Dolby SB218

Owner's Manual

1 April 2023
Issue 2 Part number: 8800328

Notices

Copyright

Dolby Laboratories, Inc.
1275 Market Street
San Francisco, CA 94103-1410 USA
Telephone 415-558-0200
Fax 415-645-4000
http://www.dolby.com

Trademarks

Dolby and the double-D symbol are registered trademarks of Dolby Laboratories, Inc.

The following are trademarks of Dolby Laboratories, Inc.

Dialogue Intelligence™
Dolby®
Dolby Advanced Audio™
Dolby Atmos®
Dolby Audio™
Dolby Cinema®
Dolby Digital Plus™
Dolby Digital Plus Advanced Audio™
Dolby Digital Plus Home Theater™
Dolby Home Theater®
Dolby Theatre®
Dolby Vision®
Dolby Vision IQ™
Dolby Voice®
Feel Every Dimension™
Feel Every Dimension in Dolby™
Feel Every Dimension in Dolby Atmos™
MLP Lossless™
Pro Logic®
Surround EX™

All other trademarks remain the property of their respective owners.

Product model

THIS DOCUMENTATION APPLIES TO PRODUCT MODEL: CID1035.

Limited warranty and warranty exclusions

THE LIMITED WARRANTY AND WARRANTY EXCLUSIONS MAY BE FOUND AT THE FOLLOWING URL: https://www.dolby.com/us/en/about/warranty-and-maintenance-policies.html

Contents

1

Important safety and regulatory information

Safety

INSTALLER ASSUMES ALL RESPONSIBILITY AND LIABILITY FOR THE INSTALLATION OF THIS PRODUCT.

No information contained in this guide is intended as a warranty on the part of Dolby. Anyone using this information assumes all liability arising from its use. Product abuse, use of the product not in accordance with Dolby instructions, or use in an application for which the product has not been designed is not covered under any Dolby warranty, nor is Dolby liable for any loss or damage.

Installation must be performed by qualified, licensed, and insured installers, and in accordance with all laws, rules, and regulations applicable to the installation site. Failure to do so could result in serious personal injury or even death. Prior to installing this product, read and completely understand the installation instructions. You must read these instructions to prevent personal injury and property damage. Keep the installation instructions in an easily accessible location for future reference.

A licensed professional engineer must approve the placement and method of attachment to the building structure prior to the installation of the system.

All information presented herein is based upon materials and practices common to North America and may not directly apply to other countries because of differing material dimensions, specifications, and/or local regulations. Installers in other countries should consult with appropriate engineering and regulatory authorities for specific guidelines.

Any supplied rigging hardware is intended only for use with the specified speaker(s). The installer assumes all risk of loss and/or injury arising out of the use of the supplied rigging hardware with any other speaker. All other rigging is considered part of the venue and/or installer-supplied equipment and is not addressed in this guide. This guide is not a comprehensive source for rigging in general. Installer assumes all responsibility for ensuring that accepted rigging and safety practices are employed. Installer assumes all responsibility for the appropriate use of Dolby supplied rigging hardware and follows at a minimum all applicable laws, rules, and regulations in force for each venue.

No open flame sources should be placed on or near the apparatus. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus that produces heat.

Storage temperature: -4 to +140°F (-20 to +60°C). The products covered by this manual are not intended for use in high-moisture environments. Moisture can damage the product and cause corrosion of electrical contacts and metal parts. Avoid exposing the speakers to direct moisture. Keep speakers out of extended or intense direct sunlight. Premature product failure or serious personal injury could occur if this product is used outdoors or in wet indoor environments.

Dolby is not responsible for the application of its products for any purpose or the misuse of this information for any purpose. Furthermore, Dolby is not responsible for the abuse of its products caused by avoiding compliance with inspection and maintenance procedures or any other abuse.

This product is intended for indoor use only.

Do not block any ventilation openings. Install in accordance with the instructions as detailed in this manual and the Product Information document.

When a rolling cart is used to transport the speaker, use caution when moving the cart/speaker system to avoid injury.

Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way.

This product may require installation in a restricted-access location. Please refer to this manual and to the Product Information document.

Caution: Hearing damage can occur by prolonged exposure to excessive sound pressure level (SPL); the speaker is easily capable of generating SPL sufficient to cause permanent hearing damage to performers, production crew, or audience members. Caution should be taken to avoid prolonged exposure to SPL in excess of 90 dB.

Caution: Vibration from this type of speaker system may cause cabinets to shift. Failure to secure the speaker cabinet to the building structure may result in the speaker system tipping or falling, which may cause damage or injury.

Caution: Make sure that no water pipes, natural gas lines, electrical wire, or conduit are present where the speaker is to be installed. Cutting or drilling into water pipes, natural gas lines, electrical wire, or conduit could cause serious personal injury or property damage.

Caution: Use proper lifting techniques when working with heavy objects to avoid personal injury. **Always be careful when moving the SB218 or the assembled speaker system and employ at least two people when attempting any relocation of the speakers.**

High temperature warning: The speaker system may reach elevated temperatures during operation. **Always remove all drive signals and allow ample time for the system to cool down prior to handling.**

To reduce electric shock, do not expose the apparatus to dripping or splashing; no objects filled with liquids, such as mugs, shall be placed on the apparatus.

