s))e®
AUDIOTECHNIK
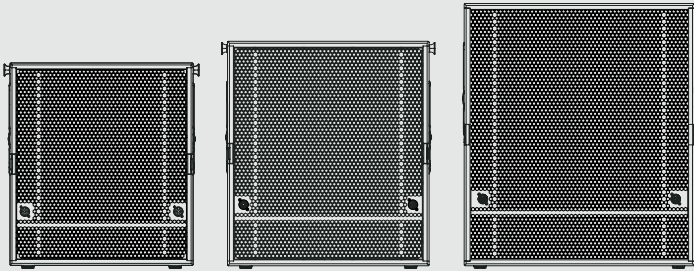
B-LINE

LOW FREQUENCIES CONTROL

MANUAL

THANK YOU FOR CHOOSING
s))e AUDIOTECHNIK®.

We are happy to be the solution for your sound reinforcement and professional sound needs.
The system you purchased is the sum of 20 years of experience as a loudspeaker manufacturer,
and more than 40 years as a speaker designer. It is the sum of German precision and Chinese
efficiency, which ensures a high-quality product that will last you for the long-term.

Please, take the time to carefully read this manual and follow its instructions. It will allow you to get the
most out of your product under safe operating conditions and suggest some care instructions leading
to long-term endurance. Keep this manual in a safe place for further reference!

If you find any mistakes or have further questions or suggestions, please contact us at
info@se-audiotechnik.de.

For more information about **SE AUDIOTECHNIK®** products, visit our website **www.se-audiotechnik.de**.
There you will also find the latest updates to manuals, firmware and technical documents for additional
support.

D

EN

中文

LIST OF CONTENTS

s)))e˚ AUDIOTECHNIK

D

EN

中文

IMPORTANT **SAFETY INSTRUCTIONS**

GRAPHICAL SYMBOLS IN THE PRODUCT

The lightning bolt triangle is used to alert the user to the risk of electric shock.

Symbol indicating that the equipment is for indoor use only.

The exclamation point triangle is used to alert the user to important operating or maintenance procedures and instructions.

Symbol for conformity with Directive 2002/96/EC and Directive 2003/108/EC of the European Parliament, on waste electrical and electronic equipment (WEEE).

The CE mark indicates the conformity with the relevant EU directives for safety, health and environmental protection. See the Manufacturer's Declaration section.

The RCM mark indicates the conformity with the relevant Australian and New Zealand requirements for electrical safety, EMC, EME and telecommunications compliance.

The CCC mark indicates the conformity with the relevant Chinese directives for safety, health and environmental protection.

GRAPHICAL SYMBOLS IN THIS MANUAL

Symbol for important safety information related with the risk of electric shock.

Symbol for important concepts and information for a better understanding of the functioning of the product.

Symbol to alert the user about important operating or maintenance instructions.

Symbol for practical tips and ideas useful to ensure the correct use of the product and improve its operation.

The products included in this manual have been engineered and manufactured to ensure your personal safety. However, **IMPROPER USE CAN RESULT IN POTENTIAL ELECTRICAL SHOCK, FIRE HAZARD AND OTHER HEALTH RISKS**. Always follow the basic precautions listed here to avoid the possibility of serious injury or even death from electrical shock, short-circuiting, damages, fire or other hazards. These precautions include, but are not limited to, the following items in this chapter.

CAUTION
RISK OF ELECTRONIC SHOCK
DO NOT OPEN

ELECTRICAL SAFETY PRECAUTIONS

DO NOT EXPOSE ANY OF THIS EQUIPMENT TO RAIN OR MOISTURE, DRIPPING OR SPLASHING LIQUIDS. OBJECTS FILLED WITH LIQUIDS, SUCH AS VASES, SHOULD NOT BE PLACED ON THIS APPARATUS.

TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT ATTEMPT TO OPEN ANY PART OF THE UNIT. THERE ARE NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

EQUIPMENT INCLUDED IN THIS MANUAL REQUIRE AC POWER SUPPLY. TO COMPLETELY DISCONNECT THEM FROM THE AC MAINS, DISCONNECT THE POWER SUPPLY CORD PLUG FROM THE AC RECEPTACLE. THE MAINS PLUG OF THE POWER SUPPLY CORD SHALL REMAIN READILY OPERABLE.

NOISE EXPOSURE PRECAUTIONS

PRODUCTS DESCRIBED IN THIS MANUAL CAN RADIATE HIGH SOUND PRESSURE LEVELS (SPL) THAT CAN LEAD TO IRREVERSIBLE HEARING DAMAGE. SE AUDIOTECHNIK® RECOMMENDS TO RESPECT THE TIMES OF EXPOSURE TO HIGH SPL.

Noise level (dBA)	85	94	97	112	127
Max. recommended exposure time per 24 hours	8 hrs.	1 hr.	30 min.	56 sec.	1 sec.

Noise exposure recommendations according to US National Institute for Occupational Safety and Health (NIOSH).

D

EN

中文

IMPORTANT SAFETY INSTRUCTIONS

1. Keep these instructions.

2. Read these instructions.

3. Follow thoroughly all instructions.

4. Read all warnings.

5. Do not use this apparatus near water.

6. Clean only with a dry cloth. Disconnect the device from the AC outlet before cleaning.
    Do not use paint thinners, solvents, cleaning fluids, or chemical-impregnated wiping cloths.

7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.

8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus
    (including amplifiers) that produce heat.

9. Do not defeat the safety purpose of the grounding-type plug. A grounding-type plug has two blades
    and a third grounding prong. The third prong is provided for your safety. If the provided plug does
    not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

10. Protect the power cord from being walked on or pinched particularly at plugs, convenience
    receptacles, and the point where they exit from the apparatus.

11. Unplug this apparatus during lightning storms or when unused for long periods of time.

12. Use the mains plug to disconnect the apparatus from the mains.

13. Keep away from objects which may be impaired by an external magnetic field. To avoid the
    damage of equipment such as computers, video monitors and magnetic data carriers, they
    should be located at least 1 meter away.

14. Only use safety pins, attachments, accessories and adapters specified and/or provided by the
    manufacturer.

15. Refer all servicing to qualified service personnel. This is required when the product has been
    damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled
    or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture,
    does not operate normally, or has been dropped.

16. Do not insert your fingers, hands or any other foreign objects into any gaps or openings of the
    device.

17. When this product reaches its end of life, take it to a collection point designated by local authorities.
    The separate collection and recycling of your product at the time of disposal will help conserve
    natural resources and ensure that it is recycled in a manner that protects human health and
    environment.

PACKAGE CONTENTS

The packaging of the **B 15**, **B 18** and **B 21** passive subwoofers include:

-   1 **B 15**, **B 18** or **B 21** unit
-   1 B-Line user manual
-   1 QC PASS card
-   1 Warranty card

The packaging of the **B 15A** self-powered subwoofer include:

-   1 **B 15A** unit
-   1 AC power cord with powerCON® connector
-   1 B-Line user manual
-   1 QC PASS card
-   1 Warranty card

Please inspect your product packaging before unboxing it. If it has been damaged during shipping,
unbox the product and check for any visual damage before using it. Notify the shipping company
immediately and contact your SE AUDIOTECHNIK® dealer or support centre for help and assistance.

Finally, save the shipping carton as evidence for the possible claim, which can be requested only by you.
We also recommend you to keep all the packing materials and contents for any further transportation.

INTRODUCTION

The B-Line is composed of four powerful subwoofers with a broad range of sizes and capabilities. They were designed specially to optimise size and low-frequency behaviour, without sacrificing high acoustical output.

These subwoofers comprise a sophisticated adaptive port that optimises the airflow and improves their response. This technology, developed through exhaustive research, enables a lower cut-off frequency while having smaller volume. This translates into deeper and dynamic bass from a compact enclosure.

In addition, the set of accessories specially designed for the B-Line, makes their setup and transportation easier, safer and more comfortable.

The B-Line includes the following products:

- **B 15**: Passive compact subwoofer with 15" driver.
- **B 15A**: Self-powered version of the B 15 subwoofer with integrated DSP.
- **B 18**: Passive compact subwoofer with 18" driver.
- **B 21**: Passive compact subwoofer with 21" driver.

| B 15 | B 15A | B 18 | B 21 |

Figure 1. B-Line products.

INTENDED USE

These general-purpose subwoofers were conceived to extend the range of sound systems to the lowest frequencies. Their capabilities allow to create full-range line array systems from small to big setups, both for permanent installations or portable applications. They can be paired not only with other SE AUDIOTECHNIK's® products, but also with systems from other brands.

Intended to be used as ground-based subwoofers, they were designed to easily deploy cardioid and end-fire subwoofer setups, with features as front and rear connections, stable rubber feet, and top recesses for stacking.

Please, read thoroughly the Applications section for further information about setups, deployment and possibilities of the B-Line products. In addition, please refer to the M-Line and L-Line user manual for more details about the right combination of the products of these lines. These manuals can be readily downloaded from our website www.se-audiotechnik.de.

B-LINE PRODUCTS

B 15 / B 18 / B 21 PASSIVE SUBWOOFERS

The **B 15, B 18** and **B 21** subwoofers are the powerful passive models of the B-Line. These comprise single 15", 18" and 21" drivers respectively, mounted in a vented box. In addition to the speakON® connectors on the back, these passive models include two additional located on the front. This guarantees wiring flexibility and ease of use, reducing setup time even in large configurations.

Features
- Sophisticated asymmetric port for smooth and laminar flow
- Compact enclosure with deeper bass response
- Optimised to use with other SE AUDIOTECHNIK® products
- Frontal connections available for flexible connectivity
- Intelligent design for a fast and simple setup
- Improved feet for increased slip resistance
- Robust and comfortable side handles
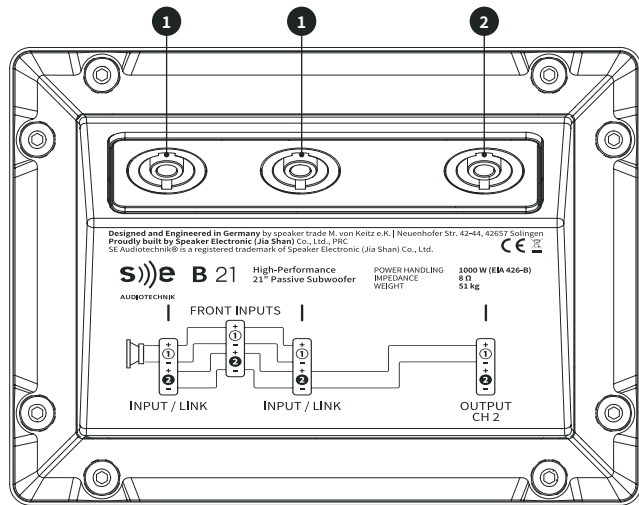- Wide range of supported applications

REAR PANEL

Figure 2. Rear panel of the **B 21** passive subwoofers. **B 15** and **B 18** subwoofers have the same panel.

1 **Input / Link 1 - 2**. Audio signal inputs and links through speakON® NL4 connectors. They are connected in parallel between them and with the two front connectors.

With the NL4 topology of these two **Input / Link** connections, it is possible to handle two signals over the 1+/1- and 2+/2- poles. Depending on the application, it can be the same signal traveling over both.

2 **Output Ch. 2**. Audio signal output through speakON® NL4 connector to pass the signal present in the 2+/2- poles of the **Input / Link** 1 and 2, and the front connectors. This signal outputs through the 1+/1- poles.

