# *DP SYSTEMS USER MANUAL*



*WE, AT MUSICSON WANT TO THANK YOU FOR THE TRUST SHOWN TOWARDS OUR PRODUCTS.*

*PLEASE READ THIS MANUAL CAREFULLY BEFORE STARTING YOUR NEW DP-3 OR DP-4 SYSTEM, IN ORDER TO AVOID ANY KIND OF PROBLEM AND TO OBTAIN ITS HIGHEST PERFORMANCE. REMEMBER THAT YOU HAVE JUST OBTAINED A HIGH-TECHNOLOGY PRODUCT.*

*IN ORDER TO CONTACT US FOR ANY REASON, PLEASE SEE OUR WEB SITE.*


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## 1. - INTRODUCTION

The new DP product line, which has been developed and manufactured by Musicson, conceals an important technological step forward in sound reinforcement. Its applications range from live concerts to recorded music in open spaces or closed rooms.

Musicson's engineers have used state-of-the-art last generation software tools in order to simulate acoustic elements as well as to produce the corresponding prototypes.

The different frequency ways that form the DP-series have been optimised, even before producing the prototypes, through several simulation processes. In order to develop the low- frequency units, a special care has been taking, not only simulating the differences in frequency response and performance, but also further factors have been taken care of for the first time.

Maximum excursion of the mobile parts of the speakers have been optimised by acting on the geometry of the enclosures, resonance frequency, length and width of wave-guiding every elements that form, for example, a folded horn unit.
On top of this, very concrete filters have been used within the ISP-1014 and the ISP-2022 dynamics processors in order to achieve an optimal frequency response and a minimum loudspeaker excursion, resulting in a reduced mechanical fatigue of these elements.

On the other hand, equally important factors, such as the sound pressure level, acoustic power, extreme current and voltage values at the speaker poles, speed and acceleration of the electro acoustic elements and the air moved within the enclosures and through the vents, etc.

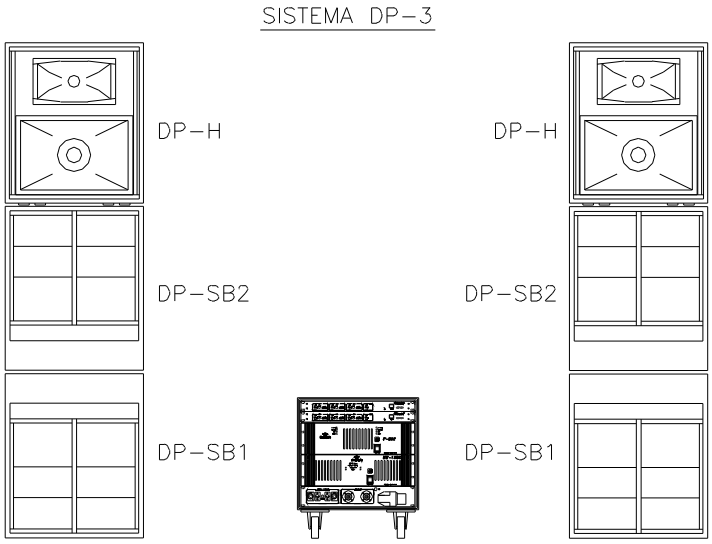
The simulation software has also been used in order to optimise high and mid- frequency band functioning, something almost unthinkable some years ago. A linear frequency response, effective bandwidth, sound pressure and also factors such as directivity, horizontal and vertical spread, possible frequency overlapping produced through horns and phase plugs, depending on the distance to the audience, are all factors that have received careful and in-depth attention.

In an ongoing step, all this information has been checked and adjusted with the first prototypes through different audio analysis software.

All this has resulted in the final development of the DP sound systems, formed by four different enclosures and two signal processors, power control, that are designed to perfectly fit together for an optimum performance, frequency response and functional parameters.

**1.1. - DP-3 SYSTEM**

The first system developed with these four enclosures is the DP-3.This is an active three-way system, featuring three different enclosures: The DP-H for the reproduction of high-mid frequencies and two equally shaped enclosures to reproduce low and very-low frequencies: DP-SB1 and DP-SB2. This whole system is controlled through the ISP-1014 processor.




1.1.1.-DP-H ENCLOSURE

The DP-H enclosure is an active-two-way acoustic system to reproduce high-mid frequencies, conceived as al long-throw unit for great musical indoor and outdoor events.

Both ways are built onto their own horn, optimised to completely control their dispersion angles.

For the reproduction of the medium frequencies, a 12” speaker with a 3” (77 mm) moving coil, mounted on an enhanced magnetic system, has been used in order to increase performance without increasing harmonic distortion. Also, the output surface has been reduced to 14 cm (5.5”) to increase its efficiency. This has been achieved through the design of an innovative phase plug, built with three concentric independent pieces. This allows us to have a constant distance between the cone surface and the throat, eliminating phase cancellations produced in other phase plug types such as ob’s or bullets. The speaker also features cooling elements for the moving coil, allowing higher power levels and, at the same time, and much lower power compression through heat. The cone has received a special coating that avoids deformation through higher-pressure levels, translated into lower harmonic distortion at high power levels and protecting it against adverse external agents such as humidity. Through all this an extremely flat frequency response up to 1200 Hz is achieved (together with the use of the

ISP-1014), offering, thus, a high level of clarity and intelligibility within the vocal frequency range.

For the high and high-mid frequencies, we have used a 4″ (100mm) diaphragm, 2″-throat compression driver. This driver from ARP features very special characteristics.

1.-An optimised magnetic structure has been used for maximum efficiency. In order to achieve this, a Neodymium magnet has been used, offering:

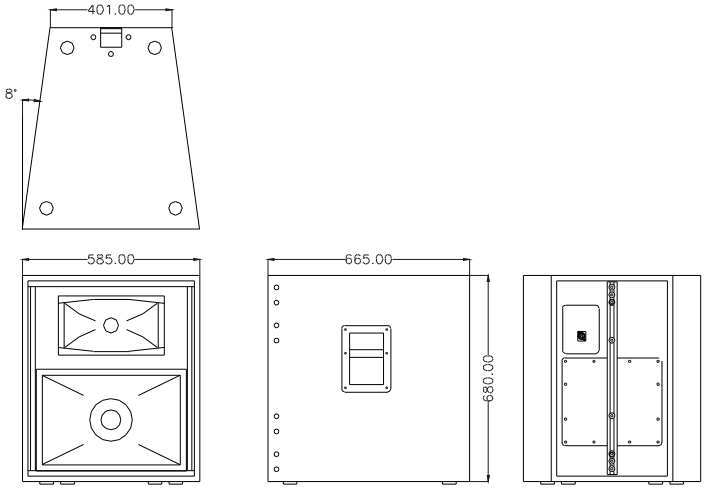
a. - 20% more induction in the magnetic gap, increasing the energy transferred to the coil and, thus, to the moving system. This means an average performance increase of 2dB to the 2″ driver, this being especially significant for frequency higher than 100 Hz, where this increase reaches up to 4dB. A linear response up to 20 kHz is achieved this way.

b. - A reduction in weight of 45% and 25% in the overall diameter.

2. - On the other hand, a titanium diaphragm with a special configuration has been used in order to reduce harmonic distortion. The membrane is fixed to a suspension made of a technical polymer. The use of this polymer has two reasons: first, the self-resonance of this material is lower within the audible frequency range, when used at high power levels, second, this material is more resistant to deformation through diaphragm excursion. It has been proven that titanium suspensions deteriorate the frequency response and increase distortion levels after 3 to 5 years of use, within this size of drivers. The mechanical resistance of these materials is much higher, almost doubling their life cycle.

In order to optimise the frequency response, an exponential horn has been used, allowing the system to perform without losses up to 19500 Hz.

This enclosure includes a rigging system to configure clusters, which enhance the sound spread and throw. It includes also a front grille, covered with a sturdy filtering technical foam to protect the speakers. (Only DP-4)

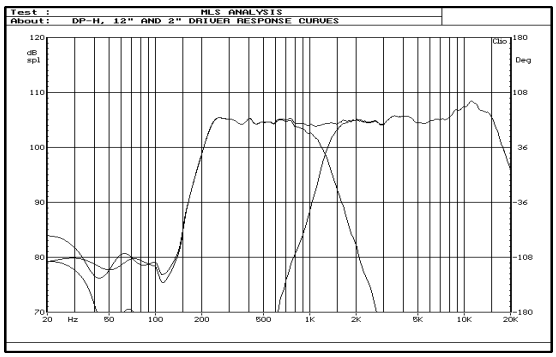



TECHNICAL SPECIFICATION FOR MID FREQUENCIES

-SPL ( 1W/1m )..... 108.5 dB
-Max. SPL (Cont.)..... 133.5 dB  (Calculated)
-Covering (dispersion).... 60 x 40º
-RMS Power..... 350 W
-Impedance..... 8 Ohm
-Frequency response..... 220-1200 Hz (con ISP-1014)

TECHNICAL SPECIFICATION FOR HIGH FREQUENCIES

-SPL ( 1W/1m )..... 112 dB
-Max. SPL (Continuo)..... 130.5 dB  (Calculado)
-Covering (dispersion)... 40º x 20º (Hasta 10 KHz)
-RMS Power..... 150 W
-Impedance..... 8 Ohm
-Frequency response..... 1200-19500 Hz (con ISP-1014)




RESPONSE OF MID FREQUENCIES, HIGH FREQUENCIES
AND DP-H ENCLOSURE (WITH ISP-1014)

1.1.2.- DP-SB ENCLOSURE

This enclosure is to be configured with the DP-H to form the DP-3 live sound system.

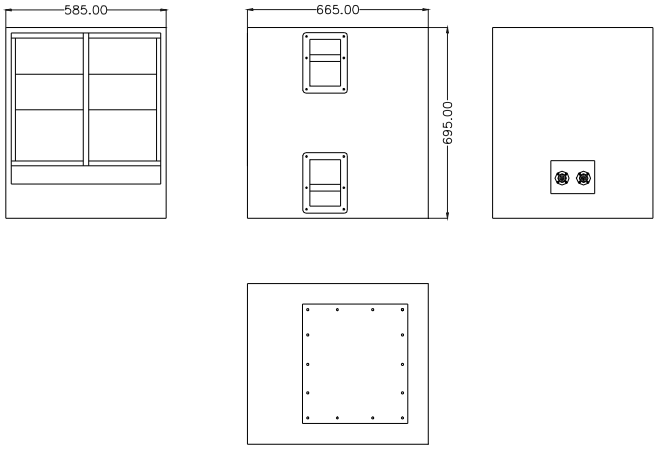
For bass and sub bass frequency sound reinforcement, a folded horn enclosure has been developed and optimised, in order to ensure high performance levels with “kicking” basses and really deep sub basses.

Special care has been taken in the design and optimisation of the wave-guiding parts of the enclosure, including throats, openings and lengths of each one. The result is a best-possible response with a minimum speaker excursion. This way a linear response and a bandwidth, reaching from 45 Hz to 220 Hz, have been achieved, performing an SPL of 102 dB 1W/m.

To configure a DP-3 system, two units are needed, called DP_SB1 and DP-SB2, which are equal and use a 700 W 18” speaker each. MUSICSON engineers have also optimised this speaker, in order to improve their response within this type of enclosure.

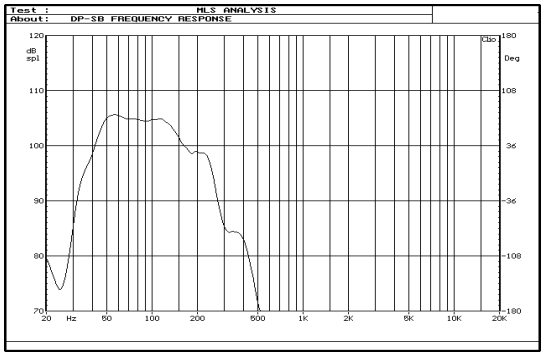
On one hand, a more powerful magnetic structure is used to improve the speaker’s dynamics, enhancing the transient response. At the same time, a 4” (100mm) moving coil, mounted on a Kapton® former, is used. The thermally efficient copper is wound on both sides of the former, achieving higher heat dissipation and structural stiffness. This allows the power application of 700W RMS (3000 W peak).
Also the height of the coil has been enlarged, in order to allow a greater excursion. In order to improve the cooling of the coil, two cooling vents are present, different from the conventional single cooling vent.

