APG 6000 system

Technical brochure 3.1.1

6000 HI | 6000 LO

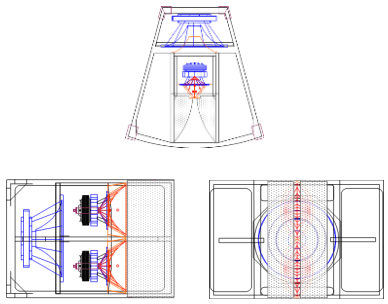
Presentation

The APG 6000 system is the **long-range 60x5°** Matrix Array series system. It allows us to create an acoustic **line source** while offering horizontal dispersion.
An APG6000 system is made up of two speakers, **6000HI** and **6000LO** that integrate four organised acoustic ways following the principle of collinearity.
Matrix Array systems use ISOTOP™ technology allow us to reach efficiency levels comparable to those obtained with conventional compression drivers, while sensitively reducing distortion ratios and increasing the bandwidth and power performance.
The APG 6000 was extensively studied to minimised handling time and set up time during installation of the system
The Matrix Aiming tool (acoustic and mechanic software including systems configuration presets in the digital processors) ease the calibration and on site installation of the systems.

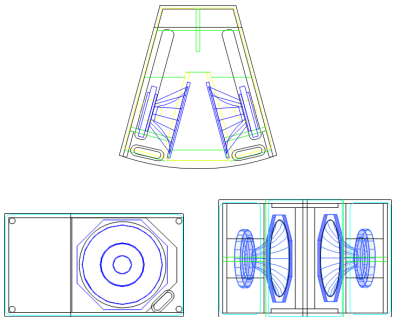
Benefits of APG6000 systems

- Carry out coherent source assemblies in the horizontal plane so that the **horizontal** acoustic dispersion can be adjusted with respect to the width of the listening area.
- Carry out coherent source assemblies in the vertical plane so that the **vertical** acoustic dispersion and the **potential range** of the system can be adjusted.
- Adapt the allocation of spectral energy to the nature of the sound message to be reproduced (music, playback, speech) thanks to the separation of HI and LO speakers.
- captive rigging systems for a substantial reduction in on-site installation time.
- the possibility to combine with APG4000, which offers optimal adaptability to the Matrix Array system in sites to apply the sound to.

1. The APG 6000 system



6000 HI top, side and front view



6000 LO top, side and front view

An APG6000 system is made up of two identical outer speakers: 6000HI and 6000LO. These two speakers reproduce the 800-19 kHz and 160–800 Hz bandwidths respectively.

The **6000 HI** speaker is one cabinet that comprises a **Lo/Mid (160-800 Hz)** section and a **Mid/Hi (800-14 kHz)**. The Lo/Mid section comprises a 15" loudspeaker set at the back of the cabinet and mounted in compression + horn. The Mid/Hi section is made of a 6,5 + 1HF driver made in compression by the exclusive APG ISOTOP™ wave guide able to reproduce an Isophase front wave. This acoustic assembly allows us to reach efficiency above 104 dB in the 500 Hz - 19 kHz bandwidth. The 60° horizontal dispersion is controlled from 500Hz thanks to the combination of the horn technologies from the Lo/Mid and Mid/High sections.

The **6000 LO** speaker is equipped with two 15'' loudspeakers, set up in double interactive chambers. These loudspeakers are identical to those used in the MID section in order to respect the same harmonic tone reproduction. The frequency range reproduced is **45 -160 Hz**.

2. Additional systems

APG4000

APG4000

The APG4000 system was designed to be acoustically and ergonomically compatible with the APG6000 system when medium-range coverage is established **(within 40 m)**. The complete configuration then allows us to have optimal site and application adaptability: horizontal dispersion, range, dynamic capacity, balance between low and Mid/Hi.

TB218S

TB215S

TB118S

SUBWOOFER

Some applications need a response extension in sub-bass as well as a heightened dynamic reserve. For this, several subwoofer types are compatible: TB118S, TB215S, TB218S.