In example, this output can be used to deliver full-range signal to the top units in the system, simplifying the wiring between the amplifier and the speakers. Find more about this in the Applications section.

B 15A SELF-POWERED SUBWOOFER

The **B 15A** is the self-powered version of the **B 15** subwoofer. It consists in a single 15" driver in a vented box, powered by an updated 800 W Class-D amplifier. Same as B-Line passive models, its improved port design smooths the airflow and maximises system capability.

Integrated DSP-presets allow to load different system setups to be used with different SE AUDIOTECHNIK® products. In addition, the Directivity function enables end-fire or cardioid setups and thus, control the sound radiation in the low frequencies.

Finally, its efficient design and compact size guarantees safe and versatile placement even in outdoor environments, where an additional rain-protection cover can be used to protect the amplifier panel from light rainfall.

Features
- High SPL with deep bass and reduced enclosure size
- DSP-Presets for easy subwoofer arrays setup
- Built-in DSP and 800 W of class-D amplification
- Simple to use LCD screen and rotary encoder controller
- Improved feet for increased slip resistance
- Robust and comfortable side handles
- Wide range of supported applications
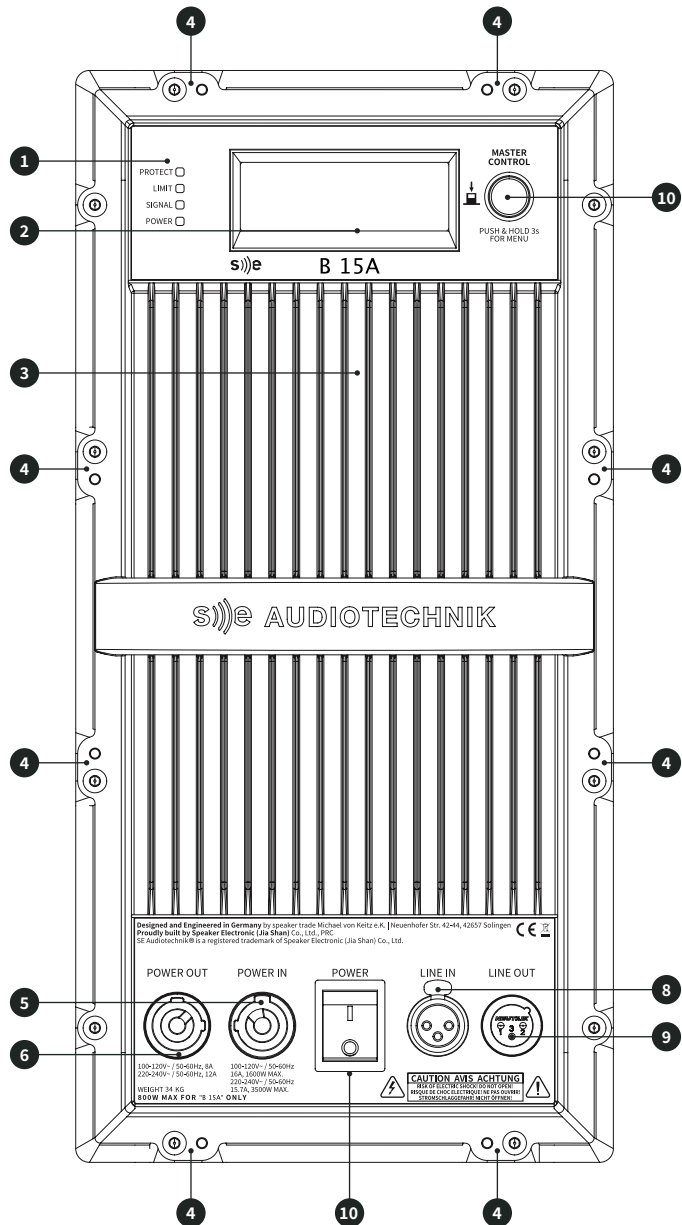- Available in black and white colours

D

EN

中文

REAR PANEL

Figure 3. B 15A rear panel.

1 Indicator LEDs:
- **Protect:** Lights red if the amplifier has short-circuited or overheated, which will be muted automatically. Upon reaching normal operating conditions, the device reverts to normal operating mode after a few seconds.
- **Limit:** Lights red when the limiter starts working. If the limiter LED lights up permanently or for longer periods, the gain level should be reduced. Failure to do so may result in a distorted sound.
- **Signal:** Lights green as soon as an audio signal is present. The input signal monitoring is performed before the Main Level controller.
- **Power:** Lights green once the system is properly connected to the mains power and switched on.

2 Alphanumeric LCD for DSP display.

3 Rear panel heatsink.

4 Mounting points for rain cover accessory.

5 **Power In.** PowerCON® type-A mains power socket. The **B 15A** subwoofer is intended for two operating voltage ranges: 100-120 and 200-240 VAC. The electrical conversion is done automatically.

6 **Power Out.** PowerCON® type-B mains power output to link power between several units in the system.

⚠ The recommended maximum quantity of units to be connected in series is 4 units for 200-240 VAC mains, and 2 for 100-120 VAC.

7 **Master control.** Rotary encoder with push button for DSP control.

8 **Line In.** Balanced line-level input with female Neutrik® XLR-3 connector to connect input signal. Maximum input level is +20 dBu.

🔧 For an optimal signal-to-noise ratio, it is recommended to input signals with a level of at least 0 dBu.

9 **Line Out.** Balanced and buffered line-level output with male Neutrik® XLR-3 connector. It can be used to link other speakers or components of the system.

10 **Power.** Switch to turn the unit on and off.

🔧 To avoid clicks and pops, turn on your PA system last and turn it off first before other connected devices. Additionally, after turning the unit off, wait for more than five seconds before turning it on again.

D

EN

中文

B-LINE ACCESSORIES

Different accessories are available to enhance the possibilities of the B-Line products. Some of them have been designed exclusively to use these subwoofers with SE AUDIOTECHNIK's® line array units, like M-F3A PRO and L 35 from the M-Line and the L-Line.
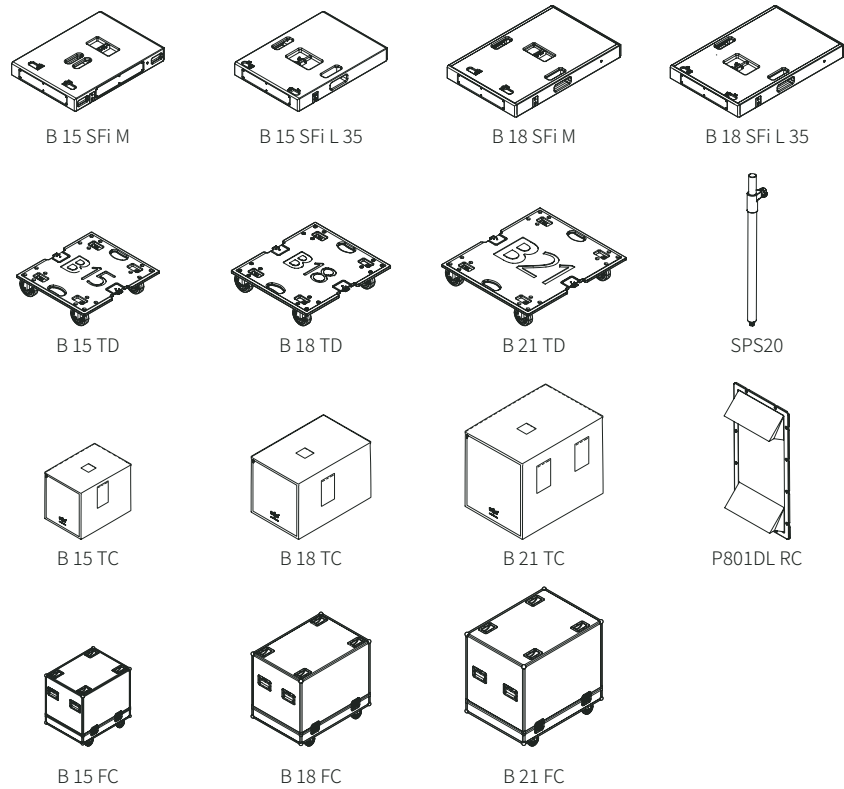

B 15 SFi M	B 15 SFi L 35	B 18 SFi M	B 18 SFi L 35
B 15 TD	B 18 TD	B 21 TD	SPS20
B 15 TC	B 18 TC	B 21 TC	P801DL RC
B 15 FC	B 18 FC	B 21 FC	

Figure 4. B-Line accessories.

- **B 15 / B 18 SFi M**: Frame for ground stacking M-Line line array units on **B 15** or **B 18** subwoofers.
- **B 15 / B 18 SFi L 35**: Frame for ground stacking L 35 line array units on **B 15** or **B 18** subwoofers.
- **B 15 / B 18 / B 21 TD**: Detachable dolly board for safe transportation.
- **B 15 / B 18 / B 21 TC**: Padded slip cover for storage.
- **B 15 / B 18 / B 21 FC**: Flight case for one subwoofer.
- **SPS20**: Pole mount with M20 thread and adjustable height.
- **P801DL RC**: Amplifier rain cover to protect the power amplifier of the **B 15A**.

Further information about the stacking frames and the right combination with M-Line and L-Line products can be found in the respective user manual of these lines. Those manuals can be readily downloaded from our website www.se-audiotechnik.de.

WIRING

B 15 / B 18 / B 21 PASSIVE SUBWOOFERS

For B-Line passive subwoofers, audio signals are input and/or passed through a speakON® NL4 connector. These wires should be connected as shown below:
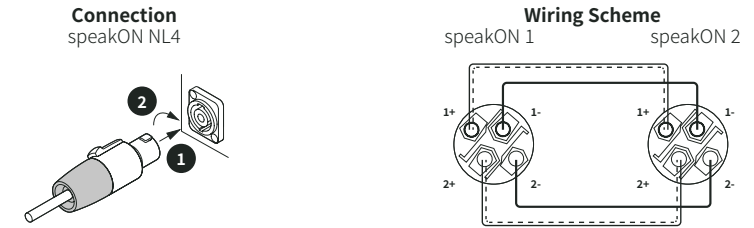

Figure 5. SpeakON® NL4 plug-in and link cable connection.

It is recommended to use cables with at least 18 AWG conductor size. For long cable lengths, the maximum conductor size is 14 AWG. Those wires must be assembled by a qualified technician.

B 15A SELF-POWERED SUBWOOFER

B 15A subwoofer use powerCON® connectors for the mains power input and link. Figure 6 shows how to plug-in and connect these wires.
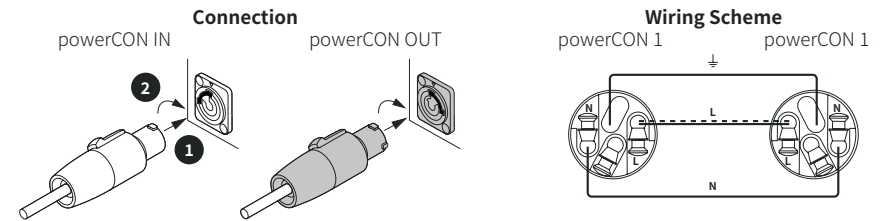

Figure 6. PowerCON® plug-in and link cable connection.

Additionally, it uses XLR-3 connectors to input and loop audio signals. They follow the next plug-in and configuration scheme:

Figure 7. XLR-3 plug-in and cable connection.

