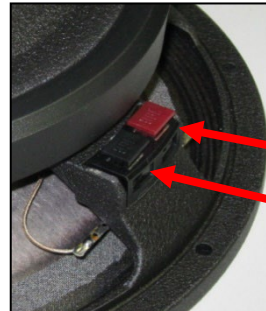


Polarity and Phase - Basics

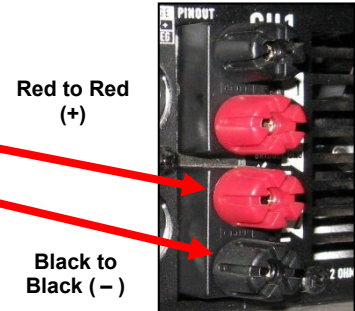
Polarity refers to the position of the “positive or hot” (+) and the “negative or common” (–) signals in an audio system. It’s the part of the signal (waveform) that is currently “active.” Some connectors will designate which pin is hot and common, and some connectors may also designate a “ground” where the shield wire should connect. Speakers will usually have red and black connectors, markings, or dots on them to designate polarity (refer to the images below).

Speaker / Amplifier Polarity Notes

When speakers are connected “In Polarity,” the speaker cones will move “in and out” at the same time, when this occurs, the speakers are said to be in correct polarity (in phase). When speakers are not connected “in phase” this can cause signal cancelations. This is why it is very important to check for the red / black connectors, any markings (plus, negative symbols), or simply a small red dot next to positive prior to hooking up your speakers.



Speaker

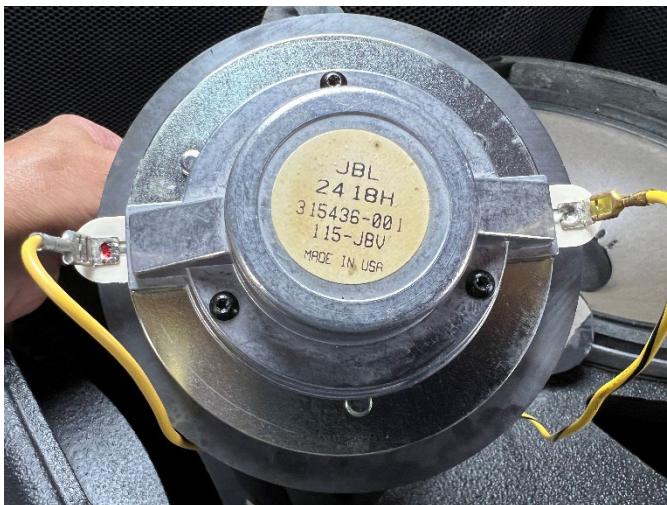
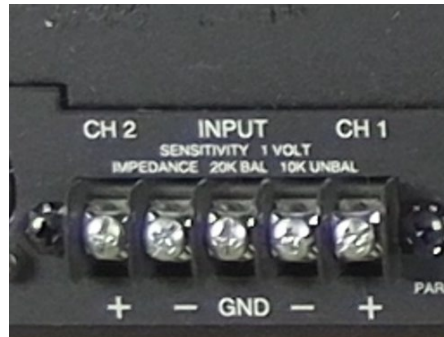


Amplifier

Red to Red (+)

Black to Black (-)

Here are some additional examples of markings (plus and minus), symbols, and dots on various pieces of audio equipment and speakers.



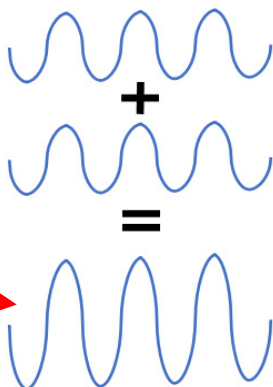
Important Technical Note: You should always maintain proper signal polarity starting with the inputs, and continuing all the way to the outputs in your sound system.

What does it mean to be “In-Phase?”

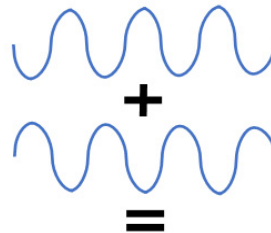
Here is an example to help you understand the principles of polarity and how it relates to signals and phase!

In the example to the right, when the two signals (which are shown as Sine Waves – also referred to as Wave Forms) are “In Phase” they add together to create a stronger signal.

In Phase
Waves Add Together



180° Out of Phase
Waves Cancel Each Other



In the example to the left, when two signals are 180 Degrees “Out of Phase” the two signals cancel each other out. Sometimes the signal can be completely cancelled out, and sometimes the signal can just sound “attenuated” (lower in signal level).

Signal Completely Cancelled Out

Testing a speaker with a 9V Battery to Check “Polarity”
You will need a 9V battery, a 9V battery connector (or some alligator clips). This test is mainly used on Low Frequency speakers, and is a quick and accurate way to test a subwoofer or woofer speaker to see if it is “Defective” and / or to check for “Polarity.” It is not recommended to use this test on high frequency speakers.

The Test

Connect (or hold) the 9V battery’s positive terminal to the speaker’s positive terminal, and then “quickly” touch the 9V battery’s negative terminal to the speaker’s negative terminal – you should hear a “pop” and the speaker’s cone should move outward. Then, reverse the battery leads – positive battery terminal to the speaker’s negative terminal, and then “quickly” touch the 9V battery’s negative terminal to the speaker’s positive terminal – you should hear a “pop” and the speaker’s cone should move inward (downward). This is a quick test to let you check the Polarity, and also know if the speaker is working or not. If you don’t hear a “pop” and the speaker cone does not move – the speaker is likely defective.

[9V Battery Speaker Test – Video Clip!](#)



Tech Note – JBL Polarity Scheme: Just in case you are working with older JBL speakers (older than 1990) be aware that JBL previously used a “Positive to Black” and “Negative to Red” Polarity scheme – the speaker cone would pull inward then outward. Newer JBL models (1990’s to Present) converted over to the “Positive to Red” and “Negative to Black” polarity scheme utilized by the majority of the other speaker manufacturers.