	2.5	4	6	10	16
AWG		20	18	17	16	14	12	10	8	6
Cable length		**Minimum wire cross section [mm^2]**								
[m]	**[ft]**									
1000	**3280**	0.5	0.75	1.5	4	6	6	10	10	16
900	**2952**	0.5	0.75	1.5	2.5	4	6	10	10	10
800	**2624**	0.5	0.75	1.5	2.5	4	6	6	10	10
700	**2296**	0.5	0.5	1	2.5	4	4	6	6	10
600	**1968**	0.5	0.5	1	2.5	2.5	4	6	6	10
500	**1640**	0.5	0.5	0.75	1.5	2.5	4	4	6	6
400	**1312**	0.5	0.5	0.75	1.5	2.5	2.5	4	4	6
300	**984**	0.5	0.5	0.5	1	1.5	2.5	2.5	2.5	4
250	**820**	0.5	0.5	0.5	0.75	1.5	1.5	2.5	2.5	4
200	**656**	0.5	0.5	0.5	0.75	1	1.5	1.5	2.5	4
150	**492**	0.5	0.5	0.5	0.5	0.75	1	1.5	1.5	2.5
100	**328**	0.5	0.5	0.5	0.5	0.5	0.75	0.75	1	1.5
50	**164**	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.75
[W]	**@100 V**	**20**	**50**	**100**	**200**	**300**	**400**	**500**	**-**	**-**
[W]	**@70 V**	**10**	**25**	**50**	**100**	**150**	**200**	**250**	**300**	**400**
Loudspeaker power at end-of-line										

❖ The cable of 24V output

Please consider the length and load of cables and wire gauges to avoid excessive power loss.

4 Maintenance

❖ Cleaning


Make sure to unplug the main power supply of amplifier prior to cleaning.

The panels and chassis can be cleaned with a soft cloth and mild non-abrasive cleaning solution.

Avoid cleaning powders or scrubbing pads, as these will scratch and dull the paint. Do not apply liquid directly to the surface. Dampen the cloth with the cleaning solution and wipe gently.

❖ Dust removal

After used the unit for a long-time, especially in dusty environments, the heat sinks may become clogged with dust. This will interfere with cooling from the air inlets, and lead to higher temperature operation and reduced life.

Dust can be most easily removed by brushing or directing an air jet between the fins of the heat sinks.

❖ User maintenance


User maintenance should be done by qualified personnel only.


Dangerous mains voltages are present inside the units. Unplug the main power supply before you do any maintenance.

Users can inspect if any broken connectors, ground, cable connections, or loose screws on the outside of amplifier.

If any loose parts rattle around on the inside when the amplifier is turned over in all directions, please shut down the amplifier immediately, as a loose part could lodge in a dangerous place and cause further damage or shock hazard.

❖ Require service

If the amplifier isn't working properly, please diagnose the problem from Troubleshooting.

If proper operation cannot be restored, the amplifier may require service from ATEÏS Technical Support. This must be examined by qualified technical personnel, to avoid shock hazard or improper repairs. Please contact your ATEÏS dealer or ATEIS Feedback.

5 Troubleshooting

Problem	Cause	Troubleshooting
Amplifier does not start-up when the AC mains is connected.	1. Check if the voltage is under the normal range (100 ~ 240VAC). 2. Check if the Service Request Contact output is open. If yes, the hardware is damaged/broken.	
No back-up power when 48VDC power supply is connected.	1. Check the voltage is under the normal range (43 - 56VDC). 2. Check if the Service Request Contact output is open. If yes, the hardware is damaged/broken.	
Power LED does not light up after the AC mains is connected.	Please contact your dealer to deal with this problem.	
Battery LED does not light up after the 48VDC power supply is connected.	Set 'OFF" on [EN54-16] setting switch to enable the 48VDC battery detection.	
Signal LED does not light up while inputs the audio signal to amplifier.	Set 'OFF" on [EN54-16] setting switch to enable the Signal LED.	
Fault LED remains yellow.	• Over-current • Overheat	1. Check the load resistance of speaker output. For example, if the load resistance at 100V on DPA2500 is lower than 20ohm, a fault will be occurred. See Technical Data > Loudspeakers Outputs. 2. Disconnect the speakers, and check if the output is short. 3. Check if the Service Request Contact output is open. If yes, the hardware is damaged/broken.
	• AC power fault • Battery power fault	1. Check the voltage is under the normal range: • AC mains: 100 ~ 240VAC • Battery supply: 43 - 56VDC 2. Check if the Service Request Contact output is open. If yes, the hardware is damaged/broken.
Overload LED remains yellow.	1. Check the load resistance of speaker output. For example, if the load resistance at 100V on DPA2500 is lower than 20ohm, a fault will be occurred. See Technical Data > Loudspeakers Outputs. 2. Check if the input is over 0dB.	
Amplifier channel fault LED remains yellow.	• Over-current • Overheat	1. Check the load resistance of speaker output. For example, if the load resistance at 100V on DPA2500 is lower than 20ohm, a fault will be occurred. See Technical Data > Loudspeakers Outputs. 2. Disconnect the speakers, and check if the output is short. 3. Check if the Service Request Contact output is open. If yes, the hardware is damaged/broken.
No sound coming from loudspeaker.	1. Check if the volume of gain knob is too small. 2. Check if the speaker wiring is correct.	