LCD PLATE AMPLIFIER

The **B 15A** subwoofer is equipped with a built-in 48 kHz/24 bit DSP processor that provides controlled signal processing and limiting. This DSP core receives audio signals through dual-range inputs which improve the SNR, and is easy to manipulate thanks to the rotary control encoder with push button, and the 4x20 symbol alpha-numeric LCD screen.

This section details the features of the DSP firmware, whose adjustable parameters and features include 5 EQ bands, delay, polarity, selection low-pass filters and directivity control. In addition, a variety of factory presets is available to easily setup subwoofer arrays and full-range systems with different products, both from SE AUDIOTECHNIK's® or other brands.

Some key cursors, symbols and considerations used throughout the menu structure are:

- The first line of each screen is the specific name or title of the given screen.
- The cursor "**>**" marks the current point of action.
- When editing preset names, the cursor "**←**" indicates deleting function.
- The symbol "*****" highlights the selection of a given preset or setting. It indicates also that the edition of a given parameter is enabled.
- The symbol "**L**" indicates the lock state of the amplifier and thus, that the editing of any parameter is not allowed. This symbol appears only when this is activated, and only in the **Overview** screen.

Figure 8 details the different menus and functions of the DSP firmware, detailed in the following subsections. Conversely, figures 13 and 27 show respectively the functions included in the **DSP Settings** and **System Settings**.
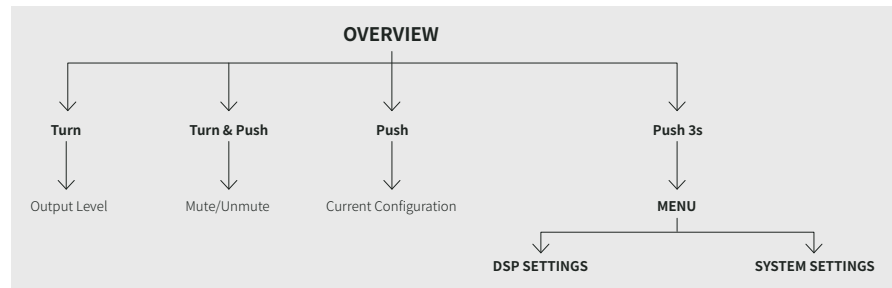

Figure 8. DSP firmware functions and menus.

OVERVIEW SCREEN

The Overview screen is the one shown by default on the amplifier LCD, during normal operation (Figure 9). It details the next information:

Figure 9. Overview screen.

- The first row shows the title of the screen and if applicable, the "**L**" letter in the top right-corner, informing the lock state of the amplifier.
- The second row shows the letters "**IN:**", followed by a numerical input level meter. The meter shows the current input level value in dBFS, with minimum "**-90**" for low or no signal. The "**>>>**" symbols show the signal strength relative to the clipping point at 0 dBFS. The readout is replaced with text "**INPUT CLIPPING!**" if the signal reaches or exceeds 0 dBFS. In such case, the screen backlight is flashing to call the attention of the user.
- The third row shows the letters "**OUT:**" which are followed by the output level meter. This meter shows current output level relative to the maximum amplifier output. If the channel is muted, the level display meters are replaced with the text "**MUTED**".
- The fourth row shows the gain reduction in dB "**GR:**" applied to the signal when the limiter threshold is reached. When the value increases, new levels appear from right to left, according with the amount of reduction applied.

Figure 10. Turning the encoder in Overview screen allows to change output gain.

D

EN

中文

From the **Overview** screen, the following options can be executed with the Master Control rotary encoder:

1. **Turn left or right** to adjust the output level (Figure 10). The output gain and the relative change in dB are shown. The output level is always recalled and is not affected by any reset function.

2. **Turn one step and push** to quickly mute or unmute the amplifier output.

3. **Push (without turning)** to open the **Active Preset Info** screen and see both the active preset and the delay currently defined (Figure 11). Clicking "**Back**" will return to the Overview screen.

   Letters "**CA**" after the name of the preset indicate that the cardioid directivity function is enabled. End-fire function is denoted as "**EF**" and normal radiation shows no additional letters.

4. **Press and hold 3 seconds** to enter the **MENU**.

```
 ACTIVE PRESET INFO
MF3AP : Default   CA
 USER DELAY:
0.64 ms       > BACK
```

Figure 11. Active Presets View.

MENU

To enter the **MENU** of the amplifier, **press and hold** the Master Control rotary knob for 3 seconds. A menu as the one shown in Figure 12 will appear on the screen.

```
MENU
> DSP Settings
  System Settings
  Exit
```

Figure 12. Main Menu.

Two submenus can be accessed from this point:

- DSP Settings: signal processing settings such as presets, filters, EQ, delay are configured here.
- **System Settings**: power amplifier operation settings are configured here.

Clicking "**Exit**" will return to the **Overview** screen.

DSP SETTINGS

DSP Settings menu is shown in Figure 13.

```
DSP Settings
>  Back
   Preset Libary
   Lowpass Filter
   Directivity
   Phase Inversion
   EQ 1
   EQ 2
   EQ 3
   EQ 4
   EQ 5
   Bypass User EQ
   Delay
   Reset User Params
   Input Sensitivity
   Exit
```

Figure 13. DSP Settings menu.

DSP SETTINGS > PRESET LIBRARY

Preset Library menu allows to load and save DSP processing presets. These are divided in two basic types:

- Factory presets: these are the default configuration for each SE AUDIOTECHNIK's® speaker intended to be used with your subwoofer, and contain the information about factory pre-defined filter and limiter settings.

  They are marked with an "**F**" letter at the right side of the preset name and their details can be found in the in the Factory Presets subsection.

- User presets: the 8 possible custom configurations the user can define, taking the factory presets as starting point and saving additional adjustments, as:
  - User High-pass filter settings
  - User Low-pass filter settings
  - User EQ settings
  - User Delay settings
  - User Phase Inversion (Polarity) settings

  They are marked with a "**U**" letter at the right side of the preset name.

As mentioned, the current loaded preset is marked with the "*****" symbol.

```
PRESET LIBARY
   Back
>  MF3A            Fº
   MF3A-P          F
   GENERAL         F
   EMPTY: USER 1   U
   EMPTY: USER 2   U
```
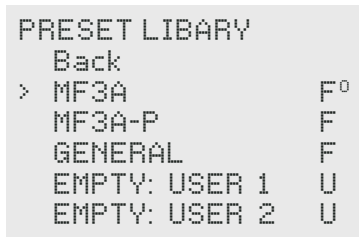
Figure 14. Preset Library menu.

The names of the presets are organised in such a way that the first symbols will always refer the loudspeaker model for which the preset has been made. This way, the user knows what factory p reset was the origin of the custom user preset.

DSP SETTINGS > PRESET LIBRARY > PRESET LOADING

To load a preset, scroll to the chosen one and click the rotary controller. A dialogue is displayed on the screen to either load preset, save preset or go back. By pressing "**Load Preset**", the preset is loaded in the DSP and the message "**Load Done**" is displayed shortly on the screen.

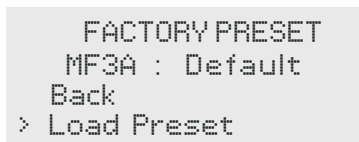To return to the Preset Library, choose "**Back**" and click the rotary controller.

```
    FACTORY PRESET
   MF3A :  Default
   Back
>  Load Preset
```

Figure 15. Loading factory preset.

DSP SETTINGS > PRESET LIBRARY > PRESET SAVING

To save a preset, choose one of the existing or empty user preset locations and click the rotary encoder. A dialogue similar to factory preset loading is displayed on the screen but in this case, an additional option is available to save the preset. Saving is only available in the user presets.
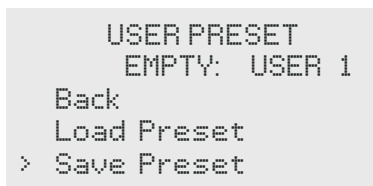
```
     USER PRESET
      EMPTY:  USER 1
   Back
   Load Preset
>  Save Preset
```

Figure 16. Saving user preset.

By clicking on "**Save Preset**", a dialogue to define the preset name is displayed. By default, the first characters of the name are the same of the current loaded preset and can these not be changed. Thus, before setting and saving any user preset, a factory preset needs to be active.

To customize the name of the new preset, the user can edit the last symbols of the default name, separated by the "**:**" symbol. To do this:

1. Set the cursor "**>**"on the name and click the encoder. The "*****" symbol appears to indicate that name edition is enabled.
2. Turn the controller to choose the character desired and fix it by pressing the button. Character deletion is performed by choosing the "**←**" symbol and clicking.
3. Complete the editing of the name by choosing the "**space**" symbol and then click twice.

To confirm the preset saving, choose "**Save**" and click the rotary controller. The message "**Save Done**" is shortly displayed on the screen. To return to the **Preset Library**, choose "**Back**" in the succeeding two screens.

```
SAVE USER PRESET
>  MF3A :_Club__←
   Back
   Save
```

Figure 17. Saving user preset.

DSP SETTINGS > PRESET LIBRARY > PRESET INFORMATION

By pressing 3 seconds on the selected preset, a dialog shows up displaying various information about it. In the latest firmware version, the **Name**, **Date**, **Version** and **Author** are displayed and shall be used to ensure that the speaker presets are up to date.
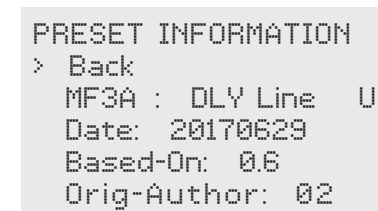
```
PRESET INFORMATION
>  Back
   MF3A :  DLY Line   U
   Date:  20170629
   Based-On:  0.6
   Orig-Author:  02
```

Figure 18. Preset information dialog.

DSP SETTINGS > LOWPASS FILTER

The DSP of the subwoofer also includes an adjustable **Lowpass Filter** and this submenu allows to change its type, slope and cut-off frequency, and to bypass it.

```
LOWPASS FILTER
>  Back
   Bypass: OFF
   Freq:  120 Hz
   Type:  LR 24dB/Oct
```

Figure 19. Low-pass Filter adjustment.

The selection of the parameters is performed as explained for the **Highpass Filter**, and the options are:
- **Bypass**: On or Off.
- **Freq**.: with 1 Hz steps, defines the cut-off frequency (-3 dB). The range available is from 80 Hz to 200 Hz.
- **Type**: - Butterworth filters: BW 6 - 48 dB/Oct.
           - Linkwitz-Riley filters: LR 12, 24, 36 or 48 dB/Oct.

DSP Settings > Directivity

Turning the control knob in the **Directivity** menu, allows to select different directivity options, to modify the radiation of the subwoofers. This function offers three options:

- Normal: no process is applied and the subwoofer behaves as an omnidirectional source. For this mode, no additional information is shown in the **Active Preset Info** screen.

- Cardioid: it implements specific DSP processes to create a cardioid directivity pattern when used properly in a subwoofer array. In this mode, the letters "**CA**" appear in the **Active Preset Info** screen.

- End-Fire: it enables end-fire configuration by selecting a desired tuning frequency with the "**Att. Freq**" parameter. This factor ranges from 40 Hz to 100 Hz, in 1 Hz steps.

