



Control[®] Contractor Series

Answers to “Frequently Asked Questions”

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- Control 23, 25, 28
- Transformer Versions
- Control SB-2 Subwoofer
- Systems, *with* Subwoofers
- Systems, *without* Subwoofers

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QUESTIONS & ANSWERS ABOUT THE CONTROL 23, 25 & 28:

Are the InvisiBall™ mounting brackets really included with the speakers at no extra cost?

Yes!

Is full-range overload protection really included in the speakers?

JBL's **SonicGuard** non-invasive protection circuitry is included inside the Control 23, 25 & 28, as well as in the transformer ("T") versions, providing full-range protection (not just for the tweeter). The subwoofer does not include overload protection.

How do I paint the speakers?

The Control 23, 25 & 28 are made of high impact polystyrene which readily accepts a wide variety of paints. For best results, follow the painting directions on page 10 of the Owner's Manual. This is a condensed version of the instructions:

Remove the grille and mask the baffle. Clean the enclosure with a light solvent such as mineral spirits. Apply two or more thin coats of either latex or oil-based paints. Latex paints adhere better if an oil-based primer is used first. The InvisiBall mount may also be painted, but because it is metal, latex paints will not adhere as well as other finishes.

Alternate Paints –

If the specified paint is not be available in your area (possibly due environmental restrictions, as in California), you may use a variety of new-generation waterbased paints. We successfully test-painted Control Contractor speakers substituting a water-based primer and spray paint. We also tested a worst-case scenario by simply spray-painting the speakers, no primer, with a generic spray paint and got acceptable adhesion. Of course, you will get the best adhesion by using the recommended paint and following the procedure in the manual.

Masking the Baffle –

We recommend masking out the ENTIRE baffle, leaving the baffle black. Then paint the speaker cabinet including the grille. Not only does this look better, it makes painting a LOT easier.

Are they available in white?

The Control 23, 23T, 25, 25T, 28 and 28T are ALL available in white. Add "-WH" to the model number to signify a white unit (such as Control 25-WH)

Are the white versions paintable?

Yes. They are made of the same easy-to-paint material as the black versions.

We lost a grille logo during an installation. Can I get replacements?

Yes. You can order spare logos as service parts:

950-00006-00 Control 23 grille logo

950-00007-00 Control 25 grille logo

950-00005-00 Control 28 grille logo

It is easy to lose logos because they get taken off during the installation.

QUESTIONS & ANSWERS ABOUT CONTROL ACCESSORIES:

What accessories are available?

Ceiling Mount Brackets –

These brackets allow you to mount the Control 23, 25 & 28 down from the ceiling instead of out from the wall. They are called ceiling mount “*adapter kits*” because they include only the shaft/ball assembly for use with the existing Invisiball base that comes with the speaker. [See “Ceiling-Mount Installation Instructions”.] They are packaged and priced in pairs (for 2 speakers). There are 50 pairs in each master pack.

MTC-28/25CM – For Control 28 or 25, one pair, black or white.

MTC-23CM – For Control 23, one pair, black or white.

Subwoofer Bracket –

The **MTC-SB2W** bracket is for installing the Control SB-2 to a wall or into a corner.

Arraying Bracket Information –

MTC-23V	Vertical array wall bracket for three Control 23 speakers.
MTC-25V	Vertical array wall bracket for three Control 25 speakers.
MTC-28V	Vertical array wall bracket for three Control 28 speakers.
MTC-25/23H	Horizontal array bracket for two Control 23 or Control 25 speakers., 60° splay. Three brackets connect to form suspendable assembly for six speakers with 360° coverage.
MTC-28H	Horizontal array bracket for two Control 28 speakers, 60° splay. Three brackets connect to form suspendable assembly for six speakers with 360° coverage.