- Bandwidth of a APG6000 only kit: **50-19 kHz**
- Bandwidth of a APG6000 + TB215S kit: **40-19 kHz**
- Bandwidth of a APG6000 + TB118S kit: **30-19 kHz**
- Bandwidth of a APG6000 + TB218S kit: **30-19 kHz**

BM3000C

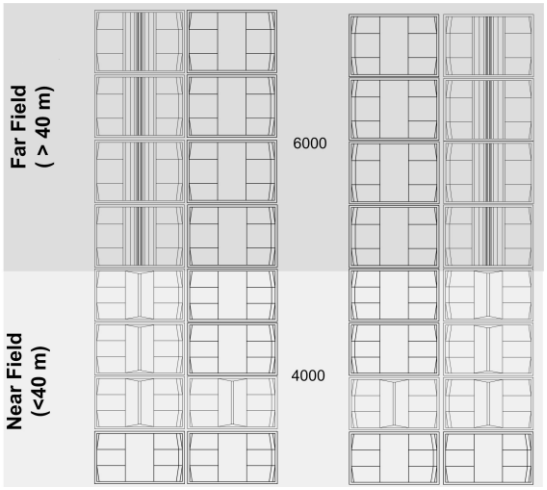
SC20

DS15

Front fill / Down fill / Back fill / Side fill

Coverage complement systems can also be required to cover the following areas: front of the stage, etc.
Sidefills and **backfills** are the areas close to the stage and on-stage and need speakers with directivity and range capacity that are adapted to areas to be used: **APG Dispersion series, Beam series**.
Depending on set-up constraints, it is possible to resort to the **SC20** long-range additional systems of Matrix Array configurations.

3. Configuration types



4000/6000 mixed configuration

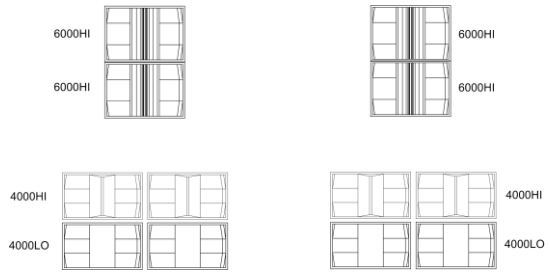
[Near field (<40m), Far field (>40m)]

1. Mixed configurations

Matrix Array technology was thought of in order to ensure the compatibility of “medium-range” **APG4000** (up to 30-40m) and “long-range” **APG6000** (beyond 30-40 m) systems.
A mixed configuration then offers the possibility of:

- **Vertically** adjusting the number and nature of the speakers to adapt the **power capacity** and **range** of the resulting source
- Adjust the number of columns of a cluster to adapt **the horizontal dispersion** of the resulting source.

In the example on the left, the 6000-4000 2 columns mixed configuration allows us to cover a listening area from 10m to about 100m and for an expected public of 8000 to 10000 people. This configuration and all lesser configurations have been tested in real conditions. The installation time outside of calibration does not exceed 1H30 for a structured touring company.
Thanks to pre-configuration presets in digital processors, the calibration time is also reduced (about 1h)



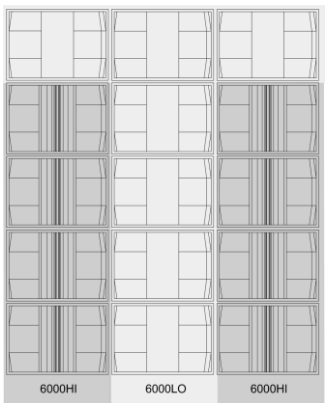
Additional systems for at the back of the room.

2. Simple configurations and additional system

In specific sites the APG6000 system can be used in a **medium-range** system or in an **accuracy system** when the geometry or acoustics require it:

In the case of a **deep room with rows that have the back “clipped” to the ceiling,** it is possible to cover the back of the room with 6000HI speakers raised in the stage frame, which allows us to avoid having to install delay lines and to preserve a sound reproduction image at the stage level (see example to the left).

