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DATASHEET

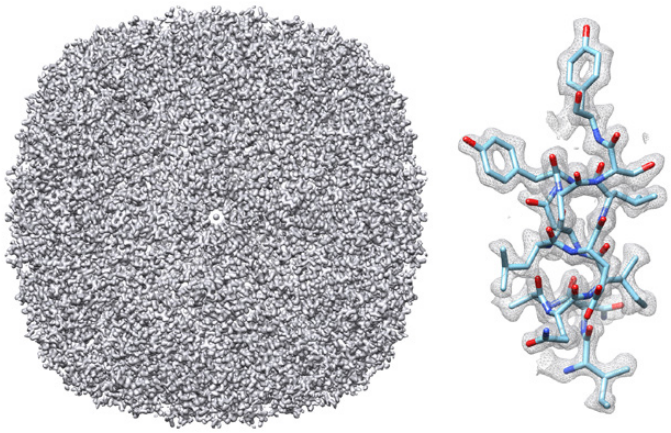
Krios G3i Cryo-TEM

Unravelling life at the molecular level—easier, faster and more reliably

Access next-level, state-of-the-art cryo-electron microscopy with improved ease-of-use and ultimate performance.

The new Thermo Scientific™ Krios™ G3i Cryo-Transmission Electron Microscope (Cryo-TEM) enables life science researchers to unravel life at the molecular level—easier, faster and more reliably than ever before. Its highly stable 300 kV TEM platform and industry-leading Autoloader (cryogenic sample manipulation robot) are designed for automated applications, such as single particle analysis (SPA) and cryo-tomography. Designed-in connectivity ensures a robust and risk-free pathway throughout the entire workflow, from sample preparation and optimization to image acquisition and data processing.

Setting up data acquisition has been made easier and quicker by enhanced automation and systematic user guidance. This allows every user to achieve the ultimate performance for every experiment. Simultaneously, the high-resolution performance and throughput of the Krios G3i Cryo-TEM have been further improved by cleverly combining hardware improvements with advanced software capabilities.



3D SPA reconstruction of Apoferritin at a resolution of 1.62 Å – overview (left) and detail (right)). Data taken on a Krios G3i™ with Falcon 3EC in counting mode. Image processing was done with Relion 3.0.
Images courtesy of R. Danev, H. Yanagisawa and M. Kikkawa from The University of Tokyo, Japan.

Key Benefits

Enhanced ease-of-use. Automated alignments and systematic user guidance allow easy operation from one single interface (EPU).

Optimal tool performance. Self-assessment of microscope optical status, combined with automated alignments ensuring optimal experimental conditions are always available.

Workflow connectivity. Guaranteed compatibility allows robust and contamination-free transfer of samples between Autoloader equipped instruments (Krios, Arctica, and Glacios Cryo-TEMs).

Highest Resolution performance. Constant power lenses reduce thermal drift, linear distortion is minimized to <1%.

Maximum throughput. Batch screening of up to 12 samples grids, creating overview atlases and classifying the ice films for guided selection of grid squares.

Single-axis holder for cryo-tomography. Improved eucentric behavior enables faster and more accurate tomography acquisition.

Enhanced ease of use through automation

The EPU Software has been further streamlined to become the single user interface for the SPA workflow, providing comprehensive user guidance, as well as access to automated routines for regularly recurring alignments.

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Reproducible, optimal tool performance guaranteed

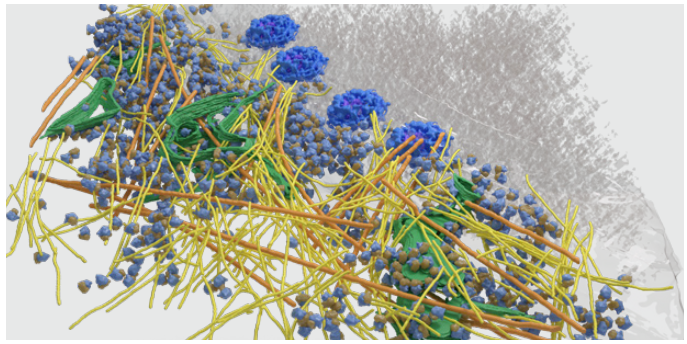
The optimal thermal and mechanical stability of the Krios G3i Cryo-TEM ensure perfect optical performance. The instrument features a self-assessment function that automatically evaluates the optical status of the microscope, providing feedback for any steps that require optimization. Additionally, automated alignment routines allow the instrument to be tuned to its optimal starting point for SPA or tomography experiments.