Adapters to Threaded Rod, Threaded Pipe & Suspended Ceilings –

Omnimount Systems in Scottsdale AZ, makes a number of adapters for installing Control Contractor speakers via threaded rod or threaded pipe. They can be ordered directly from Omnimount Systems or from one of their International Distributors. Omnimount has all these adapters in stock:

Model	Description
FOR CONTROL 25 & 28 (7/16"-20 Invisiball shaft):	
50PA BLK	Coupling adapter , black, to ½" Threaded Plumbing Pipe
50TA BLK	Coupling adapter , black, to 7/16"-20 (fine) Threaded Rod
5000MA BLK	Coupling adapter , black, to Microphone Stand Adapter 5/8"-27

FOR CONTROL 23 (6mm dia. Invisiball shaft):

25TA 6mm BLK	Coupling adapter , black, to 6mm dia (standard 1mm pitch) Threaded Rod
JNUT 6mm BLK	Black 6mm jam nut for 25TA 6mm BLK
JBL 6mm CLNG CLIP BLK	Ceiling clip, black, for suspended ceiling T-channel, 2 pc system locks around channel.

JBL does not stock these adapters. They are available directly from Omnimount Systems or from one of their distributors throughout the world. To order direct contact:

Omnimount Systems
1501 W 17th St.
Tempe, AZ 85281
Phone: (602) 829-8000
Fax: (602) 756-9000

QUESTIONS & ANSWERS ABOUT TRANSFORMER VERSIONS:

Tell us about the transformers in these speakers.

- **Less Low-Frequency Saturation** -- These speakers incorporate top quality transformers which exhibit very little low-frequency saturation. The Control 25T and 28T use the same internal transformer, except that the wires exit differently so they are carried under different part numbers.

How does the sound quality of the "T" models compare to the non-transformer models?

The sound quality for the transformer versions is comparable to that of the non-transformer versions. Some people report that they think it even sounds better! Some of our competitors use transformers that exhibit a LOT of low frequency saturation. We use transformers that are remarkably stable down to 40 Hz, even at full drive levels. This makes them easier loads for amplifiers to drive and prevents premature signal clipping.

Is the Control 23 available in a transformer version?

Yes, the Control 23T has a single (non-selectable) power tap rating of 5W@70V and 10W@100V. It exhibits very little low frequency saturation.

Which model do I order for 100V or 70V applications?

The same “T” models work on BOTH 100V and 70.7V distributed lines. Regardless whether you use 100V or 70.7V distributed line systems, you use the same speaker. On the Control 25T and 28T there is a switch to select the power taps. The Control 23T has a single power tap (non-selectable).

What are the power taps for the Control 25T and 28T?

The power taps are 30W, 15W and 7.5W at both 70.7V and 100V, with a 3.7W tap for 70.7V only. The taps are selected by a rotary switch on the back panel. A guide is provided on the back of each speaker showing which switch positions to use for the power settings at 70 and 100V.

QUESTIONS & ANSWERS ABOUT THE CONTROL SB-2 SUBWOOFER:

How do I install the SB-2?

The MTC-SB2W Bracket—

Use the new **MTC-SB2W** bracket to install the Control SB-2 either to a wall surface or into a corner. The bracket acts as an enclosed shelf on which the SB-2 sits. The bracket's outside lip and securing screws keep the subwoofer from sliding or jumping off of the bracket.

IT IS THE RESPONSIBILITY OF THE INSTALLER TO ENSURE THE STRENGTH OF THE BRACKET/BUILDING CONNECTION AND OF THE STRENGTH OF THE BUILDING STRUCTURE! Once the bracket is permanently installed to the building structure, the installer removes the 3 bottom screws from the front load baffle of the SB-2, places the SB-2 into the bracket frame, and reinstalls the baffle screws to permanently attach the SB-2 to the bracket. . . . done!

Alternate Installation –

If you want to install to a wall or corner *without* using the JBL bracket, then you **must** support the SB-2 entirely on an “enclosed shelf-type” support that the SB-2 sits into and make sure it is secure. **DO NOT “SUSPEND” (ie, do not “fly” it from suspension cables) THE SB-2 AND DO NOT INSTALL THE SB-2 WITHOUT SUPPORTING IT IN ITS ENTIRETY FROM THE BOTTOM.** The support must be able to support the weight of the product (19.1kg, 42 lbs), plus the weight of the support, plus an additional safety factor – JBL designs to a 10:1 safety factor, but check the safety factor requirement in your area. You must also take steps to make sure that the SB-2 cannot jump off or slide off the support with vibration (this IS a subwoofer and it DOES vibrate) or in the event of an earthquake.

We have used JBL Control SB-5's in the past and are familiar with them. How does the Control SB-2 compare to the SB-5?