It includes also a front grille, covered with a sturdy filtering technical foam to protect the speakers.



TECHNICAL SPECIFICATIONS (EACH ENCLOSURE)

-SPL ( 1W/1m )..... 102.5 dB
-Max. SPL (Continuo)..... 131 dB (Calculated)
-RMS Power..... 750 W
-Impedance..... 8 Ohm
-Frequency response..... 45-220 Hz -3dB (with ISP-1014)



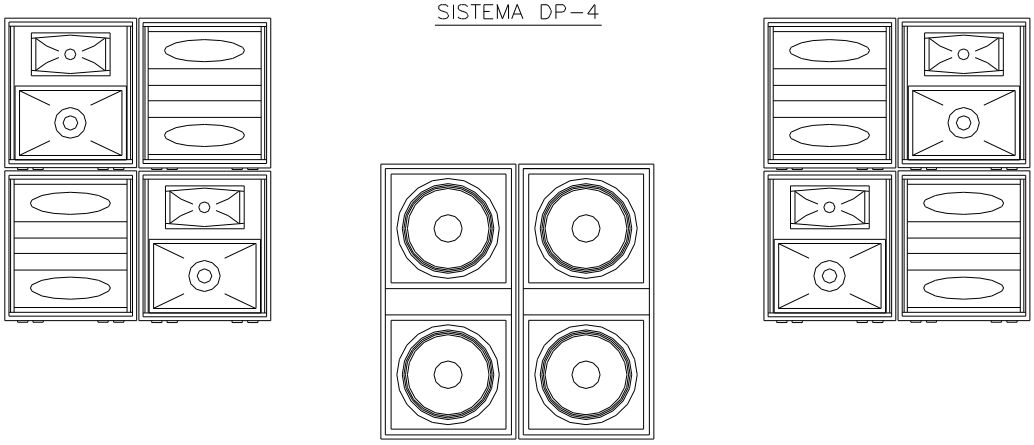

RESPONSE OF THE DP-SB ENCLOSURE (WITH ISP-1014)

**1.2.-DP-4 SYSTEM**

This next, more sophisticated sound system is configured through four active ways. Therefore, the enclosure model DP-H is used for high-mid frequencies, as described earlier. A second enclosure, the DP-G, is added to reproduce bass frequencies and the SUB-218BS for the sub bass range, including slight modifications to its predecessor to adapt it to the DP series. The whole configuration is controlled through the ISP-2022 processor for the SUB-218BS and through the newly developed ISP-1014 for the other three frequency ways.

As the DP-H has already been described in the previous section, we will now proceed with the details of the other components:

SISTEMA DP–4



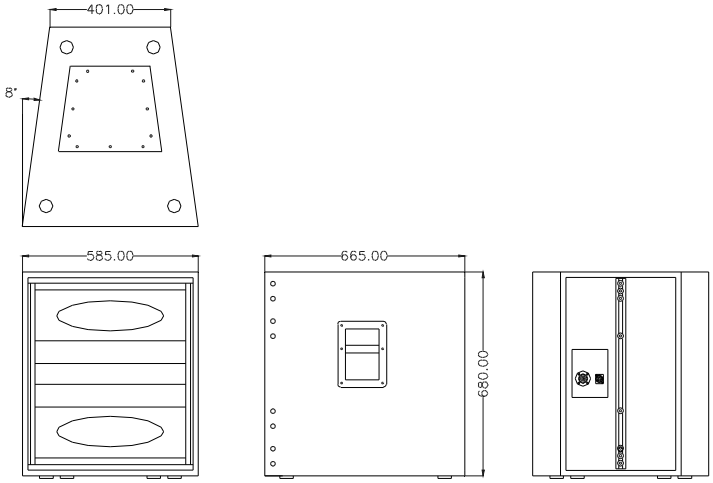
1.2.1.-DP-G ENCLOSURE

The DP-G enclosure is conceived to reproduce the bass frequency range. It will only be used with the 4-way active DP-4 configuration.

This enclosure is designed as a double sixth order band-pass system. This configuration allows higher sound pressure levels within a narrower band than other systems, such as reflex or hermetic systems. Through a correct approximation, its two points of minimum excursion can be set within the working range, thus reducing its overall mean excursion by 40% at the same power level. This allows us to apply more power to the speakers and increase the longevity of the mobile elements at the same time, keeping performance and response at the original levels.

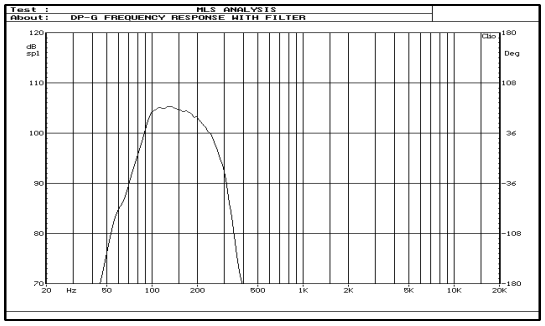
The DP-G uses two identical 500 W rms 15” loudspeakers, featuring a 4” (100mm) coil, wound on a Kapton® former fixed onto a double spider and mounted on a powerful magnetic system. All this results in a reproduction of kicking basses.

This enclosure includes a rigging system to configure clusters, which enhance the sound spread and throw. It includes also a front grille, covered with a sturdy filtering technical foam to protect the speakers.




TECHNICAL SPECIFICATIONS

-SPL ( 1W/1m )..... 105 dB
-Max. SPL (Cont.)..... 137 dB
-RMS Power..... 1000 W
-Impedance..... 4 Ohm
-Frequency response..... 65-220 Hz (con ISP-1014)



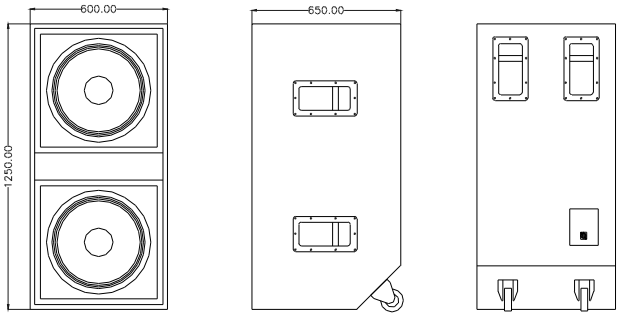

RESPONSE OF THE DP-G (WITH ISP-1014)

1.2.2.- SUB-218BS ENGLOSURE

This enclosure acts as a sub bass reinforcement system, used with the DP-4 sound system. It is built as a reflex box, using two identical 18” speakers. Its inside and the measures and shape of the vents have been

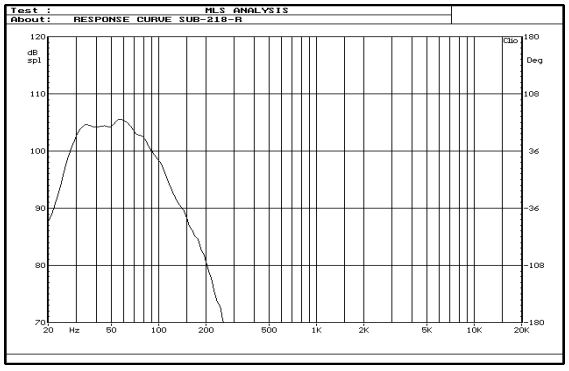
carefully studied to optimise the functioning of the loudspeakers. Through its new design, the frequency response has been enhanced and the excursion of the mobile components has been minimised. Together with the ISP-2022, its frequency response ranges from 28,5 Hz to 90 Hz (-3 dB), resulting in a very deep and powerful sub bass response.

It includes also a front grille, adding stiffness to the system and it is covered with sturdy, highly resistant filtering technical foam. It also includes 100mm casters to ease handling.




TECHNICAL SPECIFICATIONS

-SPL ( 1W/1m )..... 102 dB
-Max. SPL (Cont.)..... 134 dB
-RMS Power..... 1200 W
-Impedance..... 4 Ohm
-Frequency response..... 28.5-90 Hz -3dB (con ISP-2012)




RESPONSE OF THE SUB-218BS ENCLOSURE (WITH ISP-2022)

## 2.-ELECTRONIN AND AMPLIFICATION

Musicson serves all the necessary electronics to control the configured systems in convenient flight cases. The use of Musicson’s signal processors is absolutely necessary, since they contain the exact filters for an optimal

performance of each frequency way, control the power applied to each speaker and take care of preset phase adjustments, in order to result in a correct phase sum of the different bands.

### 2.1.- DP-3 SYSTEM

The DP-3 system features three active ways. Its basic configuration is formed of:
One DP-SB1, one DP-SB2, and one DP-H per channel.

To power the 18” speakers of the DP-SB1 and DP-SB2, we use one channel of the Musicson HE-1202 professional power amplifier, featuring 1200 W rms per channel. Both speakers are wired in parallel through the rear panel of the enclosure.

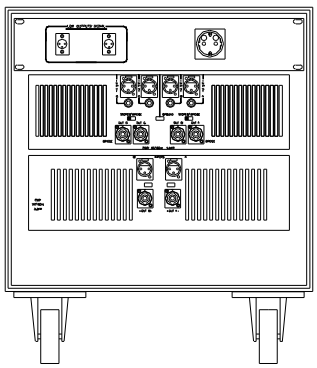
To power one 12” speaker, we will use one channel of the Musicson P-804 professional amplifier, featuring 800 W rms per channel. The 2”-driver of the DP-H will be powered through another other channel of this amplifier.

Thus, for a minimum stereo configuration, we will need a flight case that includes one Musicson HE-1202 and one Musicson P-804 amplifier. Both are preset at the factory for optimum performance.

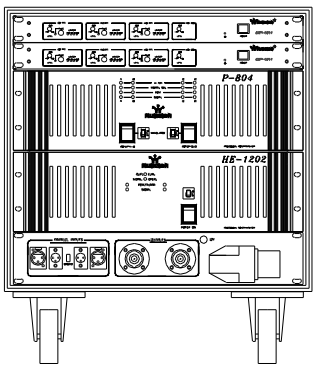
The flight case has the connections for signal input and speaker power output, as well as the mains connector, mounted on a chassis on the front. On the rear, a second chassis serves exclusively to connect this flight case to the extension unit, featuring two signal outs for the bass signal and an additional “Schuko” socket to supply power to this power extension unit.

Furthermore, the signal processor ISP-1014 shall be used together with the power amplifiers, as they are specifically designed to optimise the system’s performance. This processor includes an active three-way filter, configured with 24 dB/oct Linkwitz-Riley filters, with both high pass and low pass, optimised to improve the frequency response of all three ways. It also includes a fourth active high pass filter that serves to effectively and quickly equalise the highest frequencies (from 10 to 20 kHz) of the high-frequency way.

TRASERA RACK DP3



FRONTAL RACK DP3




It also counts on independent power control circuits for each way with attack and release thresholds adjusted to each frequency margin, avoiding the “pumping” effect when the system is working at full performance.

The use of the processor is also important due to the fact that it includes delay circuitry between the ways that produce an optimisation of the sum of them all at their crossover frequencies, obtaining a totally linear response.

The amplification and control electronics of the complete system is built into one flight case for both channels (stereo).

**2.2.- DP-4 SYSTEM**

This is an active four-way configuration of the DP-system. It comprises one SUB-218BS, 2 DP-G and 2 DP-H per channel, as a basic configuration.

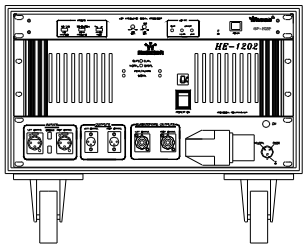
To power the two 18″ speakers of the SUB-218BS we will use one channel of the Musicson HE-1202 professional power amplifier, featuring 1200 W rms per channel. Both will be wired in parallel internally.

To power the four 15″ speakers of the DP-G enclosure, two channels of one of the Musicson P-804 professional power amplifiers, featuring 800 W rms per channel.