Caution: Troubleshooting must be performed by a trained electrician. To reduce the risk of electric shock, do not attempt to service this equipment unless you are qualified to do so.

Note: This product can be shipped only by surface transportation. Do not ship by air.

SAFETY SYMBOL KEY

Caution: This symbol that appears on the unit and/or instruction manual is intended to alert the user to the presence of important safety operating and maintenance instructions.

Warning:

This symbol that appears on the unit and/or instruction manual is intended to alert the user to the presence of uninsulated "dangerous" voltage within the product enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

High temperature warning:

This symbol that appears on the unit and/or the instruction manual is intended to alert the user that the item can be hot and that care must be taken accordingly.

EU environmental regulations/compliance and product disposal information

Restriction of Hazardous Substances Directive (RoHS): All Dolby products comply with the requirements of the EU RoHS Directive. This product is electronic equipment and should be disposed of in accordance with all applicable laws.

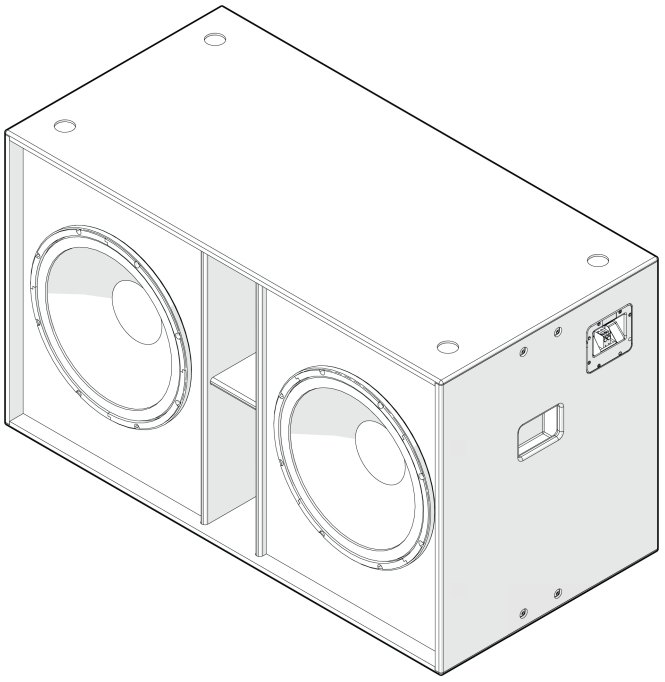
Do not dispose as household waste. Do not dispose of the product in a fire. Please dispose of this product by taking it to your local electronic waste collection point or recycling center. For information regarding where to recycle electronic equipment, contact your local dealer. For additional information regarding Waste Electrical and Electronic Equipment (WEEE) and product disposal go to http://www.dolby.com/us/en/about/environmental-commitment.html.

2

Introduction to the Dolby SB218

The Dolby SB218 (also referred to as the SB218 in this manual) is designed to meet the needs of high-performance Low Frequency Effects (LFE) channels in small to medium-sized Dolby Atmos or 7.1 cinemas. The SB218 delivers extended low-frequency response and high output, filling theaters with solid low-frequency impact to every seat in the venue. With intuitive ergonomic design and features, the SB218 enables quick, easy installation and service. Built on the foundation of the Dolby industry-leading system design and support philosophy, the SB218 provides elevated LFE subwoofer performance and streamlines speaker integration.

Figure 1: Dolby SB218



Following is an outline of this chapter:

2.1 About this documentation

This documentation provides the key features and benefits of the Dolby SB218 and shows you how to install the SB218 in a typical cinematic exhibition environment.

2.2 SB218 key features and benefits

The Dolby SB218 is a single enclosure, dual-chamber, dual-driver, high-performance LFE subwoofer that is designed to produce low frequencies.

- Each 18-inch driver is contained in an independent chamber within the cabinet that provides improved performance and reliability.
- Rubber feet on the bottom of the cabinet provide vibration control.
- Integrated handles on the sides of the speaker cabinet are positioned at the center of gravity to improve safety and comfort during handling and installation.
- Integrated mounting points are provided for using tie plates (BKT.136, sold separately) when coupling two SB218 cabinets together safely and securely in a stacked configuration.
- BKT.FLR floor bracket kit (sold separately) enables secure installation to the building structure. The kit includes two brackets and four M10 washers.
- The advanced input plate features a high-current, spring-loaded terminal block, which enables quick installation with no crimp tools or spade lugs needed, vastly simplifying installation.

