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Advantages of GSM-19T Proton Magnetometers

The method is based on the spin of protons in a magnetic field according to the Larmor equation. Typically, a sensor bottle containing a fluid with a large number of protons is subjected to a large direct current in a coil wound around the bottle. The current creates a corresponding induced field in a direction perpendicular to the earth's magnetic field.

The current is then shut off and the protons precess with a frequency that is proportional to the magnetic induction. With GEM, an advanced frequency counting algorithm is used to determine the magnetic intensity with an accuracy that is unmatched by other systems.

When choosing a proton precession system, we recommend that you carefully consider the system specifications on an equivalent footing to ensure that you are obtaining the maximum value for your investment.

Some of the advantages of GEM's Proton system are:

1. Highest sensitivity in a Proton magnetometer / gradiometer for definition of anomalies missed by or too subtle for other Proton magnetometers. GEM is the only commercially available Proton magnetometer that breaks the 1 nT level of sensitivity.

2. Highest absolute accuracy for effectiveness in operation of gradiometers and multi-sensor gradiometers. Absolute accuracy is +-0.2 nT at 1Hz.

3. Highest display resolution – 0.01 nT versus 0.1 nT for other Proton systems. GEM has an order-of-magnitude advantage in this area.

4. Latest technologies. GEM's system was re-designed in 2000 and continues to be modified to this date – making it the most up-to-date system on the market.

5. Low maintenance costs. There is no need to refill sensor fluid as the sensor is factory-sealed.

6. Fully interchangeable sensors. Non-critical design allows sensor – sensor interchangeability, which can be a valuable feature while operating in remote areas.

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7. Excellent dynamic range of 20,000 to 120,000 nT.

8. Versatile gradient tolerance of 7,000 nT/m. Gradient tolerance is a key parameter when considering operating in urban environments where cultural noise can be a factor.

9. Sampling up to 2 times / second. Higher sampling is ideal for “walking” (i.e. nearly continuous surveys) which significantly reduce field times.

10. Minimal weight. GEM’s Proton magnetometer console weighs 2.1 kg – the lowest weight in a commercial magnetometer. This translates into easier, more productive operation.

11. Minimal power consumption. Power consumption is, in general, high in Proton magnetometers due to the nature of the polarization (DC polarization). GEM’s 4.8 Watts of power consumption are significantly lower than others which typically consume 7.8 Watts or more.

12. Navigational capability with lane guidance. GEM is the only commercial Proton magnetometer with this capability which is useful for planning surveys and acquiring data with minimal positioning errors.

13. High data transfer rates. GEM’s high transfer rate of 115 kbaud ensures minimal time is required for downloading data.

GEM also delivers a range of GPS and DGPS systems that enable customers to perform magnetic surveys with a variety of positioning accuracies, according to their application needs and budgets.

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Comparison Table of Proton Magnetometers

Specifications		***GSM-19T***	***Other/s***
SYSTEM:			
	Sensitivity	0.05 nT	0.1 nT
	Display Resolution	0.01 nT	0.1 nT
	Absolute Accuracy (over total temperature range)	+-0.2 nT @ 1 Hz	0.5 nT
	Dynamic Range	20,000 – 120,000 nT	20,000 – 120,000 nT
	Gradient Tolerance	7,000 nT/m	5,000 nT/m
	Minimum Sample Interval	0.5 sec	3.0 sec
	No. of Keystrokes to Measure & Record Data	1	2
	Memory and # of readings	32MB 5,373,951	? MB 12,500
	Temperature Range	-40ºC - +50ºC	-20ºC - +50ºC
	Real-time Profile / Chart Display	yes	no
	Console Weight, with rechargeable batteries	2.1 kg	2.7 kg
POWER:			
	Power Requirements	12 volts	12 volts
	Power/Current Consumption - during measurement cycle --"snooze" mode	 12.0 Watts 0.5 Watts	
OPTIONAL SUBSYSTEMS AND SENSORS			
	Integrated **GPS** Navigation V7.0 option	yes	no
	Navigation software, including programmable survey "lanes", V7.0 option	yes	no
	Simultaneous **Gradiometer** option	yes	???
	"**Walking**" magnetometer option	yes	no
	VLF-EM option	yes	no
OTHER SYSTEM SPECIFICATIONS			
	Base station correction technique:	Exact time comparison or linear interpolation	
	Diurnal correction done within units:	yes	no
	Clock stability over temperature range:	2.5 sec/month	5 sec / month
	Interactive display menu:	yes	no
	X,Y co-ordinate calculation / recording	yes	
	Line # - No. of digits displayed / recorded	5	
	Station # - No. of digits displayed / recorded	7	