  By changing the attenuation frequency, the screen shows the distance it must be between the front grilles of the subwoofers to get the effect. Finally, when this mode is implemented, the **Active Preset Info** screen shows the letters "**EF**".
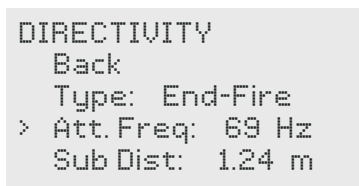
```
DIRECTIVITY
   Back
   Type:  End-Fire
>  Att.Freq:  69 Hz
   Sub Dist:  1.24 m
```

Figure 20. Example of an end-fire setup in the Directivity menu.

Find more about subwoofer arrays in the Applications section.

DSP SETTINGS > PHASE INVERSION

```
PHASE INVERSION
   Back
>  Normal            +
   Inverted
```
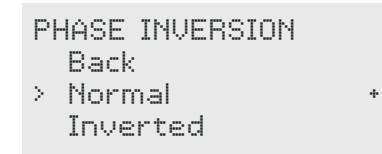
Figure 21. Phase Inversion menu.

The **Phase Inversion** submenu switches the phase of the signal. In other words, it allows to invert or "**reverse**" its polarity. Two settings are available:

- **Normal**: In phase setting.
- **Inverted**: The phase/polarity is inverted by introducing a 180° phase shift for all frequencies.

DSP SETTINGS > EQUALIZERS (EQ1 TO EQ5)

For system tuning purposes, 5 user-adjustable equalizers are available with the following parameters:

- **Bypass**: On (the EQ is bypassed) or Off (the EQ is active).
- **Type**: Low Shelf, Parametric or High Shelf.
- **Gain**: -12 to 12 dB, with 0.1 dB steps.
- **Freq**: 20 Hz to 1kHz, 1 Hz steps. Sets the center frequency for Parametric filters, or the edge frequency for Shelf filters.
- **Slope**: 0.5 to 2, with steps of 0.1. Only for Shelf filters.
- **Quality**: 0.01 to 16 with steps of 0.01, where higher Quality Factor values mean narrower bandwidth. Only for Parametric filters.

An example of a parametric equalizer with EQ1 in parametric mode is shown below.

```
EQ1
   Back
   Bypass:  ON
   Type:  Parametric
>  Gain:  6  dB
   Freq:  60  Hz
   Quality:  1.00
```
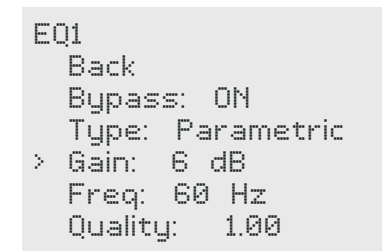
Figure 22. Equalizer menu.

To modify equalizer parameters, follow the same steps detailed in the **Lowpass Filter** section. Notice that the equalizers can be individually bypassed, their default setting.

DSP SETTINGS > BYPASS USER EQ

In order compare the response of the subwoofer with and without the applied EQ, this section allows to bypass all user EQs with a single click.
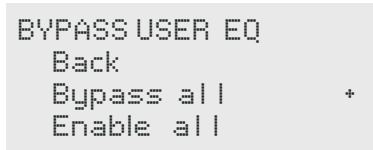
```
BYPASS USER EQ
   Back
   Bypass all        +
   Enable all
```

Figure 23. Bypass User EQ menu.

Remember that user EQs are bypassed by default and can be activated individually.

DSP SETTINGS > DELAY

The **Delay** section allows the user to apply a delay to the signal, visualise it in different units and determine the total delay. This screen has the following three sections:

- **User added delay**: This is the delay defined or added by the user depending on the specific needs of his application.
- **Preset delay**: Depending on the preset enabled or selected, the system may include an additional delay. This delay is added by the current preset and for some factory presets, it can be also edited.
- **Total DSP delay**: Total sum of "**User**", "**Preset**" and internal DSP latency. It is not an editable parameter and is only shown for information and reference.

The "**User**" and "**Preset**" delays can be defined in three different units, corresponding to the editable parameters in the first two delay sections:

- **Samples**: for 48 kHz sampling rate.
- **Time**: Delay in milliseconds (ms), referred to the 48 kHz sampling rate.
- **Distance**: Delay in meters (m), referred to **c** = 343 m/s.

When changing a parameter in any section, all the other parameters are updated with the corresponding value in their units.
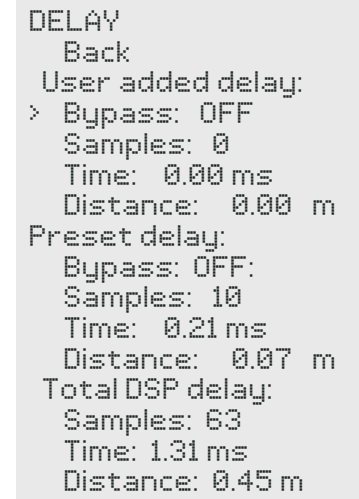
```
DELAY
   Back
  User added delay:
>  Bypass: OFF
   Samples: 0
   Time:  0.00 ms
   Distance:  0.00  m
Preset delay:
   Bypass: OFF:
   Samples: 10
   Time:  0.21 ms
   Distance:  0.07  m
 Total DSP delay:
   Samples: 63
   Time: 1.31 ms
   Distance: 0.45 m
```

Figure 24. Delay menu.

The minimum "**User**" delay available for the **B 15A** subwoofer is 1,297 samples, that corresponds to 27 ms and approximately 9.3 meters of propagation delay. Depending on the factory preset selected, the maximum available is 1,380 samples, equivalent to 28.8 ms and 9.9 meters.

DSP SETTINGS > RESET USER PARAMS

The **Reset User Params** submenu allows to reset user DSP settings such as:
- High-pass filter
- Low-pass filter
- Equalizers
- Delay
- Phase Inversion
- Bypass user EQ

The Output Gain, Input Sensitivity and the Preset selected are not affected by this function.

```
Reset  User
Parameters?
 (DLY, EQ, Filter, PHA))
   Back
>  Reset
```

Figure 25. Reset user parameters menu.

By turning the controller the options "**Reset**" or "**Back**" will appear. By choosing the first one, the message "**Reset Done**" is shortly displayed on the screen. To return to the DSP Settings, choose "**Back**".

DSP SETTINGS > INPUT SENSITIVITY

Since the **B 15A** is an all-purpose subwoofer, its sensitivity can be adjusted by the user in order to match it properly with the system chosen to use with. The screen shows the different sensitivities available in dBu or dBV, and their corresponding values in volts.
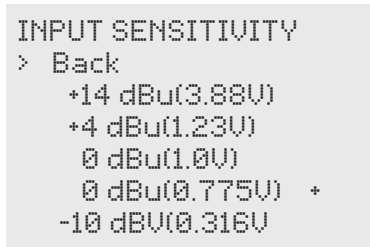
```
INPUT SENSITIUITY
>  Back
     +14 dBu(3.88U)
     +4 dBu(1.23U)
      0 dBu(1.0U)
      0 dBu(0.775U)   +
     -10 dBU(0.316U
```

Figure 26. Input sensitivity menu.

SYSTEM SETTINGS

The **System Settings** is the second submenu of the main **MENU**. It allows to set different parameters of the amplifier and access various system functions.
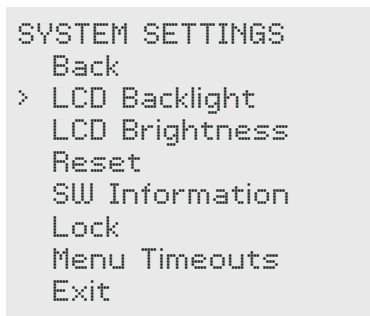
```
SYSTEM SETTINGS
   Back
>  LCD Backlight
   LCD Brightness
   Reset
   SW Information
   Lock
   Menu Timeouts
   Exit
```

Figure 27. System Settings menu.

SYSTEM SETTINGS > LCD BACKLIGHT

The **LCD Backlight** submenu configures the LCD screen's backlight settings. There are two general choices:

- **Auto Off**: Which will turn-off the backlight after 6 seconds by default. To set a different value:
  1. Set the cursor "**>**" on this option and click the encoder.
  2. Turn the controller to choose a value between 1 and 60 seconds. Pressing the button will fix this value and return the screen to the **LCD Backlight** submenu.

- **Always On**: Which sets the backlight to be always on.

```
LCD BACKLIGHT
   Back
>  Auto Off
   Always On        +
```

Figure 28. LCD Backlight menu.

SYSTEM SETTINGS > LCD BRIGHTNESS

The **LCD Brightness** screen enables to set the brightness of the LCD screen. To fix a value, follow the same procedure stated for the **LCD Backlight** submenu.

```
LCD BRIGHTNESS
   Back
>  9 [0-15]
```

Figure 29. LCD Brightness menu.

SYSTEM SETTINGS > RESET

The Reset function clears the current selections and sets the factory-default ones for the following settings:
- LCD Backlight settings
- LCD Brightness
- Lock settings

```
     RESET SYSTEM
       SETTINGS?
>  No (Back)
   Yes
```

Figure 30. Reset menu.

SYSTEM SETTINGS > SW INFORMATION

This screen shows the most relevant information about the amplifier's firmware, which can be important not only for users but also for service technicians.

- **MCU**: Software version of the Micro Controller Unit.
- **FW**: Firmware version.
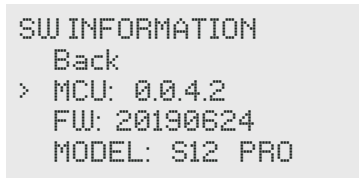- **Model**: model of your SE AUDIOTECHNIK® product.

```
SW INFORMATION
   Back
>  MCU: 0.0.4.2
   FW: 20190624
   MODEL: S12 PRO
```

Figure 31. SW Information menu.

SYSTEM SETTINGS > LOCK

In the **Lock** menu, the user can set one of the following options for the screen locking function:

- **Automatic Lock**: This option will lock automatically the amplifier's screen after 10 seconds by default. To set a different value, between 2 and 60 seconds, follow the same procedure described for the **LCD Backlight** submenu.

- **Lock Now**: This option will lock the screen instantly. The selected settings for **Automatic Lock** or **No Lock**, are kept.

- **No Lock**: This is the option set by default. It will disable the automatic lock function and make the screen always accessible.
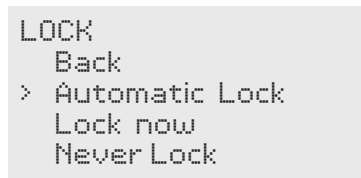
```
LOCK
   Back
>  Automatic Lock
   Lock now
   Never Lock
```

Figure 32. Screen Lock menu.

Remember that when the screen is locked, the "**L**" letter is shown in the top-right part of the **Overview** screen. To unlock the amplifier, press the controller for 3 seconds until the message "**Screen Unlocked!**" is shortly displayed on the screen. This message details the active preset as well.

SYSTEM SETTINGS > MENU TIMEOUTS

In the **Menu Timeouts**, the preferred behaviour of the main MENU can be configured according with the options:

- **On, jumping out**: After five minutes of inactivity, the display returns to the **Overview** screen.

- **Off, stay in menu**: the display stays in the current menu indefinitely. This option is selected by default.
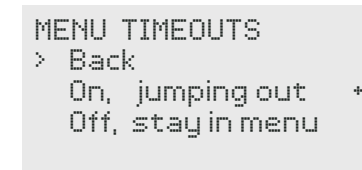
```
MENU TIMEOUTS
>  Back
   On,  jumping out    +
   Off, stay in menu
```

Figure 33. Menu Timeouts menu.

