

# Trek Model 645

## Electrostatic Chuck Supply



Trek's Model 645 software-driven Electrostatic Chuck Supply offers an array of features that provide significant benefits while accommodating a variety of demanding applications. Documented use shows that customers have seen increases in efficiency and throughput equal to three times that of other supplies. Additionally, the Model 645 virtually eliminates sticky wafer and wafer popping issues, thus ensuring better control over particle contamination.

Given the versatility and performance of the Model 645, 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.

### Key Specifications

- Output Phasing:
  - Voltage A (Reference Phase) 0 to  $\pm 2$  kV
  - Voltage B (Phase B =  $[-1] \times$  Phase A) 0 to  $\pm 2$  kV
- Output Voltage Range: 0 to  $\pm 2$  kV
- Output Current Range: 0 to  $\pm 6.5$  mADC with a peak capability of 10 mA

### Typical Applications Include

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

### Features and Benefits

- 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
- Documented reduction of backside gas errors, increased throughput, and elimination of sticky/popping wafers
- 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
- CE Compliant



## Model 645 Specifications

### 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	
<i>Output Voltage A (Reference Phase)</i>	0 to $\pm 2$ kV
<i>Output Voltage B</i>	0 to $\pm 2$ kV (Phase B = $[-1] \times$ Phase A)
<i>Offset Voltage</i>	An offset voltage of up to $\pm 2$ kV may be simultaneously added to the output of each phase. When an offset voltage is added, the polarity and magnitude of offset voltage appears simultaneously on both outputs A and B regardless of the magnitude and polarity of the A and B voltages themselves. The sum of the offset voltage and the output voltage of each phase cannot exceed $\pm 2$ kV
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 $\pm 2$ kV DC, maximum
Output Current	0 to $\pm 6.5$ mA DC 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/200 V
Phase B DC	Accuracy better than 2% of full scale
Offset Voltage	Less than 10 mV
Output Noise	Less than 50 mV rms*

### Steady State Voltage Leakage Current Monitor

Scale Factor	1 V / 100 $\mu$ A
DC Accuracy	$\pm 5$ $\mu$ A
Output Noise	Less than 50 mV rms*

### 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	40X2 LCD character display shows various system functions such as Set Voltage, Output Voltage and Capacitance Monitor

### Features

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 super-imposed 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

### Mechanical

Dimensions	43.7 mm H x 421.6 mm W x 457.3 mm D (1.72" H x 16.6" W x 18" D) 1U rack enclosure
Panel Width	482.6 mm (19")
Weight	8.5 lbs (3.86 kg)
Connectors	15-pin "D" ITT Canon used by remote device to control/monitor the unit, 9-pin "D" ITT Canon RS-232, 3-Pin FCT "D" High-Voltage, standard type-A USB, Ethernet (optional) and Front Panel
Power ON/OFF	2-position rocker switch

### Operating Conditions

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

### Electrical

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 V DC, 1.7 A

### Supplied Accessories

Operator Manual, SW	PN: 24010
USB Cable	PN: BA103
HV Connectors	PN: B8084R, B8085R, B8088R, B8089R
DC Plug (Switchcraft S761K)	PN: BA119R
Line Cord, Fuses	Selected per geographic destination

### Optional Accessories

90-264 V AC to 24 V DC Power Adapter	PN: IK045
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### Note

Trek Model 646, a  $\pm 3$  kV version of this instrument, is also available. Please contact the factory for more information

\*Measured using the true rms feature of the HP Model 34401A digital multimeter

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