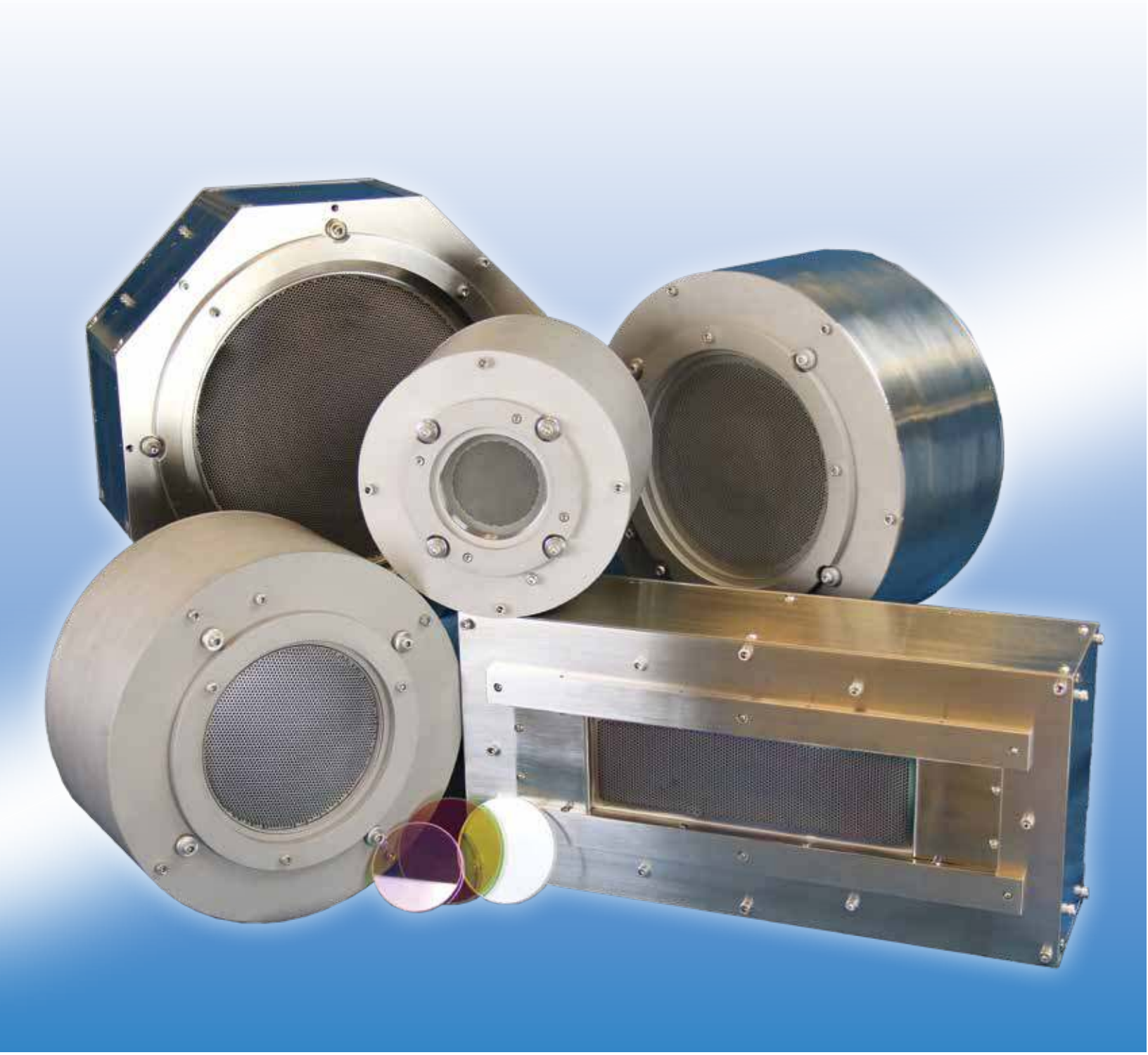


HIGH PERFORMANCE

RF SOURCES

FOR THE

OPTICAL COATING INDUSTRY

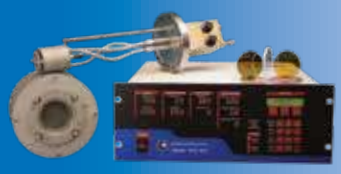
plasma process group

ESTABLISHED 2003

6cm Source

Our smallest ion beam source, the 6cm RF can provide all the benefits of radio frequency ion source technology in a smaller, more compact, and less expensive form. With a maximum beam current of 200mA at 1500V, the 6cm source is ideal for research and smaller production systems.

This source also finds a home in etch and ion beam figuring (IBF) systems with its highly divergent or highly convergent grid options. The body of this source is not water-cooled, thus requiring only two feedthroughs — RF power and DC Bias/Gas. Designed around the flexibility of internal mounting, the 6cm source is also capable of being mounted directly to a flange for process flexibility. As with all RF sources, the 6cm source can be run with both inert and reactive gases, making the 6cm ideal for any ion beam process.



SPECIFICATIONS

Model	06RF
Beam Current	25 – 200mA
Beam Voltage	50 – 1500eV
Grid Materials	Molybdenum
Water Cooling	Antenna Only
Weight	3.6 kg (8 lbs.)


Flange Mount

FLANGE MOUNT

The Flange Mount configuration for this ion source places the body of the ion source directly against the vacuum flange. This option uses the smallest amount of space in the vacuum chamber and offers fixed positioning for highly-repeatable operation. The minimum flange size for this configuration is a 10-inch Conflat. This package includes a high-voltage cover on the atmosphere side of the flange to which the RF Matching Network mounts directly. Connection points for the RF antenna cooling water, source gas, and source DC bias are also provided.


