EISCO PH0845HEL

EISCO Helmholtz Coils (Model PH0845HEL) Instruction Manual

Precision apparatus for magnetic field experiments

Introduction

The EISCO Helmholtz Coils are designed for precise studies of magnetic fields in educational and research environments. This apparatus consists of two coils, each with 400 turns of copper wire, mounted on a sturdy base with an adjustable support system. It allows for the generation of uniform magnetic fields, essential for understanding concepts such as charged particle motion and electromagnetic induction.

Key Features

- **Precision Coils:** Two coils, each with 400 turns of copper wire, wound on a 150mm diameter form.
- **Adjustable Separation:** Distance between coils can be adjusted from 1.75 inches to 12 inches (4.4 cm to 30.5 cm) for various experimental setups.
- **Safe Operation:** Designed for a maximum current of 1A to prevent overheating.
- **Secure Connections:** Each coil is equipped with 4mm terminals for reliable electrical connections.
- **Educational & Research Use:** Ideal for physics experiments related to electromagnetism and uniform magnetic fields.

Setup Instructions

1. Unpacking

Carefully remove all components from the packaging. Inspect for any damage that may have occurred during transit. Retain packaging for future storage or transport.

2. Assembly

1. Place the sturdy base on a stable, level surface.

2. Mount the two coil supports onto the base's adjustable rod.
3. Secure each Helmholtz coil onto its respective support. Ensure the coils are facing each other with the current direction markings aligned for proper field generation.
4. Adjust the distance between the coils as required for your experiment. The supports can slide along the central rod and be secured in place.

Figure 1: Assembled EISCO Helmholtz Coils. This image shows the two copper-wound coils mounted on an adjustable base, ready for experimental use.

Operating Instructions

1. Connecting Electrical Power

1. Identify the 4mm terminals on each coil. The direction of current flow is marked on each coil.
2. Using appropriate connecting wires, connect the coils in series to a suitable DC power supply. Ensure the current flows in the same direction through both coils to generate a uniform magnetic field.
3. **Important:** Do not exceed a maximum current of 1A to prevent overheating and potential damage to the coils.

