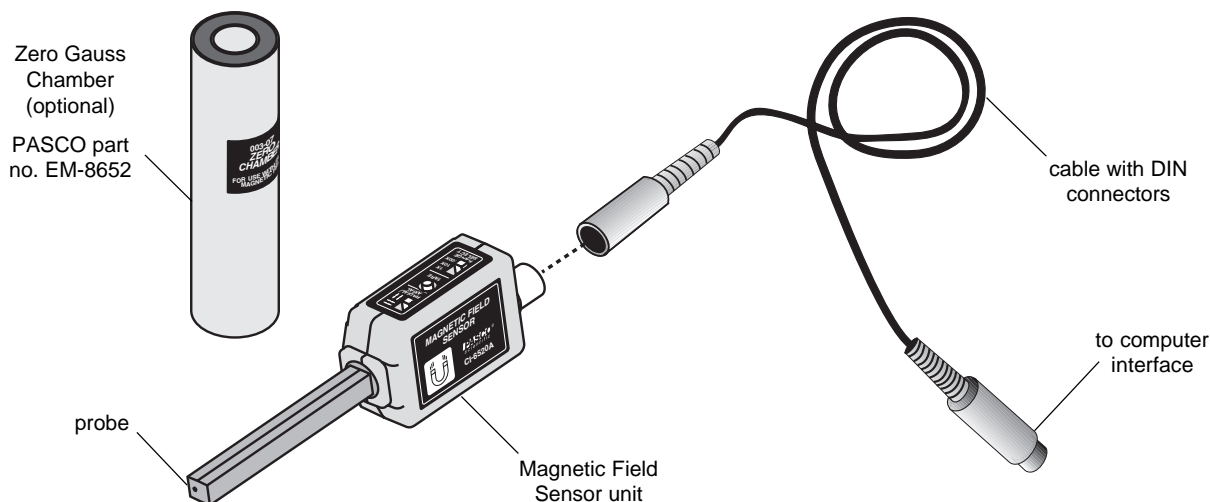


**Instruction Sheet
for the PASCO
Model CI-6520A**

MAGNETIC FIELD SENSOR



Introduction

The PASCO CI-6520A Magnetic Field Sensor is used in conjunction with a PASCO computer interface. As the name implies, the Magnetic Field Sensor senses Magnetic fields. It has three switch selectable ranges: 100X (± 10 gauss), 10X (± 100 gauss) and 1X (± 1000 gauss). The three ranges allow magnetic fields such as the earth's magnetic field, fields created by electrical coils or fields around permanent magnets to be measured.

The Sensor uses Hall Effect devices as sensing elements. There are two of these devices oriented perpendicularly to one another located at the end of the tip of the square probe. One is sensitive to axial field lines parallel to the length of the probe and the other radial field lines perpendicular to the probe. A

small white dot on the probe end indicates the plane of each sensing element. A switch is provided to select the sensor orientation. The two directions cannot be selected simultaneously.

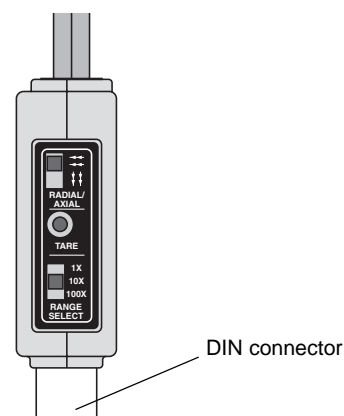


Figure 1
Top of Magnetic Field Sensor

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In addition to switch selectable range and orientation of the sensing element, a tare button is also provided on the top of the sensor. The tare allows the output of the sensor to be driven to 0. Typically the sensor is 'zeroed' while the elements are not exposed to a field. An optional Zero Gauss Chamber is available for removing the effects of earth's magnetic field when 'zeroing' the sensor at the ± 10 gauss range.