Internal Mount

INTERNAL MOUNT

Using an Internal Mount configuration places the ion source loosely inside the vacuum chamber, allowing angular (pointing) adjustment to suit process needs. The maximum distance from the RF vacuum feedthrough for this configuration is 18-inches. This option allows some freedom of location of the ion source and the ability to use multiple smaller feedthroughs instead of one large feedthrough. The standard flanges for this configuration are two 2.75 inch Conflat. Other flange combinations are available. The RF Matching Network mounts directly to the RF feedthrough.

NOMINAL PERFORMANCE DATA - USING ARGON @ 8 SCCM

BEAM		ACCELERATOR		RF POWER		NEUTRALIZER
Voltage (V)	**Current (mA)**	**Voltage (V)**	**Current (mA)**	**Forward (W)**	**Reflected (W)**	**Emission (mA)**
100	100	500	14	258	1	150
250	100	350	14	256	0	150
500	150	300	12	373	1	225
1000	200	250	2	446	2	300
1250	200	150	2	412	2	300
1500	200	150	2	391	2	300
100-1500	50 floor	100	~1	~80	1	75

OPTIONS & ACCESSORIES

Ion Source	06RF	Standard Ion Source	200mA / 1500V Limits
Interface Kits	505865A	Flange Mount	Includes Vacuum Feedthroughs and vacuum-side connections to source for RF Power, DC bias, and gas
	505864A	Internal Mount	
Neutralizer	504424B	RFN	Radio frequency - requires a mounting flange
Common Neutralizer Flanges	504854A	2¾" CF RFN Flange	Each flange has a RFN matching network.
	504891A	4.5" CF RFN Flange	
	504855A	6" CF RFN Flange	
Power Supply	IBEAM 703-1 series		RF Power, DC Bias, Control, and RFN Operation
RF Matching	505914A	Source RF	Includes Matching Network & Controller for source
Cable Kit	505752A	I-Beam 703 Cable Kit with beam, RFN and RF cables	
Adapter Box	IBOX-104		Adapts connections to an Ion-Tech style configuration

