

# Gleichbleibende Prozeßstabilität auch über große Verfahrswege: Seibu 700 K1 in Portalbauweise

Das überzeugende Konzept höchster Stabilität: SEIBU-Drahterodiermaschinen werden über CAD mit modernsten Finite-Elemente-Berechnungen konstruiert, und aus massivem Guß gefertigt. Alle mit dem Wasser in Berührung stehenden Teile sind aus verzugsarmen, nicht rostenden Materialien gefertigt und garantieren so höchste Genauigkeit über die gesamte Lebensdauer der Anlage.

Das einzigartige Führungssystem der SEIBU-Drahterodiermaschinen erlaubt hohe Tischbelastungen, ohne Einbußen in der Genauigkeit hinnehmen zu müssen. Die gesamte Last wird durch gesonderte Tragführungen aufgenommen, ohne die in unmittelbarer Nähe der Spindel befindlichen Richtungsführungen zu beeinflussen. Die gesamte Tischpartie wird ständig mit Dielektrikum überflutet und so temperaturstabilisiert. Das gesamte Drahtführungssystem, die überlagerten U-V-Achsen für die Konischbearbeitung sowie der untere Drahtführungsarm werden zudem ständig umlaufgekühlt. Selbstverständlich ist der Drahtführungsarm zusätzlich durch eine rostfreie Edelstahlabdeckung gegen Schmutz und Spritzwasser geschützt.



Technische Daten		SEIBU 700 K1		
Gesamtstellfläche	Breite x Tiefe x Höhe	4000 x 4100 x 1980 mm	Filteranlage	Automatische Filtrierung und Leitwertregelung
Gewicht	ohne Dielektrikum	4300 kg	Filtermedium	6 Papierpatronenfilter
Werkstückabmessung	Länge x Breite x Höhe	650 x 900 x 210* mm	Kapazität	300 Liter
Verfahrwege	X-Achse	450 mm		
	Y-Achse	700 mm		
	Z-Achse	210 mm*		
Drahtauslenkung	U-/V-Achse	+/- 30 mm		
Drahtgeschwindigkeit		0-280 mm/Sek.		
Generator	volltransistorisierter Impulsgenerator in MOS-Technik			
CNC-Steuerung	5-Achsen-Bahnsteuerung, X-Y-U-V-Achsen simultan, Multitasking (Simultanprogrammierung und -simulation). Linear- und Cirkularinterpolation. Komfortable Technologiedatenbank mit 1000 Speicherplätzen und integriertem Expertensystem. Drei unabhängige Kanäle für die Achsanzeige, zusätzliche Maschinenpositionsanzeige. NC-Editor mit komfortabler Suchfunktion. Fehlermeldungen im Klartext am Bildschirm. 14" Farbgraphik			
Bildschirm				
Datenträger	3,5" Diskette, DOS-Format			
Schnittstelle	RS 232 C			

\* Anlagen ohne automatische Drahteinfädung:  
Werkstückhöhe 250 mm,  
Verfahrweg der Z-Achse 265 mm

Item		Model	EW-300K1	EW-450K1	EW-600K1
Machine	Max. dimensions of workpiece (W×D×H)		※1 450×400×250mm (17.7) (15.7) (9.8)	※1 450×600×250mm (17.7) (23.6) (9.8)	※1 650×900×250mm (25.6) (35.4) (9.8)
	Max. weight of workpiece		300kg (600Lbs)	500kg (1,100Lbs)	750kg (1,650Lbs)
	Table driving system		X-Y axes digital DC servo		
	Table travel system	Right & Left Direction	X-axis 300mm(11.8)	X-axis 300mm(11.8)	X-axis 450mm(17.7)
		Back & Forth Direction	Y-axis 250mm(9.8)	Y-axis 450mm(17.7)	Y-axis 600mm(23.6)
	Table manual feed rate		(Quick)600mm/min(23.6) (Middle)90mm/min(3.5) (Slow)9mm/min(0.35) (Step feed)0.00025 (0.000001) ~ 2.5(0.01)mm(0.25 (0.001)μm unit)		
	Z axis driving system		Up & Down Z axis: Moter drive		
	Z axis travel distance		265mm(10.4)		
	Wire feeding speed		0 ~ 280mm/sec(0 ~ 11)		
	Wire tention controlling range		200 ~ 1,800g (0.44 ~ 3.97Lbs)		
	Applicable wire electrode diameter		※1 0.2mm(0.008) Others are optional		
	Outline dimension (W×D×H)		1,650×1,075×2,100mm (64.9) (42.3) (82.6)	1,650×1,565×2,100mm (64.9) (61.6) (82.6)	2,115×2,120×2,100mm (83.2) (83.4) (82.6)
Weight		2,000kg (4,400Lbs)	2,500kg (5,500Lbs)	3,500kg (7,700Lbs)	
Taper Cutting Device	Upper guide travel distance	Right & Left Direction	U-axis: 60mm(2.36)		
		Back & Forth Direction	V-axis: 60mm(2.36)		
	Upper guide manual feed rate		(Quick)300mm/min(11.8) (Middle)30mm/min(1.18) (Slow)9mm/min(0.35) (Step feed)0.00025(0.000001) ~ 2.5(0.01)mm(0.25(0.001)μm unit)		
	Taper angle		※1 ±10° (Height 150mm)(5.9)		
	Angle changing function during cutting		Available		
	Top-Bottom equal R cutting		Possible		

