Dayton Audio DS215-PR

Dayton Audio DS215-PR 8-inch Designer Series Passive Radiator Instruction Manual

Model: DS215-PR | Brand: Dayton Audio

1. Introduction

The Dayton Audio DS215-PR is an 8-inch Designer Series Passive Radiator, engineered to enhance the low-frequency performance of speaker systems. This component is suitable for both new speaker enclosure construction and as a replacement in existing designs. It is designed to work in conjunction with an active woofer or subwoofer to produce smooth, low-distortion bass without requiring additional amplifier power or a port.

Key features include a robust construction with a high-excursion design, a durable poly-coated paper cone, and a medium-roll rubber surround for clean excursion and extended lifespan. The DS215-PR also features an M5 threaded hole for convenient addition of mass, allowing for precise tuning of the system's resonant frequency.

2. Product Overview

The DS215-PR passive radiator is a non-powered speaker component that utilizes the internal air pressure changes within a sealed enclosure to augment bass output. It is cosmetically and mechanically matched to the Dayton Audio Designer Series line of drivers, ensuring a cohesive appearance and performance when integrated into a system.

Figure 1: Front angled view of the Dayton Audio DS215-PR Passive Radiator, showcasing its poly-coated paper cone and rubber surround.

Components:

- **Poly-Coated Paper Cone:** Provides durability and consistent acoustic performance.
- **Medium-Roll Rubber Surround:** Allows for high excursion and long life.
- **Steel Basket/Frame:** Ensures structural integrity.
- **Built-in Mass Disc:** Offers a starting point for tuning.
- **M5 Threaded Hole:** For adding external weights to adjust tuning frequency.
- **Flange:** For mounting the passive radiator securely.

Figure 2: Side view of the passive radiator, illustrating its depth and robust construction.

3. Setup and Installation

Proper installation of the DS215-PR passive radiator is crucial for optimal performance. This component is designed to be mounted in a sealed speaker enclosure alongside an active woofer or subwoofer.

Installation Steps:

1. **Enclosure Preparation:** Ensure your speaker enclosure is sealed and has a cutout for the passive radiator. The recommended cutout diameter is 180 mm.
2. **Mounting:** Position the passive radiator into the prepared cutout. The unit has 5 mounting holes. Secure it using appropriate screws (not included) through the flange, ensuring a tight seal to prevent air leaks.
3. **Tuning (Optional):** The DS215-PR includes a built-in mass disc. For fine-tuning the system's low-frequency response, additional weights can be attached to the M5 threaded hole on the cone. Adding mass will decrease the resonant frequency (Fs) and increase the mechanical Q (Qms).

System Design Considerations:

- **Volume Displacement:** As a general guideline, the passive radiator(s) should be capable of moving double the volume of air compared to the active woofer(s)/subwoofer(s) in the system. For example, an 8-inch active woofer with 9mm of X-max would ideally be paired with two 8-inch passive radiators, each with 9mm of X-max.
- **Size Matching:** For single passive radiator systems, it is common practice to use a passive radiator that is larger in diameter than the active woofer(s)/subwoofer(s).

Figure 3: Top-down view of the passive radiator, showing the cone and mounting holes.

4. Operating Principles

The Dayton Audio DS215-PR passive radiator operates on the principle of acoustic resonance. When an active woofer within a sealed enclosure moves, it creates pressure changes inside the box. These pressure changes cause the passive radiator's cone to move in and out, effectively radiating sound energy, primarily in the lower bass frequencies.

This mechanism allows the system to achieve deeper bass extension and higher output than a sealed enclosure alone, without the turbulence and port noise associated with a traditional ported design. The tuning of the passive radiator, influenced by its mass and the enclosure volume, determines the system's lowest resonant frequency and overall bass character.

Figure 4: Rear view of the passive radiator, showing the M5 threaded hole for mass adjustment.

5. Maintenance

The Dayton Audio DS215-PR passive radiator is designed for long-term reliability with minimal maintenance. To ensure its continued performance and longevity, observe the following guidelines:

- **Cleaning:** Periodically wipe the cone and surround with a soft, dry cloth to remove dust and debris. Avoid using harsh chemicals or abrasive materials.
- **Physical Protection:** Protect the passive radiator from direct physical impact, punctures, or excessive pressure on the cone.
- **Environmental Conditions:** Ensure the speaker enclosure is used in a stable environment, avoiding extreme temperatures or humidity, which could affect the materials over time.
- **Seal Integrity:** Regularly inspect the mounting seal for any signs of degradation or leaks, which could compromise performance.

6. Troubleshooting

If you experience issues with the performance of your passive radiator system, consider the following troubleshooting steps:

- **Insufficient Bass Output:**
  - Verify the enclosure is completely sealed. Air leaks can severely degrade passive radiator performance.
  - Check the mass tuning. Adding more mass to the passive radiator will lower the tuning frequency, potentially increasing very low bass output, but may reduce overall efficiency.
  - Ensure the passive radiator is appropriately sized and matched to the active woofer(s) according to design principles (e.g., sufficient volume displacement).
- **Distorted Bass / Rattling:**
  - Inspect the passive radiator for any physical damage to the cone or surround.
  - Check for loose mounting screws or vibrations from the enclosure itself.
  - Ensure the passive radiator is not exceeding its maximum excursion (Xmax). This can occur if the active woofer is overdriven or if the system is tuned too low for the enclosure volume.
- **No Bass Enhancement:**
  - Confirm the enclosure is sealed and airtight.
  - Verify that the active woofer is functioning correctly and producing sufficient internal air pressure.

7. Specifications

Detailed technical specifications for the Dayton Audio DS215-PR 8-inch Designer Series Passive Radiator:

Parameter	Value
Model Number	DS215-PR
Nominal Diameter	8 inches
Resonant Frequency (Fs)	23.3 Hz
Compliance Equivalent Volume (Vas)	43.1 liters
Mechanical Q (Qms)	7.34
Mechanical Compliance of Suspension (Cms)	0.68 mm/N
Drivers Mechanical Losses (Rms)	1.4 kg/s
Diaphragm Mass Inc. Airload (Mms)	68.8g
Surface Area Of Cone (Sd)	211.2 cm^2
Maximum Linear Excursion (Xmax)	11 mm
Overall Outside Diameter	216 mm (8.5 inches)
Baffle Cutout Diameter	180 mm (7.09 inches)
Overall Depth	58 mm (2.28 inches)
Number of Mounting Holes	5
Cone / Diaphragm Material	Paper Cone (Poly Coated)

Parameter	Value
Surround Material	Rubber
Basket/Frame Material	Steel
Item Weight	1 pound (16 ounces)
UPC	844632000393

8. Warranty and Support

The Dayton Audio DS215-PR Passive Radiator comes with a comprehensive warranty to ensure your satisfaction and product reliability.

- **Warranty - Parts:** 5 Years
- **Warranty - Labor:** 5 Years

For technical support, warranty claims, or further inquiries, please contact Dayton Audio customer service through their official website or authorized distributors. Please have your model number (DS215-PR) and purchase information available when contacting support.