



Potassium

Resource Mag / Grad (GSMP-35)

The new Potassium Resource system is the highest sensitivity and absolute accuracy magnetometer today. It is designed for ground applications where data quality, cost control and ruggedness are the keys for project success.

New technologies provide even more value:

Highest sensitivity available at 2.5 pT / root Hz at 1 Hz

Fast sampling at 5 Hz; ideal for walking / vehicular surveys

Integrated backpack for convenience and high productivity

GPS elevation values for input into geophysical modeling routines

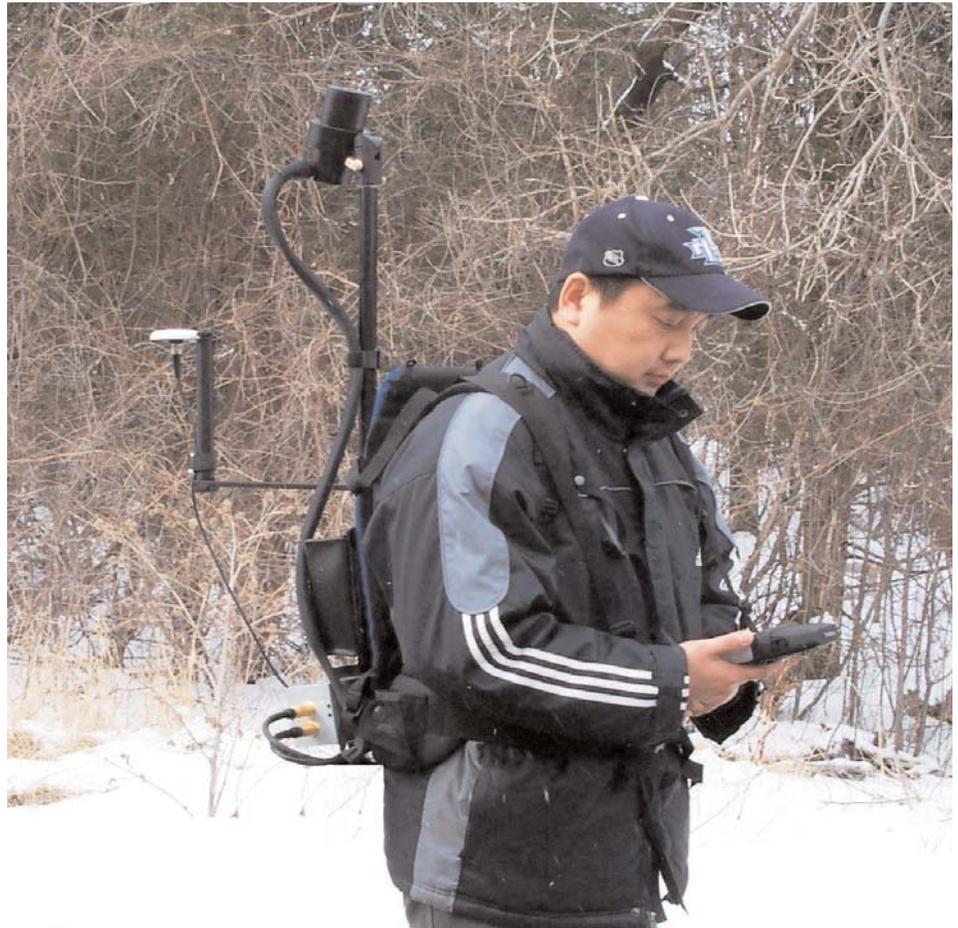
Enhanced GPS positioning resolution

<1.5m standard GPS for high resolution surveying
<1.0m OmniStar GPS
<0.7 for newly introduced CDGPS

Easy-to-use mapping and navigation capabilities for enhanced survey performance

Proven reliability based on 10 years of R&D

And all of these technologies come complete with the most attractive savings and warranty in the business.



Optically pumped Potassium (GSMP-35) Resource system with Personal Digital Assistant, backpack for electronics, light weight sensors and cables.

Looking for minerals, diamonds or oil & gas, and the optimal technologies to assist you in acquiring high quality magnetic or gradiometric data for analysis and decision making?

Then, GEM has the solution you have been seeking. The new optically pumped Potassium Resource Magnetometer is specially designed for your needs ... establishing a new standard in data quality, cost control and ruggedness.

The result of more than a decade of development, the resource mag is a backpack-mounted version of GEM's proven GSMP-40 ground magnetometer with many key new features.

Features span a variety of functions, including import, display, navigation, surveying, sampling, and more. The new system also supports GPS ... another important capability for today's production-minded explorationist.

Data Quality

High data quality is assured through the resource magnetometer's sensitivity, gradient tolerance and minimal heading error. Sensitivity is 3.7 pT / root Hz at 5 Hz - the highest in the industry. This makes the system effective for mapping subtle anomalies and structure in resource exploration applications.

