

## "TB" subwoofers Technical Brochure V1.0



APG K-Horn subwoofers

### Overview

APG's «TB» subwoofers exploit a combination of two technologies: the dual interactive chamber and K-Horn technology.

The TB115S and the TB118S are loaded with a single K-Horn, and a single 15" or 18" neodymium woofer, while the TB215S and TB218S are loaded with two 15" or 18" woofers mounted in a dual interactive K-Horn chamber. The acoustic load results from the combination of a dual interactive chamber with a specific internal loudspeaker layout which gives rise to a directivity horn (dual-inverted K-Horn).

The double acoustic compression (front and rear) of the woofers provided by the dual chamber and K-Horn loading result in a gain increase of around 4dB. The forced ventilation technology enables a reduction in thermal compression for a further 2dB gain. This means an overall gain of around 6dB compared to a conventional direct radiating reflex loaded subwoofer.

The size and the ergonomics of the TB Series subwoofers were considered in great detail to offer the greatest possible ease and flexibility for handling, transport and storage.

### Benefits

- Exceptional power/size ratio
- Sonic precision
- Neodymium loudspeakers
- Advanced forced cooling technology
- High efficiency, high output
- Minimal thermal compression
- Low distortion
- Reliability
- Advanced ergonomics for ease of handling and transport
- Compact and lightweight

## 1. TB215S and TB218S: dual K-Horn



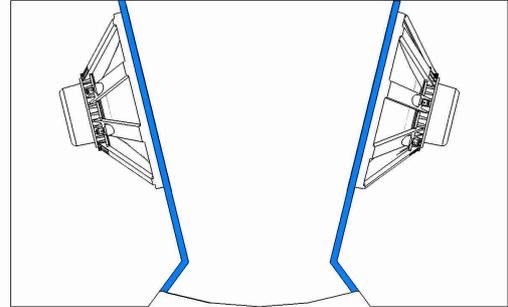
TB215S



TB218S

The TB215S and TB218S are equipped with two new generation convection cooled 15" and 18" neodymium subwoofers respectively.

Description: Robust front grille, four protective rubber skids (two on the bottom, two on the side), multiple recessed handles and optional castors.



The double interactive load provides excellent control of transducer displacement, which significantly increases mechanical reliability.

## 2. TB115S and TB118S: single K-Horn



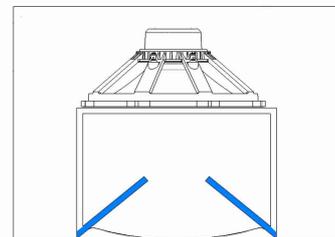
TB115S



TB118S

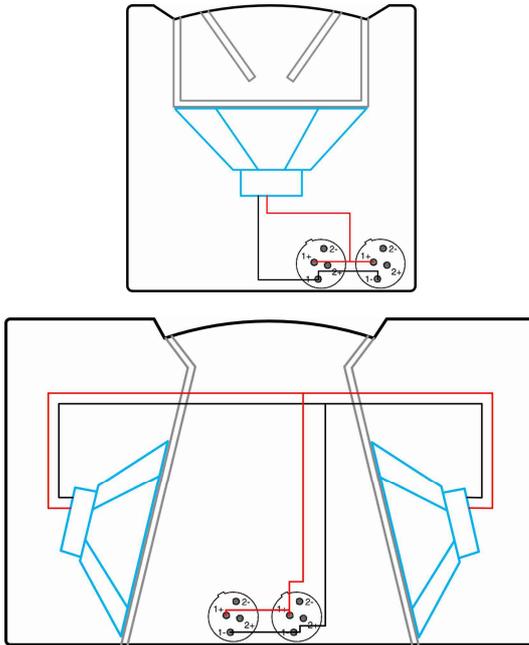
The TB115S and TB118S are equipped with a new generation convection cooled 15" and 18" neodymium subwoofer respectively, loaded with a low pass type dual chamber, which is itself loaded with a single K-Horn

Description: Robust front grille, two protective rubber skids for the TB115S and four for the TB118S (two on the bottom, two on the side), multiple recessed handles and optional castors.