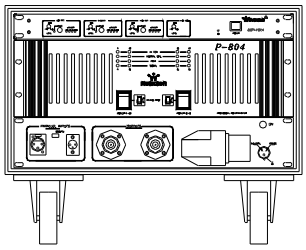
To power two 12″ speakers and two 2″ drivers on the DP-H enclosure, two further channels of the Musicson P-804 professional power amplifiers will be used.

The flight case configuration of this system will be different to the DP-3, since we will find, for stereo, the power and control electronics for the sub bass with the ISP-2022 dynamics processor in one flight case and two further mono flight cases with the configuration described before, that is, one P-804 for the other three ways, together with the ISP-1014 processor, especially set up for the DP-4.

RACK SUB–218BS



RACK DP–G DP–H



The importance of the use of Musicson power amplifiers and processors 8active filters, power controllers internal phase adjustments, etc.) has been explained in the previous section.

**3.- SYSTEM WIRING**

All Musicson DP enclosures have different rear panels with four- and eight pin Speakon® sockets, serving as signal inputs from the amplifiers or to link them to further enclosures.

On the flight cases we will find eight-pin Speakon® connectors to the enclosures, except on the sub bass flight case of the DP-4, where we sill find four-pin Speakons.

The codes used for the different speaker cabinets are:

1. - SUB-218BS. Pin 1+ to terminal + of one 18"
Pin 1- " " -
Pin 2+ to terminal + of the other 18"
Pin 2- " " - of the other 18"

2. - DP-SB1. Pin 1+ to terminal + of the 18".
Pin 1- to terminal - of the 18".
Further pins connected in parallel with the second 8-pin Speakon®

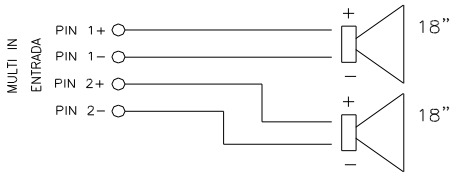
3. - DP-SB2. Pin 1+ to terminal + of the 18".
Pin 1- to terminal - of the 18".
Further pins connected in parallel with the second 4-pin Speakon®

4. - DP-G. Pin 1+ to terminal + of the 15".
Pin 1- to terminal - of the 15".
Further pins connected in parallel with the second 4-pin Speakon®

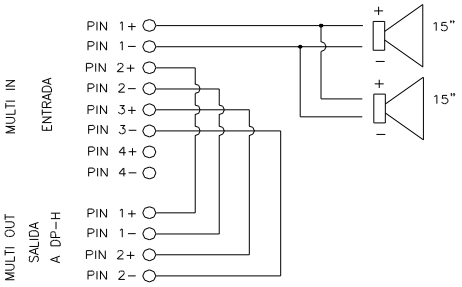
5. - DP-H. Pin 1+ to terminal + of the 12".
Pin 1- to terminal - of the 12".
Pin 2+ to terminal + of the 2" driver.
Pin 2- to terminal - of the 2" driver.

It is very important to know that the speaker cabinets have two Speakon® connectors, one used as the signal input and the other one serves as a parallel connection to further enclosures of the DP-system. Cables must always be connected as shown on the rear panels.

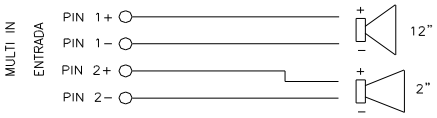
WIRING DIAGRAM SUB–218R



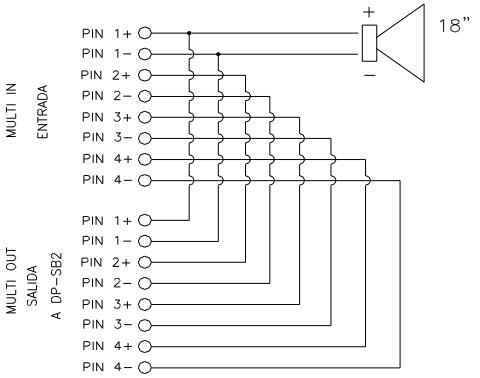

WIRING DIAGRAM DP–G



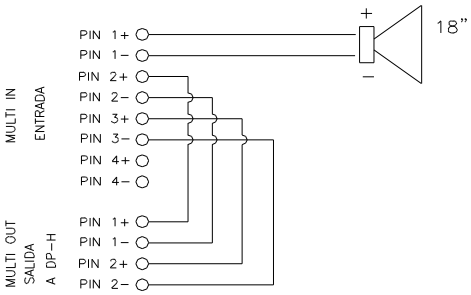

WIRING DIAGRAM DP–H




WIRING DIAGRAM DP–SB1




WIRING DIAGRAM DP–SB2




## 4.-DP SYSTEM SPARE PARTS

Before we start dismantling any acoustic part of a system, we should check first, where the failure may have originated and located it exactly.

We first have to make sure that the problem is not due to any element “previous” to the electronics racked in the flight cases (such as equalisers, mixing consoles, effects, etc.). If the problem persists, we should check for the correct functioning of the electronics of the DP-system: make sure that the processors are “ON” and no “MUTE” button is pushed. Also make sure that the power amplifiers are “ON” and that they are receiving signal from the processors. Done this, check the cables for tight and correct insertion and good condition. If Speakon® connectors are “locked-in” correctly, they always make good contact. Even so, you might want to try another cable to ensure correct functioning of these components.

Once all these steps have been undertaken and the problem persists in any element of the DP-3 or DP-4, you may want to proceed take apart the affected enclosure, extracting the damaged speaker.

If we are working on an 18” speaker of the SUB-218BS, you must unscrew the front grille with a Phillips- (cross-) screwdriver before unscrewing the speaker with an Allen-tool. Now you may take out the speaker.

If we are working on an 18” speaker of a DP-SB1 or DP-SB2, we will first unscrew the upper (or lower, depending on the model) panel to gain access to the 18” speaker. You may now unscrew the 8 screws of the speaker with an Allen-tool and take out the speaker.

In case that a 2” driver of the DP-H is the broken element, first take apart the upper and lower rigging accessories on the sides of the enclosure, using an Allen-screwdriver, the screws going through the wood on both sides. Once unscrewed the accessories, you can take out the grille through slight bending, since it has no further fixing devices. Once the grille is removed, you may see the driver and the 12” speaker. The driver is removed by unscrewing the horn with a Phillips screwdriver, taking out the horn-driver assembly. Then you’re ready for replacing the membrane.

If we need to work on the 12” speaker, first remove the wooden back panel. Use a Phillips screwdriver for this purpose. Please remove the panel with care, since the connector panel is also fixed to it and you might damage the wiring to the driver and the 12” speaker. Now you remove the Phillips screws fixing the speaker to the wooden base.

The spare parts for these loudspeakers have the following references:

1. Spare for 18” speaker: Spare for L-18800/8 ohm for DP-3 or DP-4
2. Spare for 15” speaker: Spare for L-15500/8 ohm
3. Spare for 12” speaker: Spare for M-12300/G/8 ohm for DP-H
4. Spare for 2” compression driver: Spare for HT-210/N/8 ohm.

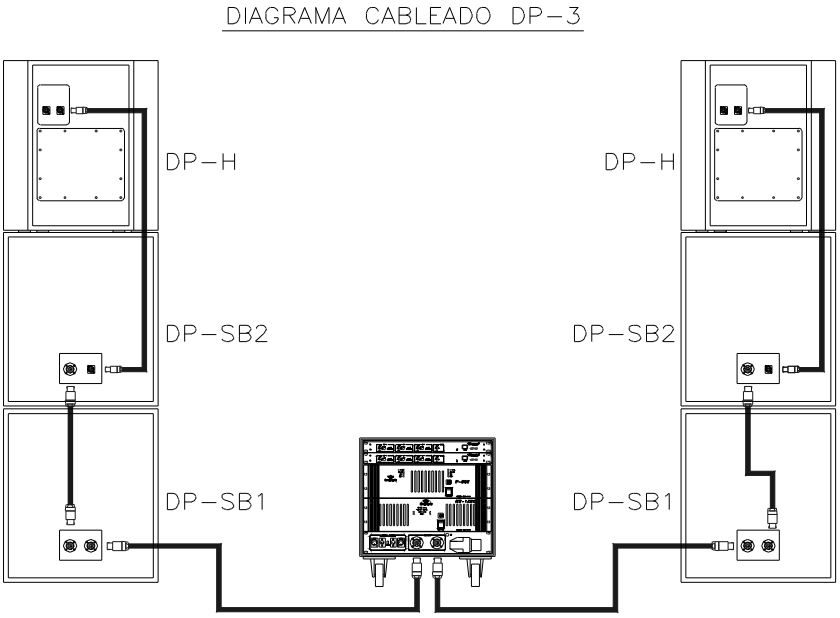
## 5.- CONECTIONS AND SETUP

Sine the Musicson DP system is “ready-to-sound” live equipment, we provide all elements necessary to amplify, control and wire the system the efficient and fast way.

The material delivered depends on the system configuration chosen by the user:

### 5.1.- DP-3 SYSTEM

The basic system that can be configured from the DP-SB1, DP-SB2 and DP-H enclosures is as follows:




The material delivered by Musicson contains:

- 1 Flight case with 1 Musicson P-804 power amplifier
  1 Musicson HE-1202 power amplifier
  2 ISP-1014 dynamics processors
  Everything conveniently wired

This flight case has a rear panel with XLR sockets for the signal input and connection to further, equal racks for greater configurations. Power cord for 220 VAC / 50-60Hz mains is included. It also includes a supplemental power socket and two 8-pin Speakon® connectors for the speaker enclosures.

- Cables: 2 cables of 15m with Speakon de 8 pins
  2 cables of 1.5m with Speakon de 8 pins

2 cables of 1.5m with Speakon de 4 pins

- Speaker enclosures: 2 DP-SB1
  2 DP-SB2
  2 DP-H

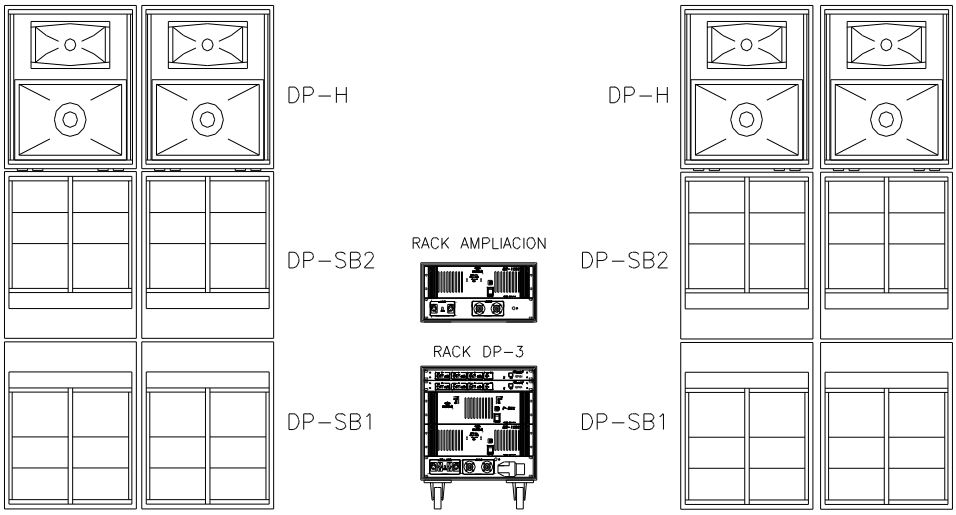
- Wiring: The two 15m cables with 8-pin Speakons directly connect the rack with the 2 DP-SB1 enclosures. The two 1,5m cables with 8-pin Speakons are used to connect the output of both DP-SB1 to both DP-SB2. Finally, the two 1,5m cables with 4-pin Speakons are used to connect the output of both DP-SB2 to the inputs of both DP-H.

ATTENTION: In order for the speakers to receive their signal, Speakon® connectors must be locked, turning them clockwise until the locking device snaps in.

Auxiliary elements, such as effects, equalisers, mixing consoles, etc. are not delivered with this live equipment.