In **reverberant sites,** using the APG6000 systems will allow us to target precisely the listening areas without exciting the walls and therefore reducing a reverberation level that is too high, which would degrade the intelligibility.



Matrix configuration: Central cluster

3. Matrix configurations

The APG6000 system allows us to set up many columns matrix configurations and thus:

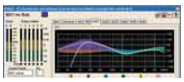
- **increase the horizontal dispersion angle** based on the column number: 1 column**/60°, 12 columns/360°**
- **separately configure the Lo and Hi** based on required performances for each of the sections
- **adapt** the power in the base and the geometry in the acoustic source.

The configuration to the left offers a large horizontal dispersion and a long range capacity in the low frequencies at the same time. This solution is particularly adapted for mono diffusion points (e.g. pyrotechnic shows).

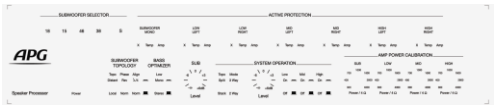
The APG4000 and APG6000 Matrix Array systems are compatible on the acoustic and mechanical plane, i.e.: same components and internal technology and ergonomics, same horizontal acoustic dispersion characteristics, same cabling systems and compatible rigging and transport systems. This allows for lots of configurations to respond to all outdoor sound events.

4. Electronics and wiring

DMS26 configuration processor



PWAPG interface



6000SP HP processor

Processing/Amplification

A 6000 system's connection order is:

1. DMS26 configuration digital processor(s),
2. 6000 SP analogue loud-speaker's processor(s),
3. Power amplifier(s).
4. Speakers

1. DMS26 configuration processor

The APG DMS26 processor has 2 inputs, 6 analogue outputs, and 96 kHz /24 bit accuracy. It is possible to network several of them for large-scale configurations and to remotely control it from the **PWAPG** computer interface. Constructor presets for different speakers and configurations are supplied with the DMS26. The user can also create their own presets and stock them thanks to PWAPG.

2. 6000SP loudspeaker processor

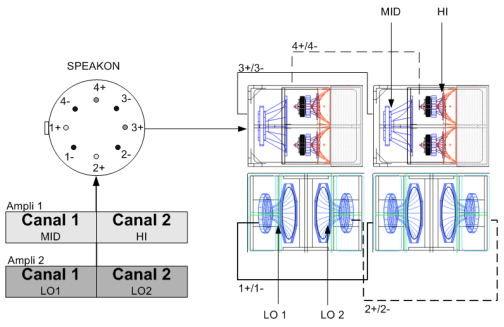
The 6000SP processor is intended to be used for the following functions in a sound system consisting of 6000HI and/or 6000LO speakers as well as subwoofers:

- Active filtering on 2x3 lines + sub,
- Control of operational modes
- Frequency and phase response optimisation (equalization, temporal alignment, etc …),
- Dynamic protection of the components by destructive parameter simulation
- Signal distribution.

3. Power amplifiers

APG recommends using professional-level amplifiers with the following power rates(equal or higher) :

- **6000 LO :** 2 x 2000 W/4 Ohms
- **6000 HI :** *Lo/Mid section:* 2000 W/4 Ohms
  Mid/Hi section: 1200 W/8 Ohms



[Amp 1, Amp 2]

"Loudspeaker" internal wiring

The connection between the amps and the speakers needs an 8 point Speakon™ connection linked to 8 2.5mm² section conductor cables:

- 1+/1- LO1channel (channel 1)
- 2+/2- LO2 channel (channel 2)
- 3+/3- LO MID channel (channel 3)
- 4+/4- HI channel (channel 4)

Wiring of Matrix Array systems are standard : 8 points conductor cables, 8 points Speakon allowing automatic feed of the speaker sections.

For an APG6000 base kit (2x6000LO and 2x6000HI per side), there are 4 sections of 4 ohms :

- LO1 and LO2 for 6000LO,
- MID and HI for 6000HI.

5. Synoptic

The APG6000 system can be used with anything from a unit speaker up to large scale matrix configurations. A base kit offers dispersion and configuration versatility (60°x5°, 60°x30°, 100°x5°, 120°x5°) and has an optimized amplification Rack.

