S-218 Subwoofer

Product User Manual
v1 November 2019

EM ACOUSTICS

LOUDSPEAKERS REDEFINED

Contents

DECLARATION OF CONFORMITY

The products contained within this manual conform to the requirements of the EMC Directive 89/336/EEC, amended by 92/31/EEC and to the requirements of the Low Voltage Directive 73/23/EEC amended by 93/68/EEC.

EMC Emission	EN55103-1:1996
Immunity	EN55103-2:1996
Electrical Safety	EN60065:1993

RECYCLING

This product and its packaging constitute the applicable product according to the WEEE directive. Please ensure that at the end of the working life of this product, it is disposed of sensibly in accordance with local and national recycling regulations. The packaging supplied with this product is recyclable. Please retain all packaging, however if disposing of this packaging please ensure that you comply with local recycling regulations. These products also all comply to the RoHS Directive 2002/95/EC.

1.0 - Introduction

Thank you for purchasing the S-218 subwoofer from EM Acoustics. This product has been designed and rigorously tested to give you the utmost in sonic performance and many years of reliable, trouble-free operation. Please take the time to read this user manual thoroughly to ensure you get the best performance from your system and to ensure you set it up correctly and safely. If you have any questions or are in any doubt whatsoever about any aspect of your new product, please do not hesitate to contact us directly or your local EM Acoustics representative.

The S-218 is a high-power reflex subwoofer, intended for a wide variety of low frequency applications in medium to large applications. The S-218 is equally at home in permanent installations as well mobile applications due to its rugged construction. A pair of state-of-the-art 18" high-excursion neodymium drive units allows a surprising amount of SPL and low frequency extension from a compact and lightweight cabinet.

This manual contains all the information you should need on topics of set up, amplifier connection and basic service. If you feel we have missed anything, or you have a question not covered by this manual, please visit our website www.emacoustics.co.uk and send us a message or give us a call – we're only too happy to help.

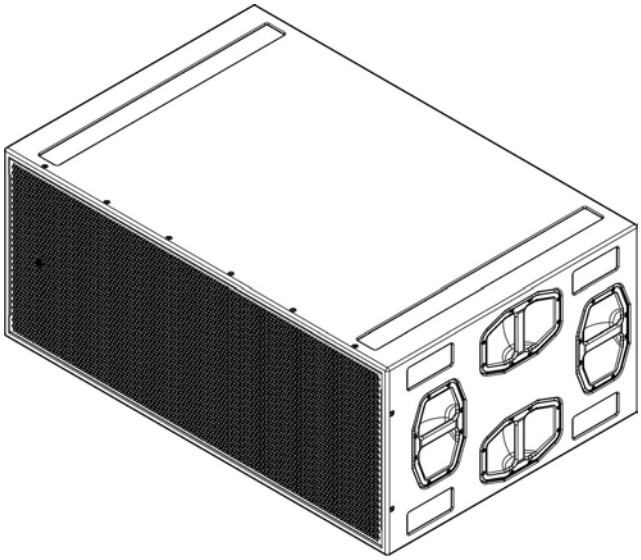
Unpacking

Please take care when unpacking your loudspeaker system. Once unpacked, please inspect each enclosure thoroughly for any transit damage and in the case of any damage please notify your carrier immediately. It is the responsibility of you, the consignee, to instigate any claim. Please retain all original packaging in case of future re-shipment.

2.0 – S-218 Subwoofer

S-218

High-power reflex subwoofer



FEATURES & BENEFITS

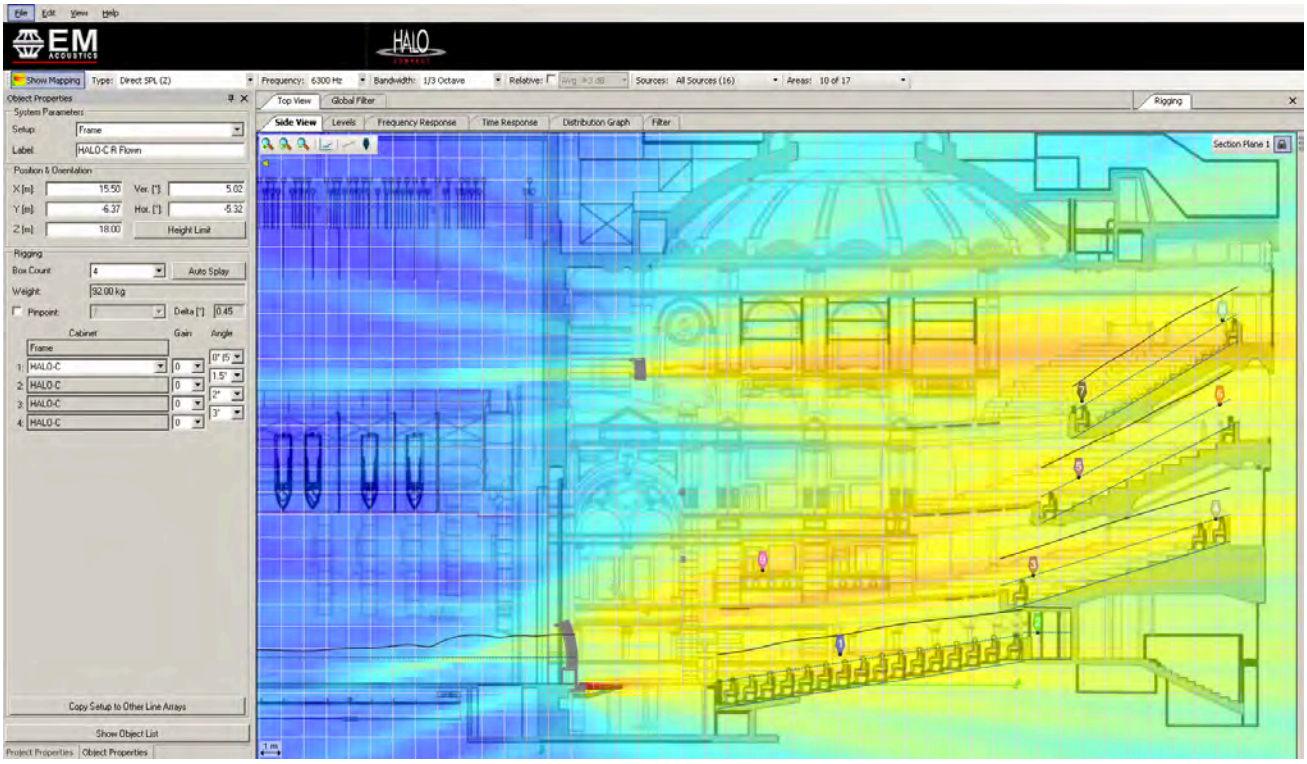
- Signature EM Acoustics "maximum headroom" design approach ensures consistency of performance regardless of SPL level.
- Enclosure coated with 3-step polyurethane process - ensuring the cabinets are not only weather resistant but more resilient to impact damage.
- Various features and accessories for easy moving & handling.
- Tour grade castor set included.
- Single amplifier channel required.

