

RF ION SOURCE

Model SO-173 (long bottle)



Features

- 700 hours lifetime
- Low gas consumption
- Currents up to 2 mA
- Different configurations available
- Reliable and easy operation
- Low energy spread

General description

The RF ion source Model SO-173 long bottle is a long life ion source for general purposes. It is a heavy-duty prolific source of hydrogen and other gaseous ions. The source bottle contains a gas, which is excited by an RF (Radio Frequency) oscillator capacitive coupled to the bottle. The plasma is confined and positioned by an axial magnetic field. The source output is optimized by control of the source gas pressure, magnetic field and oscillator loading. The source bottle is fitted with a replaceable canal, available in different aperture sizes and materials. The RF ion source Model SO-173 is suitable for single ended accelerators with high-pressure insulation gas as well as tandem injectors in combination with a charge exchange canal at atmospheric pressure.

The long bottle RF ion source is available in two configurations:

CX-SO-173-003, which is equipped with a Pyrex source bottle provided with an aluminum cap termination for maximum lifetime at full source output. The magnetic field is produced by a tunable electro magnet for optimization for different charge states and different elements. The ion source is equipped with a 2.10 mm tantalum lined aluminum source canal for operation with heavy ions.

CX-SO-173-004, which has the same configuration as the CX-SO-173-003, but is equipped with a quartz bushing and a different source bottle. Instead of the aluminum cap termination this bottle is provided with a tungsten extraction pin functioning as anode. To protect the extraction pin from electron erosion caused by back streaming electrons, a quartz baffle is installed at the top of the bottle. The magnetic field is produced by a permanent magnet. The ion source is provided with a 2.10 mm stainless steel lined aluminum canal. This source has a high output and is designed for accelerators with nanosecond pulse equipment.

HIGH VOLTAGE ENGINEERING

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



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PERFORMANCE

Minimum ion beam currents for all configurations, canal diameter 2,1 mm

Hydrogen	500 μA *	* This current may increase, up to 2 mA, depending on the RF source configuration. Currents for other gases than Hydrogen can be decreased by approximately $M^{-1/2}$
Helium	250 μA	
Nitrogen	125 μA	
Oxygen	125 μA	
Neon	100 μA	
Argon	75 μA	
Krypton	50 μA	
Iodine	40 μA	
Xenon	40 μA	

SPECIFICATIONS

Proton yield	: 75%
Energy spread	: 100 eV typical
Ion species	: H, Ar, He, Ne, Xe, Kr, CO ₂ , I, B, BF ₃
Beam emittance	: the beam emittance depends on the source canal but is expected lower than $1.5 \pi \text{ mm mrad MeV}^{1/2}$
Cooling	: the RF source and oscillator must be cooled by 3,3 m ³ /min forced air (in case the source is used at a tandem injector)

POWER REQUIREMENTS

Magnet power supply	: 85V / 2A DC (only necessary for CX-SO-173-003)
Probe power supply	: 10kV / 10mA DC
Extraction power supply	: 20 kV / 5mA DC
Oscillator power supply	: 750V / 600mA DC

The Model RF SO-173 ion source normally operates at +20 kV with respect to (terminal) ground. Therefore the source must be insulated from (terminal) ground. The source power supplies must be connected to a 20 kV isolation transformer.

Options

1. Ion source power supply package complete with isolation transformer, fiber optic linked remote control and power supply mount for tandem accelerator injector systems.
2. Ion source power supply package complete with remote control panel for single ended accelerator systems.
3. Extraction gap assembly and extraction power supply.
4. Spare part kits.

Sales offices in Europe and Japan

RFL-3

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