

dc SQUID SENSORS

The **low-temperature (LTS) SQUIDS** run in liquid helium and are fabricated using a niobium/aluminum all thin-film tri-layer technology that combines durability with high sensitivity. They feature symmetric integral signal and modulation coils that eliminate output variations with varying input loads. The niobium-shielded package comes with screw terminals ready to accept your custom input circuit. Tristan can also provide thin-film integrated LTS SQUID magnetometers with state-of-the-art performance. The Tristan Model LSQ/20 can be used with the Model SP Cryogenic Cable for ultrasensitive measurements of current ($< 0.7 \text{ pA}/\sqrt{\text{Hz}}$) and magnetic field ($< 1 \text{ fT}/\sqrt{\text{Hz}}$). In conjunction with the Model RMP and MFP Cryogenic Probes, it can measure a much wider range of electromagnetic properties in magnetic fields as high as 9 tesla—see Tristan's Cryogenic Probe data sheet for more information.

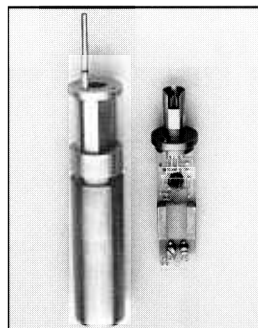
The **high-temperature (HTS) SQUIDS** run in liquid nitrogen at 77 K and are offered in magnetometer or gradiometer configurations. They feature YBCO pick-up coils patterned on the chip and a tough passivation layer for protection from moisture and oxygen. All HTS iMAG sensors use a common connector to attach them to the Model SP Cryogenic Cable; they may be easily interchanged to provide alternative pick-up coils and different sensitivity levels. We can guarantee magnetometer performance better than $90 \text{ fT}/\sqrt{\text{Hz}}$. For customers who need even lower noise levels and performance in magnetic fields, we can provide sensors with world-record noise performance; contact us for the latest specifications and pricing.

Features:

- **All Thin-Film Devices**
- **Niobium-Aluminum Tri-layer Process for Robust LTS Devices**
- **YBCO Step-edge and Bicrystal Junctions for Robust HTS Devices**
- **Symmetric Modulation Coils Eliminate Inductive Loading of Output**

Tristan offers several configurations of low-noise SQUID sensors which serve as the heart of our iMAG SQUID systems.

Address your magnetic sensing applications with the latest technology in both high-temperature and low-temperature superconductivity.



LTS Sensors

Input coil inductance:	1.8 μH
Noise level:	$< 5 \times 10^{-31} \text{ J}/\text{Hz}$ $< 5 \times 10^{-6} \Phi_0/\sqrt{\text{Hz}}$
1/f knee:	nominal 0.5 Hz
Input coil sensitivity:	0.2 $\mu\text{A}/\Phi_0$
Temperature range:	0 – 7 K



HTS Sensors

Noise (HTM-100):	$< 90 \text{ fT}/\sqrt{\text{Hz}}$
(HTo-100):	$< 10 \text{ pT}/\text{Hz}$
(HTG-100):	$< 100 \text{ fT}/\text{cm } \sqrt{\text{Hz}}$
1/f knee:	nominal 10 Hz
Operating Temperature:	77 K
Operating field:	$0 \geq 100 \text{ mT}$

Besides the standard LSQ/20, Tristan can supply LTS sensors with longer niobium shield cans such as that supplied with the MFP and RMP probes (see Probe Data Sheet for details). We can also supply the bare sensor chip for specialized applications.

