II. SPECIFICATIONS

1. Resolution

Secondary electron
image resolution : 3.5 nm guaranteed
(HIGH VACUUM mode)

Back-scattered electron
image resolution : 4.5 nm guaranteed
(Variable Pressure mode)

2. Magnification

15× to 300,000× (65 steps)

3. Electron Optics

(1) Filament : Pre-centered tungsten hairpin type
(2) Gun bias : Self-bias + Continuously variable bias
(3) Accelerating voltage : 0.3 to 30 kV (1171 steps)
0.3 to 9.99 kV (in increments of 10 V)
10 to 30 kV (in increments of 0.1 kV)
(4) Emission current : 10^{-12} to 10^{-7} A
(5) Gun alignment : 2-stage electromagnetic alignment
(6) Condenser lens : 2-stage electromagnetic condenser
(7) Objective lens : Super-conical lens
(8) Objective lens aperture : 4-opening movable aperture
(9) Stigmator coil : 8-pole electromagnetic X/Y correction for astigmatism
(10) Image shift : ±20 μm or more (W.D. = 15 mm)

4. Specimen Stage

One of the following five types of specimen stages is selectable.

(a) Super-eucentric stage
Movement range : 32 mm × 32 mm
Tilt angle : -90 ° to +90 °
Rotation angle : 360 °

(b) Standard stage
Movement range : 80 mm × 40 mm
Tilt angle : -20 ° to +90 °
Rotation angle : 360 °

(c) Large-size eucentric stage

Movement range : 100 mm × 50 mm

Tilt angle : 0 ° to +60 °

Rotation angle : 360 °

(d) Cool stage 20

Movement range : 15 mm × 15 mm

Tilt angle : -45 ° to +45 °

Temperature range : +10 °C to -20 °C

(e) 5-axis stage motor drive

Movement range : 100 mm × 50 mm

Tilt angle : 0 ° to +60 °

Rotation angle : 360 °

5. Image Display

(1) Kinds of images

Secondary electron image (only in HIGH VACUUM mode)

Back-scattered electron image (Semiconductor method)

(2) Scanning modes

TV scan

Slow scan (4 steps)

Selected area scan

Waveform monitor/signal monitor

Photo scan (4 steps)

Twin photo scan

Dual-magnification scan

(3) Scanning speeds

TV scan

Slow 1: 0.35 s (X = 0.7 ms, Y = 480 lines)

Slow 2: 2 s (X = 4 ms, Y = 480 lines)

Slow 3: 10/8 s (X = 20/16.7 ms, Y = 480 lines) *

Slow 4: 20/24 s (X = 40/50 ms, Y = 480 lines) *

Selected area: 70 ms (F) (X = 0.45 ms, Y = 160 lines One-stage filter)

70 ms (M) (X = 0.45 ms, Y = 160 lines Two-stage filter)

320 ms (S) (X = 2 ms, Y = 160 lines)

Photo 1: 40/33 s (X = 20/16.7 ms, Y = 1920 lines) *

Photo 2: 80/100 s (X = 40/50 ms, Y = 1920 lines) *

Photo 3: 200/200 s (X = 100/100 ms, Y = 1920 lines) *

Photo 4: 400/400 s (X = 200/200 ms, Y = 1920 lines) *

(*: Synchronized with power frequency of 50/60 Hz)

(4) Signal processing (analog operation)

Image polarity reversal

Image differentiation

Gamma control

(5) Data display

Accelerating voltage, magnification, micron scale, micron value, film number, W.D. value, date/time, vacuum level, photo magnification, detector

(6) Data entry

Input through full keyboard (alphabetic characters, numerics, symbols)

Graphic input (straight lines, circles, arrows, etc.)

(7) VTR signal output

6. Image Memory

(1) For display (640 × 480)

(2) For high resolution (1280 × 960)

(3) For ultra-high resolution (2560 × 1920) (Option)

(4) Memory functions

Scan conversion

Recursive filter (Applicable modes: TV, Slow 1, Slow 2)

Image integration (2 to 1024 images)

(Applicable modes: TV, Slow 1 to Slow 4)

Brightness conversion (LUT: Look-up table method)

- Intermediate level emphasis
- Gamma control
- N-ary conversion
- Others

Pseudo color

Histogram presentation

4-split screen presentation

7. Automatic Functions

Auto brightness and contrast (ABC)

Auto focus (AFC)

Auto stigmatism and focus (ASF)

Auto filament saturation (AFS)

Auto gun alignment (AGA)

Auto start (HV-ON → AFC → ABC)

Auto photographing

(1: AFC → ABC → PHOTO)

(2: ABC → PHOTO)

Full auto mode

(1: AFS → AGA → AFC → ABC)

(2: AGA → AFC → ABC)

8. Operation Support Functions

(1) Operation principle : Graphical user interface/Simplified menus

(2) Control devices : Mouse, dedicated rotary knob, full keyboard

(3) Magnification presetting (Arbitrary magnification settable)

(4) Axial alignment wobbler

(5) Condition registration (15 conditions, to be registered unlimitedly)