GRID OPTIONS

25cm FP, Convergent	505837A	Molybdenum	3-grid, 25cm FP, Convergent	Sputter deposit
25cm FP, Divergent	505834A	Molybdenum	3-grid, 25cm FP, Divergent	Assist
Collimated	507186A	Graphite	3-grid, Graphite Collimated	Etch

12cm Source

Used primarily for ion assist, the 12cm RF ion beam source also finds great value as a deposition source in smaller systems or an ion beam figuring (IBF) source for large substrates. Providing additional service as a pre-clean source for substrates, the 12cm source is one of the most versatile options available. As with all RF ion sources from Plasma Process Group, the 12cm can run on almost any process gas, including inert species such as argon and xenon, and reactive species like O_2, N_2, CH_3, and many more. Capable of outputs as high as 400mA at 1500eV, this source is also stable at more common assist conditions like 200mA at 250V. The 12cm source provides a 12cm ion beam that is shaped by the choice of grids. Available with molybdenum convergent or divergent grids with several possible focal points, or collimated graphite, the 12cm beam can be optimized for almost any process. Please refer to the grid selection table below.

SPECIFICATIONS

Model	12RF08
Beam Current	50 – 400mA
Beam Voltage	50 – 1500eV
Grid Materials	Molybdenum, Graphite
Water Cooling	Antenna and Shroud
Weight	6.8 kg (15 lbs.)

FLANGE MOUNT

The Flange Mount configuration for this ion source places the body of the ion source directly against the vacuum flange. This option uses the smallest amount of space in the vacuum chamber and offers fixed positioning for highly-repeatable operation. The minimum flange size for this configuration is a 14-inch Conflat. This package includes a high-voltage cover on the atmosphere side of the flange to which the RF Matching Network mounts directly. Also provided: connection points for the cooling water, source gas, & source DC bias.


Flange Mount

NOMINAL PERFORMANCE DATA - USING ARGON @ 10 SCCM

BEAM		ACCELERATOR		RF POWER		NEUTRALIZER
Voltage (V)	**Current (mA)**	**Voltage (V)**	**Current (mA)**	**Forward (W)**	**Reflected (W)**	**Emission (mA)**
250	150	300	3	143	0	225
500	150	300	4	139	0	225
750	200	250	5	163	0	300
1000	400	250	9	280	0	300
1250	400	200	8	270	0	600
1500	400	200	7	260	0	600
250-1500	50 floor	250	~1	~91	0	75


Internal Mount

OPTIONS & ACCESSORIES

Ion Source	12RF08	Standard Ion Source	400mA / 1500V Limits
Interface Kits	504904A	Flange Mount	Includes Vacuum Feedthroughs and vacuum-side connections to source for RF Power, DC bias, cooling water, and gas
	504905A	Internal Mount	
Neutralizer	504424B	RFN	Radio frequency – requires a mounting flange
Common Neutralizer Flanges	504854A	2¾" CF RFN Flange	Each flange has a RFN matching network.
	504891A	4.5" CF RFN Flange	
	504855A	6" CF RFN Flange	
Power Supply	IBEAM 703-1 series		RF Power, DC Bias, Control, and RFN Operation
RF Matching	505914A	Source RF	Includes Matching Network & Controller for source
Cable Kit	505752A	I-Beam 703 Cable Kit with beam, RFN and RF cables	
Adapter Box	IBOX-104		Adapts connections to an Ion-Tech style configuration