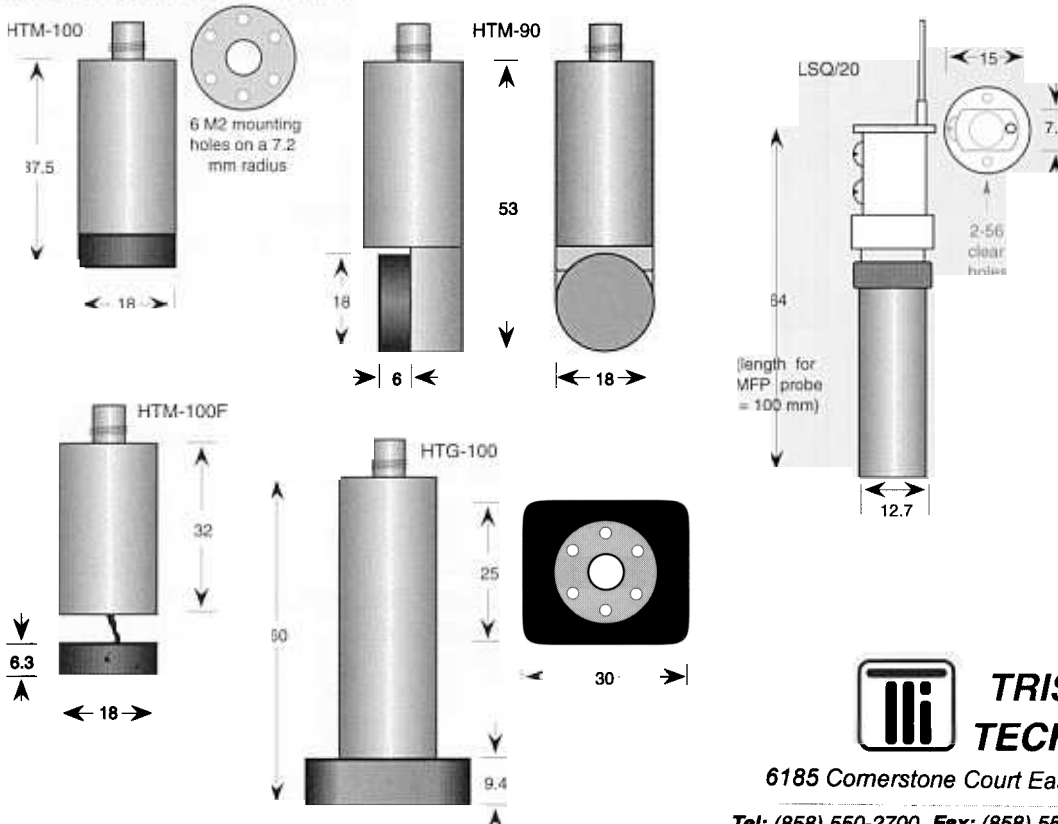
The 2 μ H input impedance of the LSQ/20 allows easier matching of input circuits. Unlike asymmetric coil designs, the symmetric coil design of the LSQ/20 avoids inductive coupling of unwanted signals. Additionally, it exhibits no sensitivity variations with changing input impedances.

Tristan's HTS sensors are the first commercial devices to operate in both ambient and kilogauss environments. Step-edge junctions ensure uniform response independent of sensor orientation, avoiding the Fraunhofer-like diffraction behavior seen in many monolithic bicrystal junction devices.

Tristan's HTS sensors are available in a wide variety of configurations. The standard HTS magnetometer sensor is available in a 90° mounting (Model HTM-90) or in a flexible end piece (Model HTM-100F). The flexible section can be as long as 15 cm without degrading performance. Pickup coil dimensions other than the standard 8 mm \times 8 mm are also available. The HTo-100 MiniMAG has a 50 μ m \times 50 μ m pickup coil and is well suited for magnetic microscopy. The HTM-400's large 16 mm \times 16 mm detection area gives it the highest sensitivity on any available HTS sensor. Tristan's gradiometers are available in either dB_z/dx (shown below) or dB_x/dz configurations.

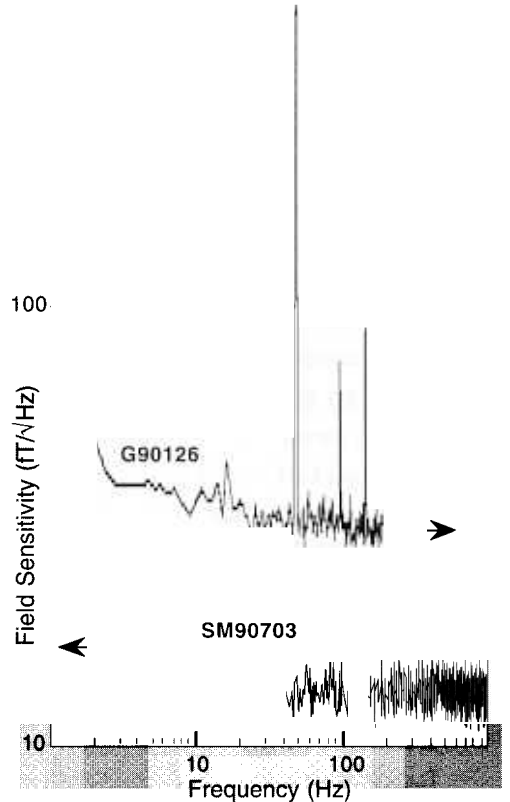
Integral heaters on all Tristan sensors (LTS and HTS) allows normalization of the sensor without having to warm the entire experiment above the critical temperature. If your measurements require special configurations or higher performance, contact Tristan directly or your Tristan representative.

specifications subject to change without notice



nominal dimensions in mm

1000



Actual performance of HTM-400 magnetometer (SM90703) and HTG-100 gradiometer (G910126)



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