KEY SPECIFICATIONS

ENCLOSURE TYPE:	High-power reflex subwoofer
DRIVE UNITS:	2 x 18" neodymium LF drive units
FREQUENCY RESPONSE:	28Hz - 150Hz +/-3dB
NOMINAL DISPERSION1:	omniirectional
MAXIMUM SPL:	137dB continuous, 143 dB peak
NOMINAL IMPEDANCE:	2 ohms
DIMENSIONS (HxWxD):	550 (21.7) x 1300 (51.2) x 850 (33.5) mm/(ins)
NET/SHIPPING WEIGHT:	106/108kg (233.2/237.6lbs)

3.0 – Simulation

Ease Focus 3



For acoustic reasons it is advised that users familiarize themselves with Ease Focus 3 – this system provides the user with accurate simulations for setting up S-218 subwoofers.

Ease Focus 3 can be downloaded for free from the AFMG website at http://focus.afmg.eu and is currently available as a stand-alone application for Windows (XP or Higher) only. It can also be downloaded directly from the EM Acoustics website with all the current product files embedded.

Tutorials for Ease Focus 3 are available from with the application itself.

For training on the design and implementation of S-218 subwoofers including the specific use of Ease Focus 3, please contact your local distributor.

4.0 - Safety Considerations

General Considerations in use

Loudspeaker systems are potentially dangerous objects if used incorrectly. Please ensure that you read this section fully, and contact EM Acoustics or your local dealer should you be in any doubt over correct operation procedures.

Personal Injury

Never stand in the immediate vicinity of loudspeakers when in use at high level. Professional loudspeaker systems are capable of producing sound pressure levels which can cause permanent damage to human hearing. Levels in excess of 90dB can cause hearing damage if people are exposed to them over a long period of time, so care and attention must be used for both staff and audience members.

When deploying loudspeaker systems on the ground or when flown, please take careful note of the following important safety considerations:

- Only use accessories and flying hardware supplied or approved by EM Acoustics for flying or transporting loudspeaker systems. Pay close attention to specific instructions, especially those considering maximum load capabilities as detailed in the appropriate user manuals or on the legend labels on the accessories themselves.
- Ensure all additional accessories, fasteners and secondary safeties are of an appropriate size, working load limit and safety factor.
- All loudspeakers and accessories should be regularly inspected for signs of wear and tear, and any damaged parts should be replaced.
- All load bearing parts and assembly bolts on accessories should be regularly checked to ensure they are tight and not worn.

Ground Stacking

- Ensure that the floor or stage surface can withstand the weight of the system.
- Wherever possible, avoid high stacks and use ratchet straps to secure loudspeakers together. Please also remember that vibrations from subwoofer systems can shake other loudspeakers out of place, which may present a toppling hazard. The use of ratchet straps and non-slip material is recommended to prevent this.

Rigging and Suspension

Please see Chapter 5 for further information on the detailed rigging options for your loudspeaker system.

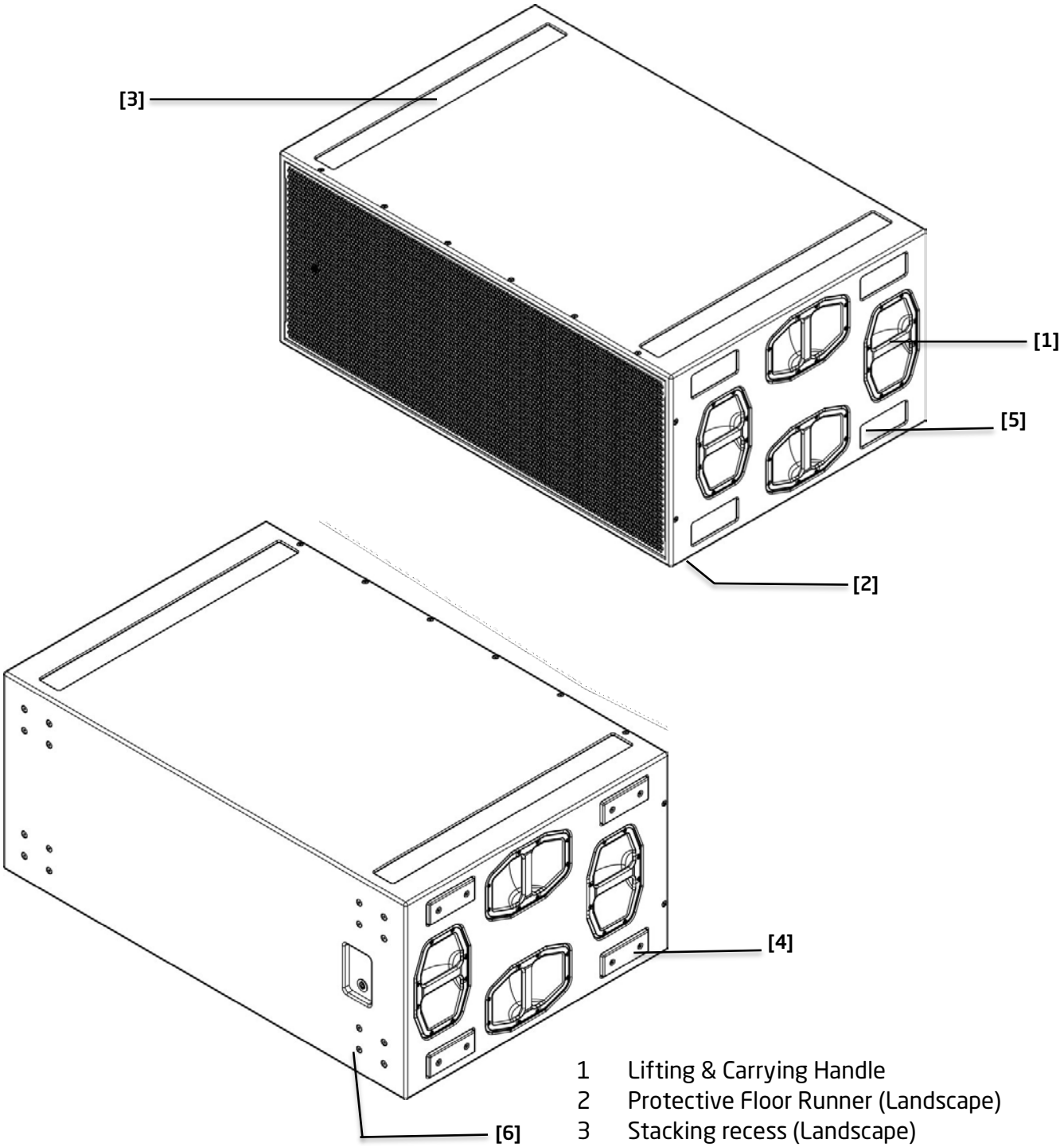
WARNING: The overhead suspension of loudspeakers is a very serious issue with potentially lethal consequences should anything go wrong. Rigging should only be carried out by experienced personnel following safe working practice. Should you be in any doubt whatsoever, please contact your local dealer who will be able to refer you to a suitable rigging company.