The Short Answer –

These two models are similar in performance, with the exceptions detailed below.

More Detailed Information --

SPL Output -- Under identical loading conditions, these two models have almost identical output at 80 Hz (within ¼ dB). If you take *recommended placement* into account -- the SB-5 instructions recommends placing it in the middle of the wall; the SB-2 is designed to couple ideally into a corner, using the wall as a bass horn -- then the SB-2 delivers greater sensitivity under these recommended loading conditions. Under identical loading, the two models have similar "Max SPL" capability. Again, with corner loading vs. wall-loading the SB-2's greater voltage sensitivity results in a little greater Max SPL.

Frequency Response –

SB-5: The SB-5 has a frequency response hump at 80 Hz and falls rapidly below that.

SB-2: The SB-2 offers true subwoofer performance: The SB-2 also has its frequency response peak at 80 Hz, but its response does not fall off as rapidly, resulting in about 15dB greater output at 30 Hz! This can sound more like a true high fidelity – and more pleasant -- subwoofer. There is also less masking of conversation with the SB-2 because this "true" subwoofer performance puts more relative energy at lower frequencies and so there is less relative upper-subwoofer sound which tends to mask speech.

Can I use the Control SB-2 outdoors?

The Control SB-2 is not made to be use outdoors. It is constructed of particle board which tends to swell with excessive moisture.

Can I paint the SB-2?

Yes, but it's a different procedure than with the other models. The SB-2 is covered in a scratch-resistant vinyl. For the paint to adhere, you must first degloss ("scuff up") the scratch-resistant coating on the surface of the vinyl. Fine sand paper works well for deglossing, then clean the surface with a "tack cloth" before painting. A variety of paints can then be used. It is best to use a oil-based primer before painting with latex paint.

QUESTIONS & ANSWERS ABOUT SYSTEMS – SATELLITES WITH SUBWOOFERS:

What is the JBL CCS6000 Control Contractor Subwoofer/Satellite System?

CCS6000 is a subwoofer/satellite system consisting of:

- 1-Control SB-2 Subwoofer.
- 4-Control 23's as High-Passed Satellites, connected to SB-2 Satellite Outputs

Why Do We Call It “6000”? -- The **CCS6000** System covers a **6000** square foot room at a typical 85dB-SPL background music level, with amazingly even coverage -- within 1½ dB (up to 8kHz!) -- throughout the listening area. 6000 square feet is about 560 square meters.

How Do I Use CCS6000? -- The “6000” figure is a baseline coverage area for system designs. From this baseline, you can scale the coverage up or down to adjust for applications with different size rooms and different SPL requirements.

Here is an example: Let's look at a taller room where the speakers are placed at the ceiling. The 6000 square foot area places the speakers at a 15 ft (4.6m) height, resulting in a 90,000 cu ft (2550 m³.) room. In a 30-foot tall room, the same SPL can be attained with a floor space of 4000 sq ft (370 m²) with maximum ±0.5 dB variation in level, resulting in a 120,000 cu ft (3400 m³) room. By placing the speakers at the ceiling we attain more even coverage yet a smaller coverage area due to lower SPL from the speakers being farther away. CADP2 can be a very useful tool for determining SPL capabilities, variation levels, and ideal locations for installation of the speakers in various size rooms.

Larger Rooms -- Multiple **CCS6000** can be used to cover areas larger than 6000 cubic feet. As a general rule in a single open space, 2 systems can cover an area that is **2.5 times** the area of a single system (approx 15,000 square feet) due to overlap in satellite coverage in the center areas.

How does the JBL CCS6000 System compare in performance to typical subwoofer/satellite systems?

Compared to most sub/sat systems, the **CCS6000** system provides greater separation between the subwoofer and the satellite frequency bands. The 2nd order crossover low-pass and acoustic low-pass of the load baffle form a dual-slope 3rd order low-pass to the sub; the high-pass to the satellites is 1st order. Electrically, the low-pass is 160Hz and the high-pass is 320Hz. The resulting intermediate band separates impedance interaction between the sub and the satellite. Because of a rising frequency response at the high end of the sub and low end of the satellites, the actual “acoustic” crossover point is at 160Hz and is quite seamless. This optimum band separation, results in a subwoofer/satellite system with exceptional clarity as well as the impedance benefits which are discussed in more detail below.

