Infinity®

kappa series

100.3se, 100.3dvc, 120.3se, 120.3dvc

instructions

Thank you for choosing an Infinity Kappa Series subwoofer. Kappa Series subwoofers are designed to suit a broad range of mobile audio applications and can be used in a wide variety of enclosure types to produce extended, powerful bass in a limited amount of vehicle space. To ensure maximum subwoofer performance, we strongly recommend that installation be left to a qualified professional. Although these instructions explain how to install a Kappa Series subwoofer in a general sense, they do not show box-construction details and exact installation methods for your particular vehicle. If you do not feel you have the necessary experience, do not attempt the installation yourself, but instead ask your authorized Infinity dealer about professional installation options.

Remember to keep your sales receipt with this manual in a safe place so both are available for future reference.

Loud Music and Hearing

WARNING
Playing loud music in an automobile can permanently damage your hearing, as well as hinder your ability to hear traffic. The maximum volume levels achievable with Infinity speakers, combined with high power amplification, may exceed safe levels for extended listening.

We recommend using low volume levels when driving. Infinity accepts no liability for hearing loss, bodily injury, or property damage as a result of use or misuse of this product.

Your Car and Bass Reproduction

Depending on the size of the vehicle's interior listening space, reproduced bass frequencies below 80Hz are boosted by nearly 12dB per octave as frequency decreases in the car.

This effect, known as the *vehicle's transfer function*, plays an important part in shaping overall in-car response and is displayed graphically, along with freespace response, on the enclosed data sheet for your Kappa subwoofer.

Choosing an Enclosure

Kappa Series subwoofers are optimized to perform best in small sealed, vented, and prefabricated bandpass enclosures. While infinite-baffle mounting is possible, power handling will be greatly compromised because there is no enclosed volume of air to prevent the speaker's cone from moving past its limit. For this reason, we do not recommend infinite-baffle mounting for Kappa Series subwoofers.

You should choose an enclosure based on the following factors: the type of music you listen to, the amount of amplifier power required to drive the subwoofer, and the volume of interior space needed for the subwoofer enclosure.

SEALED ENCLOSURES
Because a sealed enclosure provides the most control over the subwoofer's movement, an enclosed subwoofer will handle more power than one mounted in another type of enclosure. Also, sealed enclosures provide more accurate sonic reproduction than other enclosure types, so they are well suited to all types of music.

Sealed-enclosure construction is straightforward, and there are many prefabricated boxes available. Optimum sealed enclosures are always smaller than other types of optimized enclosures for a particular speaker, so they will only require the smallest amount of space inside the vehicle.

VENTED ENCLOSURES
Vented enclosures provide better efficiency in the 40Hz to 50Hz range, but at the expense of reduced sound output in the lowest octave (below 40Hz) and some loss of control and power handling. When using a small amplifier, a vented box will provide more bass output from less power.

Vented enclosures are also well suited to a variety of music types. However, because the required enclosure volume and port size have a specific relationship with the characteristics of the subwoofer, each enclosure must be built exactly to the provided specifications. While there are some prefabricated vented boxes available, matching one to a particular subwoofer is difficult. Moreover, an optimum vented enclosure is always larger than the optimum sealed box for the same subwoofer and will require more space inside the vehicle.

If you wish to use a vented enclosure, we strongly recommend having your authorized Infinity dealer build it or that you verify that your design is correct before you start building it yourself.

BANDPASS ENCLOSURES
Bandpass enclosures often provide the most output available from any amplifier and subwoofer combination at the expense of sonic accuracy. If sheer SPL (sound-pressure level) is what you desire most, then choose a bandpass enclosure.

However, bandpass-enclosure design is very tricky and may require the aid of a computer and enclosure design software. If you are an experienced installer or have some woodworking experience, you may wish to build the enclosure described in the design sheet included with this subwoofer. Fortunately, there are many prefabricated bandpass boxes available and they are all optimized to extract the most output possible from any subwoofer. Bandpass enclosures can be quite large and may require a lot of space inside your vehicle.

Power-Handling Limitations

The power-handling capability of any subwoofer is related to both its ability to dissipate heat and the maximum excursion limits of its cone. Once the subwoofer's voice coil moves outside the magnetic gap, power can no longer be converted into motion and all the amplifier's power is converted into heat. This is the most significant detriment to subwoofer longevity, so overexcursion should be avoided. Since cone excursion is different for each type of enclosure, expect power handling to be different for each enclosure as well.

EXCURSION IN A SEALED ENCLOSURE
Sealed enclosures exert the most control over the motion of a subwoofer because the air inside the box acts like a spring against the motion of the subwoofer cone. Larger boxes allow for more excursion, thus providing more low-frequency output for the amount of power used. When a subwoofer is placed in a sealed box much larger than its associated V_{as}, it will perform as if it were in an infinite-baffle installation. We do not recommend this application.

EXCURSION IN A PORTED ENCLOSURE
Vented and bandpass enclosures have the lowest amount of excursion for the amount of sound output. This is a result of port output reinforcing the sound output from the subwoofer. The mass of the air contained in the port provides an acoustic load on the subwoofer's cone at the tuning frequency, and this added mass decreases subwoofer-cone excursion. However, vented boxes do not provide adequate subwoofer control when driven below the tuned frequency (F_b), so proper design is important. A vented bandpass box will have the lowest overall cone excursion, provided a subsonic filter is used.