Workflow connectivity

For successful cryo-EM data acquisition, optimization of both biochemistry and vitrification requires an efficient screening process. The Krios G3i Cryo-TEM can be integrated into the SPA or tomography workflow where samples will be evaluated and optimized using the Thermo Scientific™ Talos™ Arctica Cryo-TEM or Glacios G3i Cryo-TEM, before imaging them at high-resolution in the Krios G3i Cryo-TEM. Designed-in connectivity ensures a robust and contamination-free pathway throughout the entire workflow, and between different Autoloader-based cryo-TEMs, without the need for manipulation of individual small specimen grids.

Maximum throughput

EPU Software is the native software package for SPA automated screening and data acquisition. With full control of the Autoloader, all 12 grids in an Autoloader cassette can be batch-screened: after the creation of a grid atlas, ice quality (presence, thickness) of the vitrified grids is automatically categorized to support guided selection of grid squares.



3D tomographic reconstruction of the periphery of a HeLa cell using cryo–tomography. The visible structures within the cell are clearly visible: Nuclear pore complex (blue), microtubules (orange), actin & intermediate filaments (yellow), large and small ribosomal subunits (brown and purple respectively) and nuclear density (grey). Image courtesy of Prof. Baumeister, Max Planck Institute of Biochemistry, Department of Molecular Structural Biology, Martinsried, Germany

High-resolution performance

The Krios Cryo-TEM has a proven track record of high-resolution imaging of a wide variety of particles: the vast majority of published structures at or below 4 Å have been determined using Thermo Scientific cryo-TEMs. Constant power lenses reduce thermal drift and contribute to the excellent system stability during long automated acquisition sessions. To allow imaging of increasingly smaller particles at increasingly higher resolution, the Krios G3i Cryo-TEM comes with phase plate integration and a guaranteed <1% linear distortion.

Krios™ G3i Cryo-TEM
Transmission Electron Microscope

Technical highlights

- High brightness X-FEG Gun
- Flexible accelerating voltage from 80-300 kV
- Cryo-Autoloader for automated and contamination-free loading of cassettes, containing up to 12 Autogrids
- Temperature Management software, including liquid nitrogen autofill and scheduling of cool down after cryo cycle
- Automatic condenser, objective and SA apertures
- Three-condenser lens system for automated, continuous parallel sample illumination
- Computerized 4-axes specimen stage with ±70° alpha tilt
- Cryo-stage with single axis holder for better stability and drift performance
- Symmetrical constant power C-TWIN image aberrations and lens design for minimizing lens hysteresis during mode switching between LM-SA-Mh imaging and diffraction
- Wide pole piece gap of 11 mm
- Rotation-free imaging upon magnification changes
- Self-assessment of microscope optical status, combined with automated alignments, ensuring optimal experimental conditions are always available
- EPU Software for single particle analysis (SPA) screening and data acquisition
- Primary control unit including two 30” monitors to be placed within 15 meters from the column and the option to extend up to 100 meters from the column
- Digital FluCam – all manual and automatic alignments can be executed with the search and view camera
- Modular column design for flexible upgrades and service
- Ceta 16M CMOS camera
- Windows® 7.0 Operating System
- Low-dose software suite for minimized electron dose during cryo-TEM operation
- Environmental Enclosure

Optional Configurations

- Thermo Scientific™ Falcon™ 3EC Direct Electron Detector
- Gatan BioQuantum energy filter for contrast enhancement
- Phase Plate solution
- Cs Image corrector
- TEM and STEM tomography SW
- HAADF STEM detector
- On-axis BF/DF detectors
- Thermo Scientific™ Vitrobot™ system
- Accelerate integrated service and application support packages to accelerate customer innovation and enhance productivity

Installation requirements

- Environmental temperature: 18°C – 23°C
- Temperature stability: 0.8°C p-p per 24hr (Compatible with air conditioning class ASHRAE 2001)
- Door height: 2.31 meters
- Door width: 1.00 meter
- Ceiling height: 3.90 meters
- Floor space need for microscope: 5.8 x 6.6 meters
- Weight distribution maximum: 1300 kg/m^2
- Double earth connection
- Frequency: 50 or 60 Hz (±3%)
- Power consumption: 11.5 kVA (including all microscope options)
- Compressed air supply with pressure range of 5–7 bar
- Nitrogen (N_2) supply with pressure range of 1–10 bar
- Liquid nitrogen (LN_2) for continuous LN_2 filling
- Sulfur Hexafluoride (SF_6) gas in proper ventilated room
- LAN connection for Remote Access Program for Interactive Diagnosis (RAPID)