※1. As for the case with an optional Automatic wire Feeding Device attached, these items will be decided by the specifications of AWF-2B.

### Specification of Automatic Wire Feeding Device

Wire material	SKH 5kg (11Lbs)
Applicable wire diameter	φ0.2 φ0.25 (Option)
Wire guide	Diamond die guide
Breakage treatment during cutting	Possible
Retry after feeding failure	Existing
Feedable start hole	φ0.5mm ~ ∞ (0.02 ~ ∞)
Max. Cutting hight	200mm(7.87)
Feedable workpiece height	Note: Workpiece height over 60mm(2.3), Start hole diameter under φ3mm(0.11)
Max. taper angle	±7°
Applicable air supply	Over 5kgf/cm <sup>2</sup> (11Lbs) Over 30l/min
Wire feed system	Belt type

## Machine Specifications

( ) Inch

Item		Model	EW-700K1	EW-1000K1	EWP-300B
Machine	Max. dimensions of workpiece (W×D×H)		※1 650×900×250mm (25.6)(35.4) (9.8)	※1 650×1,300×250mm (25.6) (57.2) (9.8)	※1 400×300×120mm (15.7) (11.8) (4.7)
	Max. weight of workpiece		1,000kg (2,200Lbs)	1,200kg (2,645Lbs)	100kg (220Lbs)
	Table driving system		X-Y axes digital DC servo		
	Table travel system	Right & Left Direction	X-axis 450mm(17.7)	X-axis 450mm(17.7)	X-axis 300mm(11.8)
		Back & Forth Direction	Y-axis 700mm(27.6)	Y-axis 1,000mm(39.4)	Y-axis 200mm(7.9)
	Table manual feed rate		(Quick)600mm/min(23.6) (Middle)90mm/min(3.5) (Slow)9mm/min(0.35) (Step feed)0.00025 (0.000001) ~ 2.5(0.01)mm(0.25 (0.001)μm unit)		
	Z axis driving system		Up & Down Z axis: Moter drive		
	Z axis travel distance		265mm(10.4)		150mm(5.9)
	Wire feeding speed		0~280mm/sec(0~11)		0~140mm/sec(0~5.5)
	Wire tention controlling range		200~1,800g (0.44~3.97Lbs)		
	Applicable wire electrode diameter		※1 0.2mm(0.008) Others are optional		※2 0.05~0.3mm (0.002~0.012)
	Outline dimension (W×D×H)		2,120×2,240×1,980mm (83.5) (88.2) (77.9)	2,150×2,850×2,125mm (84.6) (112.2) (83.6)	1,650×1,150×2,040mm (64.9) (45.3) (80.3)
Weight		4,000kg (8,800Lbs)	6,000kg (13,200Lbs)	2,200kg (4,850Lbs)	
Taper Cutting Device	Upper guide travel distance	Right & Left Direction	U-axis: 60mm(2.36)		U-axis: 40mm(1.57)
		Back & Forth Direction	V-axis: 60mm(2.36)		V-axis: 40mm(1.57)
	Upper guide manual feed rate		(Quick)300mm/min(11.8) (Middle)30mm/min(1.18) (Slow)9mm/min(0.35) (Step feed)0.00025 (0.000001) ~ 2.5(0.01)mm(0.25(0.001)μm unit)		
	Taper angle		※1 ±10° (Height 150mm)(5.9)		※1±10° (Height 100mm) (3.9)
	Angle changing function during cutting		Available		
	Top-Bottom equal R cutting		Possible		

※1. As for the case with an optional Automatic Wire Feeding Device attached, these items will be decided by the specifications of AWF-2B.

