

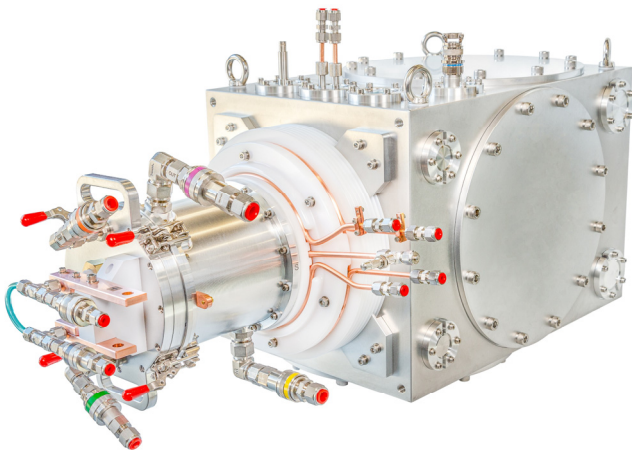


FILAMENT-POWERED TURNKEY POSITIVE/NEGATIVE ION SOURCE SYSTEM

ISV.F-100

A direct-current, volume-cusp source for both negative and positive ion beams

- Low maintenance with long filament lifetime (> 5250 mA·hours)
- Negligible electrode wear due to the optimized ion-optics and low emittance
- Internal steering magnet enables beam alignment corrections
- Instrumentation options include Faraday cup, emittance scanner, beamlines, beam profiler, and mass spectrometer
- Derived from TRIUMF-licensed technology



Ion Source with Vacuum Box

The ISV.F-100 Filament-Powered Turnkey Ion Source System is supplied complete with all of the equipment required to generate beams of positive and negative ions:

- Ion source and vacuum box
- Vacuum system and gauges
- Power supplies, PLC controls, and software
- Low-voltage and high-voltage racks
- 40 kV isolation transformer
- Personnel access control interlocks and high-voltage grounding system
- User interface and Ethernet-based remote controls
- Ion source stand
- Water flow gauges and interlocks
- Mass flow controller for feed gasses

SPECIFICATION ¹ : ISV.F-100	
ION SOURCE	
Particle Type	H ⁻ , D ⁻ , H ⁺ , D ⁺ , He ⁺
Beam Kinetic Energy ²	20 to 30 keV
Normalized 4rms Emittance	< 0.5 mm·mrad
Beam Purity	> 99% for Negative Ions
Filament Lifetime	> 5250 mA·hours
Beam Current Stability	± 1% over 24 hours
POWER SUPPLIES	
Max Bias Supply	±40 mA, 30 kV
Arc Supply	50 A, 200 V
Filament Supply	400 A, 10 V
Plasma Electrode	42 A, 20 V
Extraction Electrode	150 mA, ±8 kV
X & Y Steering Magnet	±10 V, 10 A
VACUUM SYSTEM SPECIFICATIONS	
Turbo Pumps, 1X Upstream & 1X Downstream	1500 l/s Flange ISO250F
Dry Scroll Roughing, 1X Upstream & 1X Downstream	35 m ³ /hr
GAS FLOW	
Mass Flow Controller	1-15 sccm
CONTROLS	
Control PLC	Allen-Bradley, Ethernet
User Interface Options	D-Pace standalone or OPC command library for customer integration
High Voltage Interlocks	HV grounding relay with access control locks
COOLING WATER, DEIONIZED, 20°C (>1.0 MOhm·cm)	
Source Body	8.0 LPM, 40 PSI (275 kPa)
Filament	1.0 LPM, 70 PSI (480 kPa)
Back Plate	1.5 LPM, 70 PSI (480 kPa)
Plasma Lens	1.5 LPM, 70 PSI (480 kPa)
Extraction Lens	1.5 LPM, 70 PSI (480 kPa)
XY Steering Magnet	1.0 LPM, 70 PSI (480 kPa)

The tune data and phase space plots shown on this page were derived from sources with electrode geometries selected to maximize the extracted current. The same source can also be operated using electrodes with smaller apertures to produce smaller beam currents and correspondingly low emittances. For instance, normalized 4rms emittances of 0.021 mm·mrad at 18.3 μA of H^- and 0.024 mm·mrad at 101 μA of H^+ have been achieved using a 0.5 mm aperture in the plasma electrode. To reduce costs, D-Pace can supply the ion source system with lower-capacity high-voltage power supplies to customers who will operate the source at such low beam currents.



