Hall Effect Probes

- 8 Transverse probe options
- 3 Axial probes options
- Fluxgate probe
- Ruggedised probes
- 0.6mm Transverse (0.024")
- High sensitivity probes
- Calibration traceable to NPL standards
- Compatible with GM07 & GM08

Hirst Magnetic Instruments Ltd manufactures a range of probes to complement its existing gaussmeter range.

A wide range of Hall probes are avaiable which are compatible with all GM07 & 08 Gaussmeters. Probes suitable for a wide variety of measurement applications are available, from extremely thin, 0.6mm thick (0.024"), to extra long, our range of probes meets most common requirements from our customers.

All of Hirst's Hall Effect probes in this data sheet are compatible with the existing GM07 and GM08 range of Gaussmeters ane each probe carries its own calibration information in the probe plug, allowing simple change over of probes with out the need for recalibration.

If the range listed here does not meet your specific application custom probes are also available.

The Hall Probe

A Hall Probe is a Hall Effect sensor mounted in a convenient package for the user to operate. The design of the hall probe is critical to the satisfactory operation of any gaussmeter. For the GM07 and GM08 we have used our extensive industrial experience to produce our standard transverse Hall probe which is semi-flexible and only 1mm thick by 4mm wide. This enables operators to take measurements in tight spaces and narrow air gaps. In addition the sensitive Hall element is clearly visible so that the user knows exactly where the measurement is being made.

The probe are typically fitted with a push button enabling the operator to HOLD and STORE measurements and orientate the probe for polarity readings.

All probes are fully interchangeable on both the GM07 and GM08 without the need for re-calibration, as the probes carry their own calibration in the probe plug.

Probe sensitivity

Probes are available in either standard or High Sensitivity (HS), the HS range gives a x10 sensitivity and a better low field performance than the standard probes, but has a much lower maximum applied field. A Flux gate probe is also available for extremely low fields.

Standard Probe Range

Gaussmeter range	Field Range
4	0.000 - 2.999 mT (29.99 G)
3	0.000 - 29.99 mT (299.9 G)
2	0.000 - 299.9 mT (2.999 kG)
1	0.000 - 3.000 T (30.00 kG)

High sensitivity (HS) Probe Range

Gaussmeter range	Field Range
4	0.000 - 0.299 mT (2.999 G)
3	0.000 - 2.999 mT (29.99 G)
2	0.000 - 29.99 mT (299.9 G)
1	N/A

Flux gate range

Gaussmeter range	Field Range
4	N/A
3	0.000 - 3.000 uT (2.999 mG)
2	0.000 - 30.00 uT (29.99 mG)
1	0.000 - 100.0 uT (100.0 mG)

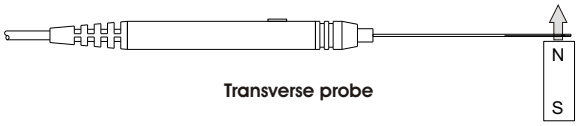
Cable length

All probes come with a 1.5 meter lead as standard. Custom leads up to 5m are possible by request. For leads greater than 5m custom active amplifier solutions are possible but your application should be discussed with the sales office before ordering.

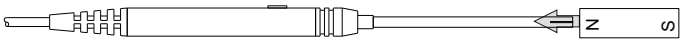
Transverse or Axial probes

A very common question we are asked is, what is the difference between Axial and Transverse probes and how in practice are the probes used to make a magnetic measurement.

Transverse probes tend to have more applications than Axial, because of their ability to be placed inside air gaps on motors/speakers etc, where as Axial probes can only be used end on, the following diagram shows the typical usage of the two probe types when used with a single magnet.



Transverse probe



Axial probe

The standard transverse probes are a semi flexible material that are designed to accept a small amount of bending. Excessive bending will break the probe. A rugged transverse probe is also available in the range (see TP002-R) that for 2mm extra thickness can be used in harsher environments where typically the TP002 would be damaged.