※2. Die guides for 0.2 wire and V-groove wire guides for 0.05 to 0.3 wire are provided.

## Air Compressor for Automatic Wire Feeding Device

( ) Inch

Supply pressure	Over 5kgf/cm <sup>2</sup> (11Lbs)
Exhaust air capacity	30ℓ/min
Operation control mechanism	Pressure switch gear mechanism
Input power supply	Single phase 100V±10% 50/60Hz 10A (Provide an exclusive power source)
Outline dimensions	450(17.7)×300(11.8)×620(24.4)mm (W×D×H)

Control Device	Input power supply	3-phase 200V±10% 50/60Hz 7.5kVA
	Outline dimensions	750 (29.5)×1,200 (47.2)×1,850 (72.8)mm (W×D×H)
	Weight	500kg (1,100Lbs)
Power Supply	Pulse generation	Mos transistor pulse circuit
	Working voltage	Adjustable in 90 steps
	Working current	Adjustable in 15 steps
Numerical Control	Control system	CNC system by microcomputer
	Ambient temperature	0~40 °C
	Control axis	X-Y·U-V·Z 5 axes(X-Y, U-V 4 axes simultaneously)
	Input system	Tape reader, MDI, RS232C interface
	Code	ISO (R840)/EIA(RS244-A), selective
	Position command system	Incremental value/Absolute value joint use
	Max. programmable dimension	(X-Y)±9999.999mm(393.7) (I-J)±99999.999mm(3937.0)
	Least input increment	0.001mm(0.0004)
	Least command increment	0.00025mm(0.000001)/ Pulse
	Interpolation	Linear, Circular
	Intersection calculation	Sharp edge, Corner R
	Wire offset	-9.999 ~ +9.999mm
	Manual table feed rate	Quick, Middle, Slow, Step feed (Step feed settable 0.00025 ~ 2.5mm)
	Cutting feed control	Constant rate/Servo feed, selective
	Reverse function	At short circuit, reverse along cutting locus(Reverse distance 0.5/1.0/2.0mm, selective)
	Plotting rate	300mm/min(11.8)
	Display function	<p>14in. color CRT, selection by operation mode.</p> <ul style="list-style-type: none"> <li>● Display of present position X-Y·U-V·Z 5axes simultaneously, 0.001mm unit, 3 channels + machine position, simultaneous / selective.</li> <li>● Cutting path and locus display</li> <li>● Condition setting value display (Wireoffset, Working condition, Operating condition).</li> <li>● Cutting status display (Time, Length, Rate, Time remaining).</li> <li>● NC data display·Alarm code display·Self-Diagnosis code display· System parameter display.</li> <li>● NC data editing display</li> <li>● Registered cutting condition display</li> <li>● Remaining capacity display of user's memory</li> </ul>
	Power failure recovery measure	Self-start power recovery
	Control function	<ul style="list-style-type: none"> <li>● Memory operation (Number of tapes: 250 pcs, Total tapes length: correspond to max 300m)</li> <li>● Pitch error, Backlash compensation</li> <li>● Mirror image X-Y axes (individual / simultaneous) ● Axes exchange</li> <li>● Optional stop ● Single block ● Machine lock</li> <li>● Positioning (Edge, Center, Vertical) ● Axis compensation ● Circle compensation</li> <li>● Figure Rotation (±1° ~ ±360°)</li> <li>● Figure expansion &amp; Shrinkage (Magnification 0.001 ~ 99.999)</li> <li>● Return to origin (Return speed 300mm/min) counter channel selection,</li> <li>● Returning axis designation) ● Dwell function (1 ~ 9999m sec)</li> <li>● Wire breakage treatment (Return to breakage point, Return to starting point)</li> <li>● Multi-Operation (During cutting, Tape editing possible by display change)</li> <li>● External input/output interface (RS232C)</li> </ul>

SEIBU's unique color display can indicate the work's position from the datum plane of workpiece at progressive die cutting and multiple hole cutting, the position from the start hole at hole cutting and the position from any discretionary datum plane, up to three channels on five axes(X-Y, U-V and Z axes) simultaneously. The cutting hole position can be securely confirmed, to which operators pay the most careful attention. In addition, the position from the machine origin is always displayed, resulting in higher accuracy of repeating positioning for the position.



