

- ▶ Three switch selectable ranges:
 - 0 to 19.99 mT (millitesla)
 - 0 to 199.9 mT
 - 0 to 1999 mT
- ▶ Coarse and fine zero adjustment
- ▶ Axial probe included
- ▶ 0 - 2V analogue output for datalogger
- ▶ Shrouded sockets
- ▶ Stackable metal case with integrated ABS carry handles
- ▶ Detachable IEC mains cable.
- ▶ Designed specifically for use in school/college laboratories
- ▶ **18 month manufacturer's warranty**

CE
to BSEN61010-2010
(EN 61010-1:2010 3rd Edition)



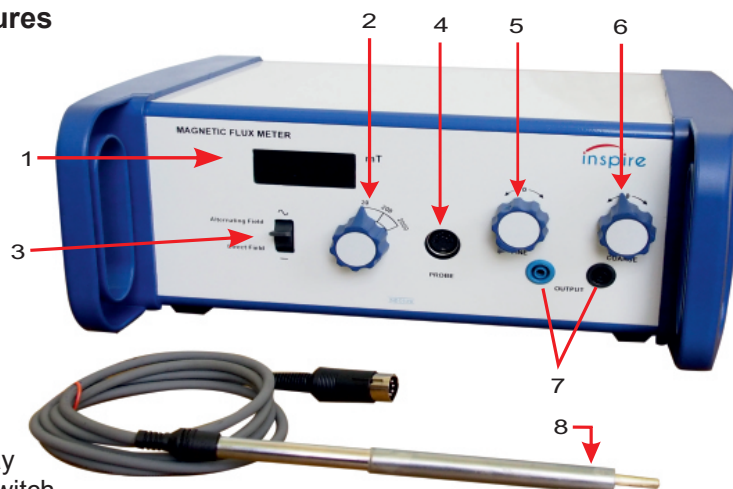
DOUBLE PROTECTION:

- ▶▶ Slow-blow fuse on mains input
- ▶▶ Split bobbin transformer with internal resettable fuse

MAGNETIC FLUX DENSITY METER

Ideal for investigation of magnetic fields around current carrying conductors, e.g. a straight wire, single turn and multiple turn coils; and also around bar magnets. To provide the high currents required for these experiments, the PowerPro Electromagnetic power supply is recommended.

Front panel features



1. 4 digit LED display
2. Range selector switch
3. Alternating/direct field switch
4. DIN socket for probe input
5. Zero adjustment (coarse)
6. Zero adjustment (fine)
7. Analogue 0-2V output for data logger
8. Axial probe (included)

Range selection

The range selector switch changes the sensitivity of the meter:

- ▶ 0–19.99 mT (accuracy 0.01 mT) : fields around a current carrying wire
 - ▶ 0–199.9 mT (accuracy 0.1 mT) : fields produced by coils and solenoids
 - ▶ 0–1999 mT (accuracy 1 mT) : fields near and between bar magnets
- these examples of fields are for guidance only.

It is good practice, when exploring an unknown magnetic field, to begin with the least sensitive range, 0 to 1999 mT, switching to more sensitive ranges when values are found to be lower.

Alternating or direct field switch

The meter is capable of measuring both alternating magnetic fields as produced by alternating currents, and relatively constant fields as produced by a direct current or found in the region surrounding magnets.

This feature is switch selectable. NOTE: zero adjustment is not relevant for alternating magnetic fields.

Zero adjustment

Coarse and fine zero adjustment controls help to reduce the effects of any background magnetic fields. It is advisable to do coarse adjustment first, then fine adjustment.

Zero adjustment only works in direct mode. In alternating field mode, the display will automatically indicate zero when the probe is moved away from magnetic sources for a few seconds. The display may show sporadic changes of the last digit in the 20mT range, i.e. 0.01 mT.

Analogue output

0-2 volts analogue output corresponding to values in the selected range. This may be captured by a data logger or other recorder, e.g. for observation of hysteresis curves.