The double interactive load provides excellent control of transducer displacement, which significantly increases mechanical reliability.

## 3. Internal Cabling



### Loudspeaker cabling:

The "TB" subwoofers are connected to the amplifiers via 4-point or 2-point Speakon connectors. The 1+/1- points are cabled between the two input connectors.

The TB215S and TB218S are connected in parallel, which gives an impedance of 4 Ohms.

**NB** – Only the 1+/1- are used on the PCM or PCS connector plate. The 2+/2- are not connected.

## 4. Handling and transport



### Handling:

All TB Series subwoofers are equipped with recessed handles in order that they may be easily transported, either on castors or simply carried.

The TB115S includes two side handles. It can be carried by one or two people. In the latter case the front vent is the second point of handling.

The TB118S has two side handles, and one on top of the enclosure.

The TB215S has six side handles and one angled handle for wheelbarrow mode.

The TB218S has six side handles and two angled handles for wheelbarrow mode.



### Optional transport kits:

To facilitate the transport of TB Series subwoofers, there are three optional wheel kits available:

KR80 comprises four 80mm castors

KR100 comprises four 100mm castors

KR125 comprises four 125mm castors

These optional wheel kits make it possible to transport the subs in either "chariot" mode (on four wheels) or "wheelbarrow" mode (on two wheels).

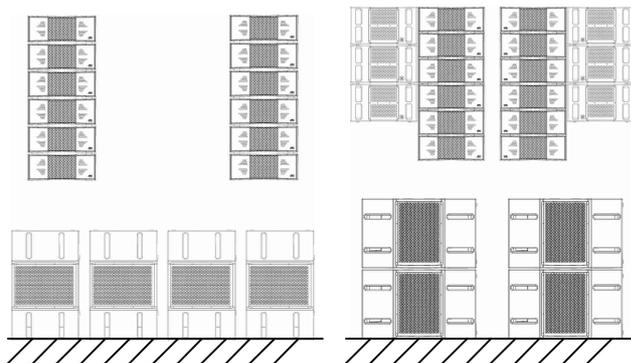
## 5. Methods of use

	TB115S	TB118S	TB215S	TB218S
MX1		X	X	X
MX2		X	X	X
MX4	O		O	X
MC1		X	X	X
MC2 /C	O	X		X
DS8	O	X		X
DS12S / DX12	O			
DS15 / DX15	O	O		
DS15S		O	O	O
SMX15	O	O	O	O
3000C		O	O	
SC25	O		O	
UL210	O	O	O	O
UL210+UL115B	X	O	O	O
APG4000		O	O	O
APG6000		O	O	O

O : Recommended

X : Non Recommended

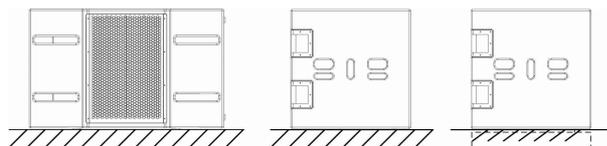
: depending on application



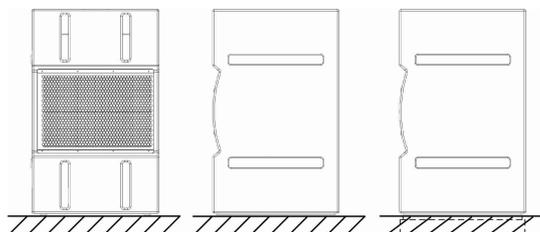
### Sub and infra sub modes/:

All TB Series subwoofers are exceptionally versatile.

They can be used equally well for bass and infra bass reinforcement for systems where there is no dedicated low frequency reinforcement, or indeed as infra bass reinforcement for systems that do offer dedicated subs such as systems such as APG4000, APG6000, UNILINE and so on. In certain cases it is even possible to substitute the TB115S for the dedicated sub if necessary.