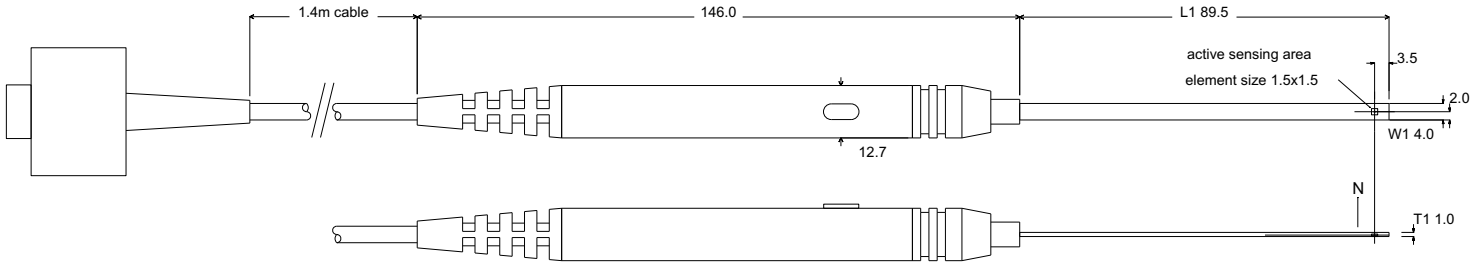
The standard axial probes tips are a brass circular construction, they are far more rugged than transverse probes but due to the requirment to use them end on, they often prove less useful due to access restrictions to the parts to be measured.

Transverse probe - TP002

Standard transverse probe as supplied with GM07 & GM08.

- 1mm thick
- Semi-flexible

0 - 3.000 T	0 - 299.9 mT	0 - 29.99 mT	0 - 2.999 mT	0 - 299.9 µT
0 - 30.00 kG	0 - 3000 G	0 - 300.0 G	0 - 30.00 G	0 - 3.000 G
✓	✓	✓	✓	✗



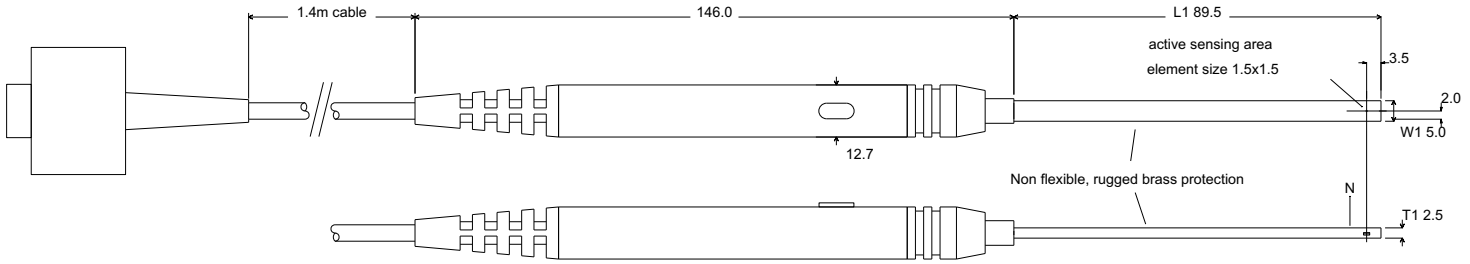
TRANSVERSE PROBE TP002

Transverse probe - TP002 R

A ruggised version of our standard TP002 probe for more demanding environments

- Rugged brass probe tip
- Ideal for NDT environments
- Only 2mm thick x 5mm wide

0 - 3.000 T	0 - 299.9 mT	0 - 29.99 mT	0 - 2.999 mT	0 - 299.9 µT
0 - 30.00 kG	0 - 3000 G	0 - 300.0 G	0 - 30.00 G	0 - 3.000 G
✓	✓	✓	✓	✗