**We have solved the all difficulties in use of multifunctional machines. Easy-to-See, -to-Understand and-to-Use.**



*Operation modes are selected on the "MODE" screen. All kinds of operation can be understood more easily due to ordinary language adopted.*

#### ●Positioning

The edge of a workpiece, the center of a datum hole or start hole can be automatically detected and positioned by using the mean (automatically calculated) of four positioning touches. With the optional automatic square wire jig, the wire can be automatically corrected.



### ● Color Plotting

The top cutting locus, the bottom cutting locus and, if necessary, the middle cutting locus of a workpiece are displayed in different color. The taper form can be verified at a glance. As cutting and plotting are carried out simultaneously, the cutting status can be monitored at a glance from a remote station. If the quick plot is chosen, plotting proceeds at the rate of 300mm/min and plotting ends in a short time.

### ● Registration and Retrieval of Cutting Conditions.

Cutting conditions of 500 kinds and 6500 items are registered. When the data is inputted, such as the material of the workpiece, the workpiece height, the finishing surface roughness, the wire diameter and the wire material, the optimal cutting conditions will be automatically selected.



### ● Wire Offset

30 different wire offset values can be stored and can be inserted into program by just using proper number. The offset values can be changed during cut.

### ● Manual Program

Independent running can be carried out by the travel data inputted with MDI. It is very convenient for manual positioning.

### ● Memory Operation

The maximum total length of all NC tapes is 300m (with option, up to 1000m expandable) and the maximum number of NC tapes is 250. The memorized NC programs can be used many times. This function is convenient when several kinds of pattern are used repeatedly. The necessary data can be retrieved by single touch operation and there are no difficulties as in the case of paper tapes.



### ● Figure, Rotation

The cutting figure can be rotated in an arbitrary direction by seconds to degrees to cut. As two arbitrary points on the datum edge of a work are measured with the wire and the angle error of the work with the X-Y table movement is calculated and displayed, you need not to measure the parallelism of the work with a dial indicator other device to correct it.

### ● Return to Origin

The machine status can return to any of the datum origins CH-1, CH-2, and CH-3 and the machine position 4 CH by single touch operation. That is very convenient especially for intervening operation when multiple workpiece are loaded on the table.

### ● Editing

The NC data in the memory can be displayed on the CRT display to confirm, add, cancel and change data freely. For example, the NC data for punch cutting can be used for die cutting by changing its input for the cutting start point.

The NC data made by using other programming devices can be used with some corrections.

The designated data within long NC data can be displayed instantly by utilizing the search function.



### ● Circle Compensation

When cutting at the center of a round work or starting to cut from the center is required, three arbitrary points on the external form of the work are measured against the wire and their central point is calculated and displayed. The center position can be easily located without any special jig.

### ● Manual Intervention during Cutting.

Occasionally it becomes necessary to raise the Z axis or to move the worktable due to some trouble happened, such as wire breakage during cutting. After such manual intervention, the worktable returns to the cutting point by single touch operation.

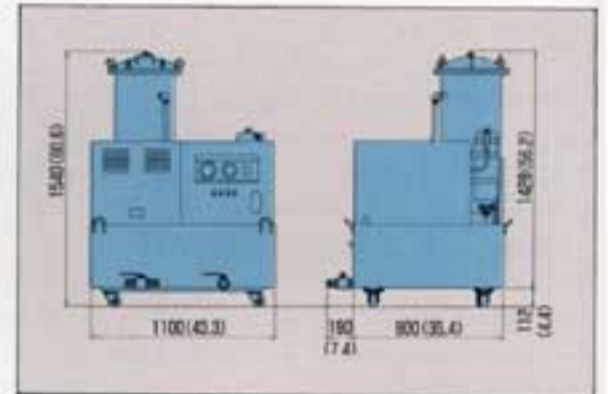
# Filtration Device

## FW-280B



### Major Specifications Without Option

- Working fluid/Deionized water (specific resistance automatically controlled)
- Deionizer/Ion exchange resin
- Deionizer capacity / 5 ℓ
- Filter element / 5 $\mu$ m paper filter
- Tank capacity / 300 ℓ
- Outline dimensions / 900(35) × 1,100(43) × 1,540(40)mm (W × D × H)
- Weight / 300kg (661Lbs) (without working fluid)
- Input power supply / 3-phase 200V ± 10% 50/60 Hz 4 kVA