Material Damage from Magnetism

Loudspeakers produce a static magnetic field at all times – even when not in use. Certain devices are susceptible to external magnetism, and as such a safe distance should be maintained to prevent damage. It is recommended that a safe distance of 0.5m (1.5ft) is maintained from loudspeakers when stored, transported and in use, from devices such as computer hard drives, magnetic media, bank cards to remove the risk of corruption. Larger distances may be required for some older cathode ray tube displays.

5.0 – Loudspeaker Hardware

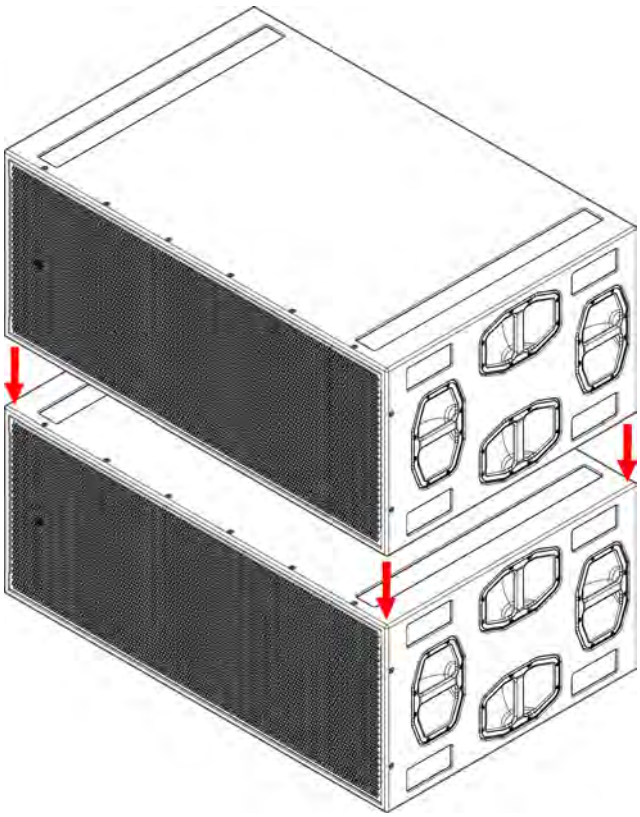
5.1 – S-218 Cabinet Hardware Overview



1 Lifting & Carrying Handle
2 Protective Floor Runner (Landscape)
3 Stacking recess (Landscape)
4 Protective Floor Runner (Portrait)
5 Locking recess
6 Castor attachment point

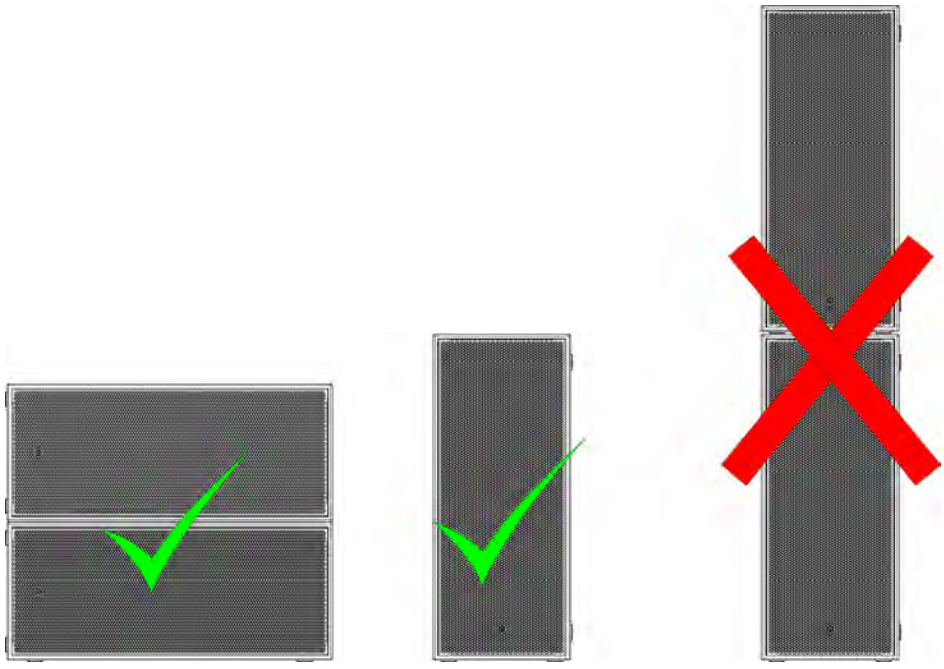
5.2 – Stacking S-218 subwoofers

The S-218 subwoofer has two protective plastic runners on the underneath, and matching recesses in the top face of the cabinet. When stacking S-18 subwoofers, this provides a neat and clear way of creating a tidy stack.