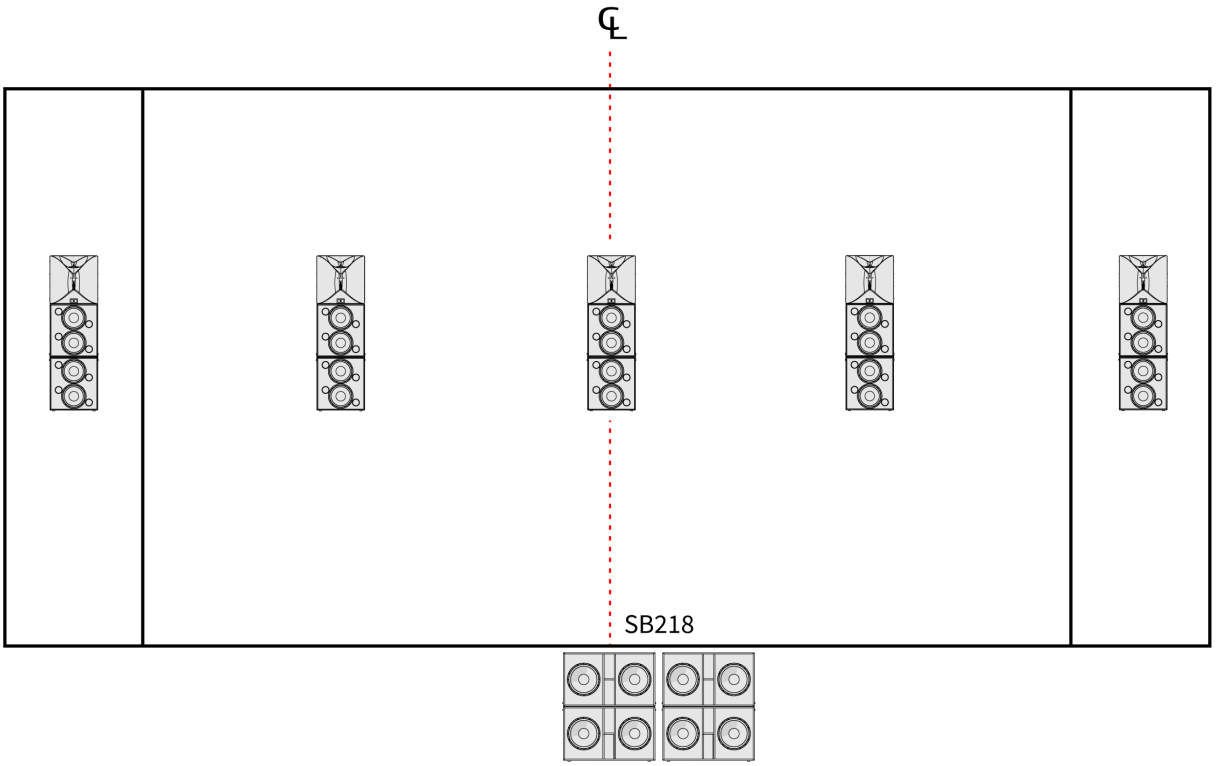
2.3 SB218 preinstallaton information

In a typical auditorium, the SB218 is installed at the front of the auditorium, near ground level, and equal with the screen plane.

⚠ **Caution:** Design and construction of a screen platform must be performed by a qualified, licensed, and insured professional in accordance with all laws, rules, and regulations applicable for the installation site. Failure to do so could result in serious personal injury or even death.

The following figure shows the placement of the speaker, as indicated in the *Dolby Atmos Specifications*. When multiple screen subwoofers are used, closely clustering the cabinets can increase the efficiency through mutual coupling, as shown in this figure. If a single cabinet or cluster is used, it should be placed near the center of the screen, but asymmetrically with respect to the center of the room to minimize stimulation of standing waves (room modes). Other configurations are also acceptable, such as uniformly spacing multiple cabinets along the front wall to improve coverage.

Figure 2: Typical auditorium installation



2.4 Selecting the wire for the SB218

It is important that you select the correct wire gauge for the SB218.

Typically, no more than 0.5 dB (or 11%) of power should be lost in the cabling. The SB218 connectors accept an American Wire Gauge (AWG) of 18 AWG to 6 AWG (1 mm^2 to 16 mm^2). When selecting a wire gauge, always use industry-standard practice, based on the rated impedance of the speaker and the length of the cable.

Typically, we recommend a wire gauge of 14 AWG to 10 AWG (2.5 mm^2 to 6 mm^2).

Note: The input terminals are marked with indicators to show the polarity. Per International Electrotechnical Commission (IEC) standards, a positive voltage on the positive marked input results in the transducers moving outward. You must verify the positive and negative markings for each respective product. Always tie the cable down to the available hardware to minimize any buzzing or pullouts. If possible, after wiring is completed, play sound through the speaker to identify any connection issues, buzzing, or rattling.

2.5 Additional information

There is additional information regarding the SB218 that you need to consider.

- System weight for stability calculations is approximately 77.6 kg (171 lb).
- Allow at least 11 inches (30 cm) between the port exits and any obstruction (including side wall or baffle wall construction). Blockage of the ports results in reduced low-frequency extension and a decreased life span of the product.
- Amplifier selection is aided by additional data, as indicated in the SB218 specifications. (See the link at the end of this section.)
- The power-draw specification provides the actual power draw in watts at the rated V_{rms} in the design, instead of calculated power. This can aid in optimizing amplifier power budgets, as the measured power is almost always lower than calculated power (sometimes significantly).