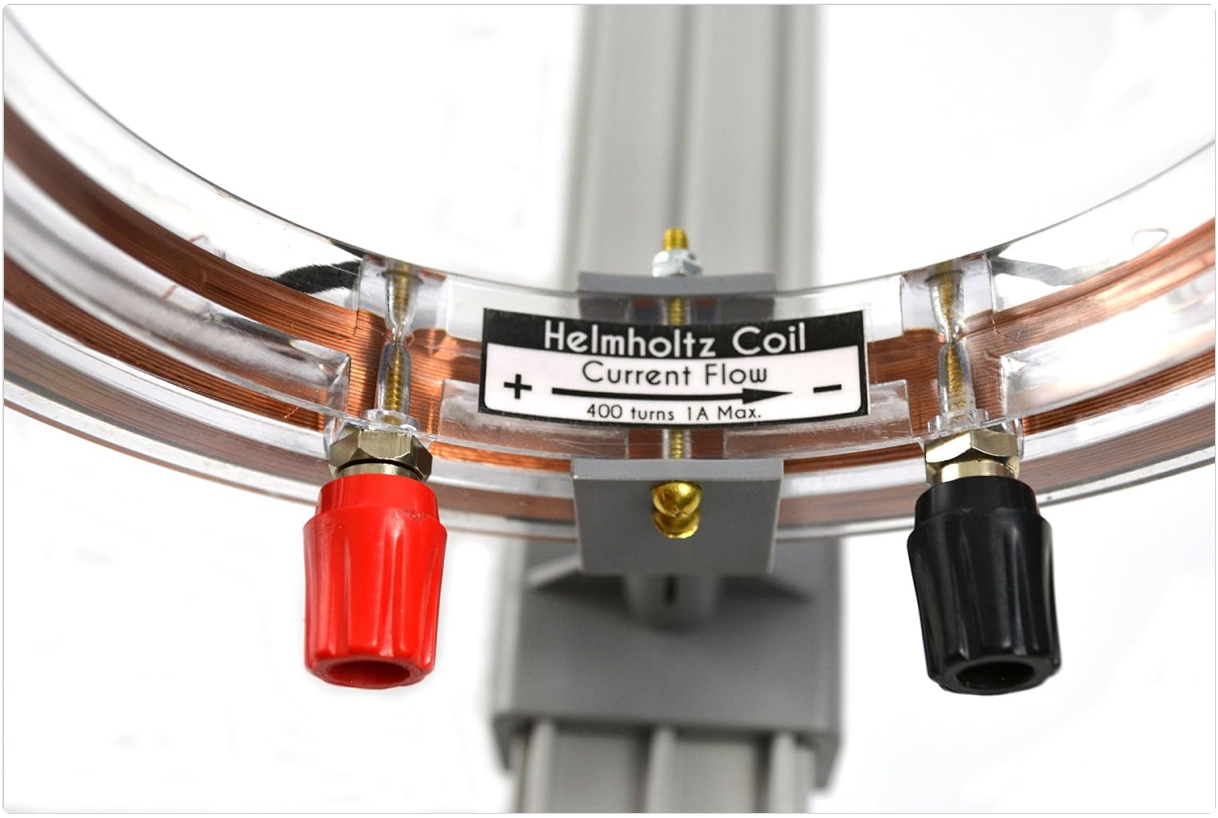

Figure 2: Close-up view of a Helmholtz Coil terminal. This image highlights the 4mm terminals and the clearly marked current flow direction, crucial for correct experimental setup.

2. Adjusting Coil Separation

The distance between the two coils can be adjusted by loosening the securing screws on the coil supports, sliding them along the central rod, and then re-tightening the screws. For a highly uniform magnetic field at the center, the separation distance should ideally be equal to the radius of the coils (75mm or approximately 2.95 inches).

3. Conducting Experiments

Once connected and adjusted, the Helmholtz Coils can be used for various experiments, including:

- Measuring magnetic field strength along the axis.
- Demonstrating the principle of a uniform magnetic field.
- Studying the motion of charged particles in a magnetic field (e.g., using an electron beam tube, sold separately).
- Investigating electromagnetic induction.

Maintenance

- **Cleaning:** Wipe the coils and base with a soft, dry cloth. Avoid using abrasive cleaners or solvents.
- **Storage:** Store the apparatus in a dry, dust-free environment when not in use. If possible, use the original packaging for protection.
- **Inspection:** Periodically check all electrical connections and the integrity of the copper wire for any signs of wear or damage.

Troubleshooting

- **No Magnetic Field Detected:**
  - Check power supply connections and ensure it is turned on.
  - Verify that the current is flowing through both coils and in the correct direction (series connection with aligned current flow).
  - Ensure all 4mm terminals are securely connected.
- **Coils Overheating:**
  - Reduce the current from the power supply. The maximum recommended current is 1A.
  - Ensure adequate ventilation around the coils.
- **Unstable Setup:**
  - Ensure the base is on a flat, stable surface.
  - Verify that all securing screws for the coil supports are tightened.

Specifications

Feature	Detail
Coil Turns	400 turns per coil
Coil Diameter	150mm (approx. 5.9 inches)
Wire Material	Copper
Terminal Type	4mm
Maximum Current	1A
Adjustable Separation	1.75" to 12" (4.4 cm to 30.5 cm)
Product Dimensions	16 x 8 x 3 inches (approx. 40.6 x 20.3 x 7.6 cm)

Feature	Detail
Item Weight	3.34 pounds (approx. 1.51 kg)
Model Number	PH0845HEL

Warranty Information

EISCO products are manufactured to high-quality standards. For specific warranty details, please refer to the warranty card included with your purchase or visit the official EISCO website. Keep your proof of purchase for any warranty claims.

Customer Support

If you have any questions, require technical assistance, or need to report an issue with your Helmholtz Coils, please contact EISCO customer support. Contact information can typically be found on the product packaging or the official EISCO website.