Mounted Filament Set

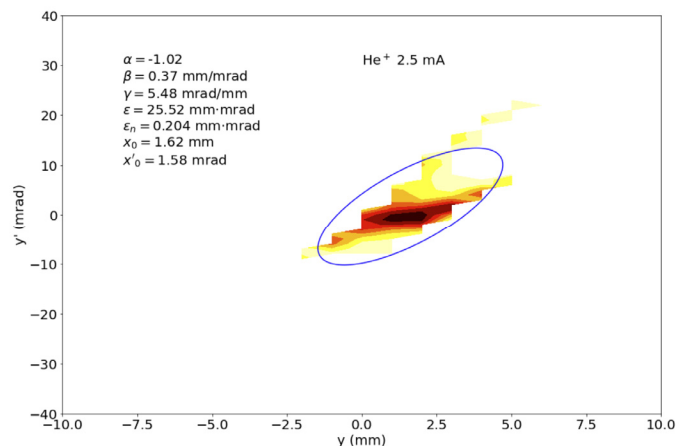
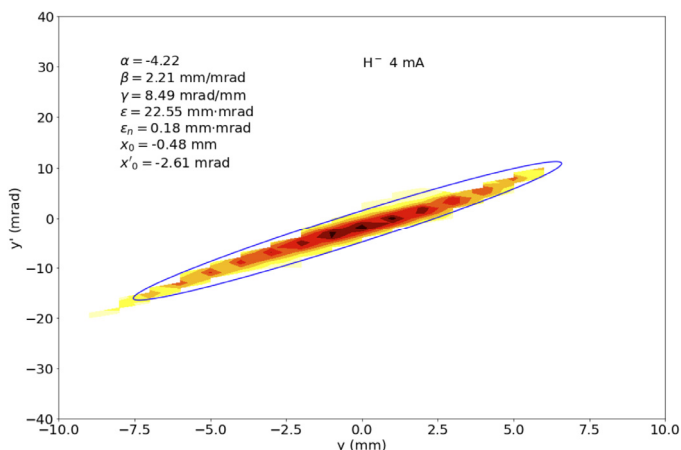
Enquire about other negative and positive ion beams, and our RF-powered ion sources

Commercially Available Beam Intensities		
ION	Beam Current (mA)	Beam Energy ² (keV)
H^-	0-4	20-30
D^-	0-1	20-30
H^+	0-3	20-30
D^+	0-3	20-30
He^+	0-2.5	20-30

	Tune Data		
	IONS		
	H^-	H^+	He^+
Beam Current (mA)	4.0	3.0	2.5
Bias Supply (mA, kV)	7.4, 30	9.8, 30	2.6, 30
Arc Supply (A, V)	24, 120	4.0, 120	1.5, 120
Filament Supply (A, V)	214, 2.8	231, 3.4	251, 3.1
Plasma Electrode Supply (A, V)	8.7, 2.5	0.7, 0	0.6, 0
Extraction Electrode Supply (mA, kV)	18, 3.3	1.2, 3.6	0.8, 2.9
Suppression Electrode Supply (mA, kV)	0.3, -2	0.6, -2	0.6, -2
Steering Magnet X (A)	1.5	0	0
Steering Magnet Y (A)	2.0	0	0
Gas Flow (sccm)	12.0	5.0	3
Vacuum, Ion Source (Upstream) (10^{-5} Torr)	4	3	2
Vacuum, V-Box (Downstream) (10^{-6} Torr)	6	3	2
Unnormalized 4rms Emittance (mm·mrad)	22.6	55.3	25.5
Normalized 4rms Emittance (mm·mrad)	0.18	0.31	0.20



Turnkey Filament-Powered Ion Source Including Optional Beamline and Mass Spectrometer



Phase Space Plots

1. D-Pace reserves the right to update specifications as part of its ongoing product improvement program.
2. Configurations to run at lower energies are possible.