PLEASE BE AWARE THAT STACKS SHOULD ALWAYS BE PLACED ON LEVEL GROUND, AND STRAPS OR SIMILAR SHOULD BE USED TO SECURE THEM.

There are also runners on one end to facilitate using the subwoofer end-up. S-218 subwoofers should **not** be stacked on top of each other in this way. The small recesses in the opposite end are to ensure you can position stacks of landscape S-218 directly beside each other.

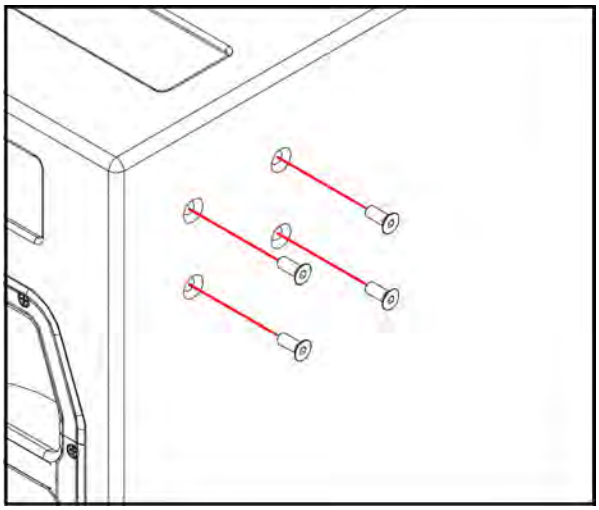


5.5 - Fitting castors

The S-218 is supplied with a set of four tour-grade castors which can be fitted for ease of movement. The carton should contain:

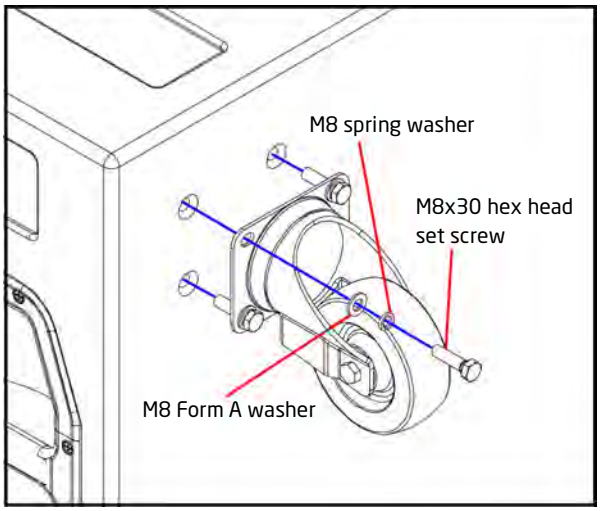
4pcs 32 x 100mm heavy duty castor
17pcs M8 x 30 hex head set screw
17pcs M8 Form A (flat) washer
17pcs M8 spring washer

Step 1.



Using a 5mm Allen key, remove the 16 M8 x 20 countersunk socket machine screws on the rear panel. Ensure that all the threaded fittings inside the cabinet are still intact and the threads are clear before proceeding.

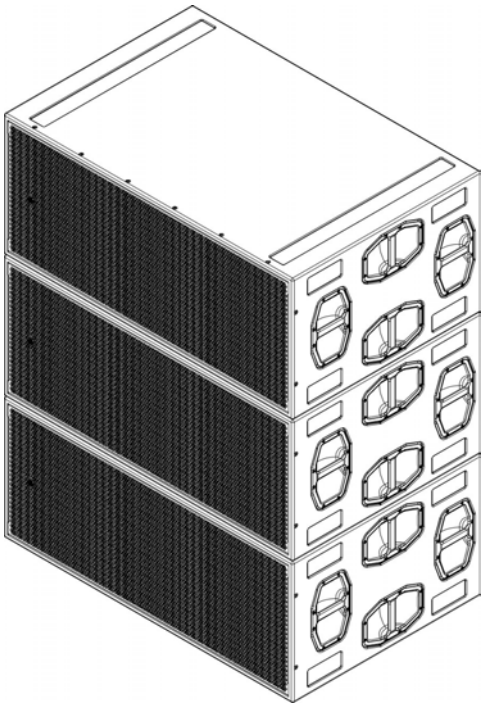
Step 2.



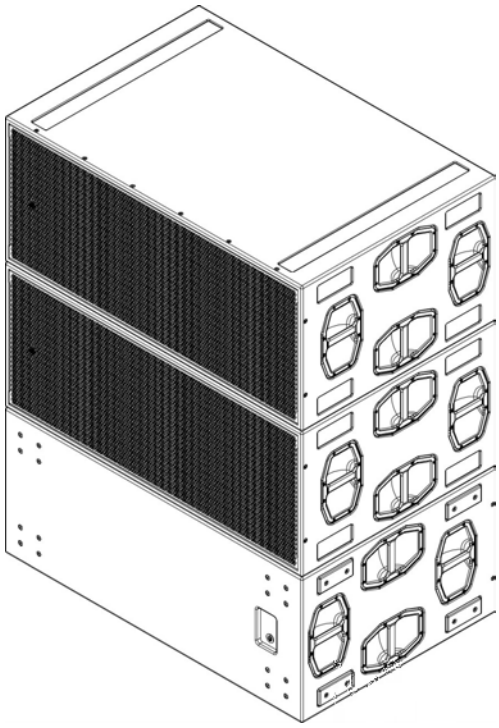
Fit each castor to the rear of the cabinet, ensuring all four bolts are started in their threads before tightening completely. The Form A (flat) washer should be in contact with the castor frame, and the spring washer should be between the flat washer and the bolt head.

