High Beam Power Supply Module

Overview

FIB Spellman's FIB Series is an integrated multiple output high voltage power supply specifically designed for focused ion beam applications. It incorporat.

Key Takeaways

A high beam power supply module generates and regulates high voltage and current to control electron emission, acceleration, and beam stability in electron beam systems.

Core Working Principle

A high beam power supply module operates by providing a stable high-voltage output to accelerate electrons and maintain a controlled electron beam. The process involves three main stages: Electron Emission: Electrons are released from a cathode using methods such as thermal emission, field emission, or photoemission. Thermal emission, where a filament is heated to release electrons, is the most common method in high-power systems.

Electron Acceleration: The emitted electrons are accelerated to high energy using a high-voltage DC potential. This is achieved through electrostatic acceleration, where the high-voltage power supply applies a potential difference between the cathode and anode, forming a focused electron beam. Electron Collection and Beam Control: The accelerated electrons are collected or directed using electric or magnetic fields.

The power supply module often integrates closed-loop emission current control and arc suppression to maintain beam stability and prevent fluctuations that could affect performance.

© 2026 ENSAA OPTICAL NETWORKS - All rights reserved

Key Components

A typical high beam power supply module includes: High-voltage transformers and rectifiers to convert AC input to stable DC high voltage. Switching power modules (e.g., MOSFET or IGBT-based) for efficient voltage regulation and control. Filament power supply floating at high voltage to heat the electron-emitting cathode.

Control boards and microcontrollers (e.g., STM32MP157) for real-time monitoring and digital regulation of voltage, current, and safety interlocks. Cooling systems such as air-cooled radiators or oil tanks to dissipate heat generated by high-power operation. Safety mechanisms including arc detection, fault monitoring, and insulation to protect both equipment and operators.

Control and Regulation

Modern high beam power supplies use fully digital control systems. Real-time microcontrollers manage: Emission current regulation to maintain a constant electron beam intensity. Voltage stabilization to ensure consistent acceleration energy.

Feedback loops using sensors or detectors to adjust output dynamically, compensating for thermal fluctuations or load changes.

Applications

High beam power supply modules are essential in: Electron beam welding for aerospace and automotive manufacturing. Material processing and machining where precise energy delivery is required. Electron beam evaporation in thin-film deposition and semiconductor fabrication.

In summary, the principle of a high beam power supply module is to generate, regulate, and stabilize high-voltage and high-current outputs to control electron emission and beam characteristics, integrating advanced power electronics, digital control, and safety mechanisms to ensure precise and reliable operation.

Article Content

High Voltage Power Supply Solutions for OEM | Advanced Energy

Find reliable high voltage power supplies for precision applications. Choose from custom, PCB, modular, and low- to high-power units engineered to meet your needs.

High Voltage Power Supply (HVPS)

Multichannel High Voltage Supply systems. Flexible and scalable HVPS solutions. 19" Eurocassette, NIM, VME and more. Available as rack or benchtop versions. Multiple High Voltage Power Supplies

Genvolt Electron Beam High Voltage Power Supply For

© 2026 ENSAA OPTICAL NETWORKS - All rights reserved

The Genvolt electron beam power supply range is suitable for 3D printing and additive manufacturing, laser metal deposition and electron beam welding.

Electron-Beam Power Supplies

The Excelitas E-Gun High Voltage Power Supply is a highly regulated power supply designed for use in an electron-beam system. The supply provides high voltage

90 mm Halogen High Beam Module for Military Combat Vehicles

With a power consumption of 55 W in high beam operation and the proven Philips H11 light source, the module provides reliable and uniform illumination. The 4-point mounting concept

High Voltage Power Supply Modules | Matsusada Precision

Browse through this wide selection of chassis mount and PCB mount high voltage power supplies. These high-voltage power supplies are safely designed for your needs.

EBM60-FEG

Spellman''s EBM60-FEG Series is an integrated, multiple high voltage power supply specifically designed to drive Field Emission Scanning Electron Microscope

PCB mount High Voltage Power Supplies | Matsusada Precision

Our PCB-mount high-voltage power supply modules feature an ultra-compact, space-saving design characterized by low noise and high reliability. These high-voltage DC-DC converters are engineered

HBM Supply Crisis 2026: The Bottleneck Redefining AI

HBM Adoption Risks: How AI Demand Created the 2026 Supply Bottleneck The artificial intelligence sector''s explosive growth has created a structural supply

Co-Packaged Optics (CPO) Market Analysis: 1.6T Transition & AI

Strategic analysis of the Co-Packaged Optics (CPO) market, tracking the 2026 inflection point for 1.6T modules. Explores value migration, supply chain bottlenecks, and thermal

High Voltage Power Supply Solutions for OEM | Advanced Energy

Advanced Energy''s high voltage power supplies feature high-performance solutions including high voltage DC power supply and DC-DC high voltage power supply options. Each product line offers a

CAN Bus module for high beam

© 2026 ENSAA OPTICAL NETWORKS - All rights reserved

By connecting to the CAN Low and Can High cables and creating a power supply for the adapter, the module determines the high beam function and outputs this via the violet cable. This signal is then

hivolt

High Voltage Modular Supplies The HMB series offers high voltage power supply modules in a small packaging for PCB mounting and soldering. Fixed polarity - positive or negative. Stable output

PCB mount High Voltage Power Supplies | Matsusada Precision

PCB mount High Voltage Power Supply Modules Our PCB-mount high-voltage power supply modules feature an ultra-compact, space-saving design characterized by low noise and high reliability. These

SEM High Voltage Power Supply | SEM series

The SEM series is a high-voltage power supply ideal for the electron gun of a scanning electron microscope (SEM). It is a high-performance, multi-output

Genvolt E-Beam High Voltage Power Supply For

The EB04 series e-beam power supply equipment for electron beam welding machines. Covers power from 100W to 2kW & voltage from 60kV to 225kV.

Components & Power-supplies landing

With proven reliability, rapid arc recovery, and control options, Temescal''s e-beam power supplies offer solutions for any evaporation requirement. CV-6SLX E-Beam Power Supply » 6-kW, constant

CV-6SLX Electron Beam Power Supply

CV-6SLX Electron Beam Power Supply Temescal Model CV-6SLX High Voltage Power Supply Overview The Temescal Model CV-6SLX is a 6-kW, constant voltage switching power supply

© 2026 ENSAA OPTICAL NETWORKS - All rights reserved

Contact Us

Continue your research online:

Website: https://ensaa.es
Technical inquiry: https://ensaa.es/contact.html

This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

© 2026 ENSAA OPTICAL NETWORKS - All rights reserved