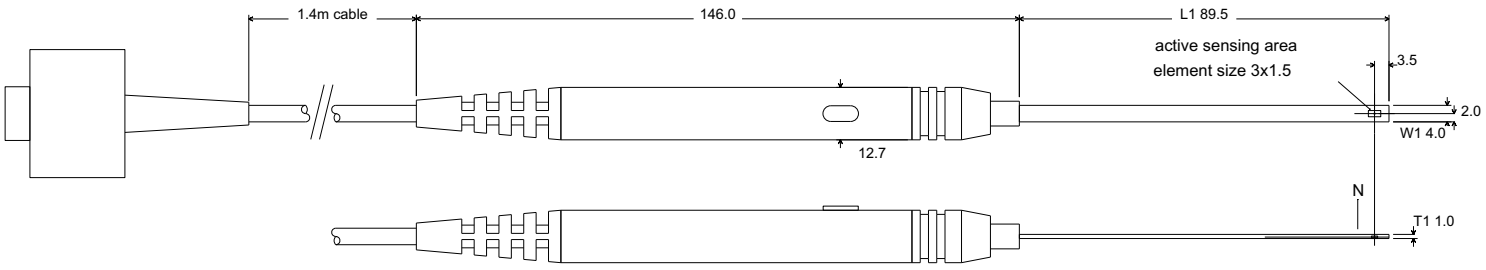
TRANSVERSE PROBE TP002-R

Transverse probe - TP002 HS

A high sensitivity version of our standard TP002 probe for lower field applications

- High sensitivity hall probe
- Only 1mm thick x 4mm wide

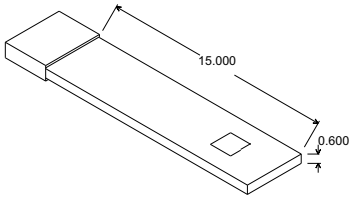
0 - 299.9 mT	0 - 29.99 mT	0 - 2.999 mT	0 - 299.9 µT	0 - 29.99 µT
0 - 3000 G	0 - 300.0 G	0 - 30.00 G	0 - 3.000 G	0 - 300.0 mG
✗	✓	✓	✓	✗



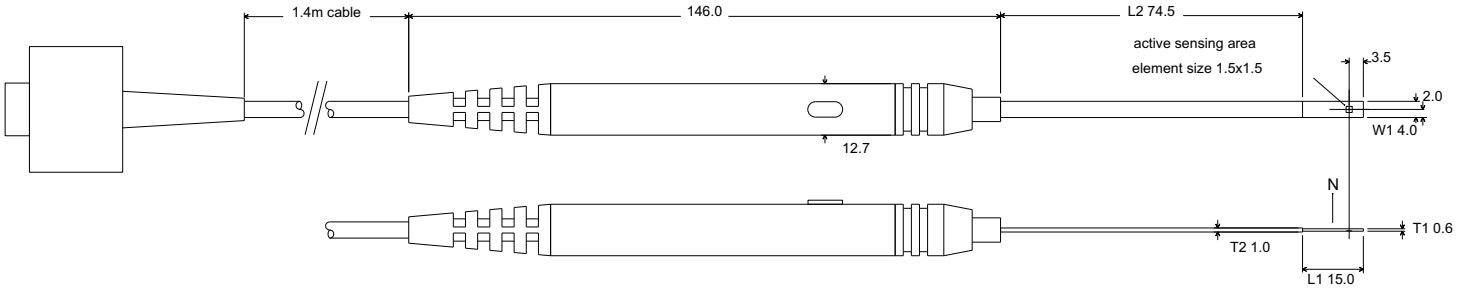
TRANSVERSE PROBE TP002 HS

Transverse probe - TP002 SP0.6

- 0.6mm thick tip
- Semi-flexible



0 - 3.000 T	0 - 299.9 mT	0 - 29.99 mT	0 - 2.999 mT	0 - 299.9 µT
0 - 30.00 kG	0 - 3000 G	0 - 300.0 G	0 - 30.00 G	0 - 3.000 G
✓	✓	✓	✓	✗