5.6 – Cardioid Use

The S-18 feet and recess locations are symmetrical front-to-back, so subwoofers can be reversed to create cardioid arrays. Simply assemble the subwoofer stack or flown column as normal but reverse every third subwoofer. The stack of subwoofers should be secured with ratchet straps or similar for safety.



Standard subwoofer column
All subwoofers forward



Cardioid subwoofer column
One subwoofer in three reversed

For guidance on correct cabling for cardioid subwoofer arrays, see Section 6.2.2 of this manual.

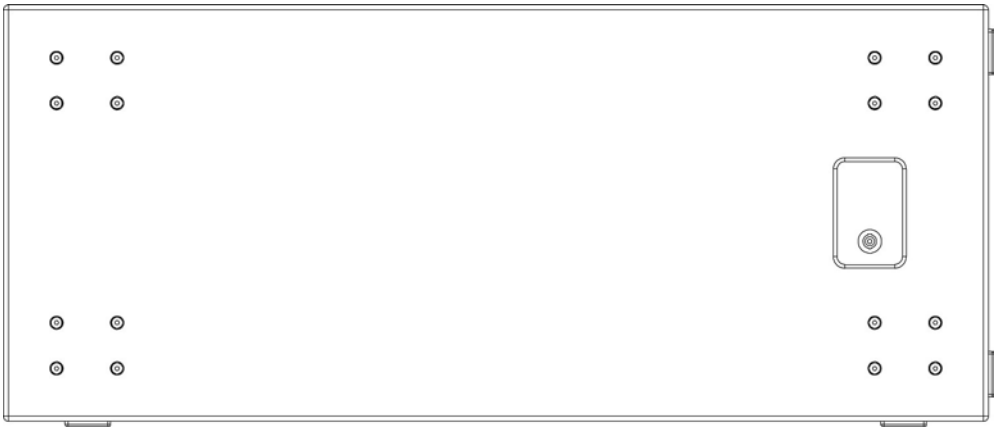
6.0 – Powering the System

The S-218 subwoofer can be powered from any amplifier & DSP combinations with the relevant high & low pass filter, and limiter settings. However, due to the self-contained nature of the package, the use of DQ Series advanced system amplifiers is highly recommended. The use of DQ Series amplifiers provides a neat and flexible system that will encompass all requirements for the system to function correctly, as well as providing user control for room EQ and system alignment.

6.1 - Amplifier and Processing Requirements

6.1.1 - Connections

The S-218 requires only a single amplifier channel. Inputs to the S-218 enclosure are on a single Neutrik SpeakON NL4 as illustrated below.



Two-core cable should be used for connecting S-218 subwoofers, and the connections are as follows:

SpeakON connection	1+	1-	2+	2-
Drive unit connection	LF +	LF -	N/C	N/C

6.1.2 - Connector Options

The ST-218 is supplied as standard with a single NL4TMP connector, which forms an IP54 rated connection when used with the STX series of SpeakON cable connectors. For more demanding environments, S-218s can be supplied with other options by special order – please contact EM Acoustics to discuss your requirement.

6.1.3 – Amplifier Requirements

The S-218 is a very powerful subwoofer, making use of some of the most advanced drive units available in the industry today. It is good practice to ensure that your amplifier can deliver at least double the RMS power handling of the loudspeaker to ensure full headroom, and as such the amplifier requirement is:

Product	RMS Power Handling	Recommended Min. Amplifier Power
S-218/ST-218	2500W @ 2 ohms	5000W @ 2 ohms

All of the DQ Series advanced system amplifiers can be used to power the S-218, however the DQ6 and DQ10 are lower power models and as such will not provide maximum power for the subwoofer.

The following table shows the maximum number of ST-218 that can be connected per channel on the various different amplifiers:

Amplifier	Max ST-218 per channel
DQ6	1*
DQ10	1*
DQ20	1

* - The DQ6 and DQ10 do not provide sufficient power for maximum headroom for the S-218 and as such should only be used in lower SPL environments.

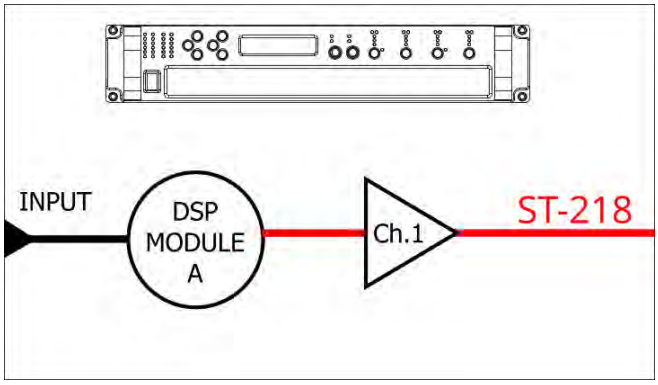
6.1.4 – Processing Requirements

The S-218 requires active high and low pass filters, and appropriate limiter settings. If not using DQ Series amplifiers, or the DSC48 Digital System Controller, then a suitable DSP system must be used in conjunction with your S-218 to prevent damage to the subwoofer. Check the EM Acoustics website for the most up-to-date DSP settings for the S-218.

