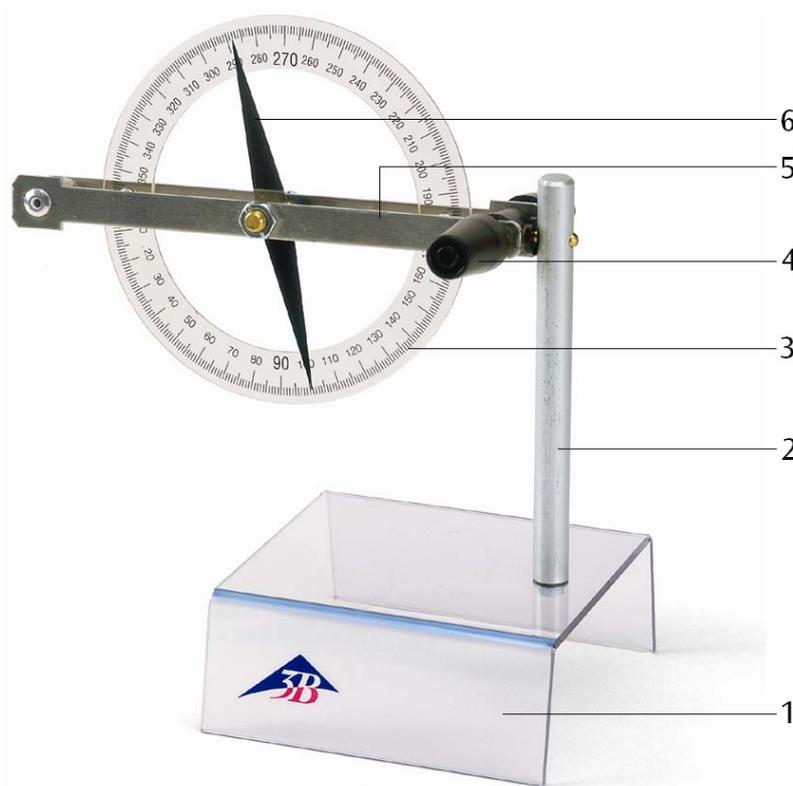


## Inclination Instrument U21900

### Instruction Sheet

11/08 ALF



- 1 Base
- 2 Pillar
- 3 Scale ring
- 4 Connecting sockets
- 5 Cradle
- 6 Magnet needle

### 1. Description

The inclination instrument is used to measure the inclination of the earth's magnetic field, and to demonstrate the magnetic field produced by a current-carrying conductor.

The instrument consists of a acrylic base with a pillar which supports an axially rotatable cradle carrying a magnetic needle and a scale ring. The magnet needle is mounted on a bearing consisting of sharp tips, and is free to rotate in either a horizontal or a vertical plane according to the direction of its axis. The sockets on the cradle can be used to pass a current of up to 5 A through it.

### 2. Technical data

Diameter of circle:	approx. 110 mm
Length of magnetic needle:	approx. 100 mm
Cradle length:	approx. 150 mm
Voltage:	max. 30 V
Current:	max. 5 A
Terminal:	4 mm safety sockets
Base dimensions:	approx. 100x90x185 mm <sup>3</sup>

### 3. Operation

#### 3.1 General precautions

- Protect the instrument from moisture, dust and mechanical shocks.
- Avoid touching the magnet needle.

The geometry of the earth's magnetic field lines can be greatly altered by static magnetic fields, steel frames of laboratory benches and equipment, and steel supports in the floor, ceiling and walls of buildings. For this reason the measured angles may sometimes differ widely from the expected values.

#### 3.2 Measurement of the inclination

The magnet needle aligns itself along the direction of the earth's magnetic field.

- With the scale ring in the horizontal plane, turn the instrument so that the blue end of the magnet needle is at  $0^\circ$  (the blue end of the needle is its north-seeking pole).
- Next turn the cradle through  $90^\circ$  (the plane of the scale ring is then vertical). The blue end of the magnet needle is inclined downwards.

The angle between the magnet needle and the horizontal plane is called the inclination. It differs from place to place. At a latitude of about  $50^\circ$  north (Europe) the inclination is  $63^\circ$  to  $68^\circ$ .

#### 3.3 Magnetic effect of an electric current

In order to carry out the experiment, a variable DC current source is also needed, such as:

1 DC power supply 0 - 20 V, 0 - 5 A (230 V, 50/60 Hz)  
U33020-230

or

1 DC power supply 0 - 20 V, 0 - 5 A (115 V, 50/60 Hz)  
U33020-115

- With the scale ring in the horizontal plane, turn the instrument so that the blue end of the magnet needle (its north-seeking pole) is at  $0^\circ$ .
- Connect the sockets on the instrument to a variable DC current source.

As the current is increased, the needle is deflected increasingly from its original direction.

When the polarity is reversed, the direction of the deflection changes.