TB218S in "horizontal" position



TB218S in "vertical" position

### Operating position:

Depending on the type of acoustic response required, TB Series subs may be deployed in one of two ways.

Either:

- "lying down", which produces a much smoother, rounder bass sound, or
- "upright", which favours the higher bass frequencies for a much punchier sonic impact

The dotted line on the diagram opposite illustrates the "acoustic mirror" effect of the reflection from the ground.

## 6. Processing and Amplification

### Processing :

There are two options : either analogue processing using our "dynamic" LP Series processors, or digital processing using our DMS26 combined with our SMP "static" analogue processors. The options vary depending on the type of processor used.



LP



DMS26



SPM

### LP Series analogue processors:

These are our so-called "dynamic" processors that incorporate active protection in excursion, in temperature and in amplitude on the mid/hi output as well as the sub output.

Front panel controls enable phase alignment with the main PA as well as sub selection. A bank of switches enables the selection of eight different APG subwoofers.

### DMS26:

The DMS26 is APG's digital processor. It offers all the necessary routing and distribution functionalities for system management.

A complete set of parameters can be saved in any one of the 50 presets available, and custom presets for specific applications such as cardioid, or networked configurations, are downloadable directly from the APG website.

### SPM Series analogue processors:

These are our so-called "static" processors: they do not incorporate real-time active protection.

The position "with sub" changes the low-cut frequency of the main loudspeaker system and adjusts the frequency crossover between the speakers and subwoofers.

Model	TB115S	TB118S	TB215S	TB218S
Recommended power	1150 to 2300 W / 80	1300 to 2300 W / 80	2300 to 3600 W / 40	2600 to 3900 W / 40

### Amplification:

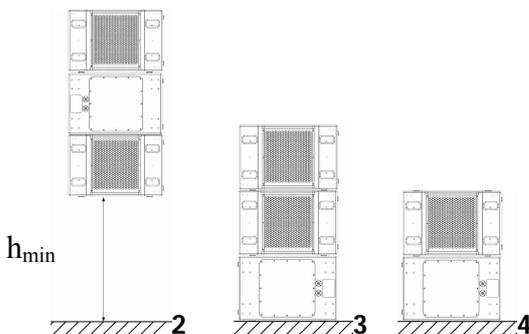
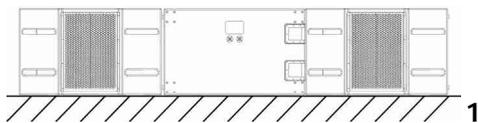
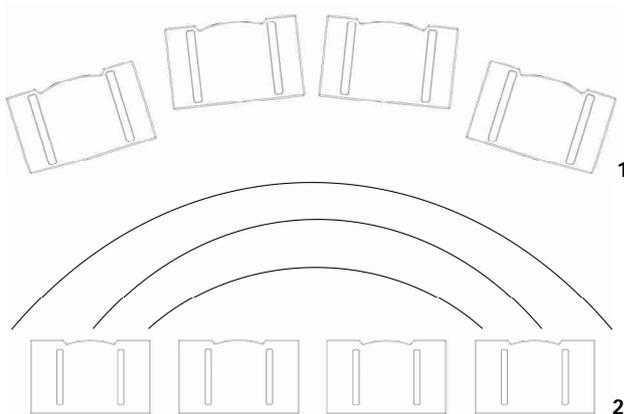
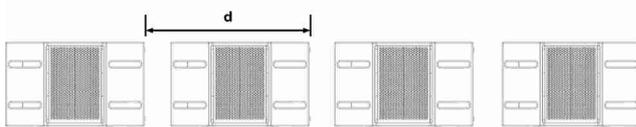
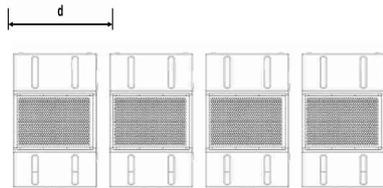
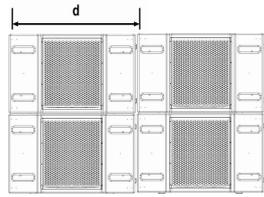
To power TB Series subs, APG recommends amplifiers with the power ratings indicated in the table opposite. For high power or live applications, it is recommended to oversize the amplifiers relative to the nominal AES output of the subs. In certain specific cases it is possible to slightly under-power the subs or loudspeakers as long as the amplifier will not be driven to its limits.