6.2 - Presets and Settings

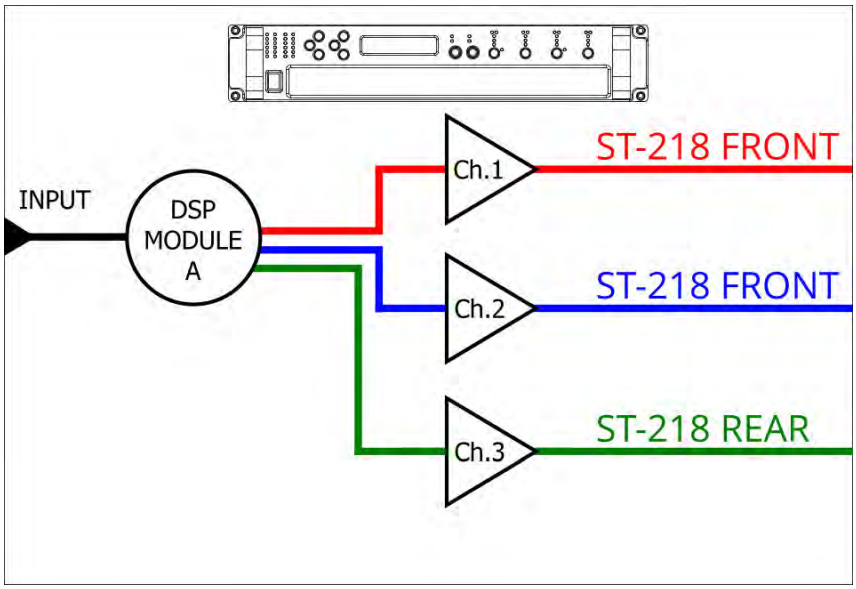
6.2.1 – Standard S-18 Preset

S-218/ST-218 subwoofers require only a single amplifier channel, and as such the preset recalled will only require one output from your DQ Series amplifier.



6.2.2 – Cardioid Array Preset

The S-218/ST-218 can be used to create cardioid arrays as detailed in chapter 6 by ensuring that one in three subwoofers are physically reversed, and the appropriate S-218/ST-218 Cardioid preset is loaded into the amplifier. This preset requires three amplifier channels.



6.2.3 - Geometric Delay

Appropriate delay will need to be applied to account for physical location differences between different elements of your system – for example time-aligning subwoofers to the main system. The use of SMAART or similar can make this task a great deal simpler and faster.

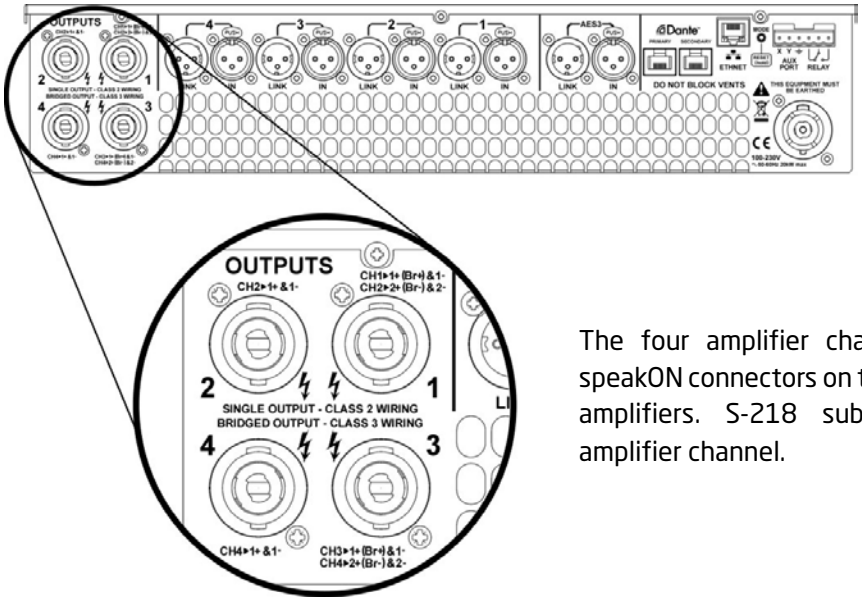
6.2.4 - Applying EQ

The presets are intended to be a starting point for your system and will almost certainly require tuning on-site dependent on room characteristics, the rest of your system design and the system voicing you are aiming for. The S-218 is designed with a significant amount of system headroom, so applying EQ is perfectly acceptable.

6.3 - Use with the DQ Series Advanced System Amplifiers

The S-218 will perform best when using DQ Series advanced system amplifiers, as not only are they state-of-the-art amplifiers, but the onboard DSP provides appropriate high/low pass filter settings and limiters to get the best from your subwoofers. Please refer to the DQ Series User Manual for detailed information on using the amplifiers and the System Engineer software.

6.3.1 - Connections



The four amplifier channels appear on four speakON connectors on the rear of the DQ Series amplifiers. S-218 subwoofers require one amplifier channel.

6.3.2 - Preset Recall

The family of S-218 presets is pre-installed on the DQ amplifiers, and as such can be used following the normal preset recall procedure. The S-218 and it's flyable variant the ST-218 utilise the same presets. The presets available are:

S-218.Sub	Standard S-218/ST-218 subwoofer preset
S-218.Card	Cardioid Array S-218/ST-218 subwoofer preset

As mentioned above, these presets are intended to be a starting point and additional work may be required depending on the venue, the style of content and the end result you are looking for.

6.4 - System Connectivity

6.4.1 - Cable Length and Specification

All cables add to the system impedance, and as such careful selection is required depending on your amplifier setup and overall system impedance. Cables with a cross sectional area of less than 2.5mm^2 should not be used. Recommended maximum cable lengths are given below:

Conductor Area	Maximum Recommended Cable Length		
	2 ohms	4 ohms	8 ohms
2.5mm^2 (14 AWG)	15m	30m	60m
4.0mm^2 (12 AWG)	20m	40m	80m
6.0mm^2 (10 AWG)	30m	60m	120m