Equipment

INCLUDED

- Magnetic Field Sensor Unit
- cable with DIN connectors

ADDITIONAL REQUIRED

- computer (PC or Macintosh)
- *Science Workshop*[®] computer interface
- *Science Workshop*[®] software version 2.3 or higher, or Data Studio

ADDITIONAL RECOMMENDED

- Zero Gauss Chamber (PASCO part no. EM-8652)

Operation

Setting up the Equipment

1. Connect the Magnetic Field Sensor unit to analog channel A, B, or C of the *Science Workshop* computer interface box using the cable with the DIN connectors (Figure 2). Alternatively, the unit can be plugged directly into the analog channel jack.

Sensor Specifications:

Each Magnetic Field Sensor is individually calibrated. See Table 1. 1 gauss = 0.0001 Tesla (T)

Table 1
Magnetic Sensor Specification Chart

Range	Gain	Resolution	Accuracy	Calibration Factor
± 1000 gauss	1X	0.5 gauss	100 gauss	100 gauss/volt
± 100 gauss	10X	0.05 gauss	10 gauss	10 gauss/volt
± 10 gauss	100X	0.050 gauss	1 gauss	1 gauss/volt

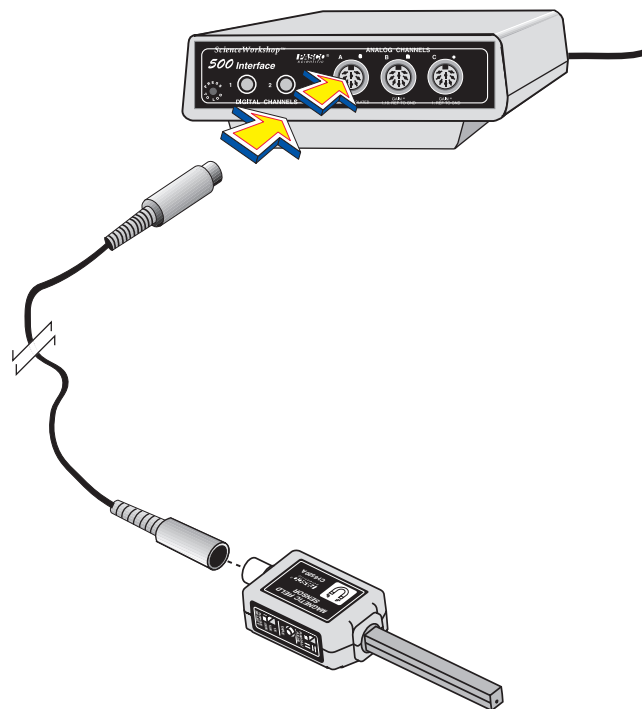


Figure 2
Connecting the amplifier box to the interface box

Choosing axial or radial

There is a slide switch on the top panel of the sensor box which toggles between axial and radial.

Note: The sensor must be re-zeroed after each change between axial and radial.

See Figure 3 for location of top panel switches.

The two sensors are located in the tip of the square probe, as shown in Figure 4. The axial sensor is on the front of the rod and the radial sensor is on the side of the rod. The position of either sensor is indicated by white dots at the tip of the probe body.

Zeroing the Sensor

Set the sensor to zero when no magnetic field is present (other than the Earth's field) by holding the

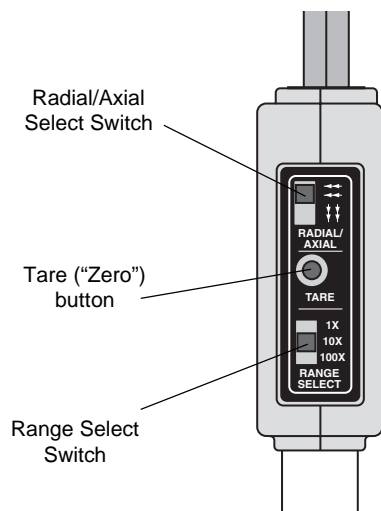


Figure 3
Magnetic Sensor Switch Description

sensor away from any magnetic field source and pushing the TARE button on the sensor box.

The optional PASCO EM-8652 Zero Gauss Chamber accessory enables the user to achieve a sensor reading closer to absolute zero and is advantageous when the Magnetic Field Sensor is being used to record very small magnetic fields. Place the probe into the chamber and press the TARE button.