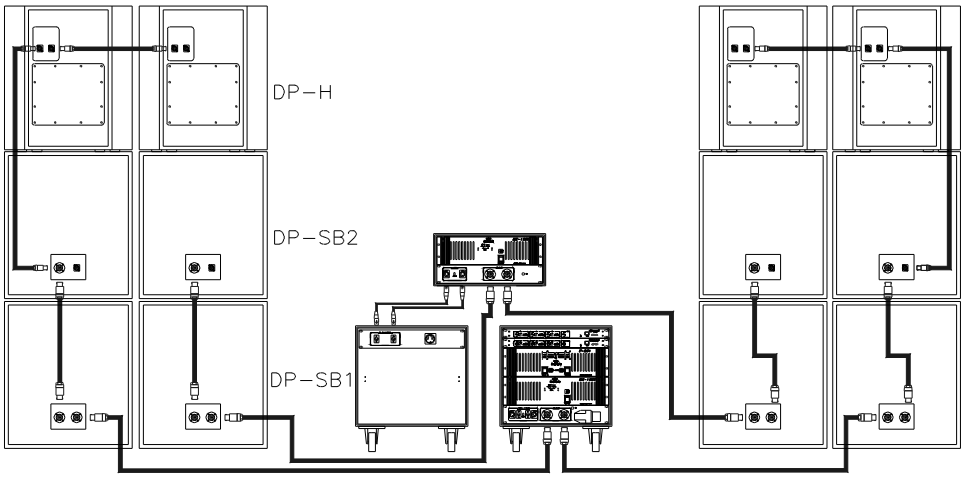
To expand the system to double its power, Musicson will deliver a flight case containing solely a Musicson HE-1202 power amplifier, which will be connected to the signal outputs of the main rack, including the ISP-1014 signal processors.

SISTEMA DP-3 AMPLIADO




The mod. DP-H enclosures will be connected in parallel on both channels, whereas the power amplification rack will power the bass systems DP-SB1 and Dp-SB2 from both channels, as shown on the following diagram:

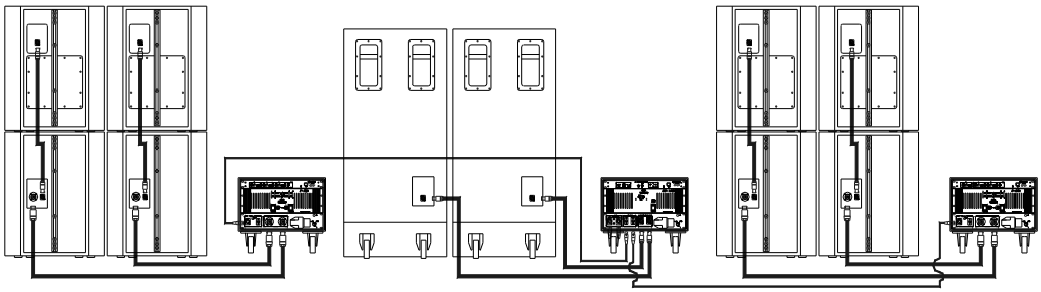
DIAGRAMA CABLEADO DP-3 AMPLIADO




**5.2.- DP-4 SYSTEM**

The basic system that can be configured, using the enclosure models SUB-218BS, DP-G and DP-H is as follows:

DIAGRAMA CABLEADO DP-4



The material delivered by Musicson contains:

- 2 Racks, A y B each one containing 1 Musicson P-804power amplifier
  1 ISP-1014 dynamics processor
  All this conveniently wired.

These flight cases have a rear panel with XLR sockets for the signal input and connection to further, equal racks for greater configurations. Power cord for 220 VAC / 50-60Hz mains is included. It also includes a supplemental power socket and two 8-pin Speakon® connectors for the speaker enclosures.

- 1 Rack C with 1 Musicson HE-1202 power amplifier.
  1 ISP-2022 dynamics processor.

- Cables: 4 cables of 15m with Speakon of 8 pins
  2 cables of 15m with Speakon of 4 pins
  4 cables of 1.5m with Speakon of 4 pins

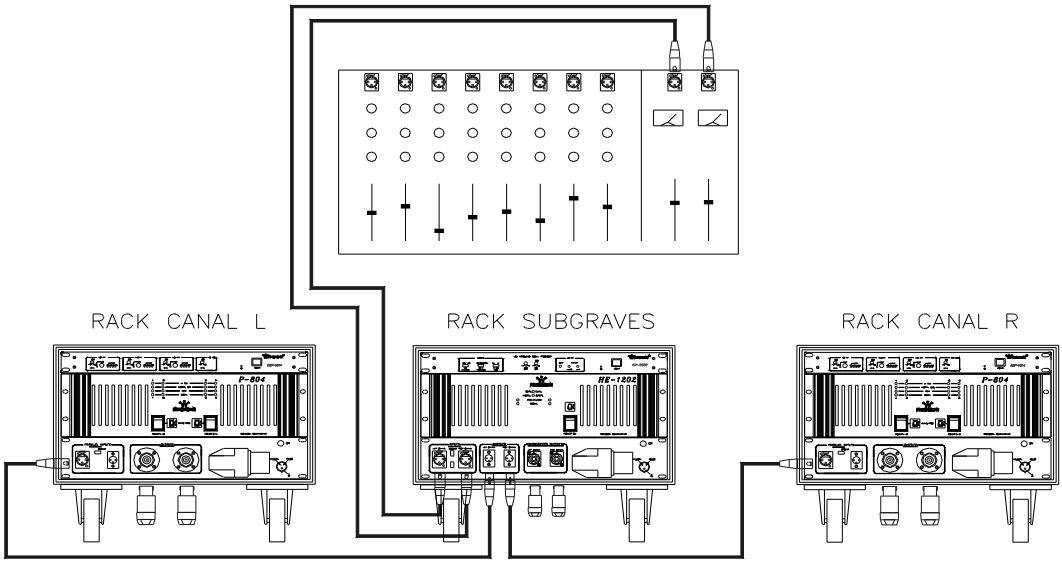
- Speaker enclosures: 2 SUB-218BS
  4 DP-G
  4 DP-H

- Wiring: The two 15m cables with 4-pin Speakons are connected directly from the rack to both SUB-218BS.

Two 1,5m cables with 8-pin Speakons are to connect directly Rack A to both DP-G. Finally, the 1,5m cables with 4-pin Speakons are to be used to connect the outputs of both DP-G with both DP-H. The same procedure applies to Rack B and the other DP-Gs and DP-Hs.

Auxiliary equipment, such as effects, equalisers, mixing consoles, etc. is not delivered with the live equipment.

In order for the DP-4 SYSTEM to work correctly, please make sure that you link the signal coming from the mixing console (or from a possible effect rack) to the sub bass rack and from there to both bass-mid-high channel, as shown on the following diagram:




ATTENTION: In order for the speakers to receive their signal, Speakon® connectors must be locked, turning them clockwise until the locking device snaps in.

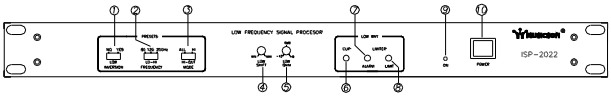
## 6.- CONTROL ELECTRONICS

Sine the Musicson DP system is “ready-to-sound” live equipment, we provide all elements necessary to amplify (power amplifiers), control (dynamics processors) and wire the system the efficient and fast way.

The use of these processors: ISP-2022 and ISP-1014 mandatory, not only for the correct functioning of the acoustic systems, but also the manipulation, substitution through other processors or active filters by the user will change these parameters, causing an immediate void on the guarantee granted by the manufacturer on these systems.

The main characteristics of the processors are the following:

**6.1.- ISP-2022**




This processor is only used when acquiring a DP-4 configuration.

Its configuration and characteristics turn this processor into a vital element in obtaining maximum performance of the sub bass enclosures of the DP-4 system, that is, the SUB-218BS.

It comes installed and wired in a flight case, together with the Musicson HE-1202 power amplifier.

Its main features are:

Two-way active filter with adjustable crossover frequency.
24 dB / Oct Linkwitz-Riley filters.
High pass and low pass filters for the sub bass way.
High pass filter for the mid-high way.
Variable gain for the low pass output
Adjustable delay between ways.
Phase inversion for the low pass.
All-pass or high-pass selector for the mid-high output.
Active power control circuitry preset by the manufacturer for the SUB-218BS.

- DESCRIPTION OF THE FUNCTIONS.

1. - LOW INVERSION: When this switch is on position “NO”, the mid-high and low frequency filters are in phase.
At the “YES” position, these two outputs are in opposite phase (180º).

ATTENTION! The phase mentioned is referred to the electrical phase, NOT the acoustical phase. It is possible that, in order to keep the (acoustic) phase

of the sub bass way output in-phase, the electrical phase needs to be inverted for some set-ups.

2. - LOW-HI FREQUENCY: This three-position selector allows selecting the crossover frequency of both outputs, the values being 90, 120 or 200 Hz. The switching affects simultaneously both ways.
For the DP-4 system the value to be selected is 90 Hz.

3. - HI OUT MODE: This selector switch allows configuring the mid-high way output filter of the ISP-2022.
On the “HI” position, it will work as a high-pass filter, at the crossover frequency selected before (LOW-HIGH FREQUENCY switch). For the DP-4, having selected 90 indicates that the crossover frequency between the sub bass and bass is 90 Hz.
At the position “ALL”, the high pass filter is switched off, turning the mid-high into an all-pass output, that is, it delivers a linear response between 20 Hz and 20 kHz.
This position may be used when the mid-high and bass enclosures of the DP-4 system are flown, lowering the response frequency of the bass way down to 60 Hz.

4. - LOW SHIFT: Fine phase adjustment between both processor outputs. It affects the sub bass way exclusively. This feature is especially useful when the sub bass way has to be delayed with respect to the rest of the system. Changing the adjustment of this control, you may fine-adjust the phase of the sub bass until the sum with the bass is perfect.
¡ATTENTION! It is not a matter of fine-adjusting the phase by ear, but through the aid of specific measuring equipment. Failure to do so may generate a phase cancellation at the crossover frequency of the affected frequency ways.

5. - LOW GAIN: Gain adjustment for the sub bass filter. Adjustable to values between –12 and +6 dB.

¡IMPORTANT! The settings delivered by the manufacturer assure the perfect functioning of he system. Inadequate manipulation of the processor’s parameters may result in a loss of sound quality and performance of your live system.

6. - LED INDICATORS:

6. - CLIP: This Light Emitting Diode lights up when the input signal of the processor is too high, producing high distortion levels at the output.

ATTENTION! It is important that this LED never lights up, since we are being signalled that the processor output is cutting off the signal crest. Under these conditions, the power control circuitry will not function correctly, resulting in a considerable loss of quality and damage to the loudspeakers.

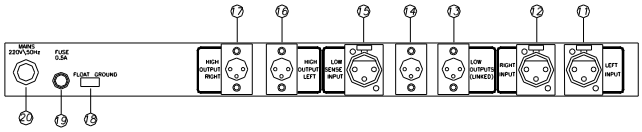
7. - ALARM: This LED must be ON when turning on the system and OFF at the moment the processor receives a signal. If, by any means, the LED does not turn off when receiving a signal, you should check for a problem at the SENSE input (output return from the power amplifier output to the processor). This would mean that the power control circuitry is not functioning properly, with the consequence of possible damage to the loudspeakers.

8. - LIMIT: Under ideal working conditions this LED should stay off or, in extreme cases, light up occasionally. If this last condition happens, we are being told that we are reaching the limit values and that the processor’s limiter circuits are starting to act, protecting the speakers from surges.

9. - ON: This LED indicates that the processor is in working condition.

10. - POWER: Mains switch of the processor.

On the rear of the processor you will find the sockets for the signals and power control connectors, as well as the mains power supply socket for this unit.




11. - LEFT INPUT: Signal input for the left channel. This requires an XLR-type connector.
This socket is connected directly to the left channel input socket on the rear rack panel.

12 - RIGHT INPUT: Signal input for the right channel. This requires an XLR-type connector.
This socket is connected directly to the right channel input socket on the rear rack panel

13-14. -LOW OUTPUTS (LINKED): Signal output for the bass way. This is a monaural output, resulting from the sum of both signals of the sub bass ways of both channels.