FACTORY PRESETS

The **B 15A** self-powered subwoofer always has to be operated with one of the factory presets from the **Preset Library**, which are the basis for the user presets. The presets available are:

Product	Preset Name	Description
M-F3A PRO	MF3AP	Default preset for systems comprising M-F3A PRO units.
M-F3A	MF3A	Default preset for systems comprising M-F3A units.
L 35	L35	Default preset for systems comprising L 35 units.
SMX 12A	SMX12	Default preset when using SMX 12A monitor as PA unit.
GENERAL	GENERAL	General preset for use with other products systems.

If the preset library on your product differs from the list shown above, please check your firmware version in the **System Settings** > **SW Information** menu and contact your dealer to update it.

APPLICATIONS

The B-Line was developed as a family of general purpose subwoofers to provide freedom and versatility when deploying full-range systems. Thanks to their flexibility, many different configurations can be implemented, both with other SE AUDIOTECHNIK® and with third-party products.

It is always recommended to simulate the system to use, in order to predict in advance its behaviour under the expected and needed conditions.

In addition, measurements of the system should be performed once installed, to define properly the crossover frequency between subwoofers and top units, and optimise the final response in the given environment.

STACKING SYSTEM

B 15A, **B 15** and **B 18** subwoofers can be safely and easily piled thanks to their two-point stacking system. It includes the following elements:

-   Top holes and bottom rubber feet: included to indicate the correct position, assuring a firm grip and a stable position.

-   Side locking points: male lever on the top of the cabinet and the female receptacle on the bottom. These must be manipulated as shown below:

    1. Pull the handle to release the blocking piece.

    2. Move the lever upwards to the receptacle of the unit above.

    3. Release the handle to close the mechanism. Try to move the lever downwards to verify a close and safe link.
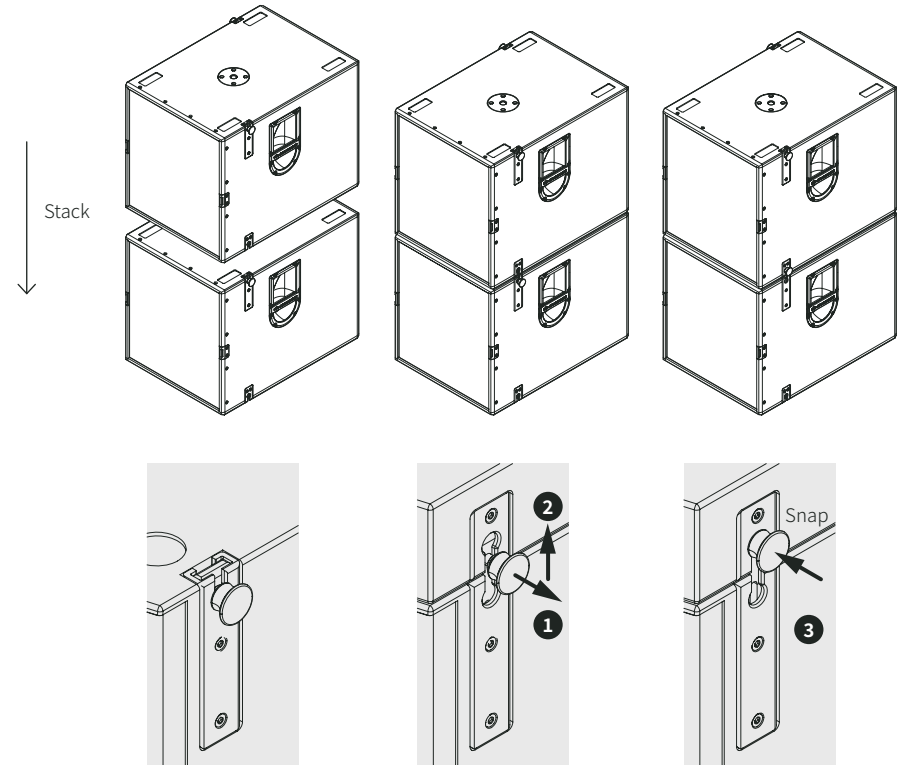

Figure 34. Linking system for stacks of **B 15A**, **B 15** and **B 18** subwoofers.

For the sake of stability and thus safety, maximum three B-Line subwoofers can be stacked together. Do not exceed these mechanical limits.

SUBWOOFER ARRAYS

The wavelength of the frequencies reproduced by any subwoofer, are usually much larger than its physical dimensions. Due to this, most of them have no control over directivity, and their radiation pattern in the pass-band is omnidirectional. In order to improve this behaviour and to introduce some directivity in the intended direction, gradient subwoofer setups are used. In addition, some of their main benefits are:

1. Reduced low frequency SPL behind the subwoofers and thus, reduced overall SPL on the stage. This helps to reduce low frequency bleed in the microphones and may improve the comfort, monitoring and performing for the musicians.

2. Reduced reflections indoors for a more homogeneous sound field, as sound is more directed towards the audience.

3. Reduced energy spill outside of the venue area, reducing noise towards the households and living areas around.

From their design, the B-Line subwoofers include different features to optimise this phenomenon, getting the best possible performance out of it. This is also reflected in the physical deployment of the setups, reducing time and resources during their placement and wiring.

Two of the main types of gradient subwoofer setups are the "Cardioid" and the "End-Fire", detailed below.

END-FIRE SETUP

In end-fire setups, two or more subwoofers are placed behind each other to introduce between them a delay, which changes the interaction of the sound in the front and the rear sides, and reduces the level in the desired direction. The cancellation of the rear sound occurs mainly around the centre or "tuning" frequency of the setup.

Usually, end-fire setups provide around 15 dB to 25 dB level reduction in the rear and are easy to set up. Their main drawback however is the space requirement, which may be a problem in some applications. That is why in most of the cases, the subwoofers are placed ¼ wavelength apart and the additional delay of ¼ wavelength is introduced electronically.

Figure 35 illustrates an end-fire setup with **B 15** or **B 15A** subwoofers 1.25 m distant. For this distance, an additional delay of approximately 3.64 ms should be added to the front subwoofer to create the highest reduction in the rear around 69 Hz, over their main operating band.
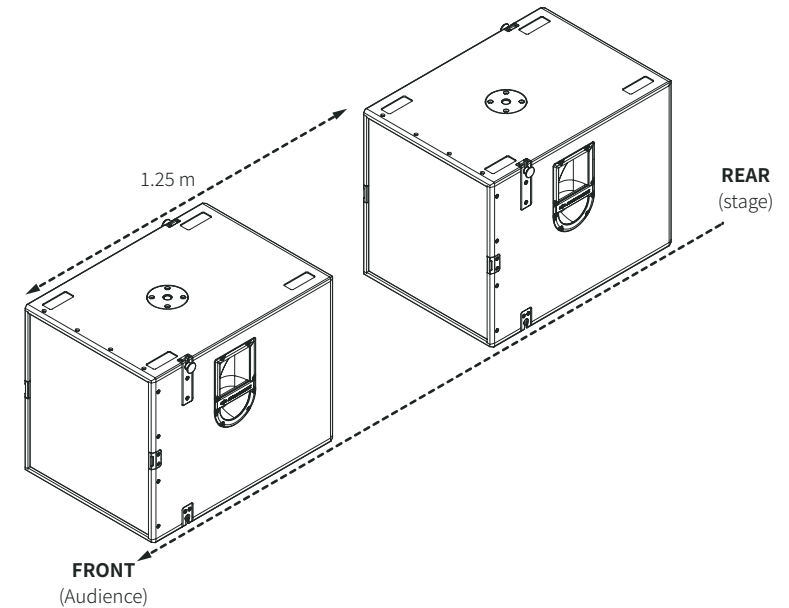

1.25 m

REAR
(stage)

FRONT
(Audience)

Figure 35. End-fire setup with two **B 15A** subwoofers centred at 69 Hz.

In **B 15A** self-powered subwoofers, the Directivity function of the DSP allows to configure this setup easily:

1. For the subwoofer placed in front of the line, enable "**End-Fire**" mode in the Directivity menu by selecting the desired centre frequency of attenuation. Below in the screen, observe the distance calculated for that frequency. This distance must match the real separation of the subwoofers from grille to grille.

2. For the subwoofer placed rear, select the "**Normal**" preset in the Directivity menu.

The distance between subwoofers is calculated at reference room temperature 20 °C, and taking the speed of sound **c** = 343 m/s.

All the additional processing like level, polarity, delay and EQ, should be done identically to all subwoofers within the end-fire setup, in order to maintain proper phase relations for directivity control.

APPLICATIONS

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中文

For the passive subwoofers, the needed delay must be applied before in the signal chain, from the mixer, an external processor or if possible, the amplifier itself. An advantage in this case, is the connection flexibility offered by the subwoofers with the front connectors they include.

Figures 36 depicts an end-fire made with two stacks of **B 18** subwoofers and figure 37 its related connection scheme. Notice how the signal is provided with a single speakON® NL4 cable from the amplifier and passed through each pair of subwoofers using link cables, simplifying the deployment of the whole setup. Keep in mind that all the connections between subwoofers are done over pins 1+/1- of the speakON® link cables.
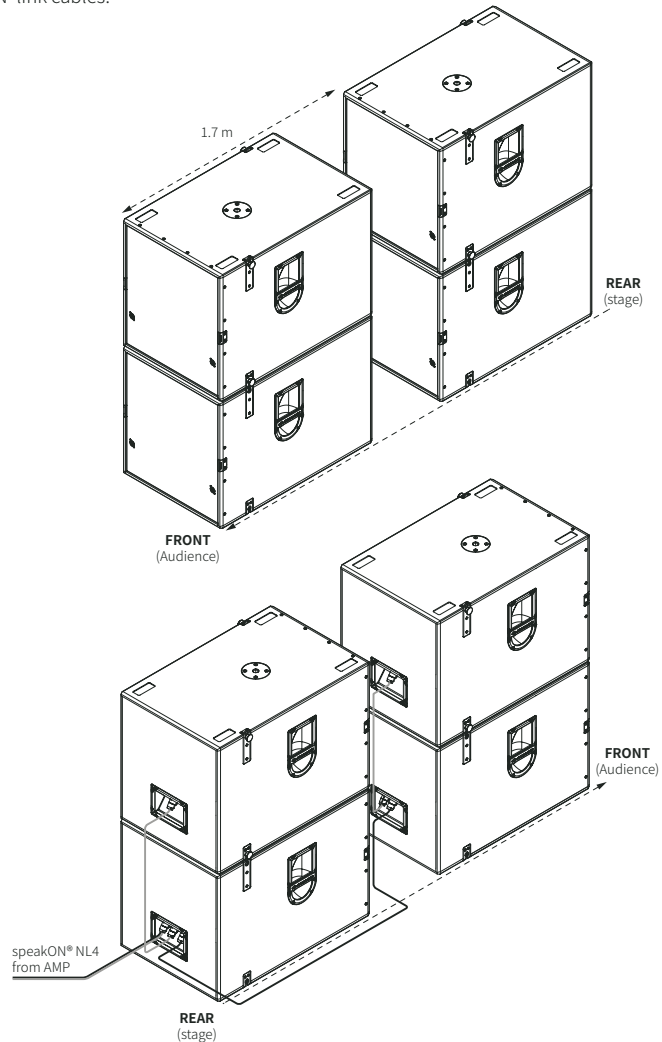