A base kit

Composition:

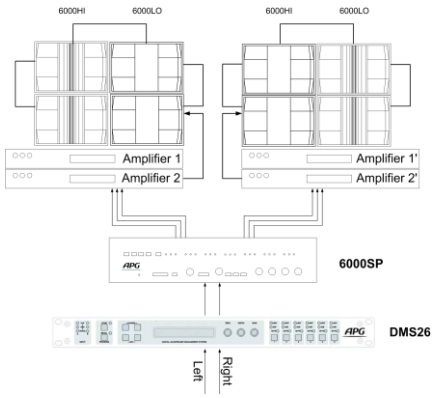
4x6000HI
4x6000LO
1 6000SP processor
1 DMS26 processor

Two “mono” amplification racks:

1 amp 2 channels for 6000LO (2 sections : LO1 and LO2)
1 amp 2 channels for 6000HI (1 section MID, 1 section HI)

Cables kit :

2 x 8 points conductors cables (2,5 mm²) → 20 m **MAX**
6 x 8 points conductors cables (2,5 mm²) → 1,5 m



Synoptic of a APG6000 base kit

Example of kit with subwoofer and frontfill

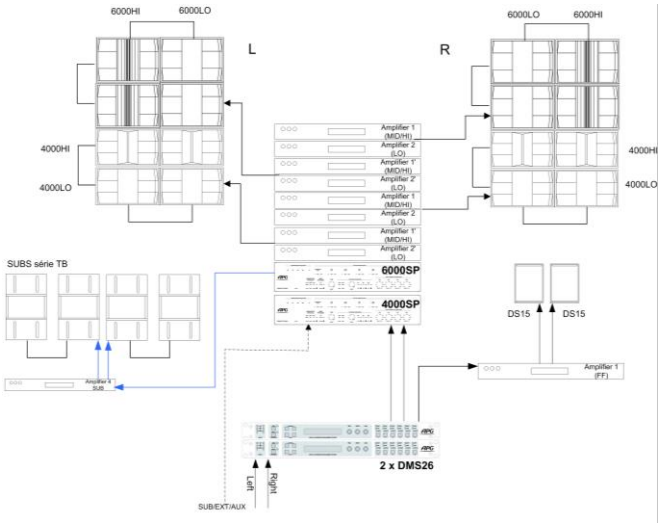
Composition

One 6000 base kit:
4 x 6000HI
4 x 6000LO
1 6000SP processor
1 DMS26 processor
1 amp for 6000LO
1 amp for 6000HI

A 4000 base kit:
4x4000HI
4x4000LO
1 4000SP processor
1 DMS26 processor
1 amp 2 channels for
1 amp 2 channels for 4000HI

A Sub kit:
4 x TB215S Subs
1 processor
1 amp 2 channels for subwoofers

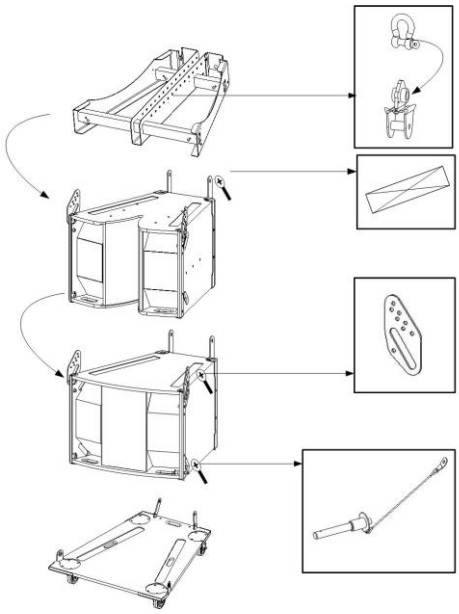
One downfill kit:
2 x DS15
1 frontfill amplifier



Synoptic of a kit with subwoofers and frontfill

[TB series SUBS]

6. Rigging and transport



Preparation and implementation

In the workshop

- Preliminary examination of mechanical and acoustic adjustments thanks to the **Matrix Aiming Tool.**

- Cluster construction in column segments (2, 3 or 4 stacked speakers) directly assembled on 6000PR (height less than 1.60m). The bumpers are pre-assembled on the first column segments

- Angle pre-configuration thanks to a sliding guide while keeping stocking and transport position at 0°. The angles between the boxes are created during system lifting.

