

DUOPLASMATRON ION SOURCE

Model 358



Features

- High currents from gaseous elements
- Positive and negative ions
- Reliable operation
- Low energy spread
- High brightness
- Filament life > 1000 hours
- Easily replaceable components

General description

The HVVE Model 358 Duoplasmatron ion source is a modified Von Ardenne ion source and useful as a source of plasma for subsequent extraction of positive and negative ions. In its design care has been taken to utilize high vacuum techniques that will minimize contamination and contribute to efficient operation and pure ion beam outputs.

A low-pressure arc discharge in the gas to be ionized is electrostatically constricted by a funnel-shaped intermediate electrode placed between the electron-emitting cathode (hot filament) and the anode. A strong axial magnetic field between the intermediate electrode and the anode further constricts the discharge to a narrow plasma beam along the axis of the exit aperture.

To increase the evacuation speed of the arc chamber during initial filament out gassing the HVVE Model 358 Duoplasmatron ion source is provided with a valve to bypass the extraction aperture.

An important feature of the design is that wearable and serviceable components - such as intermediate electrode, anode aperture and filament - are easily replaceable. The filament design has been field-tested and has an expected life in excess of 1000 hours in a hydrogen atmosphere and under normal operating conditions.

HIGH VOLTAGE ENGINEERING

Particle Accelerators Systems for the scientific, educational and industrial research communities



HIGH VOLTAGE ENGINEERING EUROPA B.V.

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SPECIFICATIONS

Negative operation (with 0.025 inch source aperture)

Hydrogen (current maximum) : 50 μ A negative or more at 25 keV
Deuterium, Tritium : similar
Beam emittance : $< 2 \pi$ mm mrad (MeV)^{1/2} (for 80% of the beam current)

Positive operation (with 0.012 inch source aperture)

Hydrogen : several mA
Deuterium, Tritium : similar
Beam emittance : $< 6 \pi$ mm mrad (MeV)^{1/2} (beam current, 5 mA positive)

General

Lifetime : > 1000 hrs filament lifetime with hydrogen
Gas consumption : 25 atm cc/hr with 0.025 inch aperture
Energy spread : approx. 15 eV
Beam divergence : $< 8^\circ$ full angle (related to extraction geometry)

POWER REQUIREMENTS

Anode power supply : 250 V / 3 A, DC
Filament power supply : 5 V / 30 A, AC
Magnet power supply : 120 V / 2 A, DC
Extraction power supply : +/- 30 kV / 10 mA, DC

The Model 358 Duoplasmatron Ion Source requires ambient temperature liquid cooling with Syltherm XLT[®] or equivalent fluids (2 l/min, resistivity > 1 M Ω /cm).

The Model 358 Duoplasmatron Ion Source normally operates at +/- 30 kV with respect to (terminal) ground. Therefore the source must be insulated from (terminal) ground. The source power supplies must be connected to a 30 kV isolation transformer.

Sales offices in Europe and Japan

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