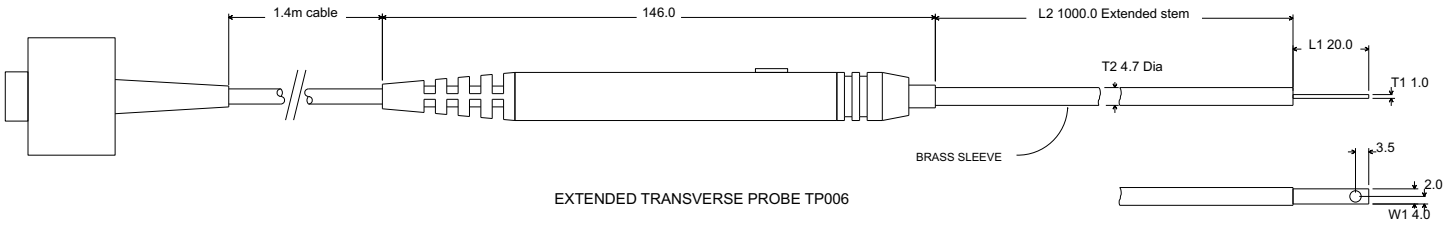
TRANSVERSE PROBE TP002 SP0.6

~~Transverse probe - TP006~~

No Longer Available

- Extended reach transverse probe
- 1000mm extension, 4.7mm dia.
- 20mm Transverse tip

0 - 3.000 T	0 - 299.9 mT	0 - 29.99 mT	0 - 2.999 mT	0 - 299.9 µT
0 - 30.00 kG	0 - 3000 G	0 - 300.0 G	0 - 30.00 G	0 - 3.000 G
✓	✓	✓	✓	✗



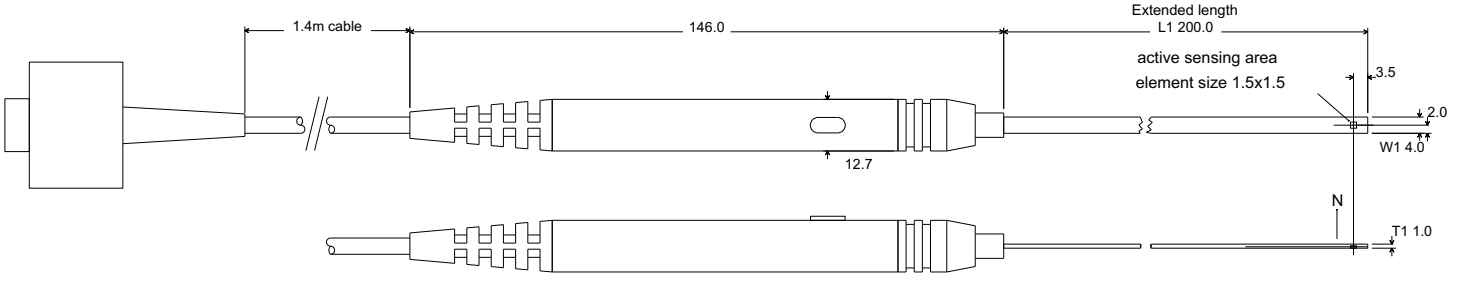
EXTENDED TRANSVERSE PROBE TP006

No Longer Available

~~Transverse probe - TP002SP SL200~~

- **Extended length transverse probe**

0 - 3.000 T	0 - 299.9 mT	0 - 29.99 mT	0 - 2.999 mT	0 - 299.9 µT
0 - 30.00 kG	0 - 3000 G	0 - 300.0 G	0 - 30.00 G	0 - 3.000 G
✓	✓	✓	✓	✗



TRANSVERSE PROBE TP002 LP200

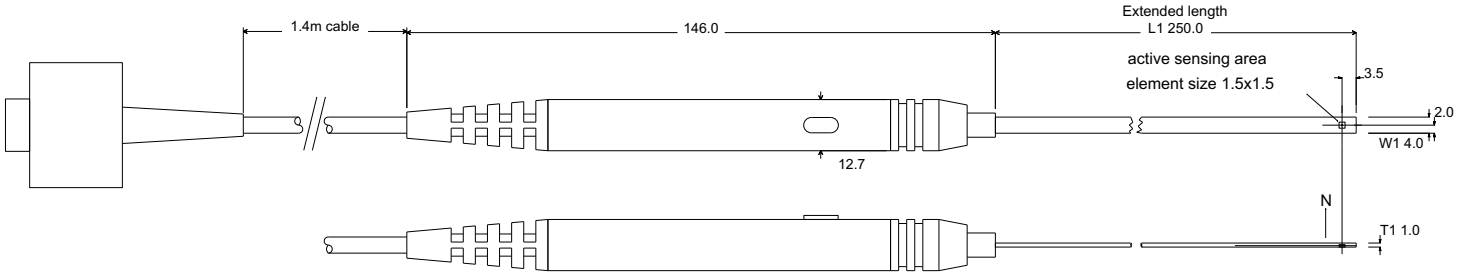
NDT Supply.com, Inc.
7952 Nieman Road
Lenexa, KS 66214-1560 USA
Phone: (913)-685-0675
Email: sales@ndtsupply.com

