

Helmholtz Tangent Galvanometer

Operating Manual

Laboratory Equipment

Intended use

A twin-coil tangent galvanometer in Helmholtz arrangement with a central compass, used in physics teaching to verify the tangent law and determine the horizontal component of the Earth's magnetic field.

Intended users

Physics teachers, laboratory staff and students (upper secondary and undergraduate). Students should work under teacher supervision.

Read this manual completely before first use and keep it with the product. This document provides general operating, care and safety guidance. Where the product is supplied with manufacturer labeling or instructions, those take precedence. For questions, a replacement copy, or a digital copy of this manual, email sales@scimedstore.com.

1. Safety

Safety warnings and cautions

- Use only a low-voltage DC supply within the recommended range.
- Always include a rheostat or current limit in the circuit; never connect the coils directly across a supply without current control.
- Switch off the supply when not taking readings to avoid heating the coils.
- Keep magnets, steel tools and phones away from the compass.
- Handle the compass gently; the jeweled needle is delicate.
- Supervise students when connecting circuits.

2. Package contents

- Galvanometer with twin coils, central compass and binding-post terminals on wooden base
- Instruction card

Check contents on receipt. Report missing or damaged items to sales@scimedstore.com within 48 hours of delivery.

3. Specifications

Configuration	Helmholtz: two equal coaxial coils, separation equal to coil radius
Coil winding	Insulated copper wire on non-magnetic former
Compass	Jeweled magnetic needle in brass cup at the midpoint
Base	Hardwood with binding-post terminals
Recommended source	Regulated DC, 0-6 V, with rheostat and ammeter (not included)

4. Unpacking and setup

- 1 Place the galvanometer on a level, non-magnetic table away from iron objects and electrical cables.
- 2 Level the base so the compass needle swings freely.
- 3 Turn the instrument until the coil plane is aligned with the magnetic north-south direction (the needle lies in the coil plane).
- 4 Set the compass pointer to read zero.
- 5 Connect the DC supply, switch, rheostat, ammeter and reversing key (if used) in series with the coils.

5. Operation

Tangent law experiment

- 1 Set the rheostat to maximum resistance and switch on.
- 2 Adjust the current to a small value and wait for the needle to settle.
- 3 Read both ends of the pointer and record the deflection and current.
- 4 Reverse the current and record the readings again; average the values.

- 5 Repeat for several current values.
- 6 Plot $\tan(\text{deflection})$ against current to check proportionality.
- 7 Use the results and the coil data from the instruction card to calculate the horizontal component of the Earth's field.

6. Cleaning and disinfection

- Dust with a soft, dry cloth.
- Do not use liquids on the coils or compass.
- Keep terminals clean for good contact.

7. Maintenance and storage

- Store in a dry place away from magnets.
- Protect the compass from shocks during transport.
- Check wires and terminals for damage before use.

8. Troubleshooting

Problem	Likely cause	What to do
Needle does not move	Open circuit	Check all connections, switch and supply
Unequal readings when current is reversed	Coil plane not aligned with magnetic meridian	Re-align the instrument and reset zero
Needle sticks	Base not level or compass disturbed	Level the base and tap gently
Erratic readings	Nearby iron, magnets or cables	Move these away from the instrument

9. Disposal

- Recycle copper coils and metal parts at a metal recycling point.
- Dispose of wooden base per local rules.

10. Warranty and support

Products are covered by SciMed's standard warranty (12 months from purchase unless a different period is stated on your invoice). Warranty terms: scimedstore.com/pages/warranty.

Support, spare parts and additional copies of this manual: sales@scimedstore.com. Please include your order number and a photo of the product or issue.

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