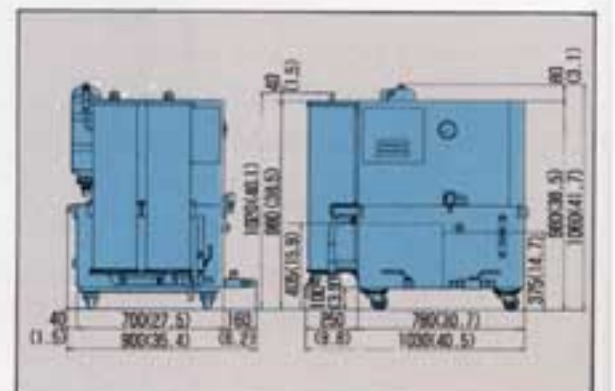


## FW-163C



### Major Specifications Without Option

- Working fluid/Deionized water (specific resistance automatically controlled)
- Deionizer/Ion exchange resin
- Deionizer capacity / 5 ℓ
- Filter element / 5 $\mu$ m paper filter
- Tank capacity / 160 ℓ
- Outline dimensions / 1,025(40) × 900(35) × 1,030(40) mm (W × D × H)
- Weight / 180kg (396Lbs) (without working fluid)
- Input power supply / 3-phase 200V ± 10% 50/60 Hz 4 kVA



# Standard Accessories.

- Tools kit/ 1 set
- Working jigs/ 1 set
- Rustproof spray /1pc.
- Wire electrode/ SBH-20,  $\phi$  0.2mm, 5kg roll-1roll
- Ion-exchange resin/ 5 $\ell$ , 2pc
- Filter element/ 12pc
- Hose joint parts/ 1 set
- Air filter sponge/ 1 set
- Power supply cables/1 set
- Spare parts(Fuses)/ 1 set



## Preparation for Introduction

### Power Source Facilities

Make sure to finish the power source facilities before the wire EDM's arrival. If an explosive input power source is not provided, satisfactory stable cutting and high accuracy may not be obtained due to voltage fluctuation.

- General max. input; 3-phase, 200V  $\pm$  10%, 50/ 60 Hz, 11.5 kVA(Control device/ 7.5 kVA, Filtration device/ 4 kVA)
- If special accessories are installed, exclusive power supply facilities are required. Refer to the latest document "Specifications."

### Grounding Works

Carry out the exclusively grounding works of the special third kind grounding (Japanese standard). If grounding is not complete, it is dangerous that an electric shock may happen. Moreover noise may be generated and the control device may not work normally.(We recommend you to check the value of grounding resistance every year for safety.)

- Value of grounding resistance/ Even in case of installing an earth leakage circuit breaker, under 10 $\Omega$ .
- Ground cable/ Flexible stranded copper conductor over 14mm<sup>2</sup> (e. g. Cabfyre cable VCT 14mm<sup>2</sup>)
- Works/ Grounding points is within the room where a wire EDM is installed or the nearest place as far as possible. Connection of the grounding cable should be done by using brass bolts over 8mm. (In case of the shielded room, connect earth the wire EDM to the shielded room and the shield room to earth.)

### Site of Installation

We recommend you to choose a place for wire EDM which satisfies the following conditions.

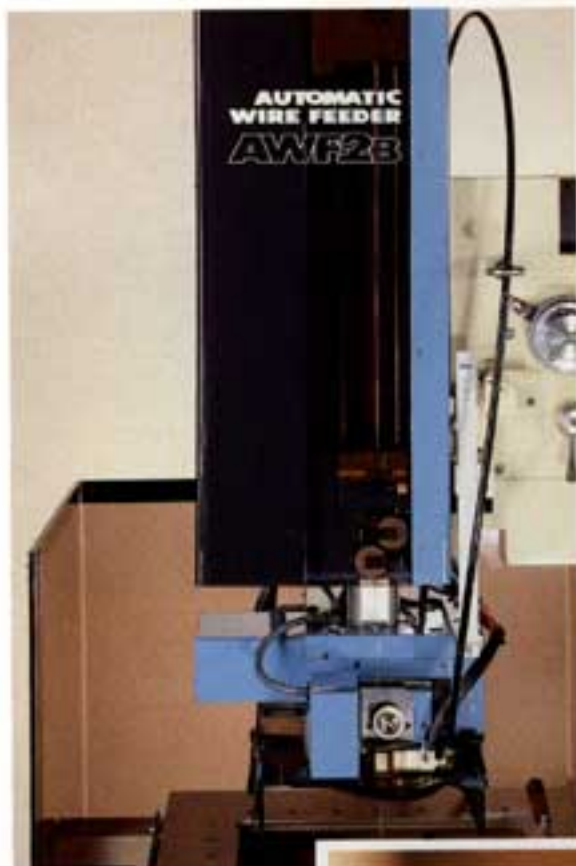
- Little temperature fluctuation, Optimal temperature 20  $\pm$  10°C
- Little humidity and dust
- Little vibration
- We recommend you to install it within a shielded room, to prevent electromagnetic wave interference.

