OERSTED'S LAW APPARATUS
MODEL GS-208

The GS-208 Oersted's Law Apparatus demonstrates that a direct electrical current creates a magnetic field around a conductor which is perpendicular to the direction of the current flow. This magnetic field causes a compass needle to deflect from magnetic north and align itself toward the new field.

EQUIPMENT NEEDED:

(1) 20 amp 12 VDC power supply with ammeter
(1) 200 watt power resistor, approximately .8 ohm
(1) 20 ohm, 20 amp rheostat
(1) GS-208 Oersted's Law Apparatus

WARNING: NEVER USE THE GS-208 WITH A POWER SUPPLY GREATER THAN 12 VDC DUE TO THE POSSIBILITY OF HAZARDOUS ELECTRICAL SHOCK. Under NO circumstances should the GS-208 be used without a current-limiting resistor. It could result in damage to the power supply and the GS-208, as well as personal injury.

Hook up the GS-208 as shown in *Figure 1* on the next page. Connect the positive terminal of the power supply to the current limiting power resistor, and then to the end terminal of the rheostat. Connect the wiper of the rheostat to the upper terminal of the GS-208. The final connection is to hook the negative terminal of the power supply to the bottom terminal of the GS-208.

Now rotate the frame of the GS-208 so that it points toward magnetic north and is parallel to the compass needle. The final step in setting up the GS-208 is to move the rheostat to the maximum resistance setting.

We are now ready to begin the experiment. After turning on the power supply, notice that the compass needle has deflected slightly away from the magnetic north position. Now slowly decrease the rheostat resistance. The compass needle will deflect even more as the current through the GS-208 increases. This is because the current flowing through the apparatus sets up a magnetic field perpendicular to the direction of current flow. The needle slowly approaches the 90 degree mark as the current increases because it's being acted upon by two forces. The current's and the Earth's magnetic fields are both acting on the compass and the sum of the two vectors will always be less than 90 degrees. If you reverse the two power supply connections to the GS-208, the results will be the same, except that the compass needle deflects in the opposite direction.

The GS-208 can also demonstrate the effect of a magnetic field around a single conductor. This is done by using the single terminal on the side opposite from the paired terminals. Hook it up as you did in *Figure 1*, except connect the negative terminal of the power supply to the single terminal on the other end of the GS-208. The compass needle will now respond as it did previously, except with less deflection for same current. If the positive connection from the power supply is changed to the lower of the two terminals and the current level set as before, the results are reversed. That is, the needle deflects in the opposite direction. We have now reversed the current direction in the lower conductor as compared to the set-up in *Figure 1*. Consequently, in accordance with the right hand rule, the direction of the field is reversed and the compass needle deflects the other direction.

SUMMARY:

1. A magnetic field is created when direct current flows through a conductor.
2. The strength of the magnetic field is proportional to the amount of current flow.
3. The direction of the magnetic field is related to the direction of the current flow.

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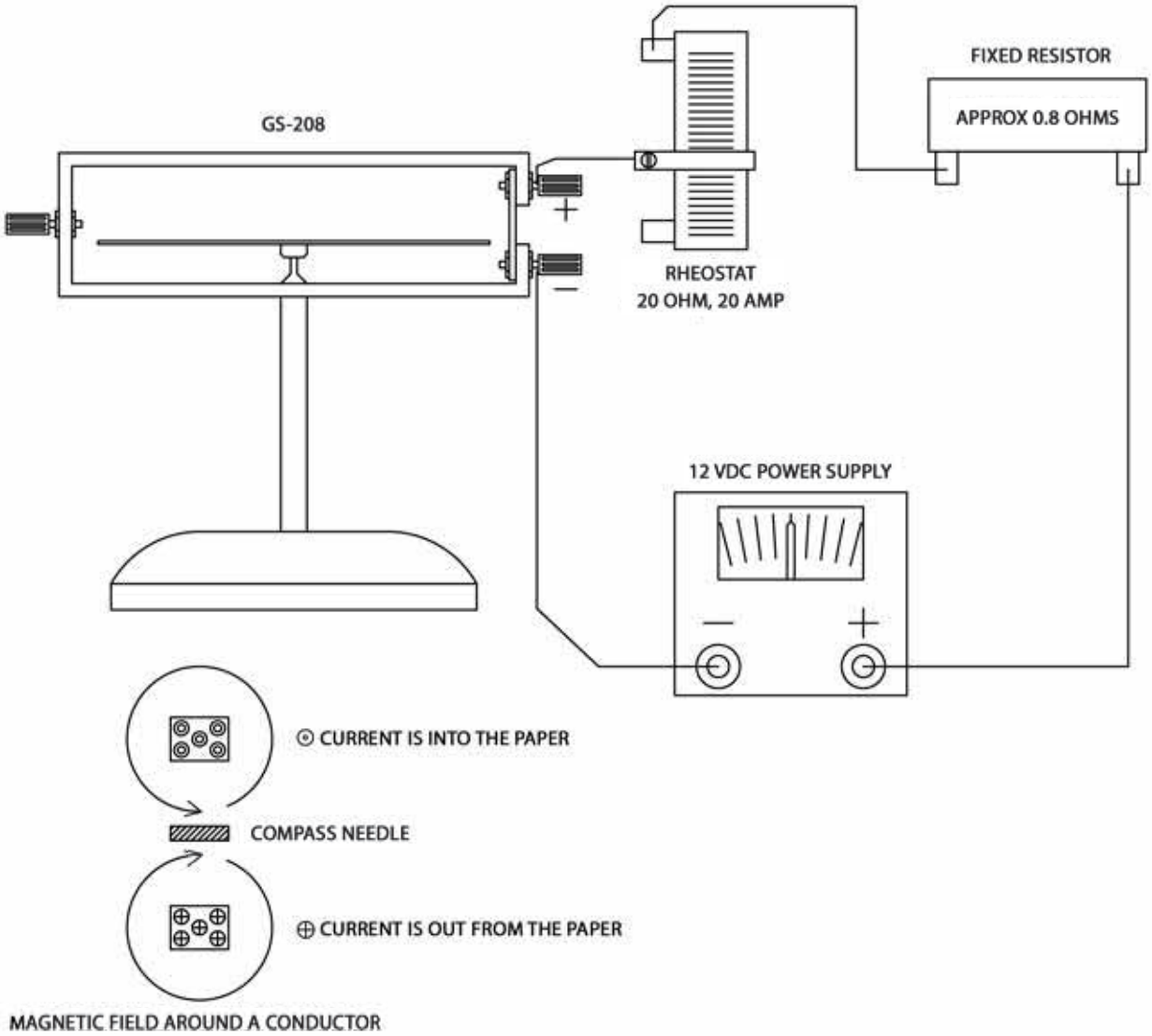
MODEL GS-208

Figure 1

CONNECTION DIAGRAM
GS-208 OERSTED'S LAW APPARATUS



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