Note: The Hall Effect sensing elements used in the CI-6520A are temperature compensated. However when measuring very low magnetic field levels (± 10 gauss scale) some temperature dependent variation may be observed in the output. It is on the order of a few gauss. For the best results when using the 100X (± 10 gauss) scale the sensor should be connected to the interface for 5 to 15 minutes before data is collected. This will allow the sensing element to come to thermal equilibrium and will yield more stable results.

Range Selection

The sensor has three switch selectable ranges: 1X, 10X and 100X. The software used with the *Science Workshop* interface should be set for the range selected and the units of measure desired.

The other slide switch on the top panel of the sensor box toggles between three ranges magnetic field detection.

- 100X, ± 10 gauss; resolution, 50 milligauss. In this range, variations in the earth's magnetic field and low fields around power cords can be detected. The use of the PASCO EM-8652 Zero Gauss Chamber is recommended to achieve the appropriate level of tare when working with magnetic fields in this range.
- 10X, ± 100 gauss; resolution, 50 milligauss. The optimum range for use with solenoid and Helmholtz Coils.
- 1X, ± 1000 gauss; resolution, 500 milligauss. For use in the detection of fields typically found in strong permanent magnets.

Mounting on an Experimental Apparatus

Use the 1/4-20 threaded connector located on the bottom of the sensor box to secure the Pressure Sensor to an experimental apparatus (Figure 4). The alignment hole fits over an alignment pin included on some PASCO apparatuses.

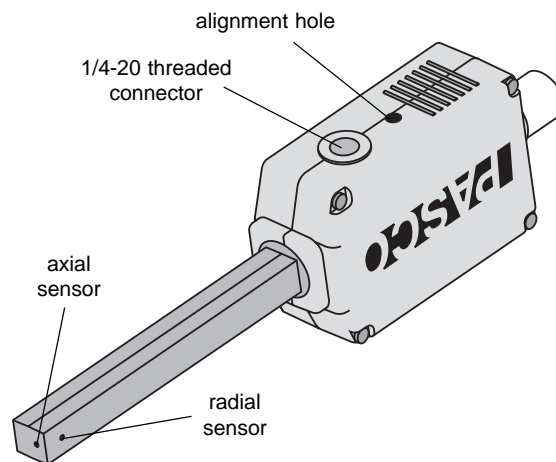


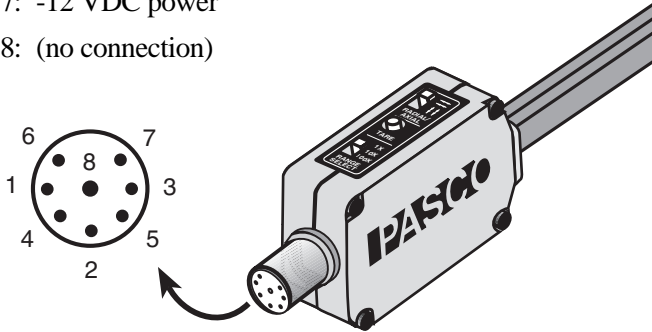
Figure 4
Mounting connector and alignment hole

Other

Note: This instruction sheet was written assuming that the user has a basic familiarity with the *Science Workshop* interface and associated software.

DIN Connector Specifications

- 1: analog output (+), -10 to +10 V
- 2: analog output (-), signal ground
- 3: (no connection)
- 4: (no connection)
- 5: power ground
- 6: +12 VDC power
- 7: -12 VDC power
- 8: (no connection)



Limited Warranty

PASCO scientific warrants the product to be free from defects in materials and workmanship for a period of one year from the date of shipment to the customer. PASCO will repair or replace, at its option, any part of the product which is deemed to be defective in material or workmanship. The warranty does not cover damage to the product caused by abuse or improper use. Determination of whether a product failure is the result of a manufacturing defect or improper use by the customer shall be made solely by PASCO scientific. Responsibility for the return of equipment for warranty repair belongs to the customer. Equipment must be properly packed to prevent damage and shipped postage or freight prepaid. (Damage caused by improper packing of the equipment for return shipment will not be covered by the warranty.) Shipping costs for returning the equipment after repair will be paid by PASCO scientific.

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