IMPORTANT! If the connection of either channel should fail or not be in perfect working condition, the output level of the sub bass would decrease by 3 dB.

15. -LOW SENSE INPUT: SENSE input for the sub bass way. This line comes directly from the male XLR connector of the power amplifier output. Information about the power is constantly sent here from the amplifier to the processor.

ATTENTION! If this SENSE line is disconnected or damaged, the power control circuits will not work, resulting in damaged sub bass loudspeakers. In such case, the guarantee will not cover the repair of the speakers.

16. -HIGH OUTPUT LEFT: This is the high-pass filter signal output of the left channel. This output is to be connected directly to the rack’s rear panel connector named "OUTPUTS - LEFT CHANNEL".

17 -HIGH OUTPUT RIGHT: This is the high-pass filter signal output of the right channel. This output is to be connected directly to the rack’s rear panel connector named "OUTPUTS - RIGHT CHANNEL".

18. -FLOAT-GROUND: Chassis ground switch. In the FLOAT position the chassis is electrically insulated from the circuit’s ground (mass). In the GROUND position both grounds are connected.
Changing the switch’s position can eliminate buzzing sound generated by ground feedback.

19. -FUSE 0.5A: this is the 0,5 A fuse for the power supply. To replace it, turn the fuse holder counter clockwise with a flat screwdriver.

IMPORTANT! In case of a blown fuse, replace it with another one of the same value If the failure persists after replacing the fuse, please contact your technical service in order to avoid further damage to this unit.

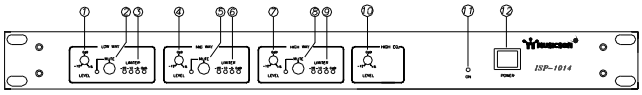
20. -MAINS: Mains cable. The processor installed in this rack will be hooked once the rack is powered.

ATTENTION! If you need to open or service a rack for any reason, please make sure that all signal cables, SENSE returns and power amplifier outputs are working properly. Any problem here can cause a defective functioning of the system and even lead to broken speakers. Always use the cabling delivered by Musicson and try to maintain the colour coding used by us.

**6.2.- ISP-1014**

There are two different configurations for this dynamics processor, each one matched to either DP-system configuration.

This unit controls the working order and power amplifiers of the bass, mid and high frequency ways of the DP-4 and the three active ways of the DP-3.



Its main features are:

1. (Manufacturer-) Configurable active three or four-way filter.
2. Three band-pass filters and one high-pass filter.
3. 24 dB/oct Linkwitz-Riley filters.
4. Adjustable gain on all frequency ways.
5. (Manufacturer-) adjustable delay between frequency ways.
6. Mute switch for every frequency way.
7. (Manufacturer-) adjusted power control circuits for every frequency way.
8. Limiter level indicators on every channel.

DESCRIPTION OF FUNCTIONS.

1. - LEVEL: This control adjusts the output gain for the low frequency way. Adjustable to values between –12 and +6 dB.

IMPORTANT! The manufacturer to obtain a linear response on the whole system, as shown on the response curves, including the subwoofer response, adjusts all gain levels.

2. - MUTE: This button mutes the low frequencies way. When pushed, the low frequencies are completely eliminated and the LED next to the button lights up.

3. - LIMITER (-20, -10, -5,0dB): This LED bar indicates the limiting level of the bass channel. A normal working margin should make the –5 dB LED light up or, in extreme cases, light up the red 0 dB LED occasionally. When we have reached this level, the limiter circuits are starting to work in order to protect the speakers from power surges.

4. - LEVEL: This control adjusts the output gain for the mid frequency way. Adjustable to values between –12 and +6 dB.

IMPORTANT! The manufacturer to obtain a linear response on the whole system, as shown on the response curves, including the subwoofer response, adjusts all gain levels.

5. - MUTE: This button mutes the mid frequencies way. When pushed, the mid way is completely eliminated and the LED next to it lights up.

6. - LIMITER (-20, -10, -5,0dB): This LED bar indicates the limiting level of the mid frequency channel. A normal working margin should make the (–5)dB LED light up or, in extreme cases, light up the red 0 dB LED occasionally. When we have reached this level, the limiter circuits are starting to work in order to protect the speakers from power surges.

7. - LEVEL: This control adjusts the output gain for the high frequency way. Adjustable to values between –12 and +6 dB.

IMPORTANT! The manufacturer to obtain a linear response on the whole system, as shown on the response curves, including the subwoofer response, adjusts all gain levels.

8. - MUTE: This button mutes the high frequencies way. When pushed, the high frequency way is completely eliminated and the LED next to it lights up.

9. - LIMITER (-20, -10, -5,0dB): This LED bar indicates the limiting level of the high frequencies channel. A normal working margin should make the –5 dB LED light up or, in extreme cases, light up the red 0 dB LED occasionally. When we have reached this level, the limiter circuits are starting to work in order to protect the speakers from power surges.

10. - HI-EQ: This control allows adjusting the response of the compression driver within the highest frequencies. It can be adjusted between 10 kHz and 20 kHz.

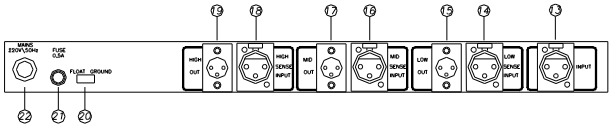
11. - ON: This LED indicates that the processor is turned ON.

12. - POWER: Mains switch of the processor.

ATTENTION! Inside these signal processors you can find a series of adjustable components. It is of vital importance not to change the original settings, since a modification of working thresholds or offset values of the

OpAmps could seriously damage your equipment. In case of unauthorised manipulation, the manufacturers guarantee will be void.

On the rear panel of this unit you can find signal and SENSE return sockets, as well as the mains power supply elements.




13. - INPUT: Signal input of the ISP-1014 processor. XLR female socket.

This socket is connected directly to the channel input socket on the rear rack panel.

14. -LOW SENSE INPUT: SENSE input for the bass way. This line comes directly from the male XLR connector of the power amplifier output. Instant information about the power is constantly sent here from the amplifier to the processor.

ATTENTION! If this SENSE line is disconnected or damaged, the power control circuits will not work, resulting in damaged sub bass loudspeakers. In such case, the guarantee will not cover the repair of the speakers.

15. - LOW OUT: Bass output signal. This socket is connected to the signal input socket of the bass power amplifier through a female aerial XLR connector.

16. - MID SENSE INPUT: SENSE input for the mid frequencies way. This line comes directly from the male XLR connector of the power amplifier output. Information about the power is constantly sent here from the amplifier to the processor.

ATTENTION! If this SENSE line is disconnected or damaged, the power control circuits will not work, resulting in damaged sub bass loudspeakers. In such case, the guarantee will not cover the repair of the speakers.

17. - MIDOUT: Mid frequencies output signal. This socket is connected to the signal input socket of the mid frequencies power amplifier through a female aerial XLR connector.

18. - HIGH SENSE INPUT: SENSE input for the high frequencies way. This line comes directly from the male XLR connector of the power amplifier output. Information about the power is constantly sent here from the amplifier to the processor.

ATTENTION! If this SENSE line is disconnected or damaged, the power control circuits will not work, resulting in damaged sub bass loudspeakers. In such case, the guarantee will not cover the repair of the speakers.

19. - HIGH OUT: Bass output signal. This socket is connected to the signal input socket of the high frequencies power amplifier through a female aerial XLR connector.

20. -FLOAT-GROUND: Chassis ground switch. In the FLOAT position the chassis is electrically insulated from the circuit's ground (mass). In the GROUND position both grounds are connected.
Changing the switch's position can eliminate buzzing sound generated by ground feedback.

19. -FUSE 0.5A: this is the 0,5 A fuse for the power supply. To replace it, turn the fuse holder counter clockwise with a flat screwdriver.

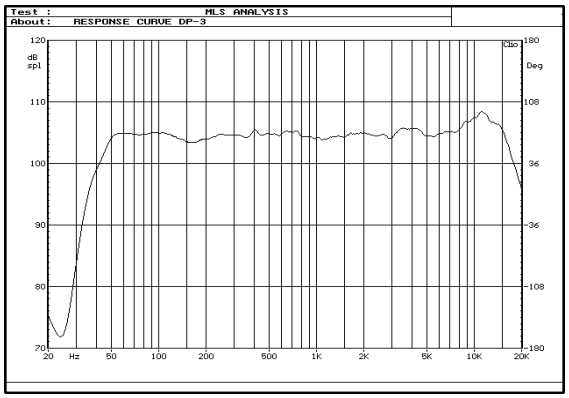
IMPORTANT! In case of a blown fuse, replace it with another one of the same value If the failure persists after replacing the fuse, please contact your technical service in order to avoid further damage to this unit.

22. -MAINS: Mains cable. The processor installed in this rack will be hooked once the rack is powered.

ATTENTION! If you need to open or service a rack for any reason, please make sure that all signal cables, SENSE returns and power amplifier outputs are working properly. Any problem here can cause a defective functioning of the system and even lead to broken speakers. Always use the cabling delivered by Musicson and try to maintain the colour coding used by us.

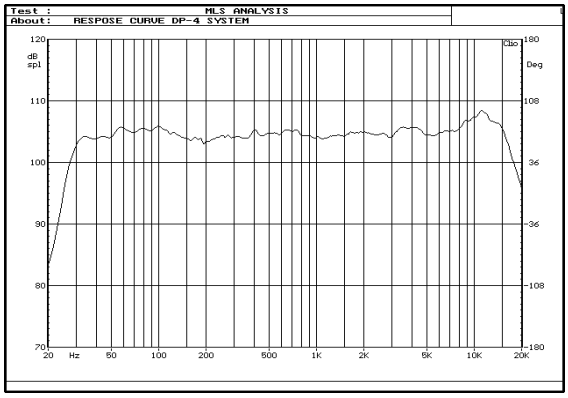
## 7.- GRAPHS

1.- DP-3 GRAPHS



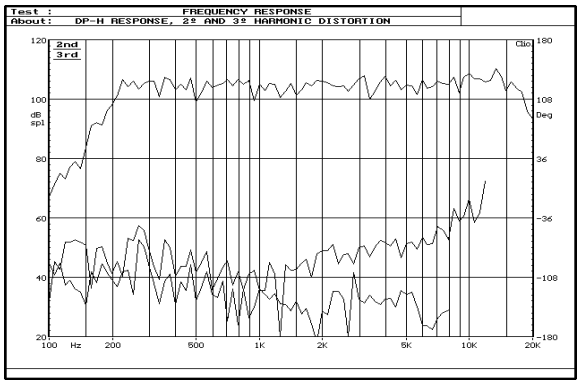

DP-3 (DP-SB1, DP-SB2, DP-H) SYSTEM RESPONSE

2.- DP-4 GRAPHS



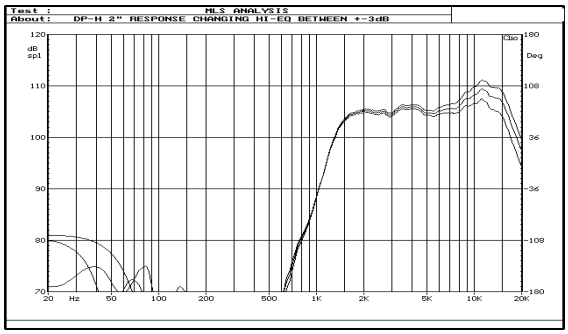

DP-4 (SUB-218BS, DP-G, DP-H) SYSTEM RESPONSE

3.- HARMONIC DISTORTION GRAPHS




2ND AND 3RD HARMONIC’S RESPONSE OF THE MID-HIGH FREQUENCY WAY (DP-H)