The instrument also has a gradient tolerance in excess of 30,000 nT / m, making it ideal for mapping highly ferrous geological units such as those typically encountered in mineral exploration. In addition, the system has the lowest heading (orientation) error, thereby resulting in the "cleanest" magnetic readings possible.

Cost Control

In the past five years, industry rationalization has resulted in a greater

emphasis on cost control for magnetometer and gradiometer surveys. With the new Potassium Resource Magnetometer, the emphasis is also on cost control, through the following features:

* Useability - Easy menu-driven operation using a Personal Digital Assistant (PDA)

* Display - Easy-to-read display with specific settings for presenting real-time data on PDA

* Navigation / GPS - The industry's most versatile navigation technology for surveying without cut grids for significant cost savings

* Import - Streamlined import of maps for georeferenced walking surveys

* Large Capacity Memory - Survey a whole day without concern for memory space or the need to dump the memory during the survey

Ruggedness

Resource exploration often requires traveling to remote locations and operating instruments in less than ideal conditions (heat, cold, damp, etc.).

The new Potassium magnetometer has excellent environmental specifications as well as other capabilities that contribute to robustness. These include rugged packaging on an ergonomic backpack, and robust sensors ... the main component of any magnetometer system.

Advancing the Field of Potassium Magnetometry

GEM's R&D programs continue to advance the frontiers of magnetometry.

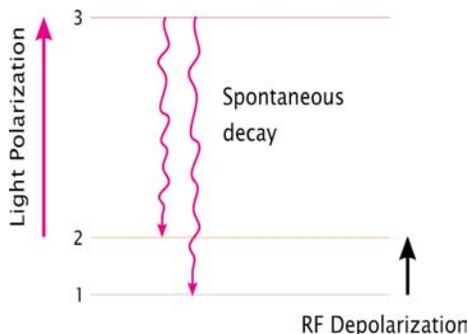
For example, recent developments with small sensor designs have increased gradient tolerance by five times while maintaining the industry standard in sensitivity and absolute accuracy.

With GEM, our work in delivering the most advanced and reliable products continues every day -- Our World is Magnetic!

Theory of Operation

A typical alkali vapour magnetometer consists of a glass cell containing an evaporated alkali metal (i.e. alkali atoms).

According to quantum theory, there is a set distribution of valence electrons within every population of alkali atoms. These electrons reside in two energy levels as represented by the numbers 1 and 2 in the figure below.



Light of a specific wavelength is applied to the vapour cell to excite electrons from level 2 to 3 only. This process (called **polarization**) reduces the number of atoms with electrons at level 2. The result is that the cell stops absorbing light and turns from opaque to transparent.

Electrons at level 3 are not stable and spontaneously decay back to levels 1 and 2. Eventually, level 1 becomes fully populated and level 2 is fully depopulated.

At this point, RF **de-polarization** comes into play. Here, we apply RF power of a wavelength that corresponds to the energy difference between levels 1 and 2 to move electrons from level 1 back to level 2.

The significance of de-polarization is that the **energy difference between levels 1 and 2 (i.e. the frequency of the RF depolarizing field) is directly proportional to the magnetic field.**

The system detects the fluctuation of light intensity (i.e. modulation) as the cell becomes opaque and transparent, and measures the corresponding frequency. The frequency value is then converted to magnetic field units.

GSMP-35 Specifications

Sensitivity:	0.0025 nT RMS @ 1 Hz
Resolution:	0.0001 nT
Absolute Accuracy:	+/- 0.1 nT
Dynamic Range:	20,000 to 100,000 nT*
Gradient Tolerance:	30,000 nT/m
Sampling Rate:	1, 5, 10, 20 Hz

* Low/High Field Options Available:

10,000 to 350,000 nT

Orientation

Sensor Angle: Optimum angle 30° between sensor head axis & field vector.

Orientation: 10° to 80° & 100° to 170°

Heading Error: +/- 0.05 nT between 10° to 80° and 360° full rotation about axis.

Environmental

Operating Temperature: -20°C to +55°C **

Storage Temperature: -70°C to +55°C

Humidity: 0 to 100%, splashproof

** Optional to -40°C

Dimensions and Weights

Sensor: 141mm x 64mm (external dia.) and 1.5 kg

Electronics Box: 310mm x 75mm x 90mm and 1.6 kg

Power

Power Supply: 22 to 32 V DC

Power Requirements: Approx. 50 W at start up, dropping to 12 W after warm-up

Power Consumption: 12 W typical at 20°C

Warm-up Time: <10 minutes @ -40°C

Outputs

Wireless output to Personal Digital Assistant (PDA) with comprehensive Windows Personal Computer (PC) software for data acquisition and display.

Outputs UTC time, magnetic field, lock indication, heater, field reversal, latitude and longitude, and GPS altitude.

Standard Components

Personal Digital Assistant (PDA), GEMLinkW software, batteries, harness, charger, sensor with cable, 24V battery belt, RS-232 cable, staff, instruction manual and shipping case.



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