1.7 m

REAR
(stage)

FRONT
(Audience)

FRONT
(Audience)

speakON® NL4
from AMP

REAR
(stage)

Figure 36. Front (top) and rear (bottom) views of and End-fire setup of two **B 18** stacks, centred at 50 Hz due to the 1.7 m distance between them. Notice that no cables are seen from the front of the array.
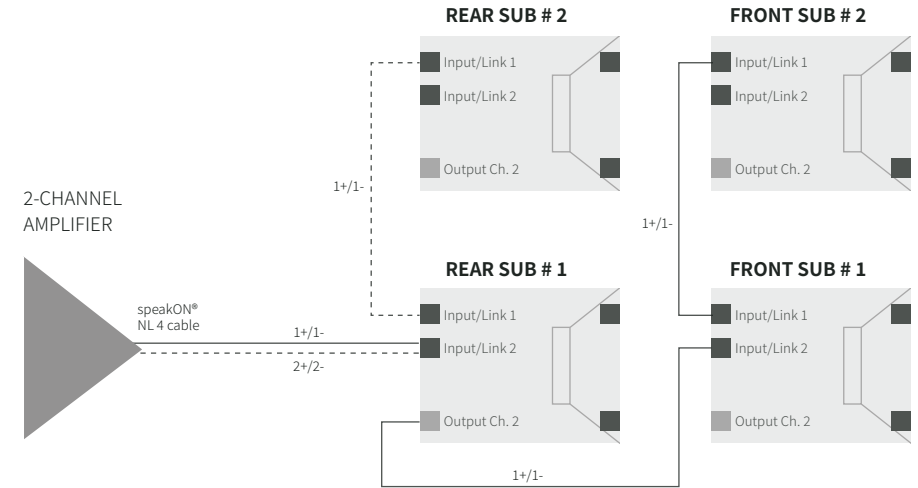

REAR SUB # 2

Input/Link 1

Input/Link 2

Output Ch. 2

FRONT SUB # 2

Input/Link 1

Input/Link 2

Output Ch. 2

2-CHANNEL
AMPLIFIER

speakON®
NL 4 cable

1+/1-

2+/2-

1+/1-

1+/1-

REAR SUB # 1

Input/Link 1

Input/Link 2

Output Ch. 2

FRONT SUB # 1

Input/Link 1

Input/Link 2

Output Ch. 2

1+/1-

Figure 37. Connection scheme for end-fire system shown in figure 36.

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CARDIOID SETUP

Cardioid configurations follow the same acoustical principles as end-fire setups but deal with shorter distances between the subwoofers. This can be an advantage in many applications where space is scarce but, it implies also some compromises regarding front SPL.

A classic cardioid setup is achieved by combining three subwoofers in a ratio of **2:1.** This means two subwoofers facing front or towards the audience, and one subwoofer facing rear or towards the stage. Figure 38 shows possible arrangements for these arrays.
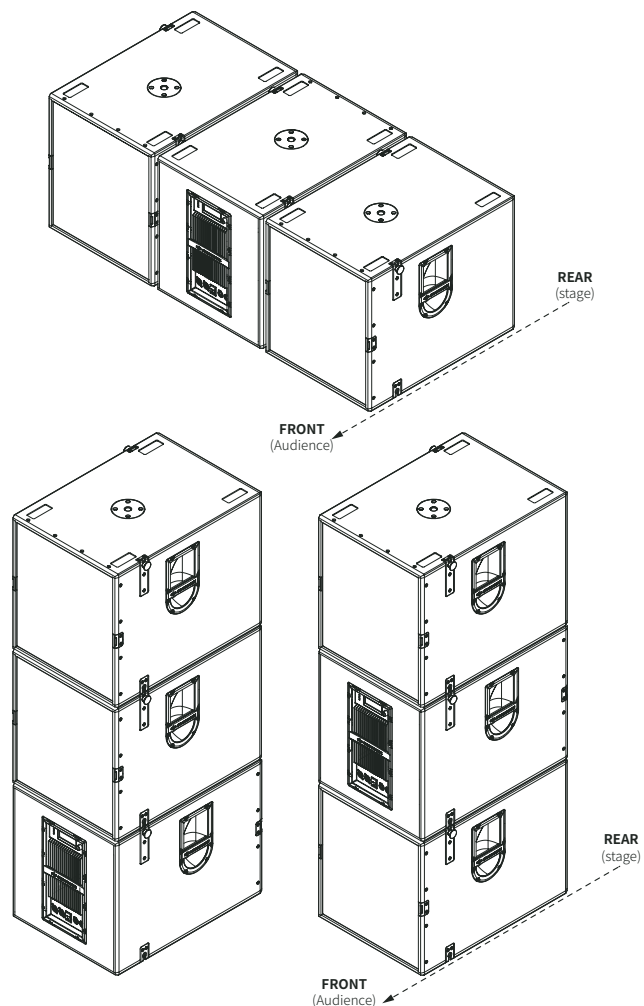

REAR
(stage)

FRONT
(Audience)

REAR
(stage)

FRONT
(Audience)

Figure 38. Horizontal and vertically stacked configurations for cardioid setups.

The amount of rejection in the rear side of the subwoofer setup varies with frequency, and depends strongly on the chosen arrangement and the acoustic environment. In half-space conditions such as outdoors, a rear-rejection of 15 to 20 dB can be achieved. Also, the stacked arrangement has proven to be the most effective.

Compared to a single subwoofer usage, the response of a cardioid arrangement exhibits an increase in the level of the highest frequencies of the subwoofer's range. If desired, and in order to retrieve a flat spectrum, a parametric EQ around 85 Hz with a Q3 and gain of at least -3 dB should be used equally on all the subwoofers of the array.

As explained before, the Directivity function in **B 15A** self-powered subwoofers highly simplifies this process. To do it, just:

1. Select the "Normal" mode in the Directivity menu of the subwoofers facing front.

2. Select the "Cardioid" mode in the Directivity menu of the subwoofer facing rear.

All the additional processing like level, delay and EQ, should be done identically to all subwoofers within the cardioid setup, in order to maintain proper phase relations for directivity control.

Conversely, in cardioid setups comprising passive models of the B-Line, the required delay must be applied before in the signal path. Also, their internal circuitry simplifies the connections, as shown in figures 39 and 40: notice that only one speakON® NL4 cable is needed between the amplifier and the subwoofers, where the signal is shared and passed through pins 1+/1- of the speakON® link cables.

In addition, notice that all the connections can be made only from the rear of the arrangement, improving the appearance of these deployments.
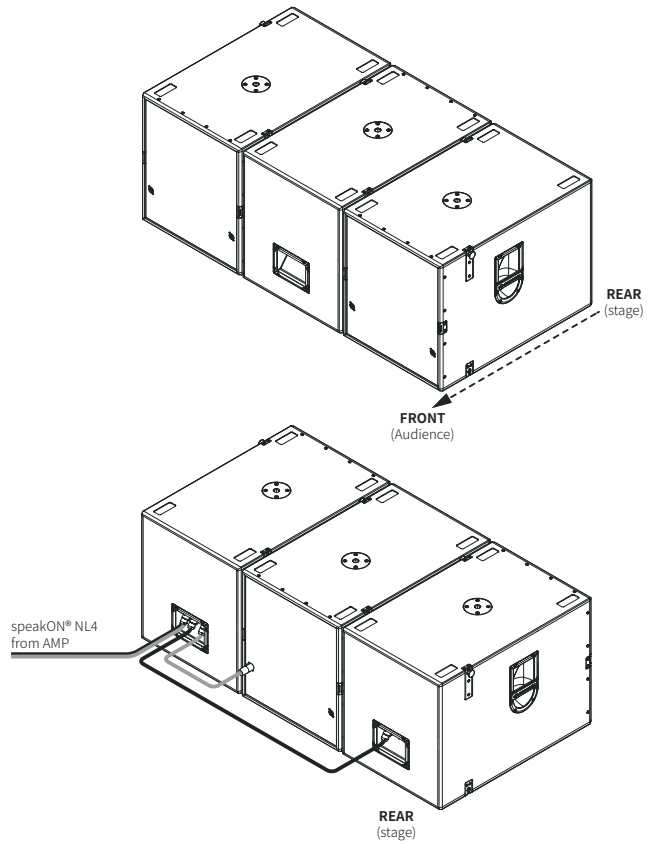
D

EN

中文

REAR
(stage)

FRONT
(Audience)

speakON® NL4
from AMP

REAR
(stage)

Figure 39. Front (top) and rear (bottom) views of a cardioid setup deployed horizontally with three **B 18** subwoofers. Notice that all the connections are made only from the rear side.
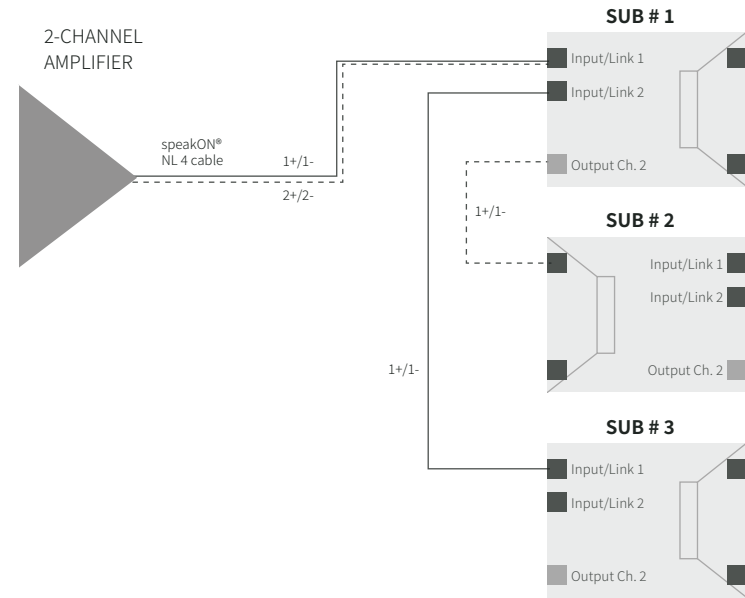
2-CHANNEL
AMPLIFIER

speakON®
NL 4 cable

1+/1-

2+/2-

1+/1-

1+/1-

SUB # 1

Input/Link 1

Input/Link 2

Output Ch. 2

SUB # 2

Input/Link 1

Input/Link 2

Output Ch. 2

SUB # 3

Input/Link 1

Input/Link 2

Output Ch. 2

Figure 40. Connection scheme for system shown in figure 39.

RECOMMENDED DSP SETTINGS

When using **B 15**, **B 18** and/or **B 21** passive subwoofers, both mechanical and thermal protection techniques should be implemented. SE AUDIOTECHNIK's® drivers are designed to reach lower stress in the suspension parts at greater excursion. However, these protections will assure the proper behavior of the equipment, its care and safety, and can maximize the performance of the whole system.

The mechanical protection of a loudspeaker controls the excursion of the cone, so the physical limits of the spider and the surround are not exceeded. This can be done by filtering the signal below the safe range of the loudspeaker.

Thermal protection controls the energy of the loudspeaker in the long term, so the temperature of the magnet and the voice coil is kept under safe levels. This is achieved by limiting the RMS voltage applied to the loudspeaker, where the maximum allowable value is its average power handling. This protection depends also on the time constant selected to trigger and release the limiter.