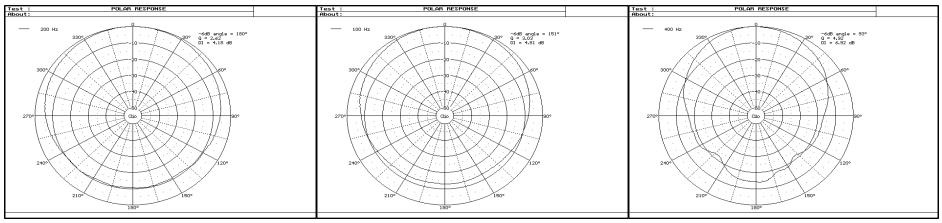
4.- HIGH-EQ WORKING GRAPHS



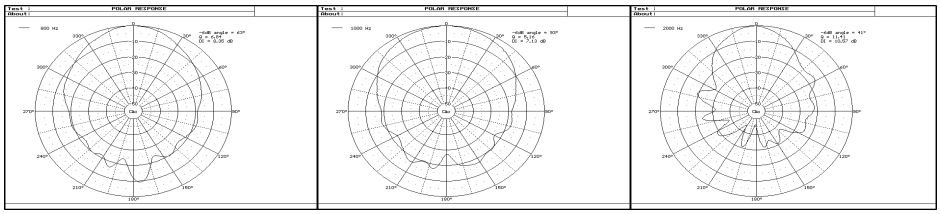

HIGH FREQUENCY RESPONSE WITH HI-EQ (+/- 3DB) FUNCTION ACTIVE

## 7.2 POLAR GRAPHS

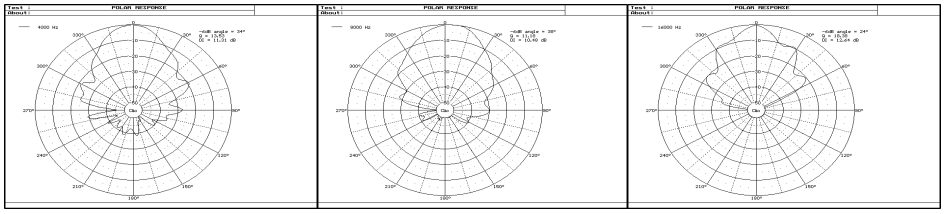
1.- HORIZONTALS



100Hz 200Hz 400Hz

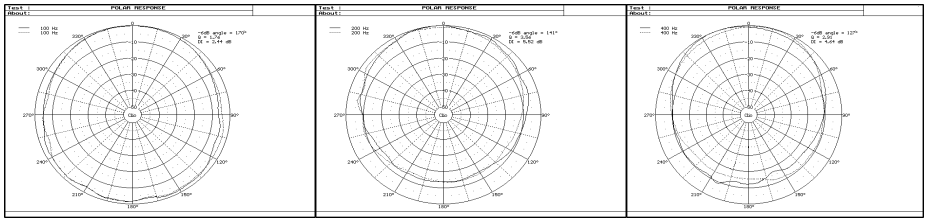


800Hz 1KHz 2KHz

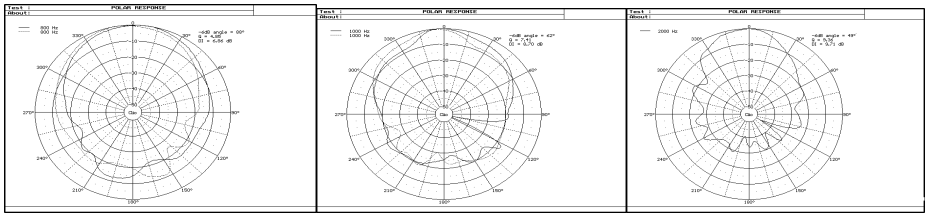


4KHz 8KHz 16KHz

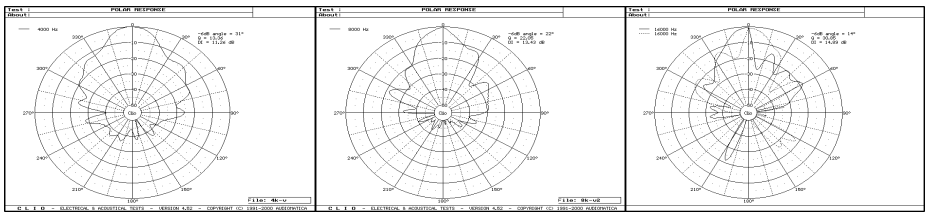
VERTICALS



100Hz 200Hz 400Hz

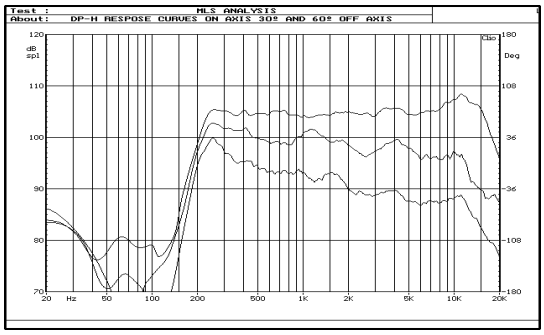


800Hz 1KHz 2KHz

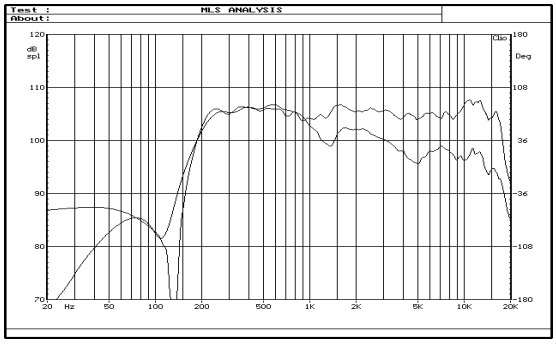


4KHz 8KHz 16KHz

20,30 DEGREES HORIZONTAL RESPONSE




10 DEGREES VERTICAL RESPONSE




## 8.- SETUP AND RIGGING ELEMENTS RECOMMENDATIONS.

Musicson has designed and developed the acoustic systems DP-3 and DP-4, so that its response could be as linear as possible under anechoic conditions, that is, without external deflexions. The user of these systems should know about the importance of the influence of the surroundings where they are installed on the final sound characteristics.

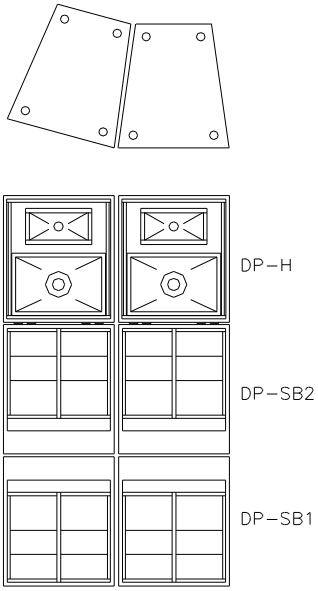
### 8.1.- DP-3 SYSTEM

The DP-3 system has been developed to work with the DP-H enclosures mounted above the DP-SB1 y DP-SB2 enclosures. Mounted in such a way, the delay between both enclosures sums up to deliver a completely linear response.

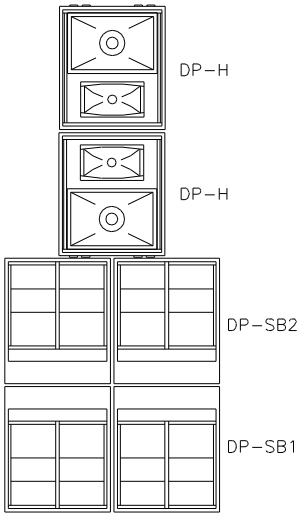
Remember that high frequencies are much more directional than low frequencies. If the source of high frequencies is installed below or at the audience level, this frequency band will be absorbed. Audience situated in the rear rows will not be reached by the high frequencies. As a general rule, the whole audience should have a direct view of the sound sources, thus, they should be installed about 1m above their heads.

This condition can be accomplished by setting up three enclosures of the DP-3 system, as indicated in this manual.

If you own at least 2 basic configurations per channel, match the sides of the cabinets in order to avoid phase cancellations in the mid-high frequencies and to increase the sound spread.




If you wish to have a more directional sound with less dispersion, mount the system as indicated below.

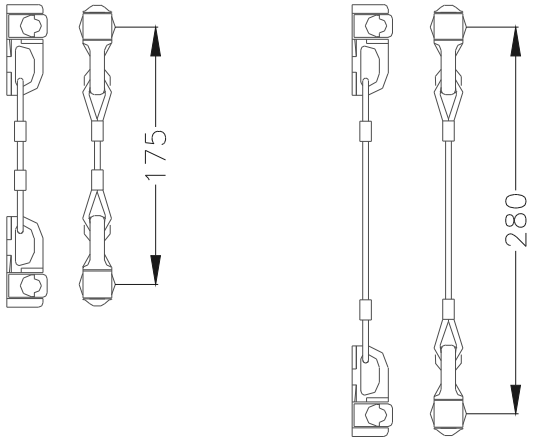



**8.2.- DP-4 SYSTEM**

The DP-4 system has been developed to obtain maximum performance by flying the system. Therefore we have built a rigging (or elevation) system into the DP-G and DP-H enclosures.

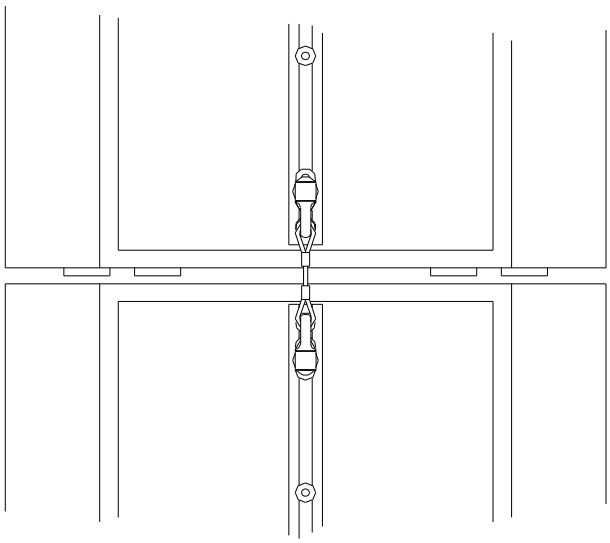
The sub bass way of the DP-4 works up to 90 Hz. The wavelength of these signals is very large, so that the SUB-218BS has to be set up closely and, if possible at the centre of the stage, in order to avoid phase cancellations between them.

In order to fly the DP-H and DP-G enclosures, Musicson furnishes the cargo restraint tracks and studs with cables. There are two lengths available: 175mm and 280mm. The shorter one is usually used to join the rear parts of the cabinets and two longer ones are used to fix the front part.



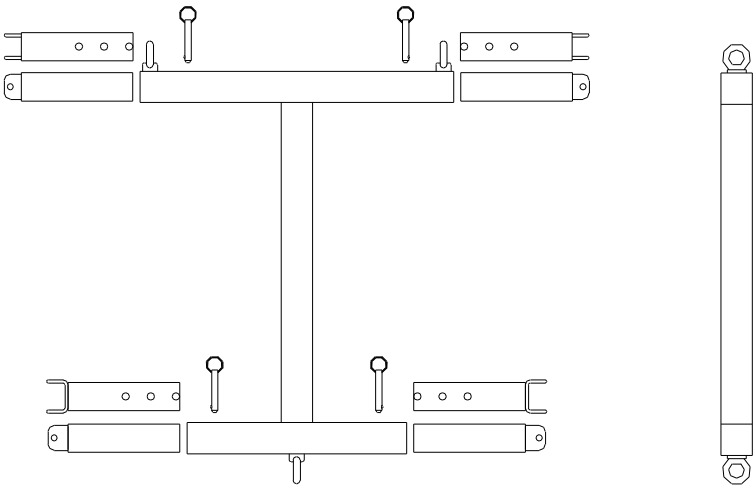

The size of the fixing systems enables the rear part of the cabinets to stay practically together:

TRASERAS DP–H Y DP–G

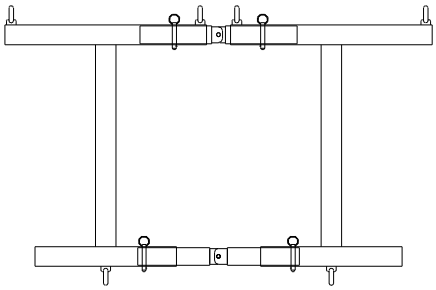


Musicson has developed all the hardware necessary to fly the DP-H and DP-G enclosures.