7.0 – Servicing Information

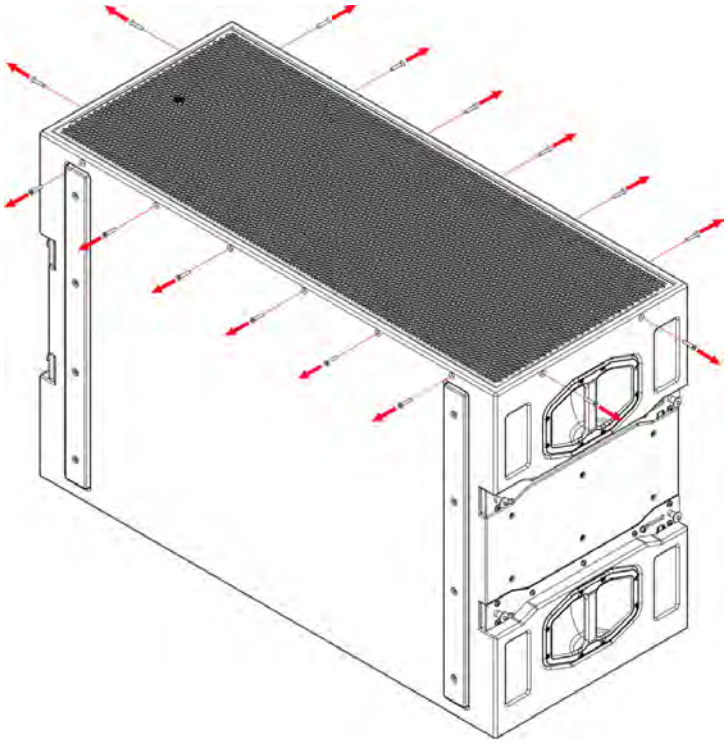
All S-218 components can be removed for service purposes if required, using the minimum of tools.

DRAWINGS ILLUSTRATE THE ST-218 FLYABLE VERSION, BUT THE SERVICE DETAILS ARE IDENTICAL BETWEEN THE S-218 AND ST-218.

7.1 – S-218/ST-218: Removing the grille

TOOLS REQUIRED: 4mm Allen key

1. Lie the enclosure on its' back and remove the sixteen M6x30 countersunk socket screws using a 4mm Allen key, and then lift the grille clear of the cabinet.

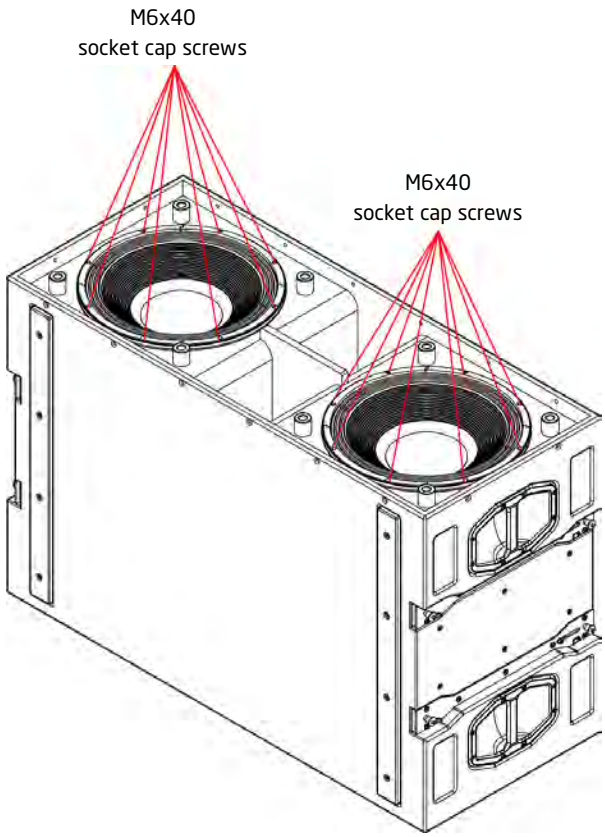


2. To replace the grille, position the grille on the front of the S-218 (logo badge should be on the left of the enclosure when in a flown configuration) and ensure the threaded fittings on the grille are lined up with the mounting holes. Replace each of the sixteen M6x30 countersunk bolts and ensure all machine screws are started in their threads before beginning to tighten. Ensure they are all tightened evenly so that the grille sits straight and flat and does not rattle.

7.2 – S-218/ST-218: Removing the drive units

TOOLS REQUIRED: 5mm Allen key

1. Complete step 7.1 above to remove the grille.
2. Using a 5mm Allen key, remove the eight M6x40 socket cap screws that secure each drive unit. Ensure that you remove the spring washers from the recesses as well as the machine screws.



3. Lift the drive unit clear of the mounting hole and disconnect the two cables – note the polarity for reconnection (red to positive, black to negative).
4. To replace the drive unit, first sit a fresh gasket around the drive unit hole, ensuring that the holes line up with the cabinet mounting holes. Reconnect the cables to the drive unit (note the red cable goes to the positive (red) terminal, and the black cable goes to the negative (black) terminal on the drive unit) and then sit the drive unit into its mounting location, ensuring that the mounting holes line up.
5. Replace the M6x40 socket cap machine screws with their spring washers and ensure all machine screws are started in their threads before tightening. Tighten opposing bolts, working around the drive unit until all bolts are appropriately tightened.
6. Replace the grille as described above.