No Longer Available

~~Transverse probe - TP002SP SL250~~

Extended length transverse probe

0 - 3.000 T	0 - 299.9 mT	0 - 29.99 mT	0 - 2.999 mT	0 - 299.9 µT
0 - 30.00 kG	0 - 3000 G	0 - 300.0 G	0 - 30.00 G	0 - 3.000 G
✓	✓	✓	✓	✗

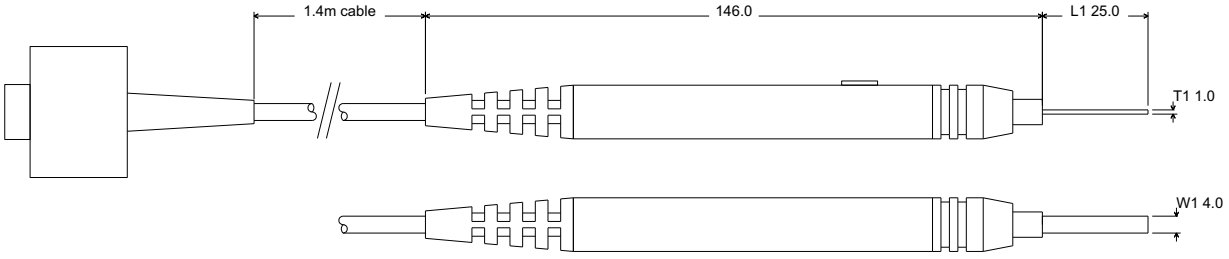


TRANSVERSE PROBE TP002 LP250

No Longer Available

~~Transverse probe - TP002SP 25SL~~

0 - 3.000 T	0 - 299.9 mT	0 - 29.99 mT	0 - 2.999 mT	0 - 299.9 µT
0 - 30.00 kG	0 - 3000 G	0 - 300.0 G	0 - 30.00 G	0 - 3.000 G
✓	✓	✓	✓	✗

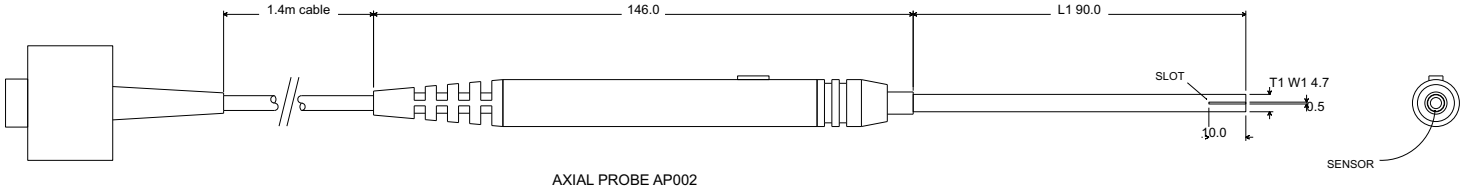


TRANSVERSE PROBE TP002SP25L

Axial probe - AP002

Solid brass axial probe tip
Rugged

0 - 3.000 T	0 - 299.9 mT	0 - 29.99 mT	0 - 2.999 mT	0 - 299.9 µT
0 - 30.00 kG	0 - 3000 G	0 - 300.0 G	0 - 30.00 G	0 - 3.000 G
✓	✓	✓	✓	✗