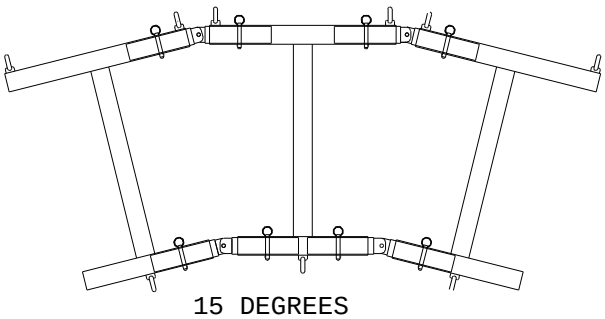
We start with the cluster-forming element, reference ....., as shown below:



The angle between the enclosures can be varied through values from 0 to 15 degrees, by changing the position of the pins and the studs, as shown on the figure below:



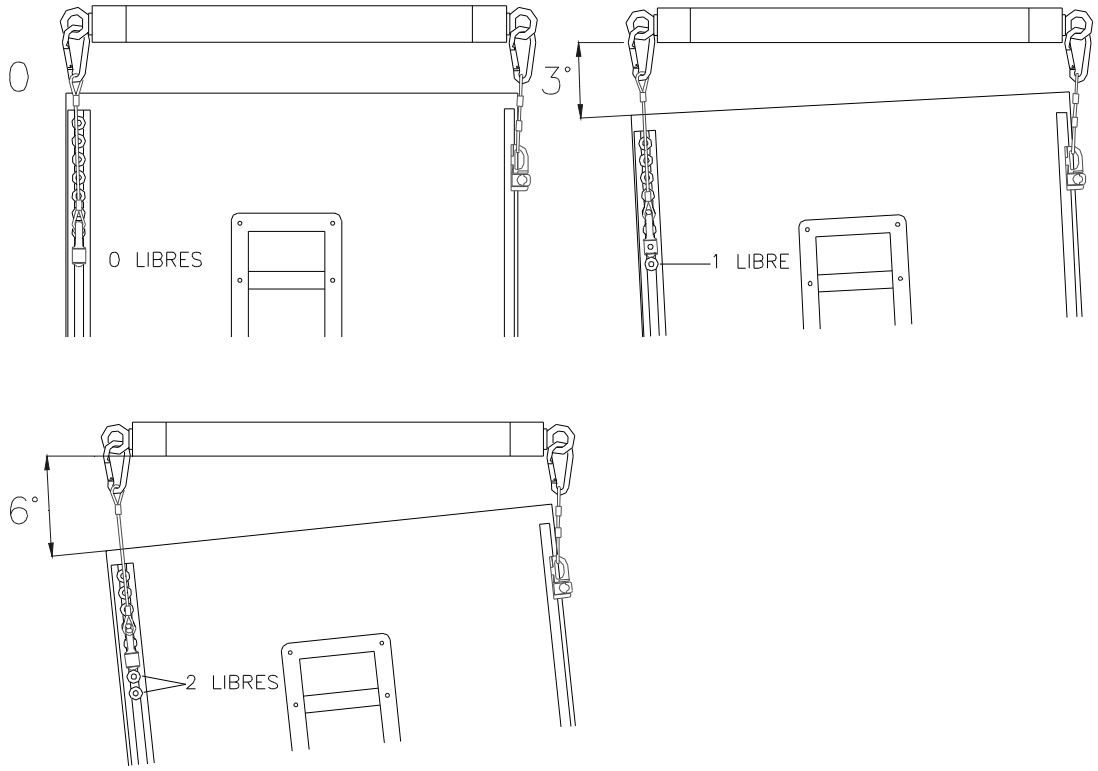
0 DEGREES



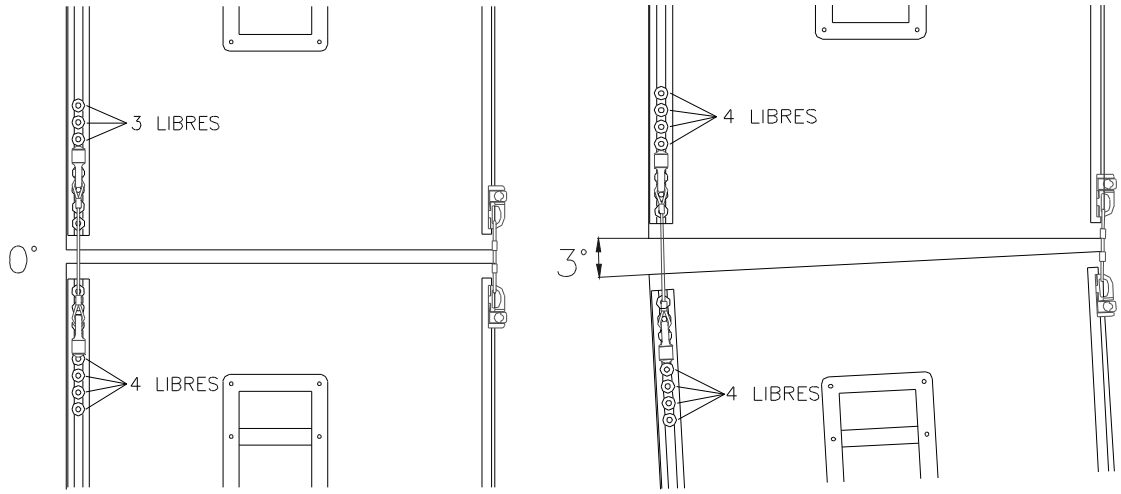
15 DEGREES

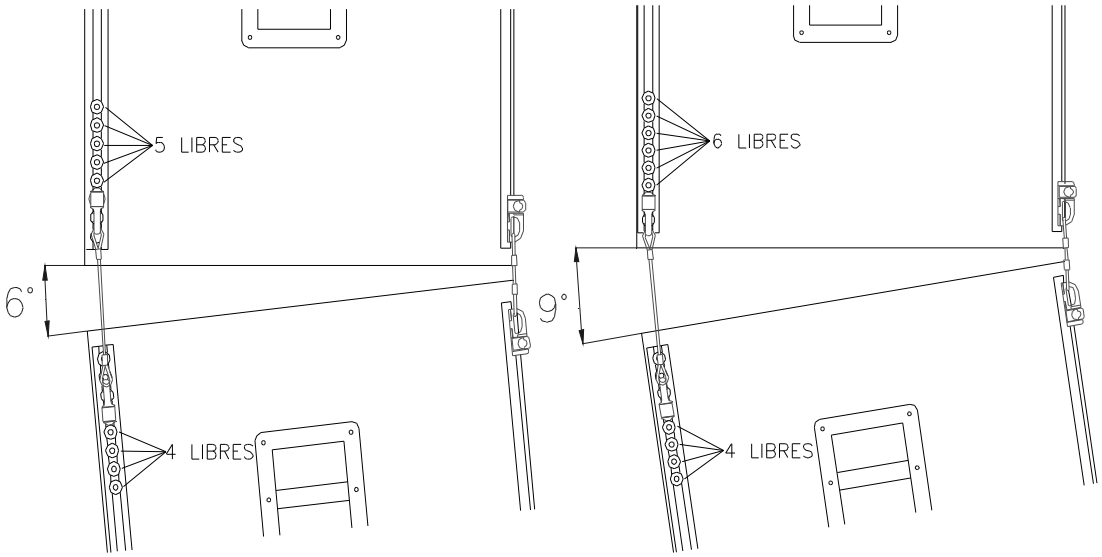
The cables and flying accessories at the front of the enclosures DP-H and DP-G allow the user to vary the angle in steps of 3 degrees.

Below you can see a series of figures that show in detail the relation between these elements and the enclosure’s positions.




The angle between the upper enclosures may also be changed by changing the position of the flying cables, as sown on the figures below:






Follow these instructions in order to achieve an improved horizontal and vertical dispersion in your installs.

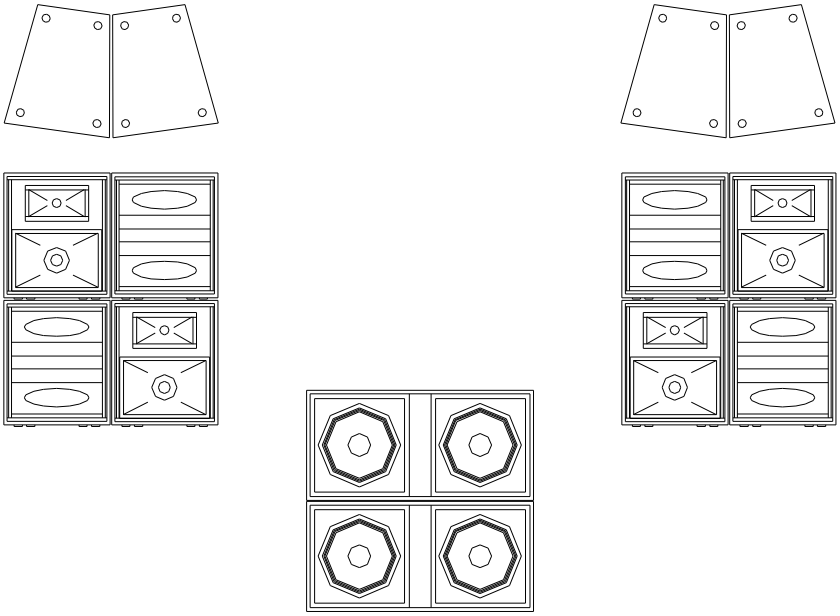
## 9.- PRACTICAL SETUPS WITH THE DP-4

At this point we show you some drawings you can use during your set-ups in order to achieve an optimal distribution when flying your DP-4.

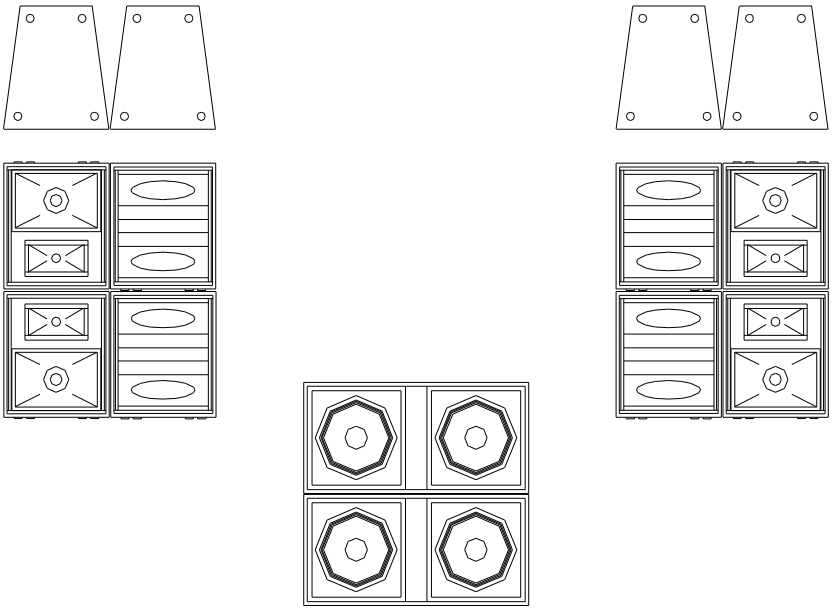
Remember that the Dp-4 system has been designed to be flown, offering its highest sound quality, dispersion and absence of cancellations.

With smaller configurations, presenting a smaller amount of enclosures, different set-ups are shown. One of them offers greater dispersion; the other one offers a longer throw.

