

## Hitachi High-Tech Launches New Tabletop Microscopes with Enhanced Usability: TM4000PlusIII and TM4000III



TM4000PlusIII

Tokyo, August 22, 2024 – Hitachi High-Tech Corporation (“Hitachi High-Tech”) announced today the global launch of TM4000PlusIII (“TM4000PlusIII”) and TM4000III (“TM4000III”) Tabletop Microscopes equipped with support features for automation and stable operation.

The TM Series shrinks the electron microscope to a size capable of being mounted on a tabletop. Thanks to their compact size and ease of installation, desktop microscopes are widely used not only for R&D, but also in quality control at manufacturing sites, science education at schools, and other purposes. In manufacturing environments in particular, there is a need to increase the efficiency of observation tasks and streamline operations so that even users with limited expertise can easily observe a large number of samples.

The TM4000PlusIII is equipped with automation support features that enable users to create recipes for numerous conditions. Recipes can control functions such as stage position adjustment and magnification, which previously needed to be manually configured every time for each sample. In addition, they come equipped with maintenance features designed to facilitate consistent observation. One such function is a monitoring system that checks the condition of the tungsten filament\* and graphically reports its condition. Since tungsten filaments require regular replacement, this function allows users to track the filament lifetime and plan ahead with maintenance tasks to allow for smooth and consistent operation of the tool.

\*Tungsten filaments: A single part used in the electron gun of an electron microscope. They are typically made by bending a thin wire made of tungsten (element symbol: W), which is a highly heat-resistant metal, into a hairpin-like shape and connecting it to an electrode. The tungsten filament emits an electron beam when heated.

### Product Development Background

Because the TM Series makes it possible to conduct high-precision observation and analysis, even when installation space is limited, it has come to be a critical tool during the development and quality control of new materials. Recently, the TM Series has contributed to conserving the environment and maintaining people’s health by being used to develop environmentally friendly materials and their manufacturing processes, as well as analyze harmful substances in the atmosphere. In manufacturing environments, the trend of decreasing feature size and stricter quality control has led to an increase in the number of SEM users. However, not all new users have specialized knowledge and operating skills. Amidst this trend, we developed the TM4000PlusIII and TM4000III to have this sought-after optimization and simplification of observation tasks for the purposes of enabling the acquisition of high-precision data without any variability, regardless of who is operating the microscope or their level of expertise.

## Key Features

### 1. Making Tasks More Efficient

The automation support feature with the TM4000PlusIII allows for observation procedures, such as stage movement, magnification changes, and imaging, to be saved as recipes. They can then be executed to run automatically with a single click. This makes operations more efficient and standardizes techniques among users. This is beneficial for those looking to automate routine tasks and for users who are concerned about having to manually configure observation conditions.

The TM4000PlusIII also features a setting for high-current mode which enables faster operations due to the increased observation signal. For example, in particle analysis a large number of measurement points are required which can be very time consuming to collect. The high-current function shortens measurement time for each location while reducing the overall time involved in such tasks.

### 2. Plan Ahead with the Filament Monitoring Function

The microscopes come equipped with new support features to ensure they can be used with peace of mind at all times. One example is the filament indicator feature, which allows users to track the filament life on screen, preventing instances of observations being interrupted due to filament replacements occurring mid-observation.

### 3. Ideal for Educational Purposes

The TM Series is equipped with low-vacuum and high-sensitivity backscattered electron detectors, which eliminate the need for complicated pretreatment processes. This makes it possible to conduct observations on a variety of samples with ease, enabling the TM Series to be utilized in educational settings.

Additionally, as digital skill development becomes a critical subject in educational settings, the TM4000PlusIII allow users to experience and learn important programming concepts such as “sequential execution,” “repetition,” and “conditional branching” via the automation support features.

The TM4000PlusIII and TM4000III will be exhibited at JASIS 2024 at the Makuhari Messe International Exhibition Halls in Chiba, Japan, from September 4 through September 6, 2024.

Hitachi High-Tech aims to ship a target total of 6,000 TM Series units across the global market as quickly as possible to contribute to manufacturing worldwide. Hitachi High-Tech will continue to refine our core analysis technologies, and provide measurement and inspection solutions that support R&D and quality control operations in a wide range of fields, in order to help improve people's QoL (Quality of Life) and to resolve social issues related to the environment, resilience, and security and safety.

## Main Specifications

	TM4000PlusIII	TM4000III
Magnification	×10 to ×100000	
Accelerating Voltage	5 kV, 10 kV, 15 kV, 20 kV	
Observation Mode Settings	5 levels (for each acceleration voltage)	
Max. Sample Size	80 mm (diameter), 50 mm (thickness)	
Stages	Motor Drive	Manual
Detectors	High-sensitivity four-segment backscattered electron detector	Detectors

\* The automation support feature and automatic particle analysis are optional.

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### **About Hitachi High-Tech**

Hitachi High-Tech, headquartered in Tokyo, Japan, is engaged in activities in a broad range of fields, including manufacture and sales of clinical analyzers, biotechnology products, radiation therapy systems, semiconductor manufacturing equipment, analytical instruments, and analysis equipment. Also, we provide high value-added solutions in industrial fields such as mobility, connected, environment and energy, etc. Through business based on our core Observation, Measurement and Analysis technologies, we will contribute to the realization of a sustainable society by solving social issues.

The company's consolidated revenues for FY2023 were approx. JPY 670.4 billion. For further information, visit <https://www.hitachi-hightech.com/global/en/>

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