System Clarity & Listener Comfort –

The response of the system has been tailored to facilitate communication within the coverage space and to not compete with people who are trying to have conversations. This reduced “voice masking” allows talkers (customers) to understand each other better at lower talking levels, making for a more comfortable atmosphere.

The Benefits of Impedance Separation –

Many other sub/sat systems have substantial overlap between the sub and the satellites. In the **CCS6000** system, below the crossover frequency the amplifier only “sees” the subwoofer impedance; above crossover the amp sees only the satellites. For design purposes, you can consider the satellite and the subwoofer loads to be totally separate from each other. For example, an 8Ω subwoofer and an 8Ω satellite on a single channel of an amp results in a total 8Ω load (not a 4Ω load) because the amp never sees both speakers at the same time on the same signal. This allows more satellite speakers to be utilized without loading down the amp with too low of an impedance.

What other subwoofer/satellite system configurations does JBL recommend?

The Control Contractor Series contains a variety of models, allowing great flexibility to configure a system to fit the requirements of many different applications. To help establish some starting points for systems we have developed some other recommended system combinations, (these combinations are structured for stereo applications):

Other Configurations which we have found work well are:

Control 25’s:

- **For high bass-content applications** – 2-Control 25’s in series with each other on each channel of an SB-2. Use multiple module, as required.
- **For lower bass-content applications** -- 2-Control 25’s in parallel or 4 Control 25’s in series/parallel on each channel of an SB-2.

Control 28’s:

1-Control 28 on each channel of an SB-2.

These configurations are only a few of the systems you can configure using Control Contractor Series speakers. The considerations you need to think about in configuring a system are outlined in the answer to the next question.

What considerations do I need to think about in using Control Contractor as “building blocks” to configure various systems (for example, in a mono system)?

The attached “CCS6000” spec sheet shows typical hookup wiring with both stereo and mono systems.

1) Configuration Considerations When Using the SB-2 Passive Crossover: When wiring the SB-2 passively into any system, you need to look at a) the impedance of both the low-pass and the high-pass bands, b) the sensitivity balance, and c) the output level capability.

a) Impedance: Because the SB-2’s crossover network does a good job of separating the low-pass and high-pass frequency bands (see explanation, above), you can usually consider the impedance in each band as being nearly separate from each other.

- **Mono System Subwoofer Impedance:** To operate in mono, parallel the two subwoofer inputs, resulting in a 4Ω load in the subwoofer range, below 160 Hz.
- **Mono System Satellite Impedance:** In mono systems (with the inputs of the subwoofer paralleled), the amp “sees” the loads hooked up to the Left and Right satellite outputs as being in parallel with each other. For example, if your amp is rated for a minimum 4-ohm load, then you need to make sure the parallel of the Left and Right satellite loads is no lower than 4-ohms.

- **Crossover Frequency & Impedance** – The crossover frequency is set for the ideal 160Hz acoustic crossover point with a 4-ohm load on each satellite output. It is best to use a 4-ohm load on each “satellite output” when possible. *Increasing* the impedance of the satellites on a satellite outputs *lowers* the crossover frequency to the satellites, resulting in a more overlap – in frequency response and in impedance.

b) Sensitivity Balance – The required sensitivity balance between the subwoofer and satellites varies by the musical requirements of the application. A pub or health club might require much more bass content than does a background music system in a retail application.

- **Satellite Sensitivity** – Sensitivity of the satellite section varies by the sensitivity of the particular satellite model chosen, the number of speakers and the hookup topology. Higher satellite sensitivities result in less relative subwoofer level.
- **Subwoofer Sensitivity** – Sensitivity of the subwoofer can be easily adjusted by varying the location of the subwoofer. Starting with a corner installation -- using the MTC-SB2W bracket – you can *increase* bass output by moving the subwoofer closer to the ceiling; you can *decrease* bass output by moving it out onto a flat wall. It may be a good idea to install the SB-2 last, adjusting the location for desired bass balance.

c) SPL Capability – The system designer needs to check that the SPL capability of both the satellites and subwoofer is adequate for the application. You can compute the theoretical maximum continuous SPL from each speaker by the following formula : *10 times the log of the continuous pink noise capability (which is 3dB below the program rating) plus the sensitivity.* Theoretical Max Continuous SPL’s for Control Contractor speakers are:

