SQUID iMAG

SYSTEMS

TRISTAN TECHNOLOGIES

- **Laboratory Applications**
- **Biomagnetic Measurements**
- **Geophysical Exploration**
- **Non-Destructive Evaluation**
- **Magnetic Microscopy**
- **Custom SQUID Systems**

Tristan offers a variety of fully configured system packages based on the iMAG© series of SQUID components. These range from basic single-channel magnetometer systems to instruments for specific applications. They include systems for biomagnetism, geophysical exploration, nondestructive testing of materials, magnetic microscopy and studies of rock magnetism. For applications that require applied fields, Tristan can supply persistent superconducting magnets, permanent magnet structures with custom-designed field profile shapes and built-in copper magnets for ac fields. Tristan's SQUIDs are available in both high temperature (HTS) 77 K and low temperature (LTS) 4.2 K versions. Standard product data sheets and application sheets are available for many of these complete systems. Contact your Tristan products representative with your specific system needs.

The basic SQUID system consists of an input circuit connected to a SQUID sensor, a dewar to provide the cryogenic environment, SQUID control electronics and possibly a data acquisition system (Fig. 1).

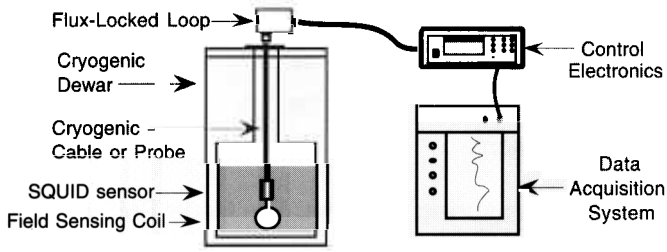

Fig. 1. Typical magnetometer system

Tristan offers complete systems or individual components, according to your needs. Tristan also supplies the basic components that can be combined to form the basis of a SQUID measurement system. Specific information on individual components can be found on their respective data sheets.

SQUIDS

Model LSQ/20 LTS dc SQUID Sensor
Model HTM-100 HTS Magnetometer
Model HTG-100 HTS Gradiometer
Model HTo-100 HTS miniMAG

PROBES

Model SP Standard Cryogenic Cable
Model RMP External Feedback Probe
Model MFP Multi-Function Probe
NLI series of dewar inserts for HTS SQUID sensors

ELECTRONICS

Model iFL-301-L (LTS Flux-Locked Loop)
Model iFL-301-H (HTS Flux-Locked Loop)
Model iMC-303 Cryogenic Control Unit
Model RLM ac Impedance Bridge

DEWARS

BMD series for liquid helium (LTS) systems
NLD series for liquid nitrogen (HTS) systems

TRISTAN LABORATORY SYSTEMS

Tristan offers the most complete line of SQUID measurement systems available. These systems can be combined with either user- or Tristan-supplied cryogenics to give you the most versatile measurement capabilities possible.

For laboratory applications, the LTS SQUID system can be configured to measure a wide variety of electromagnetic signals. HTS SQUIDs are available as pure magnetometers and planar gradiometers. Typical sensitivities that can be achieved with Tristan SQUID systems are listed below:

a) Current: 10^{-12} amp/√Hz
b) Magnetic Fields: 10^{-15} tesla/√Hz
c) dc Voltage: 10^{-14} volt
d) dc Resistance: 10^{-12} Ω
e) Inductance: 10^{-12} henry
f) Magnetic Moment: 10^{-10} emu

Model BMS Basic Measuring Systems: The Model BMS-H is a HTS SQUID system capable of measuring magnetic fields approaching 30 femtotesla/√Hz (1 fT = 10^{-15} tesla). Typically, this system is used in conjunction with a NLD series Dewar. The BMS-H can also be supplied with a planar gradiometer coil with a gradient sensitivity better than 100 fT/cm√Hz or a miniMAG sensor with spatial resolution <100 μm.

The Model BMS-L is a LTS SQUID system capable of measuring small electric currents with a better than than 7 × 10^{-13} ampere/√Hz. With a simple pickup coil, it also can be used for the detection of magnetic fields as small as 1 fT.

Model PMS Picovolt Measuring System: This cryogenic dc voltage amplifier with a gain of 10^8 and a rms noise of less than 10^{-13} volts/√Hz is used for measurements of very small voltages and resistances.

Model MPS Multi-Purpose Measurement System: This system is a low impedance ac bridge system for extremely sensitive resistance and inductance measurements. Resolutions of 10^{-10} ohm and 10^{-13} henry are readily obtained. The Model MPS also has the combined capabilities of the BMS and PMS systems and allows a wide range of both ac and dc measurements to resolutions approaching 0.001% on single or multiple samples.

Specialty Components: Tristan also provides a number of additional accessories for use in configuring iMAG SQUID-based systems. These include variable temperature cryostats (0.05 K – 800 K), room-temperature and low-temperature X-Y scanning stages, LTS superconducting motors, mu-metal magnetic shields, dewars, dewar stands, transfer tubes and other accessories.

TRISTAN MAGNETOMETER SYSTEMS

For measurements of external magnetic fields, Tristan offers both liquid helium and liquid nitrogen SQUID measurement systems. Series 600 LTS systems are designed for the researcher who desires ultimate performance from a low to medium channel count SQUID magnetometer or gradiometer system. The series 700 HTS magnetometers offer researchers interested in HTS (liquid nitrogen) SQUIDs a number of convenient platforms to perform magnetic measurements.

model	type	channels	orientation	noise
601	LTS		B_Z, $\frac{dB_Z}{dz}$ or $\frac{d^2B_Z}{dz^2}$	10 fT/√Hz
603	LTS	3	$\frac{dB_X}{dz}$, $\frac{dB_Y}{dz}$, $\frac{dB_Z}{dz}$	< 10 fT/√Hz
606	LTS	3 + 3	$\frac{dB_X}{dz}$, $\frac{dB_Y}{dz}$, $\frac{dB_Z}{dz}$; B_X, B_Y, B_Z	< 10 fT/
612	LTS		$\frac{dB_Z}{dz}$	15 fT/√Hz
701	HTS		B_Z, $\frac{dB_Z}{dz}$ or $\frac{dB_X}{dz}$	< 90 fT/√Hz <100 fT/cm√Hz
703	HTS	3	B_X, B_Y, B_Z, $\frac{dB_Z}{dz}$, $\frac{dB_\lambda}{dz}$	< 90 fT/√Hz <100 fT/cm√Hz

With the use of discrete detection circuits, Tristan LTS SQUID systems can operate in magnetic fields exceeding 9 tesla and sample temperatures ranging from mK to well above room temperature. Tristan HTS SQUIDs can operate in fields that can exceed 0.1 tesla.

TRISTAN CUSTOM SQUID SYSTEMS

Tristan has supplied a wide variety of unique SQUID-based instrumentation for Laboratory, Biomagnetic, Geophysical, and Non-Destructive Evaluation (NDE) measurements. If your needs are unique, contact us to discuss your particular requirements. Tristan's scientists and engineer's 20+ years of experience and an ever-increasing quest for refinement of its product line, ensures that Tristan can manufacture the ideal SQUID system to suit your needs.

Specifications subject to change without notice.

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