OTHER CONSIDERATIONS

- Voice-coil overheating and burning due to overexcursion are often caused by overdriving an amplifier into "clipping." A severely clipped signal, or square wave, contains nearly twice the power of a clean sine wave at the same level. Bass that sounds broken up and distorted at higher volumes is usually indicative of an amplifier that is clipping and being asked to deliver power beyond its ability.
- Infinite-baffle or "free-air" mounting applications allow for greater cone excursion than subwoofers mounted in an enclosure. For this application, power handling should be reduced to half of its published specification.
- Study the excursion curves on the enclosed Kappa Series data sheet and note the differences for different enclosure applications. The type and size of box used will produce different excursion demands on the subwoofer and, consequently, different levels of power handling. As long as the recommended enclosure parameters are used, the subwoofer will perform properly in its enclosed environment. However, any design deviation may result in less than optimum performance, and may also subject the subwoofer to overexcursion (i.e., where the voice coil leaves the gap) that can eventually damage the speaker. For additional help with this issue, please contact your authorized Infinity dealer.

Connecting a Subwoofer System

Kappa Series subwoofers are available in single and dual voice-coil versions. Depending on your system design, you may use either type in single or multiple subwoofer applications to maximize available power.

IMPEDANCE CONSIDERATIONS
To achieve maximum amplifier output, you should design a subwoofer system that provides the lowest impedance that your amplifier can drive safely. Here are some design tips:

- Don't mix different subwoofer or enclosure types in the same system. For example, use only all single voice-coil woofers or all dual voice-coil woofers.
- Connect a dual voice-coil subwoofer in series, but NEVER connect separate subwoofers in series. Because the amplifier's damping factor (i.e., the amplifier's ability to control the motion of the subwoofer) is expressed as a ratio of terminal impedance (i.e., the sum of speaker impedance, wire resistance, and the direct-current resistance of any crossover coil connected to the subwoofer) to amplifier output impedance, connecting subwoofers in series reduces the damping factor of the amplifier to a value less than one. Doing so may result in poor system damping.
- You must use both coils of a dual voice-coil subwoofer either in series or in parallel.
- Most amplifiers deliver exactly the same amount of power bridged into a 4-ohm load as they do running a 2-ohm stereo load.

POWER CONSIDERATIONS
To design a subwoofer system that maximizes available amplifier power, keep the following rules in mind:

- The formula for total system impedance of voice coils connected in parallel is:

  $I = 1/(1/w_1 + 1/w_2 + 1/w_3...)$

  where I is the total system impedance in ohms, and w is the nominal impedance of a voice coil in ohms.
- The formula for total system impedance of voice coils connected in series is:

  $I = w_1 + w_2 + w_3...$

CONNECTIONS
The following illustrations show parallel and series speaker connections.

Figure 1. Parallel connection

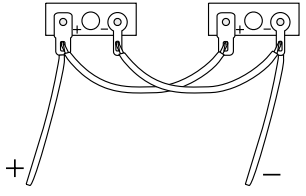
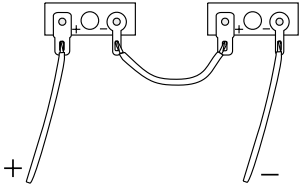


Figure 2. Series connection



SPECIFICATIONS

100.3se

Type:	10" subwoofer, single voice coil
Nominal Impedance:	4 ohms
Power Handling:	275W RMS, 1,100W Peak
Sensitivity (2.83V, 1m):	93dB
Frequency Response:	20Hz – 250Hz
Mounting Depth:	5-7/16" (139mm)
Cut-out Diameter:	9-1/8" (232mm)

120.3se

Type:	12" subwoofer, single voice coil
Nominal Impedance:	4 ohms
Power Handling:	300W RMS, 1,200W Peak
Sensitivity (2.83V, 1m):	94dB
Frequency Response:	18Hz – 250Hz
Mounting Depth:	5-3/4" (147mm)
Cut-out Diameter:	10-15/16" (278mm)

100.3dvc

Type:	10" subwoofer, dual voice coil
Nominal Impedance:	4 ohms per coil
Power Handling:	275W RMS, 1,100W Peak
Sensitivity (2.83V, 1m):	93dB
Frequency Response:	20Hz – 250Hz
Mounting Depth:	5-7/16" (139mm)
Cut-out Diameter:	9-1/8" (232mm)

120.3dvc

Type:	12" subwoofer, dual voice coil
Nominal Impedance:	4 ohms per coil
Power Handling:	300W RMS, 1,200W Peak
Sensitivity (2.83V, 1m):	94dB
Frequency Response:	18Hz – 250Hz
Mounting Depth:	5-3/4" (147mm)
Cut-out Diameter:	10-15/16" (278mm)

Declaration of Conformity

CE

We, Harman Consumer International
2, route de Tours
72500 Chateau-du-Loir
France

declare in own responsibility, that the products described in this owner's manual are in compliance with technical standards:

EN 50081-1:1992

EN 50082-1:1997

Lutz Uphoff
Harman Consumer International
Chateau-du-Loir, France. 5/01

Infinity Systems, Inc. • 250 Crossways Park Drive, Woodbury, NY 11797 USA
(800) 553-3332 • FAX (516) 682-3523 • www.infinitysystems.com

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