Earth's magnetic field

The magnetic flux density at the surface of the Earth is typically between 25 and 65 microtesla, displayed as 0.03 to 0.07 millitesla. The flux density meter should detect this after careful zero adjustment, and in the absence other magnetic fields. Students need to be aware that the Earth's magnetic field is not parallel to the Earth's surface, so the probe will have to be used at an appropriate angle to achieve a maximum reading.

Exploration of simple coils

With a dc supply, and the meter in Direct mode, flux density can be measured at various points within a long coil, to explore the relationship between current and flux density.



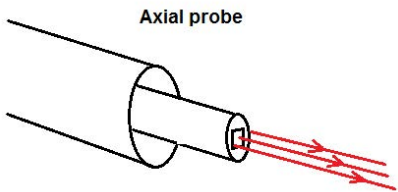
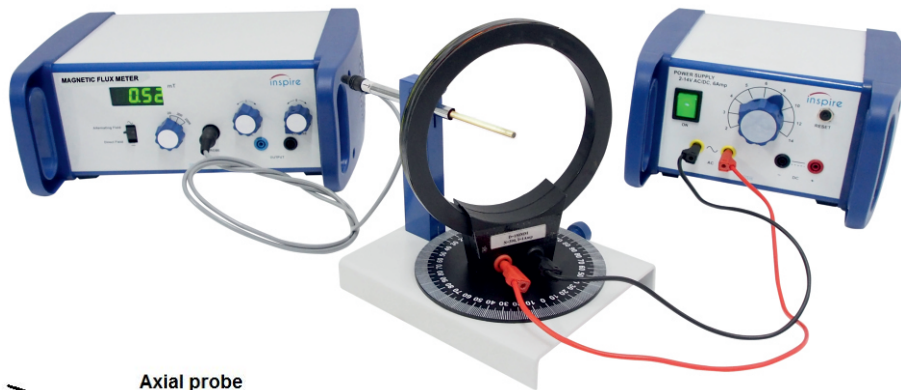
Axial probe

The tip of this probe is cylindrical and the sensor is revealed when the protective sleeve is drawn back. The probe lead is 1 metre long and has a 5-pin DIN plug for connection to the DIN socket on the Flux Density Meter's front panel.

This probe is suitable for exploring the magnetic fields along the axis of a cylindrical coil, and at points within coils of other shapes. The probe stem is 300 mm long making it capable of measuring the magnetic flux inside a long solenoid.

Here the axial probe is being used with the Field Investigation Apparatus.

The multi-turn coil can be rotated, presenting a range of angles to the probe.



The axial probe is most sensitive, when the 'magnetic lines of force' or flux are parallel to the probe's axis, as shown.

This experiment is usually performed using a dc supply.

The low voltage power supply could provide ac and the meter could be switched to ac to detect and measure the ac field.

The low voltage power supply could be replaced by a signal generator to investigate the effects of lower and higher frequency ac.

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The Magnetic Flux Density Meter supports two A level Physics required practicals:

- 10 Investigate how the force on a wire varies with flux density, current and length of wire using a top pan balance.
- 11 Investigate, using a search coil and oscilloscope, the effect on magnetic flux linkage of varying the angle between a search coil and magnetic field direction.

Fuse replacement The mains socket on the back panel has a compartment for two fuses. It can be opened using a flat bladed screwdriver as shown.

The front fuse is a spare. It is a 5 x 20mm time delay or "slow blow" T500mA 250V fuse.

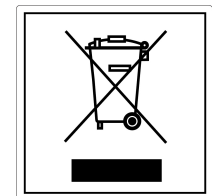


IEC mains lead

This is protected by a standard 3 A 250 V fuse in the mains plug.

WEEE directive

This symbol indicates that the electronic equipment should not be disposed of in the normal waste. It should be recycled in accordance with the WEEE directive.



Power input : 60 VA or 60 W

Dimensions : 250 x 265 x 135 mm

Weight : 4.2 kg