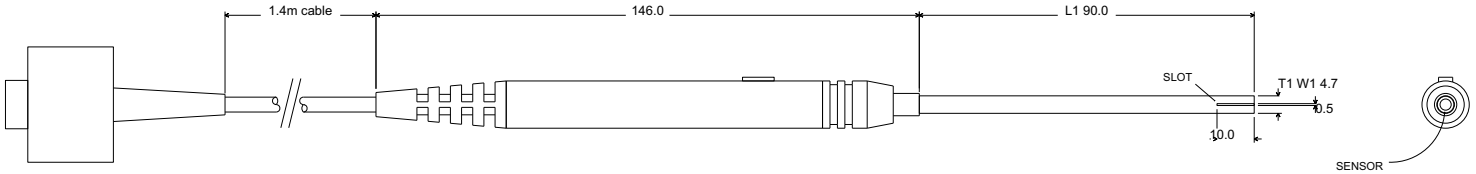


AXIAL PROBE AP002

Axial probe - AP002 HS

- High sensitivity
- Solid brass axial probe tip
- Rugged

0 - 299.9 mT	0 - 29.99 mT	0 - 2.999 mT	0 - 299.9 µT	0 - 29.99 µT
0 - 3000 G	0 - 300.0 G	0 - 30.00 G	0 - 3.000 G	0 - 300.0 mG
✗	✓	✓	✓	✗



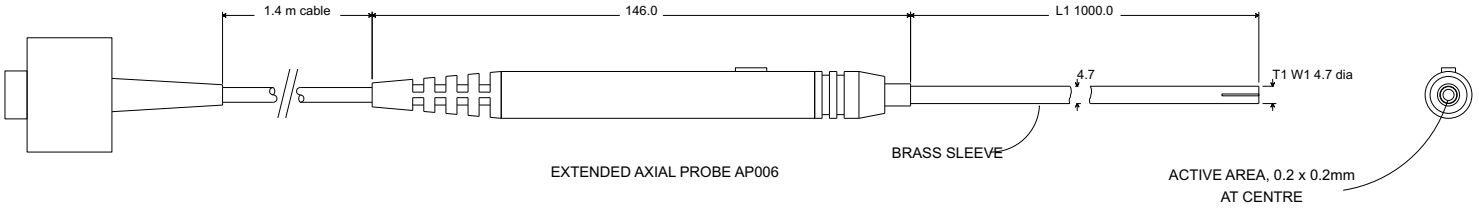
AXIAL PROBE AP002 HS

No Longer Available

~~Axial probe - AP006~~

- Long reach
- Rugged probe

0 - 3.000 T	0 - 299.9 mT	0 - 29.99 mT	0 - 2.999 mT	0 - 299.9 µT
0 - 30.00 kG	0 - 3000 G	0 - 300.0 G	0 - 30.00 G	0 - 3.000 G
✓	✓	✓	✓	✗

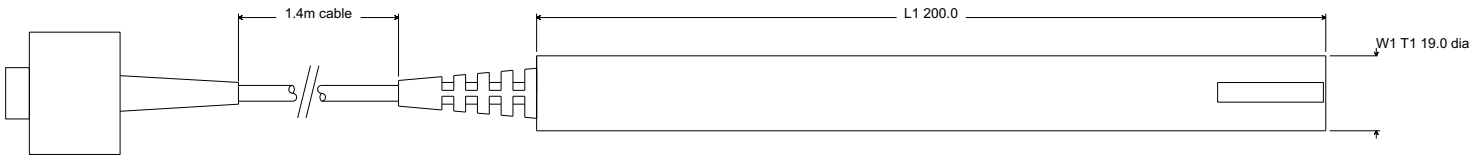


EXTENDED AXIAL PROBE AP006

Fluxgate probe - FG002 (preliminary data) AFG100

- Very high sensitivity
- Suitable for IATA, IACO and FAA regulations for magnetisation on air fright packages
- Auto Null
- AC and DC

0 - 2.999mT	0 - 100.0 µT	0 - 29.99 µT	0 - 2.999 µT	0 - 299.9 nT
0 - 30.00 G	0 - 3.000 G	0 - 300.0 mG	0 - 30.00 mG	0 - 3.000 mG
✗	✓	✓	✓	✗