Model	Typical Location	Theoretical “Max. Continuous SPL” (1m)
Control 23	On-wall (2π loading)	100dB-SPL
Control 25	On-wall, (2π loading)	107dB-SPL
Control 28	On-wall (2π loading)	111dB-SPL
Control SB-2	Wall/wall/ceiling ($\pi/2$ loading)	122 dB-SPL
	Wall/wall or wall/ceiling ($1-\pi$ loading)	119 dB-SPL

Qualifications:

Headroom – The short-term “peak” SPL is 6dB higher than this theoretical continuous maximum. In most applications you will want to design the system with higher headroom – often 10 to 14 dB – over typical operating levels.

Power Compression – Power compression affects everyone’s speaker systems, so the theoretical maximum is “approached”, but not actually sustained.

Adjustments to SPL Computations for Multiple Speakers: The coverage of the satellites usually overlap in the center of the space, so in addition to using the inverse square law to indicate the SPL level at a distance, you need to add in the overlap with other speakers. Another considerations is the low-frequency coupling of multiple speakers which tends to reinforce the bass response more than other frequencies.

Using CADP2: The considerations listed above can be complex. CADP2 allows you to model the speaker’s performance and SPL capability in the listening space. CADP2 files have been developed for the Control 23, 25 & 28.

2) Driving the SB-2 Separately – The *best* way to control the subwoofer level is by running it on its own amplifier, with its own volume control. More complex systems benefit from providing a separate amplifier channel dedicated for the subwoofer(s) in the system.

How do I order a CCS6000 System?

The model number for ordering purposes is “**CCS6000**”. The JBL CCS6000 System is a system module *recommendation*, but it is not bundled together in a single carton for shipping. So you can either order it by its individual product models: 4 - Control 23’s and 1 - Control SB-2, or you can order it as a **CCS6000**. The system is shipped in 3 cartons: 2 pairs of Control 23’s and 1 Control SB-2.

Remember to add an **MTC-SB2W** bracket if you want to install the subwoofer to a wall or corner.

Can I run an SB-2 on a 70V or 100V distributed system?

To operate the SB-2 on a distributed-sound line, you need to use a very good quality transformer. Most transformers saturate at low frequencies, dropping the impedance in the subwoofer range to a fraction of what it is at higher frequencies. This can draw too much current from the amplifier – either causing the amp to fail or creating undesirable audible artifacts such as premature amp clipping or “topping-out” at low levels. This can degrade the sound that goes through the full-range speakers, as well. If you’re going to use a transformer, full isolation transformers are typically much better than autoformers for subwoofers because they exhibit much less low frequency saturation. The more power you put through the transformer the more it saturates, so even a transformer that looks well behaved on low-signal test equipment can saturate badly on higher voltage distributed lines. It requires a very large and expensive transformer to drive the SB-2 adequately on a distributed line.

It is often a better idea to run the SB-2 from its own low-voltage (not 70/100V) amplifier channel and run only the satellites from the distributed-sound line.

QUESTIONS & ANSWERS ABOUT SYSTEMS WITHOUT SUBWOOFERS:

What EQ do you recommend for full range satellite-only systems without subwoofers?

Systems consisting of Control 25’s or Control 28’s by themselves -- without a subwoofer -- deliver acceptable low frequency performance for many applications without equalization because the speakers naturally feature a fairly flat frequency response.

However, you might want to use some EQ to tailor the sound for the application. The proper equalization depends on many factors, such as the quantity of speakers (the more speakers, the more bass coupling), the room characteristics, the typical operating level (Fletcher-Munson equal loudness contours), the type of activity taking place in the venue, and the tastes of the listeners.

One small, inexpensive equalizer that appears to be useful for these types of systems is the ST-EQ3 3-Band EQ “Stick-On” Module, from Radio Design Labs (USA 800-933-1780; Europe 31-20-6238-983). This module’s center-frequencies and bandwidths work well to tailor the performance of these satellite-only systems to fit most applications.

We hope this FAQ sheet helps to answer your questions and that you have found this information helpful. For more information about Control Contractor Series, contact JBL Professional, Customer Assistance, 8400 Balboa Blvd, Northridge, CA 91329 USA. (818) 894-8850.