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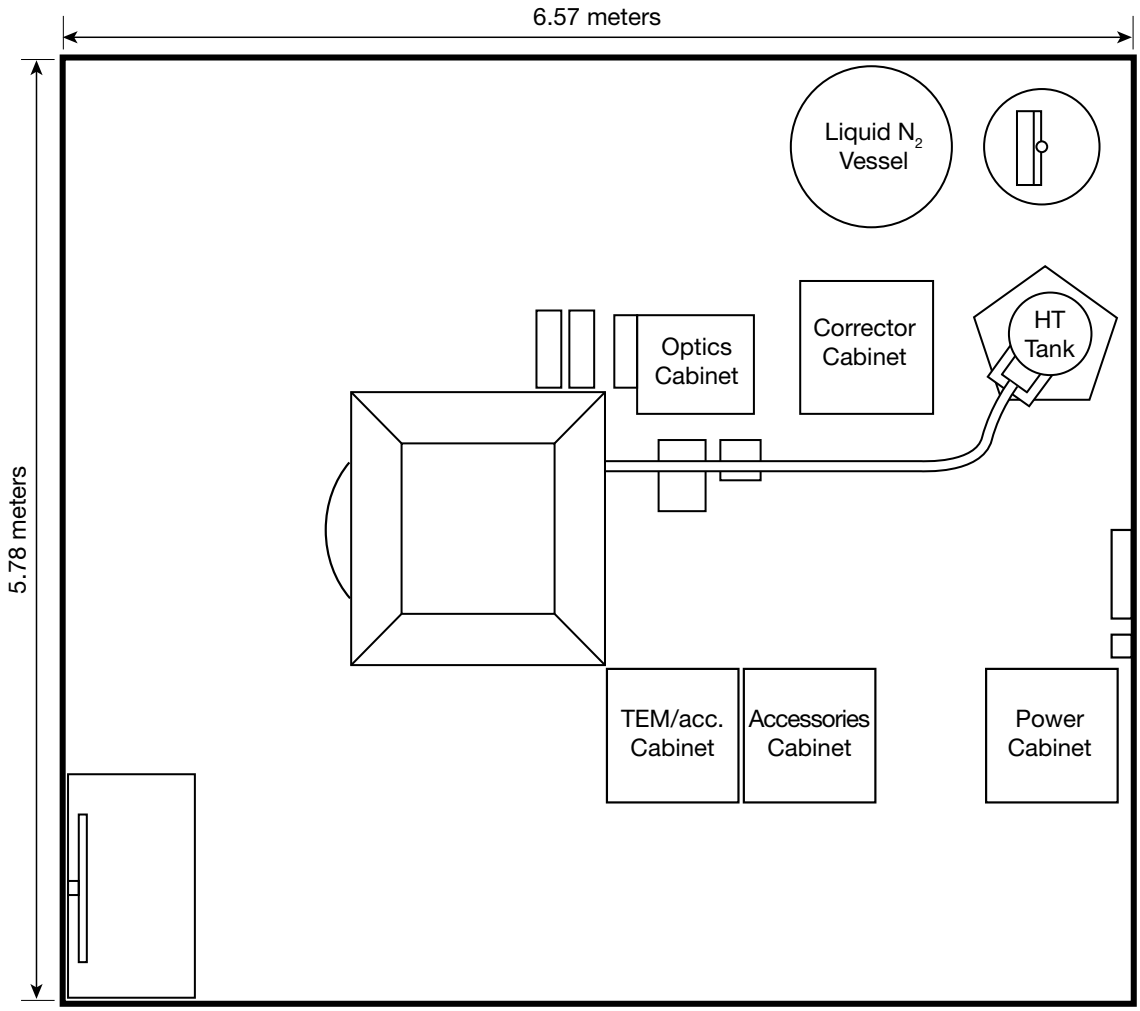

Krios G3i Cryo-TEM instrument footprint.

Find out more at **thermofisher.com/EM-Sales**

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