GRID OPTIONS

130cm FP, Convergent	504149C	Molybdenum	3-grid, 130cm FP, Convergent	Assist
	504391A	Molybdenum	3-grid, 130cm FP, 8cm Hole Pattern (Ion Tech-style)	Assist
	505790A	Titanium	3-grid, 130cm FP, Convergent	Sputter deposit
46cm FP, Divergent	504593A	Molybdenum	3-grid, 46cm FP, Divergent	Assist
46cm FP, Convergent	505992A	Molybdenum	3-grid, 46cm FP, Convergent	Sputter, Etch
25cm FP, Convergent	504660A	Molybdenum	3-grid, 25cm FP, Convergent	Sputter, Etch
Collimated	505274A	Graphite	3-grid, Graphite, Collimated	Sputter, Etch
	505343A	Graphite	3-grid, Graphite, Elliptical Hole Pattern (120cm x 50cm)	Sputter deposit

INTERNAL MOUNT

Using an Internal Mount configuration places the ion source loosely inside the vacuum chamber, allowing angular (pointing) adjustment to suit process needs. The maximum distance from the RF vacuum feedthrough for this configuration is 18-inches. This option allows some freedom of location of the ion source and the ability to use multiple smaller feedthroughs instead of one large feedthrough. The standard flanges for this configuration are three 2.75 inch Conflat. Other flange combinations are available. The RF Matching Network mounts directly to the RF feedthrough.

16cm Source

Our 16cm RF ion beam source is an industry workhorse, serving as the dominant deposition source in ion beam deposition (IBD) systems around the world. With an output capacity of 600mA, 800mA, or even 1000mA this dynamic and versatile source can satisfy a huge array of needs in deposition and large-scale Ion assist processes. Available with standard molybdenum, collimated graphite, or titanium grids, this source can be used in almost any type of contamination-sensitive ion beam process. This 16cm source can even be equipped with modulators allowing it to be used in metal deposition and etch processes, an operational regime normally challenging for RF ion beam. The source provides a 16cm ion beam which is then shaped by the choice of grids. Convergent, divergent, collimated, and even multi-focal point grids are available with this source. Please refer to the grid selection table below.

SPECIFICATIONS

Model	16RF08
Beam Current	100 – 1000mA
Beam Voltage	100 – 1500eV
Grid Materials	Molybdenum, Graphite, Titanium
Water Cooling	Antenna and Shroud
Weight	7.7 kg (17 lbs.)


Flange Mount

◂FLANGE/EXTENSION MOUNT

The Flange and Extension Mount options for this ion source offer fixed positioning for maximum process repeatability. The Flange Mount places the source directly against the flange using the smallest amount of space, while the Extension Mount stands off the flange with fixed posts. The minimum flange size for these options is a 16.5-inch Conflat. These packages include a high-voltage cover on the atmosphere side of the flange to which the RF Matching Network mounts directly. Also provided are connection points for cooling water, source gas, and DC bias.


Extension Mount


Internal Mount

▲INTERNAL MOUNT

Using an Internal Mount configuration places the ion source loosely inside the vacuum chamber, allowing angular (pointing) adjustment to suit process needs. The maximum distance from the RF vacuum feedthrough for this configuration is 18-inches. This option allows some freedom of location of the ion source and the ability to use multiple smaller feedthroughs instead of one large feedthrough. The standard flanges for this configuration are three 2.75 inch Conflat. Other flange combinations are available. The RF Matching Network mounts directly to the RF feedthrough.

NOMINAL PERFORMANCE DATA - USING ARGON @ 18 SCCM

BEAM		ACCELERATOR		RF POWER		NEUTRALIZER
Voltage (V)	**Current (mA)**	**Voltage (V)**	**Current (mA)**	**Forward (W)**	**Reflected (W)**	**Emission (mA)**
250	300	550	11	199	0	450
500	300	400	8	193	0	450
750	450	300	17	266	0	675
1000	600	350	18	347	1	900
1250	600	250	15	352	2	900
1250	800	400	24	485	4	1200
1500	800	250	20	475	3	1200
250-1500	100 floor	200	~3	~94	1	150