In any case, the dynamic APG processors should be deployed in front of the amp to ensure that the amplifiers do not go into clip.

The dynamic processors also include:

- Thermal protection from power surges or overload
- Diaphragm displacement protection

## 7. Typical configuration



### Point source:

Where wide coverage is required, the ideal configuration is a point source (distance between sources  $d < \lambda/4$ ). It's also the configuration that offers the best performance per couplage. Ideally there would be just one point source which would be situated at centre stage.

### Line source networks

If you are looking to extend throw, you have to build a big enough source to cover the critical distance. The first option is a line of paired subs. To avoid harmful interference, a distance of  $d < \lambda/2$  between sources must be observed. This configuration offers a fairly narrow breadth of coverage (roughly equivalent to the total length of the line) known as the corridor effect.

Examples of "d" calculated coupling distance @ 20°C:

Freq (Hz)	$\lambda$ (m)	$\lambda/2$ (m)	$\lambda/4$ (m)
65	5,3	2,6	1,3
80	4,3	2,1	1,1
110	3,1	1,6	0,8

### Arc Sub:

If you are looking to extend throw whilst maintaining a significant breadth of coverage, a good way of doing this is to place the subs in an arc formation. This gives you the necessary coverage and an overall acoustic performance resembling that of a point source (fig.1).

Most of the time it is impossible to physically place the subs like this, but a "virtual arc" can be created by placing the subs in a line and using delays on each source (fig.2).

The delays can be calculated using APG's simulation software, APG Tools, for example.

This configuration can be central or per side (a sub arc per side beneath the PA hangs)

### Cardioid arrangement:

In order to limit interference and to reduce vibrations at stage level, several cardioid configurations are possible. See opposite for diagrams of possible cardioids configurations:

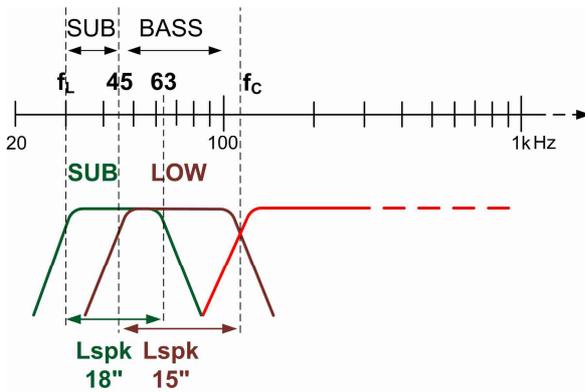
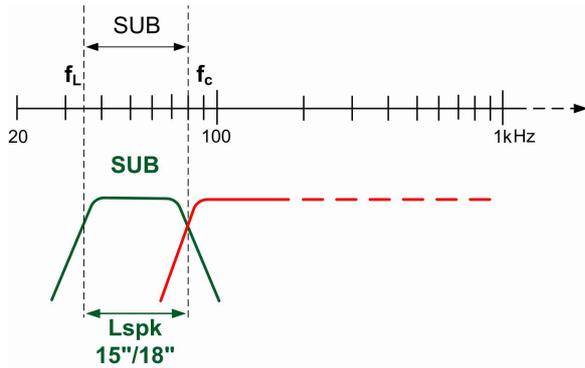
1. 3. and 4.: Ground-stacked only
2. Flown only (or on stage if  $h > 1\text{m}$ )
- 3.

A minimum distance of 60cm between vertical stacks or between a stack and a wall must be observed.

