High Voltage-Power Supply for charged particle beam.

FUTEX Co., Ltd.

http://www.futex.jp/english

HV-Power Supply for TFE-Gun

This product is an electron gun power supply for Thermal Field Emission Scanning Electron Microscope. (acceleration voltage: 30kV~15kV)

- **FE303XP Custom multiple output power supply for “high resolution TFE-type scanning electron microscope”**.
  Components: 30kV acceleration power supply, filament power supply, suppressor power supply and extractor power supply. (super-low ripple and super-high stability level)

- **FE303XS Custom multiple output power supply for “TFE-type scanning electron microscope”**.
  Components: 30kV acceleration power supply, filament power supply, suppressor power supply and extractor power supply. (low ripple and high stability level)

- **FE153XP Custom multiple output power supply for “high resolution TFE-type scanning electron microscope”**.
  Components: 15kV acceleration power supply, filament power supply, suppressor power supply and extractor power supply. (super-low ripple and super-high stability level)

- **FE153XS Custom multiple output power supply for “TFE-type scanning electron microscope”**.
  Components: 15kV acceleration power supply, filament power supply, suppressor power supply and extractor power supply. (low ripple and high stability level)
HV-Power Supply for low acceleration TFE-Gun

In recent years, semiconductor miniaturization proceeds, in order to improve the yield defect inspection process has become increasingly important.

This product is an electron gun power supply for semiconductor inspection equipment, CD-SEM and Review-SEM.

- **FE103XP** Custom multiple output power supply for “high resolution TFE-type CD-SEM and Review-SEM”. Components: 10kV acceleration power supply, filament power supply, suppressor power supply extractor power supply and deceleration lens power supply.

- **FE502XP** Custom multiple output power supply for “high resolution TFE-type CD-SEM and review-SEM”. Components: 5kV acceleration power supply, filament power supply, suppressor power supply extractor power supply and deceleration lens power supply.
HV-Power Supply for Electron beam lithography

- **FE503XP 50kV custom multiple output power supply for “Electron beam Lithography with TFE-type emitter”.**
  Components: 50kV acceleration power supply, filament power supply, suppressor power supply 1st anode power supply and 2nd anode power supply.

**Outline specifications**

- **Acceleration power supply:**
  - Output voltage: -1kV~51.2kV, Absolute voltage accuracy: Less than 0.1%, Set ability: 16bit (0.1V LSB)
  - Output current: 100 μA max, Ripple noise: Less than 2ppm 100mVp-p@50kV,
  - Temperature coefficient: 3ppm/℃, Stability: 5ppm/1hr after 1hour warm up

- **Filament power supply (Referenced to Accelerator):**
  - Output voltage: 0~5V, Set ability: 14bit (0.25mA LSB), Output current: 0~3.2A, Ripple noise: Less than 5mA p-p @3A,
  - Absolute current accuracy: ±0.01A, Stability: 100ppm/1hr @ 3.0A, Temperature coefficient: 25ppm/℃

- **Supressor power supply (Referenced to Accelerator):**
  - Output voltage: -0.03kV~ -0.6kV, Absolute voltage accuracy: Less than 0.1% @300V, Set ability: 14bit (0.11V LSB)
  - Output current: 150 μA max, Ripple noise: Less than 20mVp-p, Stability: 50ppm/1hr after 1hour warm up
  - Temperature coefficient: 25ppm/℃

- **1st anode power supply (Referenced to Accelerator):**
  - Output voltage: +0.3kV~+6.5kV, Absolute voltage accuracy: Less than 0.1%, Set ability: 16bit (0.125V LSB)
  - Output current: 300 μA max, Ripple noise: Less than 50mVp-p @6.5kV, Stability: 10ppm/1hr after 1hour warm up
  - Temperature coefficient: 5ppm/℃

- **2nd anode power supply:**
  - Output voltage: +0.2kV~+5.12kV, Absolute voltage accuracy: Less than 0.1%, Set ability: 16bit (0.125V LSB)
  - Output current: 100 μA max, Ripple noise: Less than 50mVp-p @5.12kV, Stability: 10ppm/1hr after 1hour warm up
  - Temperature coefficient: 5ppm/℃

* External control: RS232C (optical isolation), Interlock: Vacuum, Temperature sensor, HV connector
* HV connector: Customer specification, Input-Voltage: AC90V~240V single phase 1.5A (50, 60Hz)
* Insulated system: Hybrid insulation by air and silicon rubber
Solution system for charged-particle beam equipment

About customizing

Best customizing and tuning high-voltage power supplies to suite systems. Almost all high-voltage power supplies that FUTEX offer are customized products. High-voltage power supplies that are tuned to meet specifications of customers’ devices can reduce risks in product development to the minimum and contribute to shorten the development speed.

Delivering original high-voltage power supplies to suite customers’ purposes

The higher the demands of resolution and refinement are, the less the general high-voltage power supplies for charged particle beam can handle. High-voltage power supplies, especially for thermal FE electron guns that are used for lithography and for ion guns that are used for FIB equipment, etc., cannot generate high precision probes unless they are modified to meet specifications of customers’ electron guns (ion guns).

At FUTEX, we ask customers’ requests and customize from built-in electronic circuits to packages based on the entire configuration of customers’ apparatus. We offer solutions to high-voltage power supplies to meet customers’ needs by modifying to the requested output voltage and adding high-voltage power supplies for the extra electrode if needed.

Customized high-voltage power supplies can bring out the best performance of apparatus.

Even the superior electron guns, ion guns or systems cannot bring out the maximum performance if they have poor matching with power supplies. Our high-voltage power supplies can be customized and tuned to the best conditions in accordance with customers' systems. Customers select the ones with closest specifications to their apparatus from our wide variety of high-voltage power supplies. Then, we customize and tune high-voltage power supplies to the best condition based on the specifications of target systems.
What is the supply of the beam PS by the solution?

Example of “System solution of wafer defect inspection equipment”

Accelerator, Filament, Suppressor, Extractor, SE-lens, Gun-alignment × 16, Condenser lens1, Stigmator, Condenser lens2, Alignment × 16, Collection coil, Beam blanking, SE-collector, Photomultiplier, scintillator, Detector-amp, deflection-amp, Object-lens, Focus-lens, CPP, Retarding, ES-chuck, etc. + Low voltage PS × 30

50~100 kinds of complex PS compositions
Conceptual diagram: HV-PS & TFE-Gun