OPTIONS & ACCESSORIES

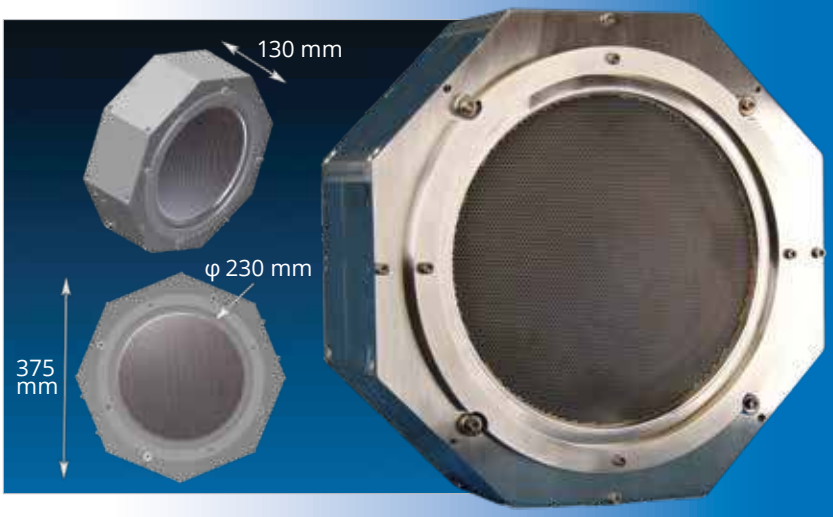
Ion Source	16RF08	Standard Ion Source	Used for 600mA Configuration
	16RF HC	Advanced Ion Source	Required for 800mA and 1000mA configuration
Interface Kits	504901A	Flange Mount	Includes Vacuum Feedthroughs and vacuum-side connections to source for RF Power, DC bias, cooling water, and gas
	504902A	Extension Mount	
	504903A	Internal Mount	
Neutralizer	504424B	RFN	Radio frequency – requires a mounting flange
Common Neutralizer Flanges	504854A	2¾" CF RFN Flange	Each flange has a RFN matching network.
	504891A	4.5" CF RFN Flange	
	504855A	6" CF RFN Flange	
Power Supplies	IBEAM 703-1 series		RF Power, DC Bias, Control, and RFN Operation
	IBEAM 701-4	1000mA / 1500V Beam configuration, requires separate RF Generator	
RF Matching	505914A	Source RF	Includes Matching Network & Controller for source
RF Generator	505311A	1000W RF Generator	Used only with I-Beam 701 power supplies
Cable Kits	505752A	I-Beam 703 Cable Kit with beam, RFN and RF cables	
	507128A	I-Beam 701/703 Cable Kit for use with 1kW RF Generator	
Adapter Box	IBOX-104		Adapts connections to an Ion-Tech style configuration

GRID OPTIONS

3 Focal Point	504296B	Molybdenum	3 grid, 104/72/40cm FPs, 0.065" spacing, .020" thick	Sputter
	504296J	Molybdenum	3 grid, 104/72/40cm FPs, 0.065" spacing, .015" thick	Sputter
	507103A	Titanium	3 grid, 104/72/40cm FPs, 0.065" spacing	Sputter
2 Focal Point	504137A	Molybdenum	3 grid, 104/72cm FPs, 0.065" spacing, .020" thick	Sputter
66cm FP, Div.	504373B	Molybdenum	3 grid, 66cm FP, Divergent	Assist
66cm FP, Convergent	504599A	Molybdenum	3 grid, 66cm FP, Convergent	Sputter
	504851A	Titanium	3 grid, 66cm FP, Convergent	Sputter
33cm FP, Div.	504455A	Molybdenum	Moly, 3 grid, 33cm FP	Assist
Collimated	504822A	Graphite	3 grid, Graphite, flat	Etch

23cm Source

We offer a 23cm RF ion beam source for larger area, high current processes. This RF source is ideal for etch or assist applications. The 23cm ion source is typically used in production environments. Using RF discharge (no filaments) minimizes maintenance requirements, and enables use with typical process gases including many reactive species. Molybdenum grids are available for this ion source in a couple of configurations. The 23cm ion source is typically internal-mounted, but flange mounting is available. Every ion beam installation is unique so we are ready to help meet the requirements of your specific application.