FLUXGATE PROBE FG002

Probe Size summary

Probe No	Type	Combined accuracy	Tip Length L1	Tip Width W1	Tip Thickness T1	Stem Length L2	Stem Width W2	Stem Thickness T2	Active Area
TP002	Transverse	1%	89.5	4	1	-	-	-	1.5x1.5
TP002R	Transverse	1%	89.5	5	2.5	-	-	-	1.5x1.5
TP002HS	Transverse	1%	89.5	4	1	-	-	-	3.0x1.5
TP002 SP0.6	Transverse	1%	15	4	0.6	74.5	4	1	1.5x1.5
TP006	Transverse	1%	20	4	1	1000	4.7	4.7	1.5x1.5
TP002 SL200	Transverse	1%	200	4	1	-	-	-	1.5x1.5
TP002 SL250	Transverse	1%	250	4	1	-	-	-	1.5x1.5
TP002SP 25SL	Transverse	1%	25	4	1	-	-	-	1.5x1.5
AP002	Axial	1%	90	4.7	4.7	-	-	-	1.5x1.5
AP002HS	Axial	1%	90	4.7	4.7	-	-	-	3.0x1.5
AP006	Axial	1%	1000	4.7	4.7	-	-	-	1.5x1.5
FG002AFG100	Fluxgate	TBA	200	19	19	-	-	-	8.0x6.0

Flux Density

Hall effect devices measure Flux Density, that is the amount of magnetic "flux" that is passing through a given area. Typically the instrument that is connected to a hall effect device is known as a Gaussmeter, or a Flux Density meter or though sometimes these are referred, incorrectly to, as Flux meters, which are a completely separate class of instrument.

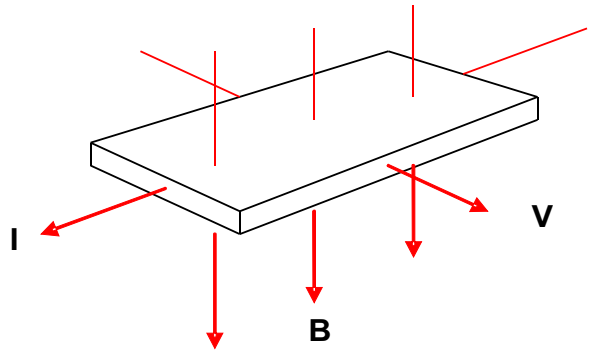
Flux Density is typically measured in Tesla (in SI units) but is also commonly measured in Gauss in CGS units. It is also possible to express the flux density as a Magnetic Field strength and may therefor be shown in units of Amps/meter or Oersted. Although this conversion from Flux Density to Field Strength is technically valid in air with the absence of magnetic materials, care should be taken using these units.

Hall Effect Theory

In an ideal world, a Hall Element consists of a small slab of semi-conductor material. Current passes from one end of the slab to the other and the voltage on each edge of the slab is the same when no magnetic field is present. If a magnetic field is now applied through the top to bottom surfaces of the slab, a voltage appears across the sides of the slab which is directly proportional to the Magnetic Flux Density or Magnetic Field Strength. In reality, all practical Hall Probe elements are only linear within certain limits, normally 1%-2%. The more accurate and thinner the probes, the greater the expense. Most Gaussmeter manufacturers approach this problem by selecting current and Hall Probe load resistance to minimise these non-linearity errors.

The Hall Probes are connected to a Gaussmeter, thE Gaussmeter measures the output of the Hall Effect device and displays a reading in magnetic units. The philosophy behind the design of Hirst's Gaussmeter range is that both the Probe and the Gaussmeter will contain non-linearities and errors. The difference between a theoretical, perfect Hall Probe and that of an individual Hall Probe is measured and the difference recorded in an EEPROM located in the Hall probe socket (this memory device also contains other information such as serial number and calibration date). The Gaussmeters read this calibration data and use this to provide an accurate linear reading on the display of the gaussmeter, that is a true representation of the magnetic field being applied to the Hall Probe.

The perfect Hall Probe is in fact a calibration process using a technique known as Nuclear Magnetic Resonance (NMR) which gives very high accuracy.



RoHS Compliance

Both the GM07 ,GM08 meters, probes and accessories are RoHS compliant.

Hirst Magnetic Instruments Ltd. also manufactures wide ranges of magnetic instruments, magnetisers, demagnetisers, precision demagnetisers and special magnetic systems.

Due to a process of continual improvement, Hirst Magnetic Instruments Ltd. reserve the right to change any specifications without notice.