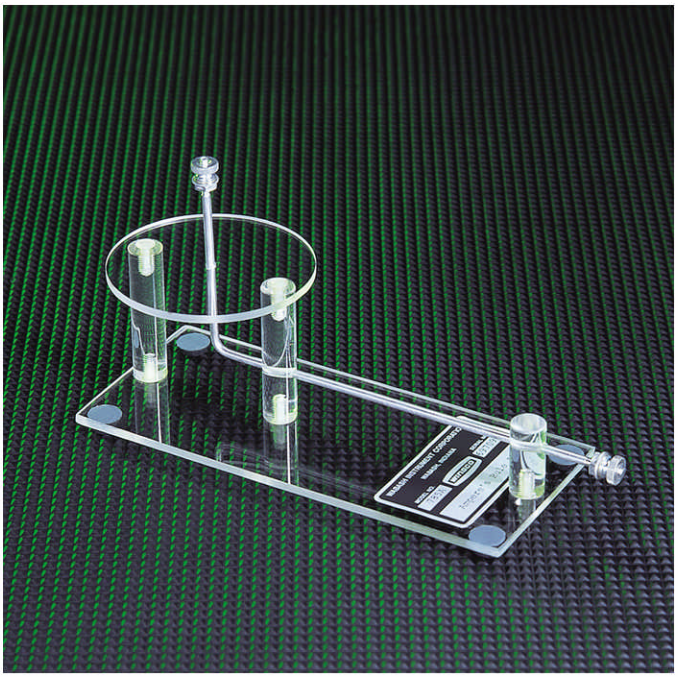
AMPERE'S RULE APPARATUS

MODEL GS-785A

When a current flows in a conductor such as a length of wire, a magnetic field is established around that conductor. The direction of this field relative to the direction of current flow may be determined by "Ampere's Rule". The old traditional convention is that current flows from plus to minus and with this assumption, we must use the right hand. Grasp the conductor with the thumb pointing in the direction of current flow (plus to minus) and with the fingers curled around the conductor. The direction of the magnetic field will be the same as the curl direction of the fingers. If current flow is stated as electron flow from minus to plus, then use the left hand in the same manner. This demonstration device is used to verify that there is indeed a magnetic field created and that its effect supports Ampere's Rule.

Connect a low voltage direct current power supply through a resistor and thence through the aluminum conductor of the Ampere's rule demonstration. Select a voltage and resistor which will give a current flow of between one and three amperes. A typical set-up might be a 6 VDC supply and a 3 ohm resistor. Align the unit so that the horizontal wire is pointing roughly north and south and place a small compass (not furnished) beneath that horizontal wire. The wire and compass needle should be approximately pointing in the same direction. Now turn on the current and it will be seen that there is a major change in direction of the compass needle. Depending on the strength of the magnetic field, it will have shifted direction by 45° or more and the direction of that movement will depend on which direction the current is flowing in the device.

Without changing the overall north to south alignment, move the compass to the 9:00 or 3:00 o'clock position alongside the vertical conductor. With current flowing, there will be little noticeable effect on the compass needle. A quick check with the right hand rule will show the field to be roughly parallel to the needle direction and no particular change should be expected. On one side of the vertical rod, the field reinforces the earth's magnetic field, and on the other side, it opposes it, but in each case it is roughly parallel to it.



If we now move the compass to the 12:00 or 6:00 o'clock position, there is an immediate and large deflection of the needle. Another quick reference to the right hand rule shows the field around the conductor to be perpendicular to the normal direction of the compass needle. This field force will cause a deflection upwards of 45° and its direction will depend on which way the current is flowing in the rod.

If a number of small (10 or 20 mm) diameter compasses are available, arrange about eight of them in a circle around the vertical rod. This demonstration will give a clear and immediate presentation of the effect of the field created by the flowing current.

Wabash Instrument Corporation 300 Olive St., Wabash, IN 46992 Tel: 260.563.8406 www.winsco.com
For more information, please contact us: info@winsco.com