SPECIFICATIONS

Model	23RF
Beam Current	200 – 1500 mA
Beam Voltage	100 – 1250 eV
Grid Material	Molybdenum
Water Cooling	Antenna Only
Weight	22 Kg (48 lbs)

FLANGE MOUNT

In the Flange Mount configuration the ion source is fixed directly to the vacuum flange, providing the maximum level of process repeatability. This ion source requires an ISO400 flange or larger, and uses the least space inside the vacuum chamber. Flange Mount packages include a high-voltage protective cover on the atmosphere side of the flange, to which the RF Matching Network mounts directly. Also provided are the connection points for antenna cooling water, source gas, and DC bias.

NOMINAL PERFORMANCE DATA - USING ARGON @ 20 SCCM

BEAM		ACCELERATOR		RF POWER		NEUTRALIZER
Voltage (V)	Current (mA)	Voltage (V)	Current (mA)	Forward (W)	Reflected (W)	Emission (mA)
100	1000	1000	58	510	0	1500
250	1000	750	64	460	0	1500
500	1100	500	62	450	0	1650
750	1250	300	55	520	0	1562
1000	1500	250	59	640	0	2000
1250	1500	250	60	630	1	2000

OPTIONS & ACCESSORIES

Ion Source	23RF	Standard Ion Source	1500mA / 1250V Limits
Interface Kit	507178A	Internal Mount	Includes vacuum feedthroughs and vacuum-side connections to source for RF Power, DC Bias, and Gas
Neutralizer	504424B	RFN	Radio frequency – requires a mounting flange
Common Neutralizer Flanges	504854A	2¾" CF RFN Flange	Each flange has a RFN matching network.
	504891A	4.5" CF RFN Flange	
	504855A	6" CF RFN Flange	
Power Supply	IBEAM 701-6-1-2		I-Beam with I-Box Adapter. Requires RF Generator
RF Generator	505311A	1kW RF Generator	Required for I-Beam 701-series power supplies
RF Matching	505914A	Source RF	Includes Matching Network & Controller for source
Cable Kits	507128A	I-Beam Cable Kit for I-Beam 701 with I-Box configurations	

GRID OPTIONS

66cm FP, Divergent	507090A	Molybdenum	3-grid, 66cm FP, Divergent	Assist
33cm FP, Divergent	507216A	Molybdenum	3-grid, 33cm FP, Divergent	Assist

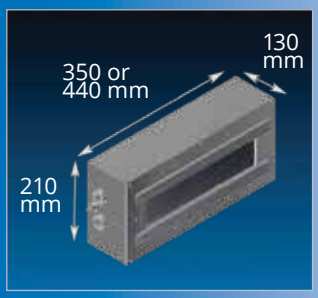
INTERNAL MOUNT

The Internal Mount configuration places the ion source loosely inside the vacuum chamber allowing angular (pointing) adjustment to suit process needs. The maximum distance from the vacuum feedthrough is 18-inches. This option allows some freedom of location of the ion source, and provides the ability to adjust the tilt for specific chambers. It also allows the use of multiple smaller feedthroughs instead of one large feedthrough. The standard flanges for this configuration are two 2.75 inch Conflat. Other flange combinations are available. The RF Matching Network mounts directly to the RF feedthrough.

RF Linear Sources

Our Linear ion beam sources are useful for in-line applications such as roll-to-roll or web coaters. The 6x30cm RF ion beam source can be equipped with either 6x30cm collimated graphite grids or 6x22cm shaped molybdenum grids, allowing greater process flexibility with a single ion source. Additionally, the gas, RF antenna cooling water, and DC connections have been placed on the side of the ion source instead of the rear giving the ion source more placement flexibility inside the chamber. We also offers a standard 6x22cm ion source with most of the same benefits, but constrained to 6x22cm molybdenum grids.

