Ratio Guidelines for Control 312CS Subwoofers

Control 300 Large-Format In-Ceiling Speakers are capable of excellent bass without subwoofer reinforcement. However, for applications requiring additional low-frequency reinforcement, Control 312CS subwoofers can be added. This chart is a starting-point guideline for how many Control 312CS subwoofers are required to achieve the proper subwoofer SPL, taking into consideration the model of Control 300 main loudspeakers, whether running low impedance vs. 70/100V, the tap setting on 70V/100V systems, the type of bass desired (light/typical/strong), and placement relative to boundaries. Additional factors may need to be considered. Please read Important Application Notes, below.

	Placement Mostly Away from Walls & Corners		Placement Mostly Near Corners (for small rooms only)	
	Typical Music Reproduction	Very Strong Bass	Typical Music Reproduction	Very Strong Bass
	Ratio (Mains : Subwoofers)		Ratio (Mains : Subwoofers)	
CONTROL 328				
Control 328C, 8 ohm	1 : 1	1 : 2	2 : 1	1 : 1
Control 328C & optional MTC-T150 x-former	2 : 1	1 : 1	3 : 1	2 : 1
Control 328CT, 60W tap	4 : 1	2 : 1	6 : 1	3 : 1
Control 328CT, 30W tap	8 : 1	4 : 1	8 : 1	6 : 1
Control 328CT, 15W tap	8 : 1	8 : 1	8 : 1	8 : 1
Control 328CT, 7.5W tap (70V only)	8 : 1	8 : 1	8 : 1	8 : 1
CONTROL 321				
Control 321C, 8 ohm	1 : 1	1 : 2	2 : 1	1 : 1
Control 321C & optional MTC-T150 x-former	3 : 1	2 : 1	4 : 1	2 : 1
Control 321CT, 60W tap	4 : 1	2 : 1	6 : 1	3 : 1
Control 321CT, 30W tap	8 : 1	4 : 1	8 : 1	6 : 1
Control 321CT, 15W tap	8 : 1	8 : 1	8 : 1	8 : 1
Control 321CT, 7.5W tap (70V only)	8 : 1	8 : 1	8 : 1	8 : 1
CONTROL 322				
Control 322C, 8 ohm	1 : 2	1 : 4	1 : 1	1 : 2
Control 322C & optional MTC-T150 x-former	3 : 1	2 : 1	4 : 1	2 : 1
Control 322CT, 100W tap	3 : 1	2 : 1	5 : 1	3 : 1
Control 322CT, 50W tap	6 : 1	3 : 1	8 : 1	5 : 1
Control 322CT, 25W tap	8 : 1	6 : 1	8 : 1	8 : 1
Control 322CT, 12.5W tap (70V only)	8 : 1	8 : 1	8 : 1	8 : 1

Important Application Notes:

1) COVERAGE -- This chart shows the ratios for attaining proper SPL balance into the room but does NOT indicate how even the coverage will be, which is also an important consideration. Additional subwoofers may be necessary to achieve acceptable coverage. Ceiling-mounted subwoofers typically directly cover an area of 120 x 120 degrees. At ratios, above, that utilize fewer subwoofers, coverage becomes an increasingly important factor to consider. In addition, while placement near walls and corners increases sensitivity, it can result in sound that is too loud close to the subwoofers and too soft away from subwoofers. As rooms get larger, it is increasingly important to cover the center of the room directly.

2) CROSSOVER MODE and EQ -- This chart assumes the use of a traditional active crossover that low-passes the subwoofers (Control 312CS must be low-passed in all cases) and high-passes the main speakers. If main speakers are being operated full-range (not high-passed), then a subwoofer/mains bump will occur in the frequency response, resulting in an overly dominant mid-bass (ie, "muddy" bass). Typically, a **PARAMETRIC EQ** (set with measurement software) must be utilized in the signal chain before the crossover to remove this bump.

3) POWERING THE SUBWOOFERS -- Ratios are based on Control 312CS operated low-impedance (8 ohms) with adequate power amplification (800W into 8 ohms, per driver) to attain maximum SPL capability from the 312CS. With lower amplification per subwoofer, the ratio may need to be adjusted to a greater quantity of subwoofers (at an approximate ratio of doubling the quantity of subwoofers for each halving of the amplifier power).

4) USING DIFFERENT JBL PRO SUBWOOFER MODELS -- JBL Professional provides a wide variety of subwoofer choices. For systems where the chart indicates a large number of Control 312CS subwoofers, an alternative JBL subwoofer may be warranted. Choices include Control SB210, AL6115, ASB6118 or ASB6128. Following are some rough guidelines: For Control SB210 subwoofers, reduce the number of subwoofers to 50% of the quantity recommended by the chart (half as many as the quantity indicated on the chart). SB210s can be installed in distributed layout above ceiling grates, or on walls. For AL6115 or ASB6118 subwoofers, reduce the number of subwoofers to 25% (use one-fourth as many as indicated on the chart). For ASB6128, reduce the number of subwoofers to 12% (one-eighth as many as indicated). Be especially mindful of coverage when using fewer subwoofers (see "Coverage", above).

0607 -- RK