

# 3000 GAUSS HELMHOLTZ COIL HTS ELECTROMAGNET



3000 GAUSS IN 25 SECONDS: STEADY-STATE POWER WITHOUT THE CRYOGENS.

The HTS-110 Helmholtz Coil Magnet System leverages HTS technology to provide a high-uniformity, cryogen-free magnetic environment. Engineered to outperform traditional copper-coil systems, it maintains a 0.3 tesla (3000 Gauss) steady-state field without the extreme power consumption or resistive heating of water-cooled alternatives.



- **Dry, Cryogen-Free Cooling:** Eliminates liquid helium and nitrogen, reducing safety risks, infrastructure requirements, and long-term overhead.
- **Unmatched Sample Access:** Provides a large 180 mm x 80 mm transverse access zone and a >60 mm room temperature bore for complex experimental setups.
- **Precision Homogeneity:** Achieves exceptional field uniformity of < 0.1% over a 50 mm x 20 mm volume, providing large-sample capability.
- **Rapid Field Control:** Capable of reaching full field in just 25 seconds without quench risk, maximising experimental throughput.
- **Lab-Friendly Footprint:** Features an exceptionally low fringe field (< 10 Gauss at 30 cm), making it safe for operation in standard, high-traffic laboratory environments.

**180 MM**  
TRANVERSE ACCESS

**25 SECONDS**  
RAMP TO FULL FIELD

**3000 GAUSS**  
CONTINUOUS 0.3 T FIELD

**CRYOGEN-FREE**  
NO LIQUID HELIUM

**With rapid 25-second ramping and a compact, orientation-independent architecture, it offers a powerful and low-maintenance solution for researchers requiring large homogeneous volumes and unencumbered sample access.**

- **Sensor Characterization:** Stable, uniform field environments for the precision calibration of Hall effect sensors, fluxgates, and magnetometers.
- **Material Science:** Facilitating magneto-optical studies and transport measurements where large-scale transverse or axial sample access is paramount.
- **In-Situ Beamline Analysis:** Compact, orientation-independent design allows for seamless integration with X-ray or neutron scattering experiments.
- **Geophysical Research:** Simulation of planetary magnetic fields and rock magnetism studies.
- **Biotechnology:** High-gradient magnetic bead separation and the study of magnetic field effects on biological samples.



HTS-110's global client base includes tier-one data storage companies; manufacturers; universities; and national research institutes including ALBA, ANL, ANSTO, BNL, CAS, FZJ, HZB, ILL, IMRE, JAXA, LNLS, MSL (NZ), NIST, NUS (SSLS), PAL, RAL, RTRI, TATA, TPS, and TUM (FRMII).

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LARGE 180 MM TRANSVERSE ACCESS: HIGH-UNIFORMITY PRECISION IN A DRY, COMPACT SYSTEM.

## MODEL SPECIFICATIONS

Peak Central Field	> 3000 Gauss
Magnet field orientation	Horizontal
Homogeneity over $\varnothing 50$ mm x 20 mm	< 0.1%
Pole gap	> 80 mm
Transverse access	180 mm x 80 mm
Horizontal room temperature bore	> 60 mm
Fringe field at distance of 30 cm from centre of magnetic field in the axial direction	< 10 Gauss
Maximum current	100 A
Ramping rate to full field	25 s
Cool-down time	< 10 hour
Peak inductance (approx.)	0.17 H
Dimensions	630 x 472 x 543 mm
Mass - magnet and cryocooler (Approx.)	175 kg
Mass - compressor (HC-4E1)	96 kg

## SYSTEM COMPONENTS

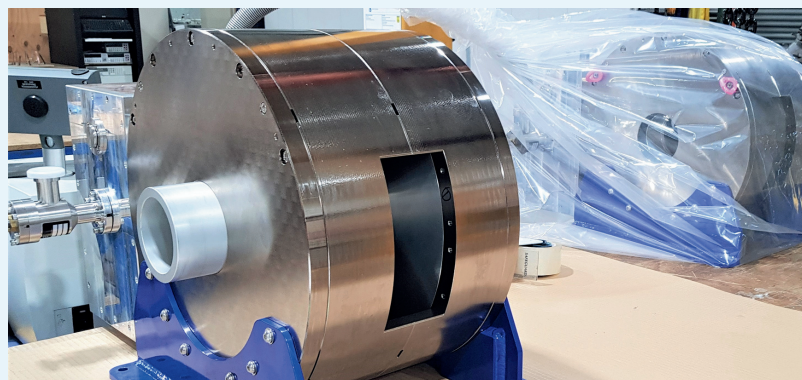
- **HTS Magnet Core.** A vacuum-insulated vessel containing HTS Helmholtz coils, precision-aligned for field homogeneity and optimized for thermal stability
- **Cryocooler System.** A high-reliability 4-5 kW mechanical cooler (Gifford-McMahon) mounted directly to the cryostat for efficient, dry cooling
- **Power Supply.** A high-resolution 100 A, high-stability DC power source providing precise, bi-directional field control and rapid ramping
- **System Magnet Monitor.** A dedicated unit for monitoring all critical operating temperatures and voltages, with safety interlocks for automated shutdown

## POTENTIAL ADD-ONS

- Air-cooled options
- Vacuum pump
- Extended service agreements

## SITE AND OPERATING ENVIRONMENT

- Designed for operation in standard laboratory environments (15°C to 25°C)
- Space & Mounting: The system is orientation-independent, but requires clearance for the cryocooler head and sample positioning
- Utility Requirements: 5 kW input power for the cryocooler. Water cooling for the compressor is standard, with air-cooled options available



## ENQUIRY AND DELIVERY PROCESS

### Initial Consultation or Feasibility Study

Discuss your needs to confirm if a turnkey, customised or bespoke magnet is suitable.

### Application and Options Assessment

Verify specifications, supply a quote with lead time, and reserve stock or capacity.

### Production and Testing

We build, test, and QC the system to rigorous standards.

### Delivery and Integration

On-site installation and operational training, plus lifetime support.



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