As with all RF ion sources, these can be run with both inert and reactive gases allowing a huge range of processes. With a maximum of 500mA and 1500V, these linear ion sources can handle both high-rate, high-throughput and precision assist or etch operations.



SPECIFICATIONS

Model	06X30RF 06X22RF
Beam Current	50 – 500mA
Beam Voltage	50 – 1500eV
Grid Materials	Molybdenum, Graphite
Water Cooling	Antenna Only
Weight	11.9 kg (26.5 lbs.)

INTERNAL MOUNT

Plasma Process Group RF Linear ion sources are typically installed with an Internal Mount configuration. The maximum distance from the RF vacuum feedthrough is 18-inches. The standard flanges for this configuration are two 2.75 inch Conflat. Other flange combinations are available. The RF Matching Network mounts directly to the RF feedthrough.

NOMINAL PERFORMANCE DATA - USING ARGON @ 20 SCCM

BEAM		ACCELERATOR		RF POWER		NEUTRALIZER
Voltage (V)	**Current (mA)**	**Voltage (V)**	**Current (mA)**	**Forward (W)**	**Reflected (W)**	**Emission (mA)**
100	250	600	11	387	3	375
250	300	500	15	435	4	450
500	300	400	13	485	3	525
1000	450	200	12	464	4	525
1250	500	200	12	453	4	525
1500	500	200	12	450	4	600
100-1500	100 floor	200	3	210	3	150

OPTIONS & ACCESSORIES

Ion Source	06X30RF	6x30cm Ion Source	500mA / 1500V Limits
	06X22RF	6x22cm Ion Source	
Interface Kits	505890A	Internal Mount	Includes two 2¾" CF Vacuum Feedthroughs and vacuum-side connections to source for RF Power, DC bias, and gas
Neutralizer	504424B	RFN	Radio frequency – requires a mounting flange
Common Neutralizer Flanges	504854A	2¾" CF RFN Flange	Each flange has a RFN matching network.
	504891A	4.5" CF RFN Flange	
	504855A	6" CF RFN Flange	
Power Supply	IBEAM 703-1 series		RF Power, DC Bias, Control, and RFN Operation
RF Matching	505914A	Source RF	Includes Matching Network & Controller for source
Cable Kits	505752A	I-Beam 703 Cable Kit for non-IBOX configurations	
Adapter Box	IBOX-104		Adapts connections to an Ion-Tech style configuration

GRID OPTIONS

6x30 Collimated	504761A	Graphite	2-grid, Graphite, Collimated	Etch
6x30cm Divergent	504983A	Graphite	2-grid, Graphite, Divergent	Assist
25cm FP Convergent	505810A	Molybdenum	3-grid, 25cm FP, 6x22cm Linear, Convergent	Sputter Deposit
25cm FP Divergent	505809A	Molybdenum	3-grid, 25cm FP, 6x22cm Linear, Divergent	Assist

I-Beam Power Supplies

Integrating all RF, DC, and RFN power and control into a single 19-inch rack mount unit, the I-Beam 700 series Power Supply was a revolution when it was first released in 2009. The oldest unit, the I-Beam 701, has a long history and is still used in systems where a separate RF generator is required. The I-Beam 703, which has its own RF generator, has become the standard in the field for performance, quality, and backward compatibility. We have designed these power providing workhorses as drop-in replacements for aging Ion Tech RF2000-series supplies. The I-Beam series has rugged output capabilities while using the same communications protocols and connectors, and can therefore keep older systems running.

The I-Beam 703 is also capable of meeting the newest system requirements, offering a standard 600mA configuration, an 800mA option when paired with a Plasma Process Group ion source, and even a 1000mA version that uses a separate RF Generator.

The I-Beam 702 offers stand-alone RF Neutralization for any system using an ion source. This option allows the elimination of the filament or hollow-cathode based neutralizers, making the incredibly low-maintenance, high-performance capabilities of the RFN available.