- The maximum voltage peak specification is useful for selecting an amplifier that has a voltage rail at or above the rating for the maximum dynamic performance of the speaker. Some amplifier companies provide this data in their respective technical data sheets (or provide the data by request).

Related information

Dolby SB218 specifications on page 17

2.6 Contacting Dolby

You can contact Dolby Cinema Solutions and Support using email or regional telephone numbers. You can also access documentation by visiting the Dolby customer portal.

Contact Dolby Cinema Solutions and Support

- Send an email to cinemasupport@dolby.com.
- Call:

  AMERICAS: +1-415-645-4900
  ASIA, CHINA, and PACIFIC RIM: +86-400-810-5850
  EMEA: +44-33-0808-7700
  JAPAN: +81-3-4520-9798

Access documentation

Visit https://customer.dolby.com.

Submit feedback about this documentation

Send an email to documentation@dolby.com.

3

Assembling and installing the Dolby SB218

Instructions are provided for assembling and installing the SB218. Each section of instructions specifies the tools that are needed to complete the required tasks. Refer to each section for more details on the required tools.

Following is an outline of this chapter:

3.1 Assembling and securing the Dolby SB218

Instructions are provided for assembling and securing the SB218.

About this task

The SB218 is designed to not shift during use when placed directly on a flat and level concrete floor. Installation on any other surface type may cause the cabinets to shift during use. Should the SB218 shift during use, regardless of the surface type it is installed on, it must be secured to the building structure. The Installer is responsible for inspecting any installation of an unsecured SB218 to ensure that it does not shift over time. The Installer assumes all responsibility and liability for the installation of this product. The SB218 must not be installed on a mobile platform. The SB218 attachment points are for stacking and connecting to the building structure only; they are not intended for hanging or flying the speaker.

Caution: Vibration from this type of speaker system is high and may cause cabinets to shift. Failure to secure the bottom speaker cabinet to the building structure may result in the system tipping or falling, which may cause damage or injury.

Caution: : Dolby disclaims any liability, including damage or injury, for failing to properly place or secure the speaker system. The Installer assumes all responsibility and liability for the installation of this product.

Caution: Dolby disclaims any liability, including damage or injury, for the use of mounting hardware, supports, and brackets not supplied by Dolby. Any modification to the speaker system (for example, mounting by drilling holes into the speaker system) will render the product warranty null and void.

3.1.1 Securing an SB218 cabinet

Instructions are provided to install a single SB218 cabinet. For instructions on stacking a second SB218 speaker on an installed unit, refer to the next section.

About this task

Parts and tools:

- Installer-provided 6 mm hex driver
- BKT.FLR brackets (not required when installing on the ground)
- Installer-provided serviceable thread-locking compound (recommended)
- Installer-provided acoustic or nonhardening caulk (recommended)

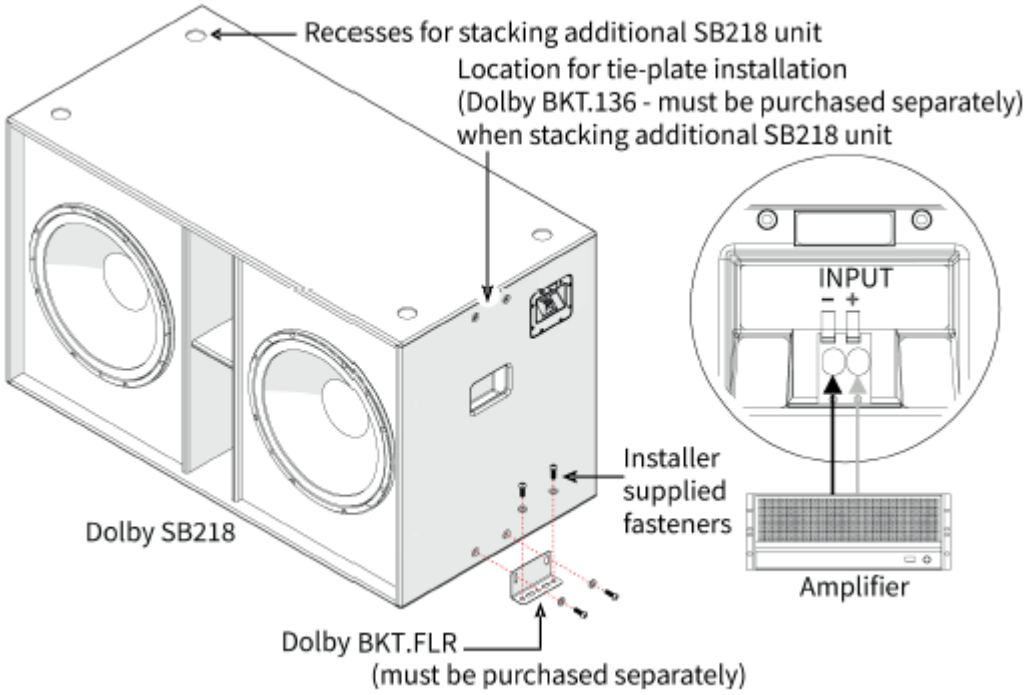
Note: BKT.FLR floor brackets are available from Dolby (sold separately) to secure the speaker system to the building structure. When using the BKT.FLR brackets, the installer must supply the mounting hardware necessary to secure the speaker system to the building structure. The holes in the bracket are sized for M10 or 3/8-inch bolts.