The table below contains recommended values for the protection mechanisms mentioned before. For the cone excursion, an additional bell filter is suggested to compensate the slight effect of the high-pass in the usable range of the subwoofers. For the thermal protection, the maximum RMS voltages supported by the subwoofers are listed, so the limiter's threshold should not exceed them. Also and for most typical applications, a time constant from 10 to 50 ms can be set.

Subwoofer	B 15	B 18	B 21
Mechanical Protection Filters			
High Pass	Type: Butterworth Slope: 24 dB/oct f: 35 Hz	Type: Butterworth Slope: 24 dB/oct f: 32 Hz	Type: Butterworth Slope: 24 dB/oct f: 28 Hz
Bell (optional)	Gain: +3 dB f: 38 Hz Q: 2	Gain: +2 dB f: 34 Hz Q: 2	Gain: +2 dB f: 30 Hz Q: 4
Thermal Prodection Limits			
RMS Voltage Limiter	55 Vrms	69 Vrms	89 Vrms

Finally, a 6th-order Butterworth low-pass at 150 Hz is a good generic filter to define the working band of the subwoofers in the upper range. However, this filter should be defined taking also into account the other components of the system, specially their frequency response and their position with respect to the subwoofers.

SPECIFICATIONS

B 15 / B 18 / B 21 SUBWOOFERS

TECHNICAL SPECIFICATIONS

PARAMETER	B 15	B 18	B21
ACOUSTICAL			
Frequency range (-3 dB)[1]	39 Hz - 130 Hz	37 Hz - 130 Hz	33 Hz - 130 Hz
Frequency range (-10 dB)[1]	33 Hz - 160 Hz	29 Hz - 160 Hz	25 Hz - 160 Hz
Coverage (-6dB) [H x V]	Omnidirectional	Omnidirectional	Omnidirectional
Nominal impedance	8 Ω	8 Ω	8 Ω
Sensitivity[2]	98 dB	99 dB	99 dB
Peak power	1600 W	2400 W	4000 W
Continuous power[3]	400 W	600 W	1000 W
Maximum Peak SPL[4]	136 dB	138 dB	142 dB
System type	1-way passive system	1-way passive system	1-way passive system
Transducers	1 x 15" driver	1 x 18" driver	1 x 21" driver
Enclosure	Vented box	Vented box	Vented box
Connectors	Input / Link signal: 4 Neutrik speakON® NL4 Link output: 1 Neutrik speakON® NL4	Input / Link signal: 4 Neutrik speakON® NL4 Link output: 1 Neutrik speakON® NL4	Input / Link signal: 4 Neutrik speakON® NL4 Link output: 1 Neutrik speakON® NL4
Wiring	Pins 1+/1- : driver Pins 2+/2- : link (Output CH 2, pins 1+/1-)	Pins 1+/1- : driver Pins 2+/2- : link (Output CH 2, pins 1+/1-)	Pins 1+/1- : driver Pins 2+/2- : link (Output CH 2, pins 1+/1-)
MECHANICAL			
Product dimensions [H x W x D] (Including rigging)	514 x 494 x 650 mm	572 x 542 x 794 mm	666 x 585 x 832 mm
Net weight	30 kg	41 kg	51 kg
Packaging dimensions [H x W x D]	613 x 550 x 733 mm	721 x 615 x 885 mm	796 x 685 x 930 mm
Total weight	33.1 kg	49.5 kg	61.5 kg
Cabinet	15 - 18 mm plywood	15 - 18 mm plywood	15 - 24 mm plywood
Cabinet finishing	Black or white polyurea coating	Black or white polyurea coating	Black or white polyurea coating
Grille	Powder coated perforated steel	Powder coated perforated steel	Powder coated perforated steel
Hardware	- 2 SE AUDIOTECHNIK® ergonomic handles - 4 rubber feet and top recesses for stacking - M20 pole thread	- 2 SE AUDIOTECHNIK® ergonomic handles - 4 rubber feet and top recesses for stacking - M20 pole thread	- 4 SE AUDIOTECHNIK® ergonomic handles - 8 rubber feet and top recesses - M20 pole thread
Stacking	Two-point SE AUDIOTECHNIK® stacking system	Two-point SE AUDIOTECHNIK® stacking system	-
ACCESSORIES			
Stacking frame for M-F3A PRO	B 15 SFi M	B 18 SFi M	-
Stacking frame for L 35	B 15 SFi L35	B 18 SFi L35	-
Pole bar	SPS20	SPS20	SPS20
Flight case	B 15 FC	B 18 FC	B 21 FC
Transport dolly	B 15 TD	B 18 TD	B 21 TD
Transport cover	B 15 TC	B 18 TC	B 21 TC

[1] Measured with a 6th-order Butterworth low-pass filter applied at 130 Hz.
[2] Half space, 1W / 1m, on axis.
[3] According to EIA-426B Standard (based on RMS Voltage).
[4] Max Peak SPL = Sensitivity + $10\log_{10}$(Continuous Power) + 12 dB Crest factor.

MECHANICAL DRAWINGS

654.00

495.00
465.00

521.00

Figure 41. B 15 views and dimensions. Annotations given in millimetres.
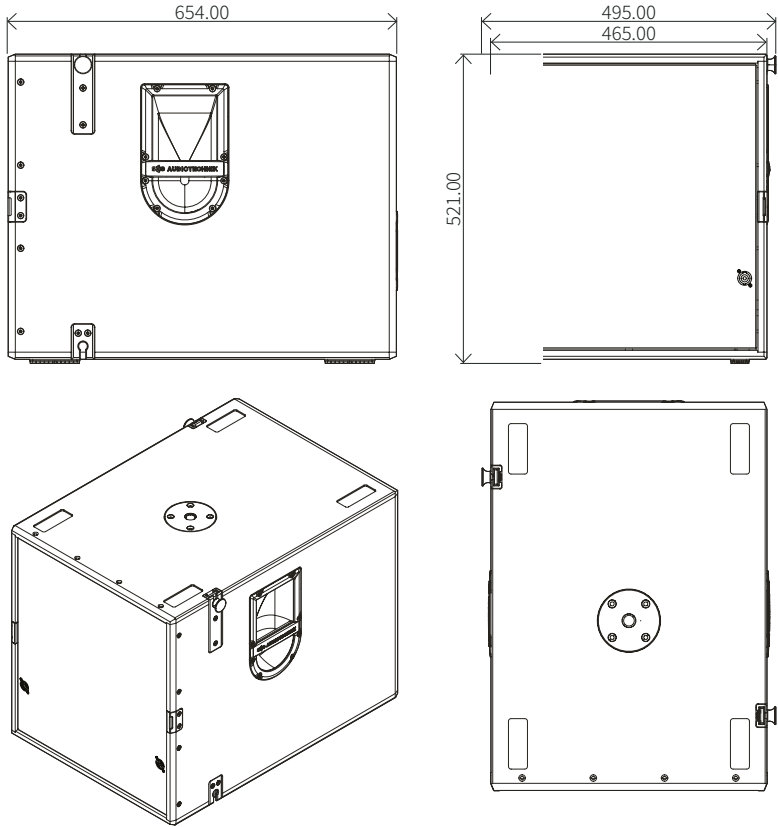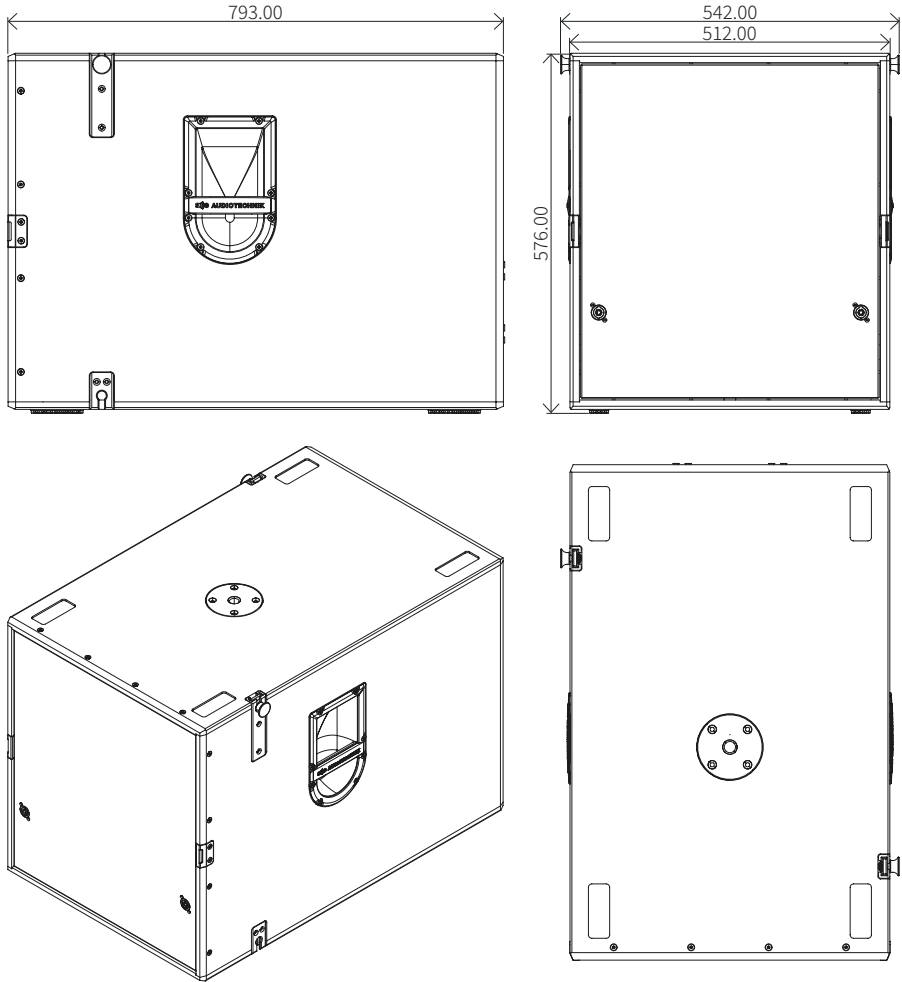
793.00

542.00
512.00

576.00

Figure 42. B 18 views and dimensions. Annotations given in millimetres.