All four supplies are equipped with front panel keypads for direct user control with large, easy-to-read LED displays. Three modes allow convenient control access, with "Manual" providing full RF power control, "Local" allowing direct beam current control, and "Remote" locking the front panel to prevent accidental changes during process. Communication using RS-232 allows full computer control, while the power supply can alternatively trigger with remote switches.

SPECIFICATIONS

Power Outputs *Six individual supplies to run an RF ion beam source with an RF Neutralizer*	Beam Supply	1500VDC, 600mA – 1500mA	I-Beam 701, 703, 704
	Accelerator Supply	1000VDC, 50mA	I-Beam 701, 703, 704
	RF Discharge	500W maximum, built-in RF Generator	I-Beam 703
	RF Generator for RFN	100W	I-Beam 701, 702, 703, 704
	Keeper for RFN	60V, 300mA	I-Beam 701, 702, 703, 704
	RFN Emission	120V, up to 2000mA	I-Beam 701, 702, 703, 704
Output Connections	Source	4-pin industry standard: 97-3102A-18-4S Mil Spec	
	Neutralizer	5-pin industry standard: 97-3102A-14S-5S Mil Spec	
Interface	Communications	RS-232, DB-9 female	
	Interlock / Remote Switch	DB-9 female	
	Matching Network	DB-9 female	
Power Input	208 VAC, 50/60 Hz, 16A, single-phase		
Cooling	Forced air		
Chassis	Mounting	19" rack mount, 4U height	
	Size (w x h x d)	19" x 7" x 20" (483mm x 178mm x 508mm)	
	Weight	51 lbs (23.1kg)	
Certification	I-Beam 701	RF Source Supply / Separate RF Generator	CE Certified, RoHS Compliant
	I-Beam 702	RFN Stand-Alone Supply	CE Certified, RoHS Compliant
	I-Beam 703	RF Source / RFN Supply	CE Certified, RoHS Compliant

OPTIONS & ACCESSORIES

Power Supply	IBEAM-701	RF source power supply for separate RF generator	
	IBEAM-702	RFN Stand-alone power supply	
	IBEAM-703	RF source power supply with built-in RF generator	
RF Matching	505914A	Source RF	Includes Matching Network & Controller
Cable Kits	505752A	I-Beam 703 Cable Kit with beam, RFN and RF cables	
	507128A	I-Beam 701/703 Cable Kit for use with 1kW RF Generator	
Adapter Box	IBOX-104	Adapts connections to an Ion-Tech style configuration	

Plasma Process Group

Since its founding in 2003, Plasma Process Group has consistently provided the highest quality service and equipment to the ion beam industry. We offer innovative new designs and industry standard products compatible with legacy equipment.

EQUIPMENT

We provide a wide array of ion beam products ranging from turnkey sputter coating systems through stand alone ion beam source and power supply packages. We offer a production tool, called *Techne*, that produces high quality optical thin films using ion beam assisted deposition (IBAD) processes. The ion beam sources we offer include both radio frequency RF and filament-driven DC styles. Our I-BEAM Power Supply family provides reliable operation for the most demanding production environments. Our ion beam grid assemblies, or ion optics, are constructed from molybdenum, graphite, or titanium and are available in a variety of shapes and sizes. We also carry a healthy assortment of spare parts including discharge chambers, insulators and many other items to keep your source running.

CUSTOMER SERVICE & SUPPORT

Whether in research or production, Plasma Process Group is committed to providing the best support in the industry. Help is always just a call or email away. Our staff has decades of hands on experience using ion beam sources and sputter deposition systems. We are happy to share our expertise and assist you with your application. New ideas can be tested in our Applications Laboratory equipped with a *Techne* coating system.

CONTACT US

Contact us today for all of your ion beam needs — *simple ion beam solutions.*

plasma process group

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