Note: Check with local and national building codes, and always refer the installation to a qualified professional.

Procedure

1. Determine the proper placement of the system.
2. Determine if it is necessary to secure the SB218 to the building structure to prevent the speaker system from shifting during use.
3. Remove the four M10 bolts from the bottom side of the SB218 speaker cabinet, as shown in the following figure. These bolts are preinstalled in the SB218 cabinet.

Figure 3: Secure a single SB218 cabinet



4. Reinstall the M10 bolts with the M10 washers, included with the BKT.FLR kit, securing the BKT.FLR brackets, and then tighten the M10 bolts to 12 Nm (8.9 ft-lb, 106 in-lb).
5. Secure the SB218 to the building structure with installer-provided mounting hardware.

Note: Proper selection and installation of mounting hardware is the exclusive responsibility of the installer. We recommend using M10 bolts and a serviceable thread-locking compound (for example, Loctite 243). We also recommend applying acoustic or other nonhardening caulk to the bottom side of the bracket to isolate speaker vibration from the building structure.

3.1.2 Securing two SB218 cabinets

Instructions are provided for stacking a second SB218 on an installed unit.

About this task

Parts and tools:

- Installer-provided 6 mm hex driver
- BKT.136 tie-plates (sold separately)
- BKT.FLR brackets (recommended [sold separately])
- Installer-provided serviceable thread-locking compound (recommended)
- Installer-provided acoustic or nonhardening caulk (recommended)

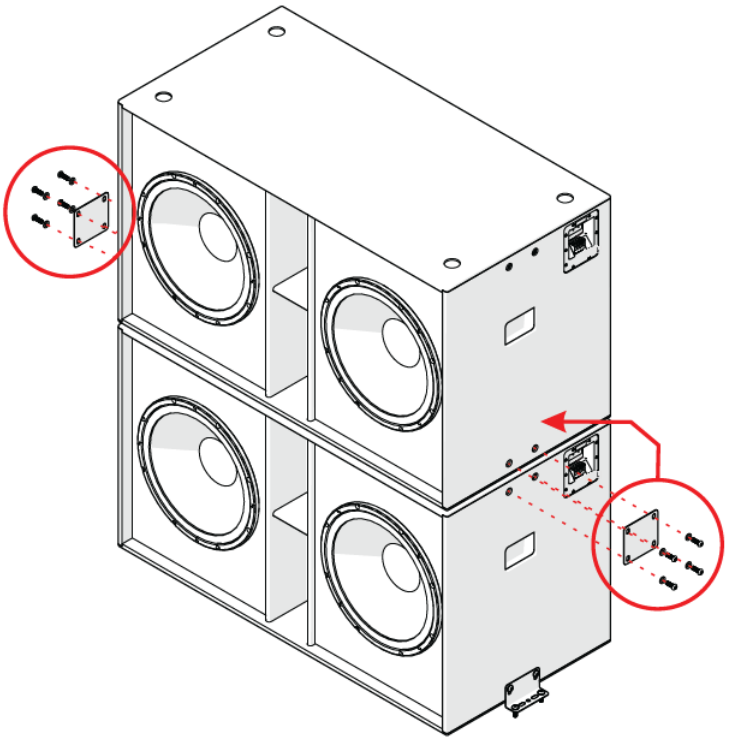
Note: BKT.136 tie (coupling) plates are available (sold separately) and are used to connect two SB218 speakers together in a stacked configuration to prevent movement or shifting of the cabinets during use. These tie plates must be installed on stacked units prior to system use.

Note: BKT.FLR floor brackets are available from Dolby (sold separately) to secure the speaker system to the building structure. When using the BKT.FLR brackets, the installer must supply the mounting hardware necessary to secure the speaker system to the building structure. The holes in the bracket are sized for M10 or 3/8-inch bolts.

Procedure

1. Place the upper SB218 on top of the lower secured cabinet, ensuring that the rubber feet of the upper unit properly seat within the recesses of the lower unit.
2. Locate the two-bolt tie-plate mounting locations on the sides of each cabinet.
3. Remove the two M10 bolts from the side of the lower SB218 cabinet, and then remove the two M10 bolts from the side of the upper SB218 cabinet.

Figure 4: Remove M10 bolts from lower and upper cabinet



4. Reinstall the M10 bolts through the BKT.136 tie plates using the included M10 washers (packaged with the BKT.136), and then tighten the M10 bolts to 12 Nm (8.9 ft-lb, 106 in-lb).

Note: We recommend using a serviceable thread-locking compound (for example, Loctite 243) when installing the M10 bolts.

Caution: Use proper lifting techniques when working with heavy objects to avoid personal injury. Always be careful when moving the SB218, and employ at least two people when attempting any relocation of the speakers.