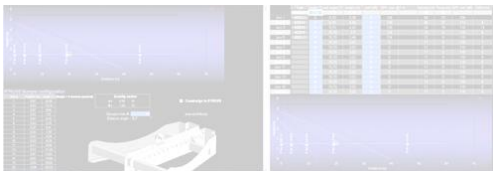
In the field

The transport and rigging systems were thought to **accelerate the on-site installation time and to limit potential mistakes in the field** thanks to preparation at the workshop.

- Transport of the clusters thanks to the wheeled 6000PR tray.

- Velleda labels at the back of the speakers allow us to indicate the destination and assembly order of the segments in the cluster to the technicians.

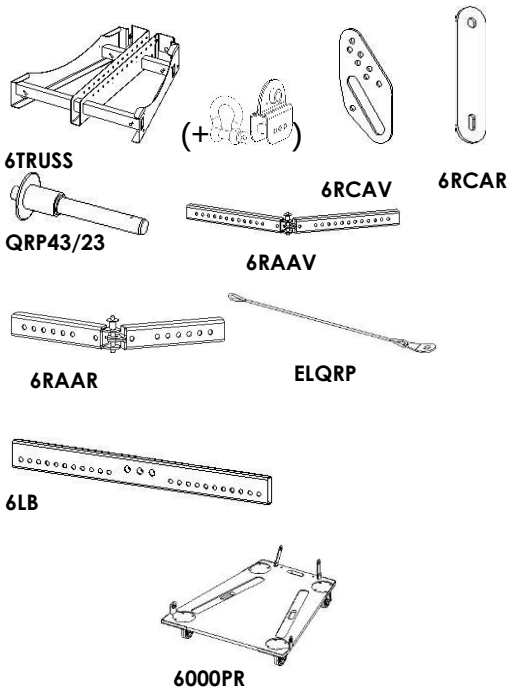
- Cluster setting up and/or flying.



Interface of the Matrix Aiming Tool

Matrix Aiming Tool

The '**Matrix Aiming Tool'** developed by APG allows us to precisely calculate and determine all mechanical adjustments of the Matrix Array speaker clusters.
The Matrix Aiming Tool spreadsheet allows us to link acoustics and system geometry, and thus preview angulations and mechanical variables in the workshop (hook position on the bumper, horizontal connections etc.).
This characteristic specific to the APG rigging system is going to allow us to **save precious time in the field, which benefits electro-acoustic and artistic adjustments.**



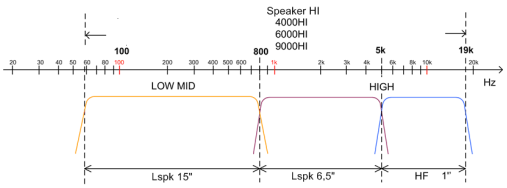
Rigging and flying system

REF.	Designation	Qty.1	Qty. 2
6TRUSS	Lifting Truss (bumper) supplied with shackle and angles adjustment piece	**2**	**4**
6RCAV	Front vertical lifting connection	16	16
6RCAR	Back vertical lifting connection	16	16
6RAAV	Front horizontal coupling connection	**0**	**4**
6RAAR	Back horizontal coupling connection	**0**	**2**
QRP23EL	Ball-pin L=23mm with ELQRP sling	16	16
QRP43EL	Ball-pin L=43mm with ELQRP sling	16	16
6LB	Lift Bar	**0**	**2**

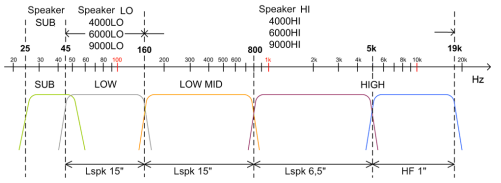
Transport

6000PR, multiple wheel tray. 3 boxes of 6000s with complete rigging is the maximum load. (1,60 m high).