Preset for these configuration are available upon request, or downloadable from [www.apg.tm.fr](http://www.apg.tm.fr)

## 9. Specifications

### Technical specifications

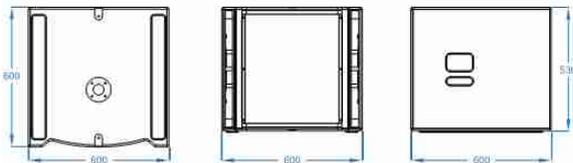


#### Enceintes

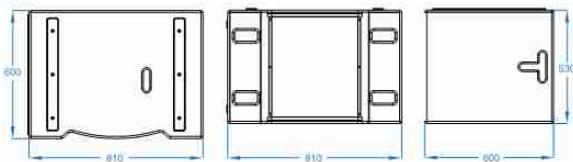
	TB115S	TB118S	TB215S	TB218S
Response ( $\pm 3$ dB) *	45 – 190 Hz	40 – 190 Hz	45 – 300 Hz	35 – 250 Hz
Efficiency @ 1W/1m	102 dB	102 dB	104 dB	105 dB
Power handling (AES)	1150 W	1300 W	2300 W	2600 W
Max SPL @ 1m	132 dB	133 dB	137 dB	138 dB
Peak SPL @ 1m	136 dB	139 dB	143 dB	144 dB

The frequency crossover is managed by the processor (either analogue or digital depending on the situation) which also enables the temporal alignment of the subs in relation to the mid/high source. The result is an acoustic response of exceptional linearity in both amplitude and phase.

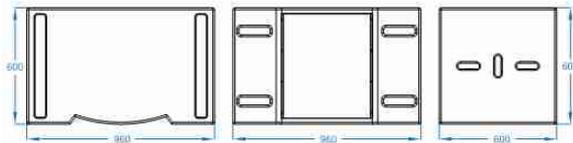
On the graphs opposite, the  $f_L$  value corresponds to the lowest frequency of the sub's bandwidth, and the  $f_c$  value corresponds to the frequency crossover between the mid/hi and the low.



TB115S



TB118S



TB215S



TB218S

#### Components

	TB115S	TB118S	TB215S	TB218S
Transducers	1 x 38cm	1 x 46cm	2 x 38cm	2 x 46cm
Coil diameter	100mm	100mm	100mm	100mm
Impedance	8 Ohms	8 Ohms	4 Ohms	4 Ohms

#### Physical characteristics

	TB115S	TB118S	TB215S	TB218S	
Dimensions :	H :	530 mm	530 mm	600 mm	716 mm
	L :	600 mm	810 mm	960 mm	1160 mm
	P :	600 mm	600 mm	600 mm	716 mm
Unit weight	36 kg	43 kg	55 kg	74 kg	

#### Materials

The cabinet is made of birch plywood covered with a tough coating of black aquaréthane (polyurethane?). The perforated steel grille ensures a high acoustic transparency. A 2mm layer of acoustic foam is glued under the front grille to protect the speakers from projected liquids and dust.

### Training

APG organises a number of training days on the use of its product aimed at different areas of specialisation within the world of professional sound reinforcement. There are two levels of training: sound technician and sound engineer.

### Technical support

APG's technical support engineers offer an advanced level of ongoing technical support with the aim of finding the optimum solution from both a technical and economic point of view.

Also, as well as acoustic modelling performed using classic acoustic modelling software, APF has developed two "project specification" tools – APG Project Manager, and the APG Project Specification Guide software – which will enable third party installers to create and document an APG installation, which can then be easily reviewed and ratified by our technical department.

### General information

APG takes no responsibility for errors committed on behalf of the users of their products.

APG has a comprehensive research and development policy for the continual improvement of its products and service. Due to this, new materials, manufacturing methods and technological changes may be introduced without prior notice.

As a result, an APG product may differ from its published description in certain areas. However, unless otherwise indicated, its characteristics will always equal or better the published specifications.

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The logo for APG, consisting of the letters 'APG' in a bold, italicized, sans-serif font. The letters are black with a white outline, and there is a blue horizontal line underneath the text.