Caution: Dolby disclaims any liability, including damage or injury, for failing to properly secure the speaker system. The Installer assumes all responsibility and liability for the installation of this product.

3.2 Connecting and configuring the Dolby SB218

Basic information is provided regarding the SB218 input plate and installing the wiring.

Connecting audio

Caution: Turn off all amplifiers when connecting speaker wiring.

Note: The input terminals are marked with indicators to show their polarity. Per IEC standards, a positive voltage on the positive marked input results in the transducers moving outward.

3.2.1 Connecting the SB218

Instructions are provided on how to connect and configure the SB218.

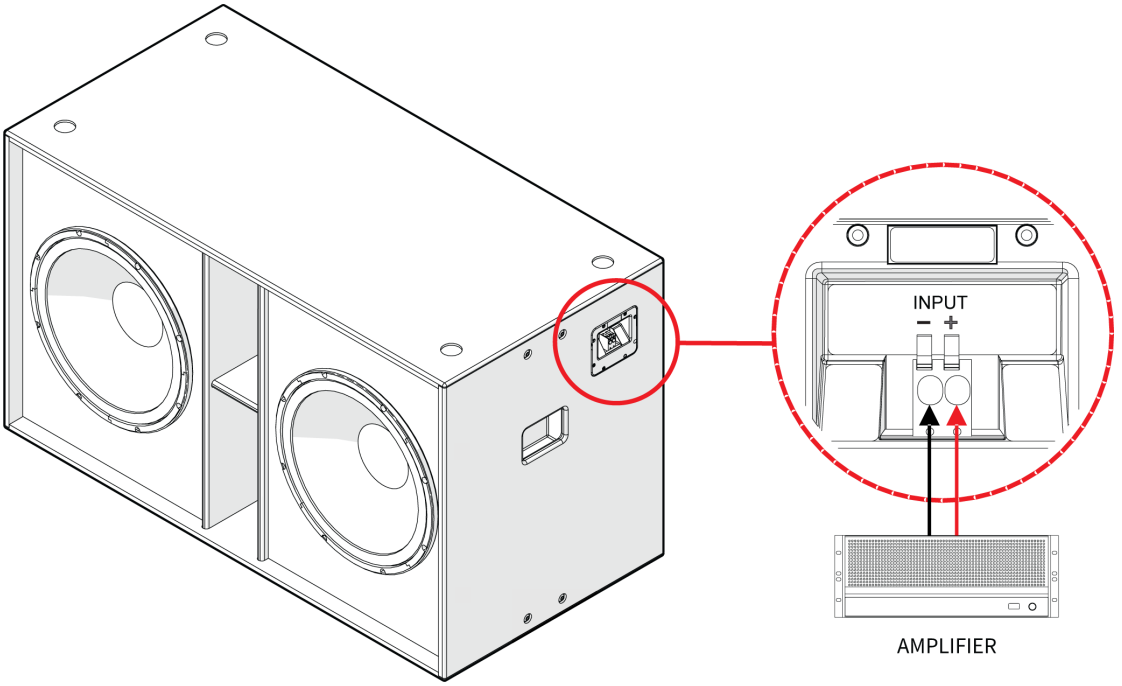
About this task

To be sure speakers work correctly, you must connect all electrical components properly. A wire stripper is required to complete the tasks in this section.

1. Locate the input plate on the side of the Dolby SB218.

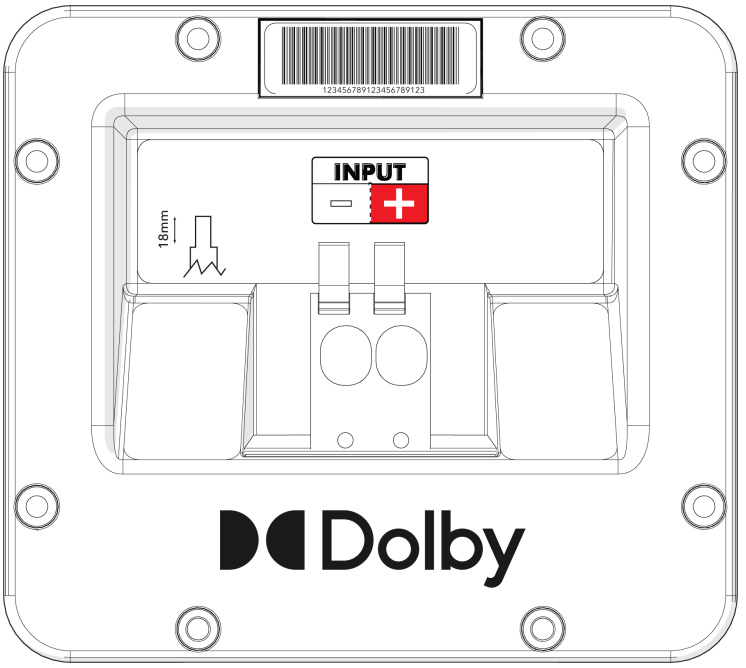
   The SB218 input plate is mounted on the side of the speaker for easy access to the wiring, as shown in the following figure.

