

OPERATING INSTRUCTIONS

Oersted's Law Apparatus 32243

1. Introduction

Have your students picture themselves in a world without the benefits of electromagnetic machinery — where it was only suspected that electricity and magnetism have a connection; and they might imagine themselves in a world similar to that of Hans Christian Oersted's in 1819. It was then (during a classroom demonstration) that he first placed a compass near a current-bearing wire and watched the compass needle veer perpendicular to the wire. Though Oersted never did anything practical with his momentous discovery, Faraday, Henry, and others did. Some of your students may be interested in the story of electromagnetism and reading material is suggested at the end of this instruction. You can repeat Oersted's original discovery for all of your students, though, using our Oersted's Law Apparatus.

2. Description

The apparatus is a free-swinging flat magnetized needle with a pivot-point center, set on a pin bearing within an aluminum frame through which an electrical current is made to flow. The pin bearing is integral with a rod that supports the aluminum frame. It's screwed onto a heavy, non-magnetic base which assures the apparatus' stability and will not affect the magnetic field.. The metal frame has three five-way binding posts that permit you to determine the direction of the electrical current through the frame. You can create an electrical field that completely surrounds the needle or one that runs either above or below the needle depending upon your choice of conduction points. A single dry-cell battery is the only power source required to safely conduct experiments using this apparatus..

3. Setup

The components of this apparatus are neatly taped together for shipment. Remove the tape from the support rod and frame and from the needle and frame. Remove the screw and lock washer from the rod and screw the support rod to the base with the lock washer positioned underneath the base. Position the frame over the pin bearing of the support rod and screw down the provided hex nut. The apparatus is ready for the electrical connections described below.

4. Operation

The current flowing in the rods may be set up to oppose or be additive in the parallel legs
PARALLEL LEGS? — IS THERE A BETTER WAY TO SAY THIS? or may be operated with a single conductor only above and below the magnetic needle.

Connect a dry cell battery to the binding posts at the same side of the frame and observe the magnetic needle swing, and the final "north-south" needle alignment with respect to the direction of the current. Move the magnetic needle to the opposite position of polarity and again observe the deflection when the voltage is applied. Reverse the direction of the current passing through the frame and again observe the needle swing and final polar alignment at different beginning needle orientations.

Next, connect the battery to binding posts on opposite sides of the frame so that the current flows only above or below the needle. Repeat the experiment as before. MIKE, I DON'T PERCEIVE ANY DIFFERENCE — IS THERE SUPPOSED TO BE?

Use two batteries to send an opposing charge through both parallel legs. What are the results? — OK, HOW DO YOU REALLY DO THIS?

Your students can determine the direction of the magnetic field about a current-carrying conductor and the relationship between the direction of the current and the polar orientation of the resulting magnetic field with their observations.

Please have students note that the needle does not align itself truly perpendicular to the apparatus' frame. The reason for the slight angular difference is due to the influence of the earth's magnetic field.

5. Maintenance

The Oersted's Law Apparatus needs no special maintenance. If you should experience any difficulty with this piece of equipment, please contact Central Scientific Company, giving details of the problem. To ensure better service, please do not return any apparatus to Central Scientific Company until we have sent you authorization.

6. Accessories

<u>Description</u>	<u>Catalog No.</u>
79148-01	6VDC Dry Cell Battery
83976-01	Wire Leads with Alligator Clips

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