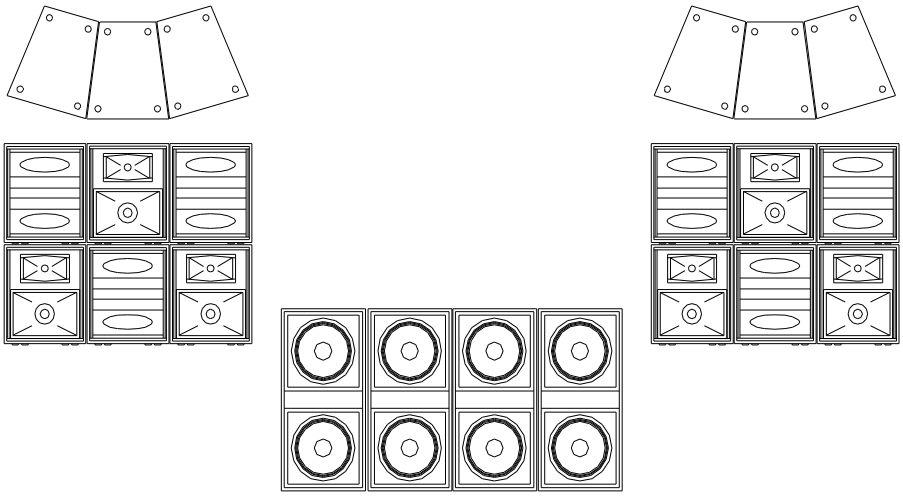
1.- More dispersion.



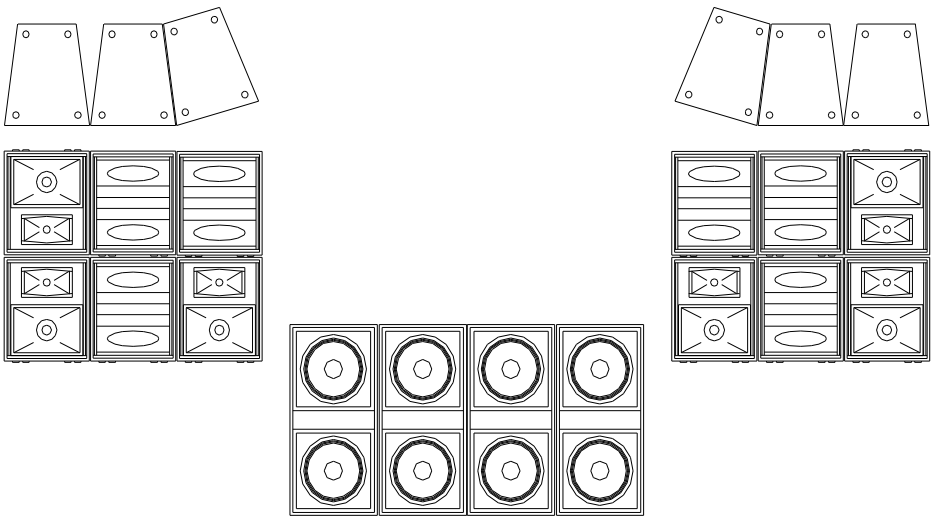
2.- Longer throw



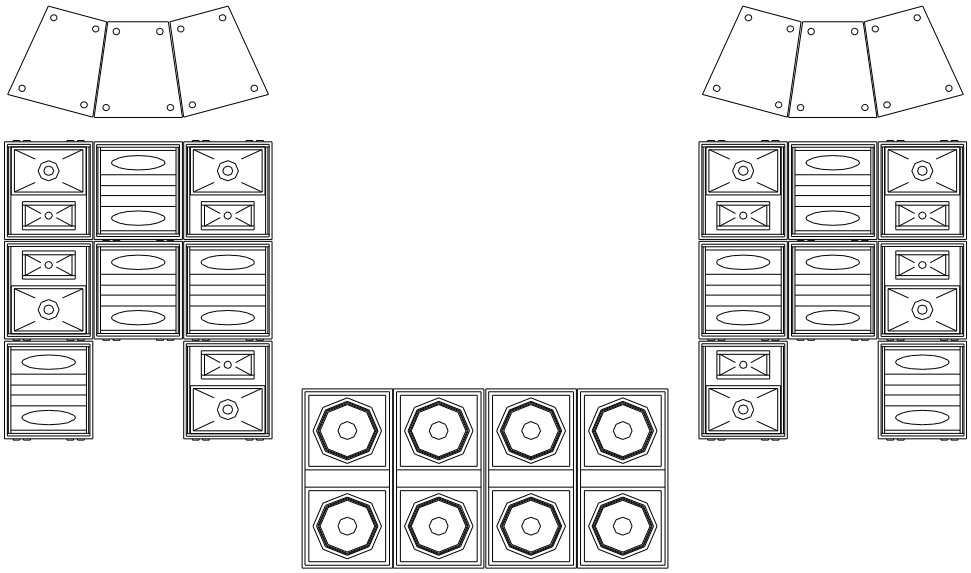
In case you use a larger number of sub bass enclosures with the same electronics:



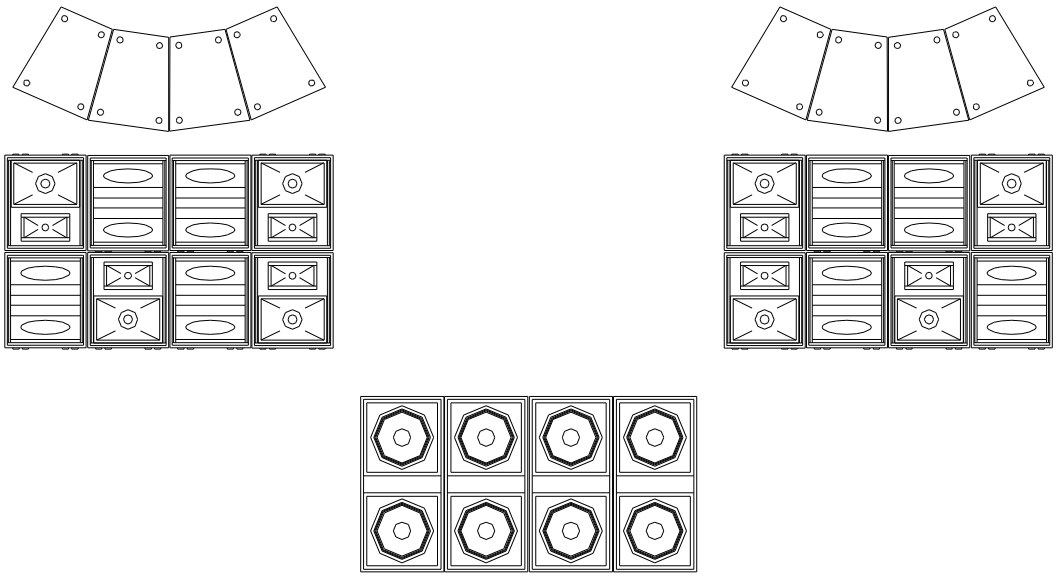
Or:



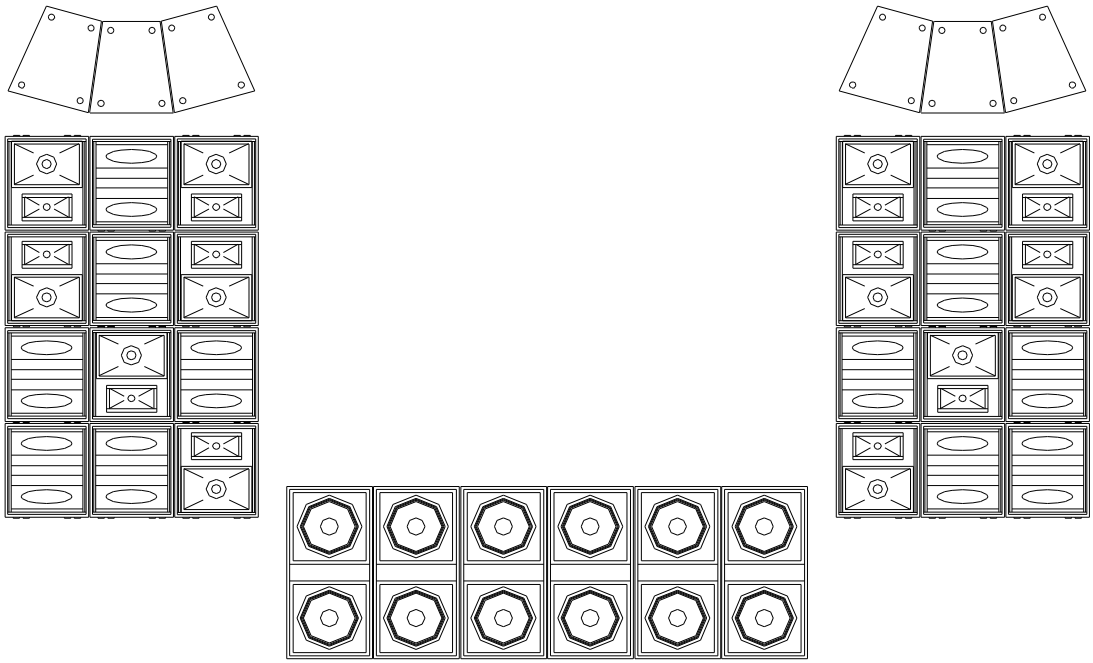
More powerful systems for big events:



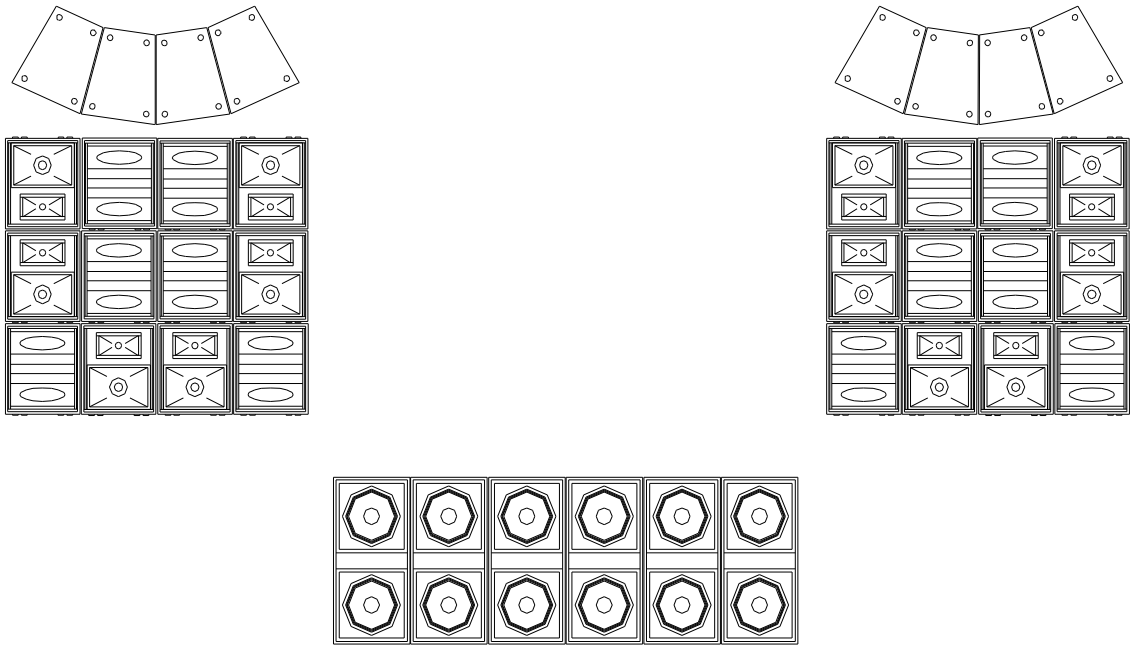
Or:



Also for bigger events:



Or also:



## 10.- GUARRANTEE EXTENSION:

All Musicson products are guaranteed against faulty elements or defective craftsmanship. If any components generate malfunctioning of the system during the period specified in this manual, these will be exchanged or repaired without cost of craftsmanship (subject to approval of the technical department of Musicson). The period during which the systems are covered by this guarantee is 12 months from the date of purchase by the user.
Musicson always covers this guarantee within its own premises (C. / Dr. Mora Sanz s/n, Mislata, Valencia, Spain), or by an authorised technical service. All transportation costs that arise from this guarantee are at the expense of the client.

THIS GUARRANTEE DOES NOT COVER:

A. - External damage, due to the handling and transport of the enclosures and flight cases.

B. - Defective functioning due to misuse or abuse of the systems or any use different to those specified in this manual.

C. - Repair done by unauthorised personnel or any other person not pertaining to Musicson or its authorised technical services.