If the problem cannot be solved, please contact your dealer to deal with this problem.

6 Technical data

- Electrical

AC power input:	100VAC ~ 240VAC ±10%, 50/60Hz		
power consumption (AC):	idle	1/2 full power	full power
DPA8060	42VA	365VA	705VA
DPA4125	34VA	340VA	650VA
DPA4250	38VA	660VA	1300VA
DPA2500	28VA	700VA	1320VA
Idle: pilot tone -36dBu, 1/2 full power: alarm tone			

DC power input:	43 ~ 56VDC (TYP:48VDC)				
power consumption (DC):	standby mode	idle	1/8 full power	1/2 full power	full power
DPA8060	2W	35W	92W	330W	635W
DPA4125	0.7W	30W	85W	305W	585W
DPA4250	0.7W	34W	165W	595W	1170W
DPA2500	0.7W	25W	175W	630W	1180W
Idle: pilot tone -36dB, 1/8 full power: speech, 1/2 full power: alarm tone					

Amplifier outputs:	• US type: 70V, 35V, 4ohm • EU type: 100V, 50V, 4ohm

- Continuous output current (Imax A/ Imax B/ Imin)

24VDC output:	0.1A/ 0.1A/ 0A
500W amplifier 100Vrms (141Vpp) output:	5A/ 5A/ 0A
250W amplifier 100Vrms (141Vpp) output:	2.5A/ 2.5A/ 0A
125W amplifier 100Vrms (141Vpp) output:	1.25A/ 1.25A/ 0A
60W amplifier 100Vrms (141Vpp) output:	0.6A/ 0.6A/ 0A

- Audio characteristics

Frequency response:	50Hz ~ 20kHz (±3dB) @ 0dBu
SNR:	> 90dB
THD+N:	< 0.1% @ 1 kHz
Max. input level:	0dBu
Input impedance:	• DPA2500: 10Kohm • DPA8060/DPA4125/DPA4250: 12Kohm
Crosstalk:	> 70dB @ 0dBu gain

- Loudspeakers outputs (1 min. at 40°C, per CH)

Model	Rated output power	Rated load resistance	Rated load capacitance
DPA8060	60W	167ohm (100V); 82ohm (70V); 41.6ohm (50V); 20ohm (35V)	30nF (100V); 62nF (70V)
DPA4125	125W	80ohm (100V); 40ohm (70V); 20ohm (50V); 10ohm (35V)	62nF (100V); 120nF (70V)

Model	Rated output power	Rated load resistance	Rated load capacitance
DPA4250	250W	40ohm (100V); 20ohm (70V); 10ohm (50V); 5ohm (35V)	240nF (100V); 470nF (70V)
DPA2500	500W	20ohm (100V); 10ohm (70V); 5ohm (50V); 2.5ohm (35V)	120nF (100V); 240nF (70V)

- Mechanical

Dimensions (W x H x D):	• DPA8060: 437 x 88 x 400 mm (17.2 x 3.5 x 15.7 inch) • DPA4125: 437 x 88 x 370 mm (17.2 x 3.5 x 14.6 inch) • DPA4250: 437 x 88 x 387 mm (17.2 x 3.5 x 15.2 inch) • DPA2500: 437 x 88 x 387 mm (17.2 x 3.5 x 15.2 inch)
Weight:	• DPA8060: 14.8 kg (32.6 lbs) • DPA4125: 14.5 kg (32 lbs) • DPA4250: 14.5 kg (32 lbs) • DPA2500: 16 kg (35.2 lbs)
Mounting:	19" 2U rack
Color:	RAL 7016

- Environmental

Operating temperature:	-5ºC ~ +55ºC (+23ºF ~ +131ºF)
Storage temperature:	-40ºC ~ +70ºC (-40ºF ~ +158ºF)
Relative humidity:	20% to 95%
Air pressure:	600 to 1100hPa
Heat dissipation:	• DPA8060: 767 BTU/hr • DPA4125: 512 BTU/hr • DPA4250: 1024 BTU/hr • DPA2500: 1092 BTU/hr

7 Standard and certification

The products or the system is approved processing/pending and complied to the following.

Europe	Voice Alarm	EN 54-16 (in process)
Europe	CE/EMI	EN 55032:2015/AC:2016 Class A
Europe	CE/EMC	EN 61000-3-2:2014 EN 61000-3-3:2013 EN 55020:2007/A11:2011
Europe	CE/LVD	EN 60065: 2014 (in process)
USA	Mass Notification Systems	UL 2572 (pending)
USA	Safety	UL 60065 (pending)

8 Contact information

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