※When a working fluid cooling device is attached, it is considered that heat will be generated from the device by heat exchange which may cause necessity of improving the air-conditioning ability depending on the status of facilities.

### Purchase of Expendables Supplies

Expendables are indispensable for products machining by all means, such as ion-exchange resin, filter elements and wire electrode. Make sure to keep them in stock without fail.





## Die Summe präziser Komponenten führt zu zuverlässiger Alltags-Tauglichkeit

Technologievorsprung erreichen wir nicht nur durch hohe Stückzahlen. Erst in der Kundennähe nehmen Ideen praxistaugliche Gestalt an. Individuelle Wünsche der Anwender finden Eingang in die Serienfertigung – Unser Marketingdenken zu Ihrem Nutzen.

### Automation vom Feinsten: Automatische Drahteinfädelung AWF 2B

SEIBU-Drahterodiermaschinen werden bereits in der Grundausstattung mit der motorisch bewegten und programmierbaren Z-Achse ausgestattet. Nur auf diese Weise sind exakte Positionen zum Konischschneiden erreichbar.

Selbst Konikschnitte bei mehreren Werkstücken unterschiedlicher Bauhöhe in einer Aufspannung, sind durch einfaches Programmieren der Z-Achsen-Position problemlos möglich. Selbstverständlich auch unbeaufsichtigt in der Nacht und am Wochenende. Kollisionen mit dem Werkstück oder anderen Hindernissen wie Spannmitteln etc. werden durch einfaches „Überspringen“ der Gefahrenzone wirksam verhindert. Die automatische Drahteinfädelung ist geschützt in den Maschinenkopf eingebaut.

Sie ist eines der wichtigsten Elemente für die „mannlose Schicht“, für die Verkettung mit Robotern zur automatischen Beschickung der Anlage und dient durch ihre speziellen Einfädelsequenzen der Betriebssicherheit.

### Einfädeln in kleinste Bohrungen und im Schneidspalt.

Die SEIBU-Drahteinfädelung ist eine technische Meisterleistung. Da sie völlig ohne Transportmedien wie Wasserstrahl o.ä. auskommt, kann sie sowohl unmittelbar an Werkstückkanten, in schmale Schlitze und kleinste Bohrungen einfädeln. Sollte es während des Erodierprozesses zu Störungen kommen, die einen Drahtbruch zu Folge haben, so wird durch die spezielle Rückzugstrategie unmittelbar vor der Drahtbruchstelle automatisch im Schneidspalt eingefädelt.

Durch die spezielle Glüh-Reck-Technologie wird die Treffsicherheit auch über größere Höhen erheblich gesteigert. Know-How und Präzision: die Grundprinzipien der SEIBU-Drahteinfädelung!

Sowohl die obere als auch die untere Spüldüse ist bei SEIBU-Drahterodiermaschinen federnd gelagert und paßt sich kleineren Unebenheiten automatisch an. Sie sind dadurch gegen Auffahren und Beschädigung geschützt.



### SUPERFINISH – Mehr als nur feine Oberflächen.

Die SEIBU-Generatoren verfügen standardmäßig über eine eingebaute Feinschlichtstufe.

Speziell für die Bearbeitung feinsten Werkstücke und schwieriger Materialien hat SEIBU die SF-2B-Polierschlichtstufe entwickelt. Durch die speziellen SF-Parameter wird die Oberfläche nicht nur optisch geglättet, die gesamte Struktur der Kraterbildung wird nachhaltig verändert. Dies hat zudem wesentliche Verbesserungen des Erodiergefüges zur Folge.

Die SF-2B wird in der Regel zusammen mit dem SEIBU-DUO-Filtersystem eingesetzt, um innerhalb kürzester Zeit mit Dielektrika unterschiedlichen Leitwerts arbeiten zu können.

