



## TREK 646

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The Trek® 646 software-driven electrostatic chuck supply offers an array of features that provide significant benefits while accommodating a variety of demanding applications. Trek 646 incorporates Advanced Energy technology which has demonstrated increases in efficiency and throughput equal to three times that of other supplies. Virtual elimination of sticky wafer and wafer popping issues ensures better control over particle contamination. Given the versatility and performance of the Trek 646, it can be used in multiple unique tools/processes, thus eliminating the need to specify a new supply for each unique tool/process in a facility.

### PRODUCT HIGHLIGHTS

- Supports both Coulombic and Johnsen-Rahbek ESC technologies
- User configurable for custom clamp and declamp sequences and wave shapes
- Electrostatic chuck profiles can be uploaded to the unit and stored internally via a user-friendly software interface
- Reduces backside gas errors, increases throughput, and eliminates sticky/popping wafer issues
- Lockable front panel control interface
- Ability to control parameters such as over-current, wafer-present and wafer-clamped thresholds, clamp voltage, offset voltage and internal or external amplitude/offset control
- Wafer detection includes no wafer, wafer present or wafer clamped status
- Includes in-process-adjustable amplitude/offset and output-control versatility
- Output can be controlled by back panel I/O, serial computer command or front panel controls
- NIST-traceable Certificate of Calibration provided with each unit

### AT A GLANCE

#### Output Phasing

0 to  $\pm 3$  kV

#### Output Voltage Range

0 to  $\pm 3$  kV

#### Output Current Range

0 to  $\pm 6.5$  mADC with a peak capability of 10 mA

### TYPICAL APPLICATIONS

- Electrostatic-driven handling of materials
- Semiconductor wafer processing
- Non-mechanical transfer of flat panels or other processing materials sensitive to mechanical clipping

## TREK 646 ELECTROSTATIC CHUCK SUPPLY

### TECHNICAL DATA

Outputs		
Simultaneous High Voltage Outputs	Two simultaneous high-voltage outputs (Output Phase A and Output Phase B) of equal magnitude and opposite in polarity relative to an offset voltage	
Output Phasing	Output Voltage A (Reference Phase)	0 to $\pm 3$ kV
	Output Voltage B	0 to $\pm 3$ kV (Phase B = $[-1] \times$ Phase A)
	Offset Voltage (This feature can be disabled through the program)	Each DC output voltage (Phase A and Phase B) is ramped up and down with symmetrical rise and fall times, or they can be programmed with the user's custom clamping and declamping waveforms. The clamping process is initiated in response to the Clamp On/Off control. The polarity of each output reverses to the opposite polarity after each Clamp On/Off cycle.
Output Waveshape	Each DC output voltage (Phase A and Phase B) is ramped up and down with symmetrical rise and fall times, or can be programmed with the user's custom clamping and declamping waveforms	
Output Voltage Range	0 to $\pm 3$ kVDC, maximum	
Output Current	0 to $\pm 6.5$ mADC with peak capability of 10 mA	
Input		
Setting the High Voltage Amplitude	HV magnitude can be controlled either externally or internally to the unit	
Setting the Offset Voltage	Offset voltage may be controlled externally or internally to the unit	
Output Voltage Monitor (Back Panel Connector)		
Scale Factor	1 V/300 V	
Phase B DC	Accuracy better than 0.5% of full scale	
Offset Voltage	Less than 10 mV	
Output Noise	Less than 50 mV rms <sup>1</sup>	
Steady State Voltage Leakage Current Monitor		
Scale Factor	1 V / 1 $\mu$ A	
DC Accuracy	$\pm 0.1$ $\mu$ A	
Output Noise	Less than 50 mV rms <sup>1</sup>	
Mechanical Specifications		
Dimensions (H x W x D)	88.1 x 431.8 x 531.9 mm (3.47 x 17 x 20.9 in) 1U rack enclosure	
Panel Width	482.6 mm (19 in)	
Weight	5.0 kg (11 lb)	
Connectors	15-pin "D" ITT Canon used by remote device to control/monitor the unit, 9-pin "D" ITT Canon RS232, 3-Pin FCT "D" High-Voltage, standard type-A USB, Ethernet (optional) and Front Panel	
Power ON/OFF	Two-position rocker switch	
Electrical Specifications		
DC Input Receptacle	2.0 mm locking DC jack; center contact is positive and shell is negative (receptacle mates with Switchcraft S761K plug)	
Ground Receptacle	Ground stud	
Power Requirements	24 VDC, 2.0 A	

<sup>1</sup> Measured using the true rms feature of the HP Model 34401A digital multimeter

## TECHNICAL DATA

### Environmental Specifications

Temperature	0 to 35°C (32 to 104°F)
Relative Humidity	To 85%, noncondensing
Altitude	To 2000 m (6561.68 ft)

### Features

Interlock	Connections are provided to support an interlock safety configuration. In the event that the interlock is open, the high-voltage generation circuits are shut down
Digital Display	40 x 2 LCD character display shows various system functions such as Set Voltage, Output Voltage and Capacitance Monitor
Clamped Wafer Detection Feature (Thresholds are set by the program)	To indicate wafer clamping events, the capacitive currents generated by a low voltage sine wave, super-imposed on the Phase A and Phase B outputs, are monitored but can be disabled through the program. The superimposed waveform is used to indicate a no wafer, wafer present, or wafer clamped status
Capacitive Load Select	Clamped capacitance status range can be selected by the program for 0 to 10, 20, or 30nF (phase to phase) depending on the system and electrostatic clamp physical configurations

## REFERENCE NUMBERS

### Included Accessories

PN	Description
24013	Operator's Manual, Software
B8095R	HV Connector
BA103	USB Cable
BA119R	DC Plug (Switchcraft S761K)
Varies	Line Cord, Fuses (selected per geographic destination)

### Optional Accessories

PN	Description
IK066R	90 to 264 VAC to 24 VDC Power Adapter



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#### **ABOUT ADVANCED ENERGY**

Advanced Energy (AE) has devoted more than three decades to perfecting power for its global customers. AE designs and manufactures highly engineered, precision power conversion, measurement and control solutions for mission-critical applications and processes.

Our products enable customer innovation in complex applications for a wide range of industries including semiconductor equipment, industrial, manufacturing, telecommunications, data center computing, and medical. With deep applications know-how and responsive service and support across the globe, we build collaborative partnerships to meet rapid technological developments, propel growth for our customers, and innovate the future of power.

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