   Figure 5: SB218 input plate location



2. Strip back the wire insulation/sheath to 18 mm (0.7 in).
3. Locate the orange terminal tab and push it inward. This terminal tab is spring-loaded; pushing it inward opens the gap in the hole directly below the tab.
4. Insert the wire fully into the hole (observing proper polarity).
5. Release the terminal tab; the spring mount-clamp secures the wire.
6. Remove any stray wire strands that may be present in and around the terminal tab.

Figure 6: SB218 input plate



Note: The input terminals are marked with indicators to show their polarity. Per IEC standards, a positive voltage on the positive marked input results in the transducers moving outward.

Note: Always tie the cable down to the available hardware to minimize any buzzing or pullouts. If possible, after wiring is completed, play sound through the speaker to identify any connection issues, buzzing, or rattling.

The SB218 is nominally rated at 4 ohms and driven by a single amplifier channel.

4

Dolby SB218 specifications

Detailed specifications for the Dolby SB218 are provided here.

4.1 SB218 specifications

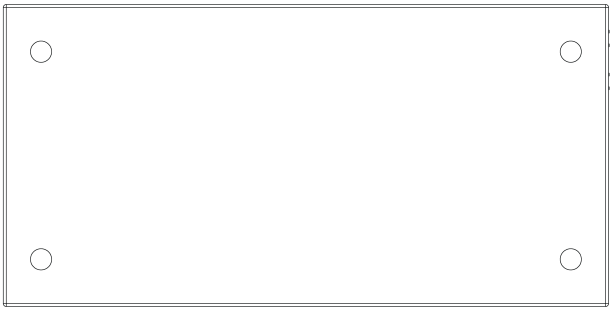
These are the specifications for the SB218.

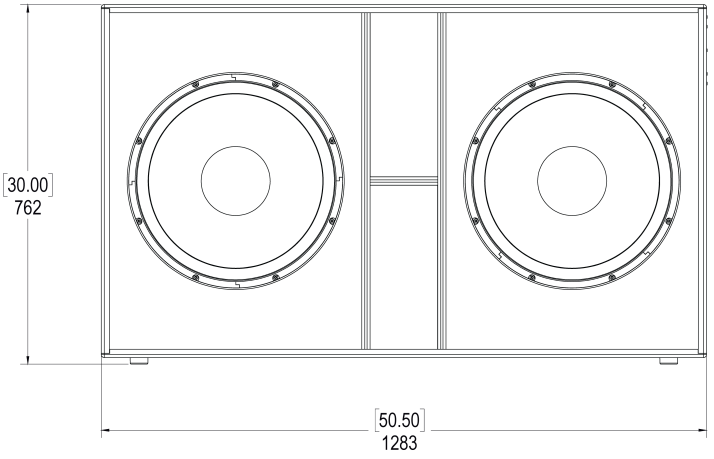
Table 1: Dolby SB218 specifications

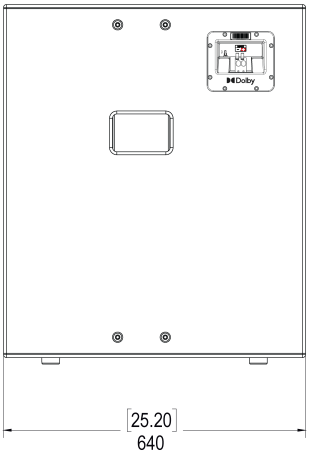
Specification	Technical data	Notes
Frequency range	26 Hz - 170 Hz	-6 dB in half-space conditions using required processing.
Usable low-frequency response	22 Hz	-10 dB in half-space conditions.
Coverage window	Omni	
Rated impedance	4 ohms	
Sensitivity @ 1 watt	102 dB	Measured with 12 dB crest pink noise @ 2 V_{rms} in half-space conditions with required highpass filter and lowpass filter.
Power handling	1,200 W @ 61 V_{rms}	9 dB crest pink noise for two hours with required highpass filter and lowpass filter, calculated power based on minimum impedance.
Power draw	750 W	Measured average power over five seconds at the rated V_{rms} using 9 dB crest pink noise with required highpass filter and lowpass filter. This measured power draw from the amplifier is useful for estimating amplifier sizing in overall system design.
Maximum voltage peak	175 Vpk	Measured Vpk over 100 hours using a Hann-shaped sine-wave burst at the maximum excursion frequency of the system. This data is useful for setting peak stop limiters and amplifier selection.
Maximum continuous sound pressure level (SPL) @ 1 meter	133 dB	Calculated from rated sensitivity and power.
Measured acoustic peak SPL @ 1 meter	141 dB	Measured half-space peak SPL over five seconds at rated V_{rms} using 9 dB crest pink noise with required highpass filter and lowpass filter.
SB218 weight	171 lb (77.6 kg)	

Note: These specifications provide typical values and do not represent absolute limits.

4.2 Dolby SB218 dimensions







5

Dolby SB218 digital signal processing requirements

The tables in this chapter show the SB218 digital signal processing requirements.