Appendix A – Technical Specifications

S-218 large format flyable subwoofer

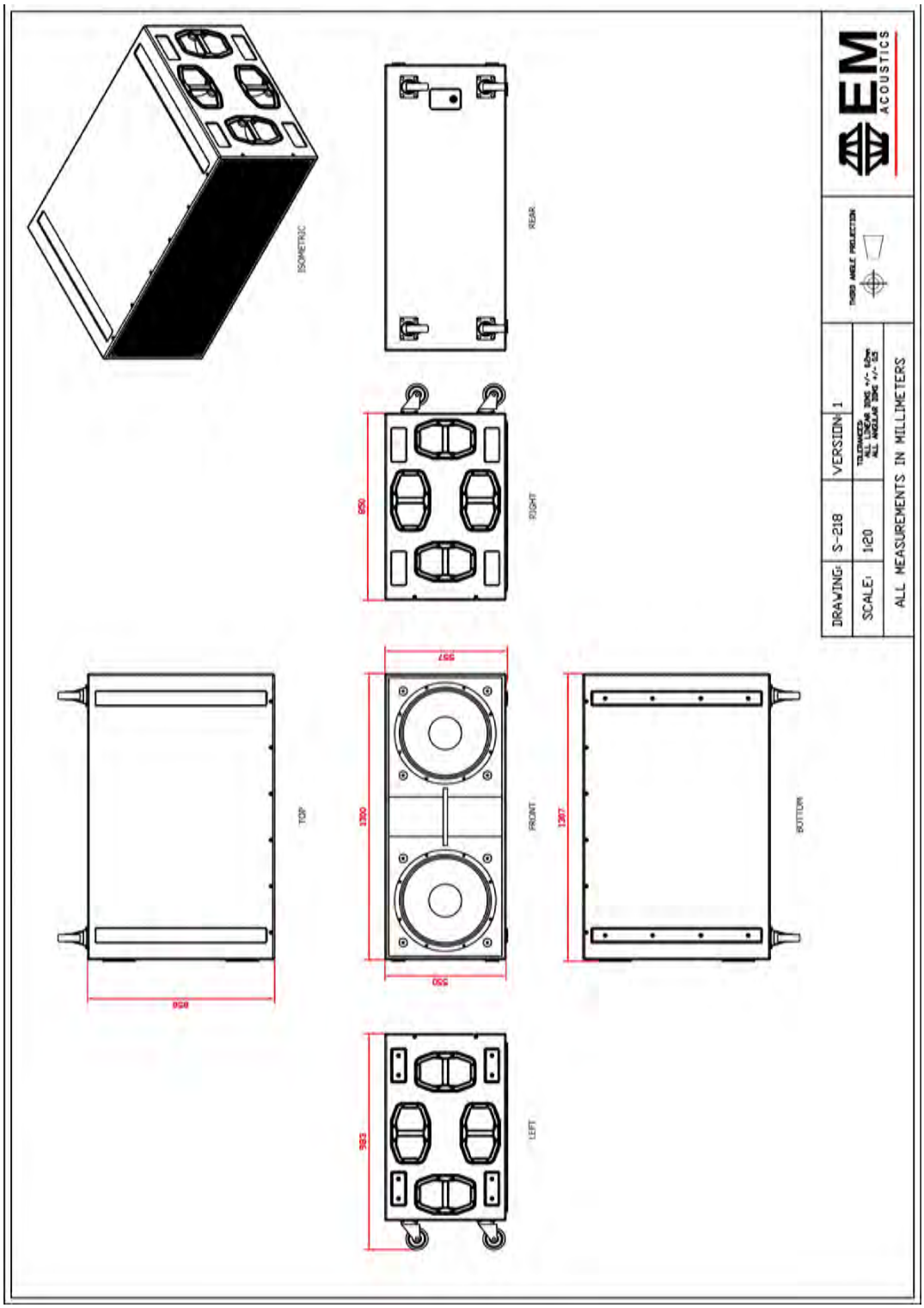
Dimensions (HxWxD) :	550 x 1300 x 850mm (21.7" x 51.2" x 33.5")
Net/Shipping Weight:	106kg/108kg (233.2/237.6lbs)
Frequency Response (+/- 3dB)[1]:	28Hz – 150Hz
Dispersion[3]:	Omnidirectional
Drive Units:	2 x 4.5" (115mm) voice coil 18" (457mm) neodymium LF drive units
Power Handling:	LF: 2500W RMS, 5000W program
Maximum SPL:	137dB continuous, 143dB peak
Nominal Impedance:	2 ohms
Crossover:	External active
Enclosures per amp channel:	DQ6: 1* DQ10: 1* DQ20: 1
Connectors:	1 x Neutrik SpeakON™ NLT4MP
Enclosure:	18mm (3/4") multi-laminate birch plywood, rebated, screwed and glued. Finished in polyurethane textured finish
Rigging & Hardware:	8 flush handles, touring runners & stacking recesses. Tour-grade castors.
Grille:	Mesh-backed perforated stainless steel
Options:	Colours/extended weather protection
Accessories:	TC-S218 single enclosure padded transit cover

* - The DQ6 and DQ10 do not provide sufficient power for maximum headroom for the ST-215 and as such should only be used in lower SPL environments.

Notes on measurement conditions:

[1]Measured on-axis at 2m in an anechoic environment and referenced to 1m. [2]Measured in half-space at 2m with 4W sine wave input and referenced to 1m. [3]Nominal dispersion, measured in an anechoic environment and averaged over stated bandwidth. [4]Calculated and verified by subjective listening test of familiar program material.

Appendix B – Technical Drawings



Appendix C - Spare Parts List

Order Code	Description
01A022	DU-1802 replacement 4 ohm 18" LF drive unit
04A024	RFG-S218 replacement grille/fabric for S-218/ST-218

Appendix D – Warranty Information

Limited Warranty

This EM Acoustics loudspeaker product is warranted to the original end-user purchaser and all subsequent owners for a period of **five (5) years** from the original date of purchase.

Warranty Coverage

This warranty covers defects in materials and workmanship. It does not include:

- Damage or failure caused by accident, misuse, neglect, abuse or modification by any person other than an authorised EM Acoustics representative.
- Damage or failure caused by operating the loudspeaker product contrary to the instructions contained within this manual.
- Damage caused during shipment.
- Claims based on any misrepresentation by the seller.
- Products which contain anything other than the original components (or EM Acoustics factory supplied spare parts).
- Products on which the serial number has been removed, altered or defaced.

Returning your EM Acoustics loudspeaker

Should your EM Acoustics loudspeaker develop a fault, please return it (freight prepaid) in its original packaging, along with proof of purchase to your local dealer or to:

EM Acoustics (Returns Department), Building 19.11, Dunsfold Park, Cranleigh, Surrey, GU6 8TB, UK

including a description of the suspected fault. Serial numbers must be quoted in all correspondence relating to the claim. EM Acoustics or its representatives are in no way liable for any loss or damage in transit, and hence it is recommended that the sender insure the shipment. EM Acoustics will pay for return freight should the repair be covered under warranty.

EM Acoustics' liability is to the replacement or repair (at our discretion) of any defective components, and as such are not liable for any incidental and consequential damages including (without limitation) injury to persons, damage to property or loss of use.

This warranty is exclusive and no other warranty is expressed or implied. This warranty is also in addition to – and in no way detracts from – your statutory rights as a consumer.