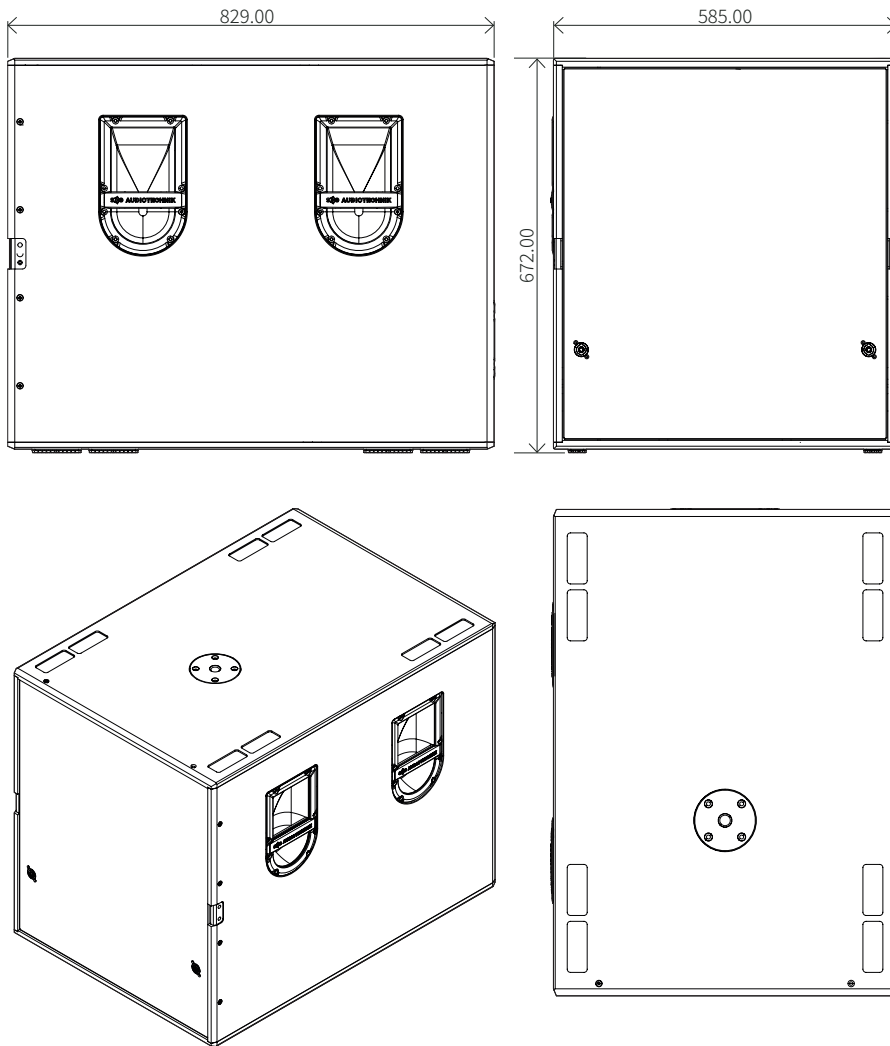**Figure 43. B 21** views and dimensions. Annotations given in millimetres.

B 15A

TECHNICAL SPECIFICATIONS

PARAMETER	B 15A
ACOUSTICAL	
Frequency range (-3 dB)[1]	39 Hz - 87 Hz
Frequency range (-10 dB)[1]	33 Hz - 113 Hz
Coverage (-6dB) [H x V]	Omnidirectional
Maximum Peak SPL[2]	136 dB
System type	1-way self-powered system
Transducers	1 x 15" driver
Enclosure type	Vented box
AMPLIFICATION	
Type	Single channel, class-D with SMPS
Output power	800 W
Protection	Short circuit, overheating, overcurrent
Connectors	Input signal: balanced XLR 3-pin female
	Link output: balanced XLR 3-pin male
	Power input: powerCON® 20A
	Power link output: powerCON® 20A
Wiring	Pin 1: Ground
	Pin 2: Positive
	Pin 3: Negative
Input sensitivity	+14 dBu (3.88 V), +4 dBu (1.23 V), 0 dBu (0.775 V), 0 dBV (1 V),
	-10 dBV (0.316 V)
DSP	48 kHz/24 bit with extended dynamics
	Processing latency: 1.1 ms
Processing	Factory and user presets, EQ, delay, directivity control, phase inversion, input sensitivity
User controls	Power: ON/OFF switch
	DSP: display with digital encoder
MECHANICAL	
Product dimensions [H x W x D] (Including rigging)	520 x 495 x 654 mm
Net weight	34 kg
Packaging dimensions [H x W x D]	613 x 550 x 733 mm
Total weight	37.1 kg
Cabinet	15 - 18 mm plywood
Cabinet finishing	Black or white polyurea coating
Grille	Powder coated perforated steel
Hardware	2 SE AUDIOTECHNIK® ergonomic handles
	4 rubber feet and top recesses for stacking
	M20 pole thread
Stacking	Two-point SE AUDIOTECHNIK® stacking system
ACCESSORIES	
Stacking frame for M-F3A PRO	B 15 SFi M
Stacking frame for L 35	B 15 SFi L35
Pole bar	SPS20
Flight case	B 15 FC
Transport dolly	B 15 TD
Transport cover	B 15 TC
Amplifier rain cover	P801DL RC

[1] Measured with MF3AP preset.
[2] Measured with 12 dB Crest factor Pink Noise, half space.
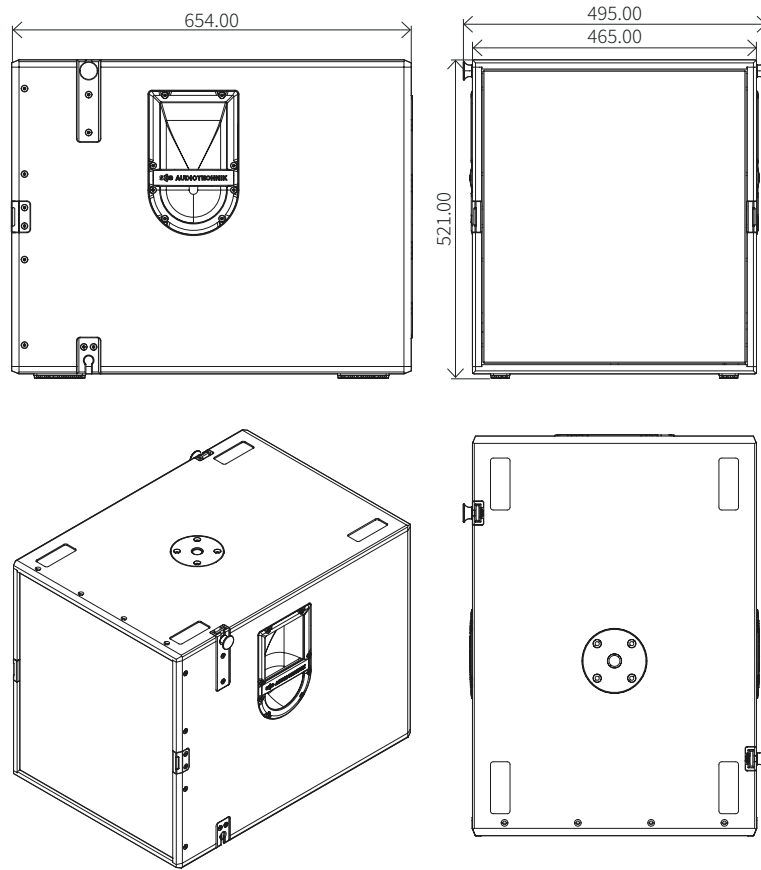
MECHANICAL DRAWINGS

Figure 44. **B 15A** views and dimensions. Annotations given in millimetres.

MANUFACTURER'S **DECLARATIONS**

LIMITED WARRANTY

This limited warranty applies to SE AUDIOTECHNIK® branded products.

The statutory warranty rights towards the seller are not affected by this guarantee. In fact, it justifies additional independent warranty claims towards SE AUDIOTECHNIK®.

SE AUDIOTECHNIK® warrants that the SE AUDIOTECHNIK® product purchased from SE AUDIOTECHNIK® or from an SE AUDIOTECHNIK® authorized reseller, is free from defects in materials or workmanship under normal use, for a period of three years from the date of purchase.

The limited warranty period starts on the date of purchase. To receive warranty services, proof of the purchase must be provided. The dated sales or delivery receipt, stating the date of purchase, is the proof of purchase. Should products of the brands named above be in need of repair within the limited warranty period, you are entitled to warranty services according to the terms and conditions stated in this document.

This limited warranty extends only to the original purchaser of this SE AUDIOTECHNIK® branded product and is not transferable to anyone who obtains ownership of the SE AUDIOTECHNIK® product from the original purchaser. During the limited warranty period, SE AUDIO-TECHNIK® will repair or replace the defective component parts or the product. All component parts or hardware products removed under this limited warranty become the property of SE AUDIOTECHNIK®.

In the unlikely event that the SE AUDIOTECHNIK® product has a recur-ring failure, SE AUDIOTECHNIK®, at its discretion, may elect to provide a replacement unit of SE AUDIOTECHNIK® choice that is at least equivalent to your SE AUDIOTECHNIK® branded product in hardware performance.

SE AUDIOTECHNIK® does not warrant that the operation of this product will be uninterrupted or error-free. SE AUDIOTECHNIK® is not responsible for damage that occurs as a result of your failure to follow the instructions included with the SE AUDIOTECHNIK® branded product.

This limited warranty does not apply:

- to wear parts
- to any product from which the serial number has been removed or that has been damaged or rendered defective as the result of an accident
- in case of misuse, abuse, or other external causes
- by operation outside the usage parameters stated in the user's documentation
- by use of spare parts not manufactured or sold by SE AUDIOTECHNIK®
- by modification or service by anyone other than SE AUDIOTECHNIK®

These terms and conditions constitute the complete and exclusive warranty agreement between the purchaser and SE AUDIOTECHNIK® regarding the SE AUDIOTECHNIK® branded product purchased.

LIMITATION OF LIABILITY

If the SE AUDIOTECHNIK® branded hardware product fails to work as warranted above, the sole and exclusive remedy shall be repair or replacement. SE AUDIOTECHNIK®'s maximum liability under this limited warranty is explicitly limited to the lesser of the price it has been paid for the product, or the cost of repair or replacement of any hardware components that malfunction in conditions of normal use.

SE AUDIOTECHNIK® is not liable for any damages caused by the product or the failure of the product, including any lost profits or savings or special, incidental or consequential damages. SE AUDIOTECHNIK® is not liable for any claim made by a third party or made by the purchaser for a third party.

This limitation of liability applies whether damages are sought, or claims are made, under this limited warranty or as a tort claim (including negligence and strict product liability), a contract claim, or any other claim. This limitation of liability cannot be waived or amended by any

person. This limitation of liability will be effective even if the purchaser has advised SE AUDIOTECHNIK®, or an authorized representative of SE AUDIOTECHNIK®, of the possibility of any such damages. This limitation of liability however, will not apply to claims for personal injury.

This limited warranty gives the purchaser specific legal rights. There may also be other rights that may vary from state to state or from country to country. The purchaser is advised to consult applicable state or country laws for a full determination of his rights.

REQUESTING WARRANTY SERVICE

To request warranty service for the product, the purchaser must contact SE AUDIOTECHNIK® or the SE AUDIOTECHNIK® authorized reseller from which the product was purchased.

EC DECLARATION OF CONFORMITY

This device meet the essential requirements and further relevant specifications of the Directives of the European Union. The detailed declaration, and the list of these Directives and the Harmonized Standards, is available in our website **www.se-audiotechnik.de**.

CORRECT DISPOSAL OF THIS PRODUCT (ELECTRICAL WASTE)
(Applicable in the European Union and other European countries with separate collection systems)

This marking, shown on the product or its literature, indicates that it should not be disposed with other household wastes at the end of its working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate this from other types of waste and recycle it responsibly to promote the sustainable reuse of material resources.

Household users should contact either the retailer where they purchased this product, or their local government office, for details on where and how they can recycle this item in an environmentally friendly manner.

Business users should contact their supplier and check the terms and conditions of the purchase contract. This product should not be mixed with other wastes for disposal.

WEEE-DECLARATION

This SE AUDIOTECHNIK® product was developed and manufactured with high quality materials and components which can be recycled and/or reused. This symbol indicates that electrical and electronic equipment must be disposed of separately from normal waste at the end of its operational lifetime.

Please dispose this product by bringing it to your local collection point or recycling centre for such equipment. This will help to protect the environment in which we all live.

s)))e' AUDIOTECHNIK

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