5.1 SB218 digital signal processing requirements

There are a variety of SB218 digital signal processing requirements.

Table 2: SB218 general filtration, gain, and delay requirements

Highpass filter	Lowpass filter	Overall gain	Polarity	Delay
25 Hz, 24 dB (4th order Butterworth)	170 Hz (4th order Butterworth)	0 dB	Positive	None

Table 3: SB218 parametric equalization requirements

EQ frequency	Constant Q		Constant bandwidth	EQ gain
32 Hz	2.87	0.5 bandwidth	0.65	+2 dB

Note: There are two principal implementations for parametric EQ filters in a digital signal processor (DSP). You need to select either the Constant Q or Constant Bandwidth mode in your DSP user interface (UI). The DSP UI may provide both Q and bandwidth settings, or it may show only bandwidth with no option to input or show Q. To correctly match the intended performance of this Dolby product, confirm with your DSP manufacturer as to which implementation is used. The Dolby CP850 and Dolby CP950 cinema processors use constant-bandwidth parametric EQ filters.

Table 4: SB218 limiter requirements

RMS limiting	Attack time	Release time	Peak stop
61 V_{rms}	45 ms	720 ms	175 Vpk

6

System limiters

We recommend using one or more system limiters to control and protect the SB218 speaker.

- Setting system limiters

6.1 Setting system limiters

You can use an RMS limiter in a digital signal processor (DSP) to perform the system limiting operation. We recommend setting up the system limiter thresholds with the proper SB218 digital signal processing parameters engaged. (For DSP parameter details, see the link at the end of this section.)

About this task

We recommend that you set up the system gain structure with the amplifier channel volumes turned all the way up if the volume setting is easily accessible by any user, such as via a front-panel knob that is not behind a security panel. Disconnecting the speakers from the amplifier during this process will most likely result in conservative settings. You can connect the speakers to the amplifier during this process if caution is observed when increasing the stimulus level and confidence in the measuring setup is secured. In addition, we recommend wearing hearing protection when setting up system limiters via the following procedure.

⚠ **Caution:** Speaker damage as a result of exceeding the power-handling specifications, as defined in the Dolby SB218 specifications, is not covered under the warranty.

⚠ **Caution:** Hearing damage can occur by prolonged exposure to an excessive sound pressure level (SPL); the speaker is easily capable of generating an SPL sufficient to cause permanent hearing damage to performers, production crew, or audience members. Make sure that you avoid prolonged exposure to SPL in excess of 90 dB.

We recommend that you set the system limiter for each amplifier channel individually. However, you can copy the limiter settings to other channels if those channels share identical SB218s, identical amplifier models, and identical gain structure in the signal path (including any amplifier front-panel volume controls).

Procedure

1. Connect a wide-bandwidth multimeter with averaging to the amplifier output. A wide-bandwidth meter has a rated measuring bandwidth of at least 20 kHz with an averaging function that is more than five seconds (very important for low-frequency outputs).
2. Access the RMS limiter setting in the DSP, and set it to the maximum value, such that no limiting should occur.
3. Set the attack and release times based on the highpass filter (HPF), according to the recommended digital signal processing settings for the respective speaker being measured. If that data is not available, we recommend these HPF settings:
   - <30 Hz: Attack 45 ms, release 720 ms
   - 30 Hz to 59 Hz: Attack 16 ms, release 256 ms
   - 60 Hz to 99 Hz: Attack 8 ms, release 128 ms
   - 100 Hz to 224 Hz: Attack 4 ms, release 65 ms
   - 225 Hz to 449 Hz: Attack 2 ms, release 32 ms
   - 450 Hz to 999 Hz: Attack 1 ms, release 16 ms
   - 1 kHz to 1.99 kHz: Attack 0.5 ms, release 8 ms
   - >2 kHz: attack 0.3 ms, release 4.8 ms
4. Mute all outputs into the system except for the output you are setting.
5. Play low-level pink noise into the amplifier channel, and confirm that the expected speaker is playing (if the speaker is connected to the amplifier) and that the multimeter is reading the voltage.
6. While monitoring the meter, slowly increase pink noise until the V_{rms} is at the published rating.

   For low-frequency outputs, an average of at least five seconds at the same pink-noise level is required for the reading to stabilize. Typically, some amplifier clipping will occur. However, if the amplifier clipping light is almost solid, stop increasing the pink noise and leave it at a V_{rms} level below the published rating.
7. While pink noise is playing at the rated V_{rms} (or there is heavy amplifier clipping), turn down the threshold on the root mean square (RMS) limiter block until the measured V_{rms} goes down slightly.

8. Turn up the stimulus gain, and then confirm that the V_{rms} does not increase beyond the rated V_{rms}. If it does, turn down the limiter threshold again until the V_{rms} is not above the speaker rating when the stimulus is driven heavily.

Related information

Dolby SB218 digital signal processing requirements on page 20

7

Documentation revision history

The documentation revision history lists the date, issue number, and description of all publications of the *Dolby SB218 Owner's Manual*.

Date	Issue	Description
March 2023	Issue 1	Initial release
April 2023	Issue 2	Minor updates