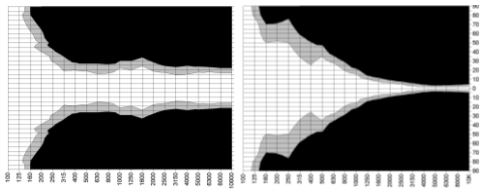
7. Specifications



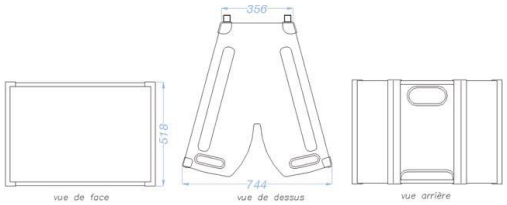
Broad-band mode (3 lines)
[HI speaker]



Complete base kit mode(4 lines)
[SUB speaker, LOW speaker, HI speaker]



Horizontal dispersion Vertical dispersion



Sides
[front view, plan, side view]

Grips

Technical specifications

	6000 LO	6000 HI	
Speakers			
		Section	
		Mid	**Hi**
4 way response (± 3 dB)	45 – 160 Hz	160 - 800 Hz	0.8 – 19 kHz
3 way response (± 3 dB)	-	65-800 Hz	0.8 – 19 kHz
Efficiency @1W 1m	104 dB SPL	104 dB SPL	112 dB SPL
Maximum level at 1m	137 dB SPL	139 dB SPL	
Crest level at 1m	140 dB SPL	145 dB SPL	
Nominal impedance	2 x 8 Ohms	8 Ohms	16 Ohms
Horizontal gap angle at (-6dB)	-	60°	
Vertical gap angle at (-6dB)	-	5°	
Components			
Transducer……..	2 x 15''	1 x 15''	1x7''and 2x1'' HF
Coil diameters……	100 mm	100 mm	Coaxial 50mm and 45mm
AES power……	2 x 1000 W	1000 W	600 W
Dimensions and ergonomics			
Dimensions ……	550 x 750 x 780 mm		
Net unit mass……	53 kg		70 kg

Manufacture

Cabinet making is in covered birch with a black high resistance aquarethane coating. The front protection grating is made of high transparency perforated steel + acoustic foam.

Seven integrated grips allow for maintenance.

APG6000 conformity declaration

APG France Ltd states that the equipment described in this document conforms with the following European directives:
Electromagnetic compatibility:
89 / 336 / EEC
93 / 68 / EEC
Directives regarding base voltages:
73 / 23 / EEC
This declaration certifies the accordance of products submitted to the following norms:
EN 55013: 1995 Emissions
EN 50082-1: 92 Immunity
EN 60065: 1994 Safety norms
PRODUCT: The products mentioned in the present document are entirely manufactured and assembled in France according to enforced European laws.

8. MISCELLANEOUS

Training

APG organises training days aimed at different sound engineering specialisations. Two training levels are given:
Technician level
Engineer level.

Technical support

APG support engineers constantly ensure advanced technical support in association with operator's practical experiences in order to achieve a technical solution that is adapted to the most reasonable of the supply project's group of technical and economic criteria.

Also, as well as acoustic studies carried out from classic simulators, APG has elaborated two "project validation" tools allowing us to validate a sound project from any site by the design office: the APG project form and APG project guide software.

General information

APG France refuses all responsibility involving any possible mistakes of APG product use that the user is responsible for and strongly advises you to become familiar with the safety recommendations described in the product application review before use.

APG leads a research and development policy with the goal of improving its products. For this reason, new materials, fabrication methods and rule changes can be introduced without notice. Because of this, certain aspects of an APG product can differ from their publicised description. However, unless otherwise indicated, its properties will be better than or the same as those published. These technical specifications, dimensions, weight and properties do not represent quality guarantees.

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