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Ionization Solutions

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Modulated Pulse AeroBar®

MODEL 5635

The Model 5635 AeroBar MP ionizing bar is specifically designed to eliminate static charge in semiconductor and other ultra-clean manufacturing processes where fast discharge time, low swing voltages, and precision balance are required. The Model 5635 utilizes MP technology, combining a high-frequency sine wave with modulated pulses (MP) for high ion output and delivery. This breakthrough technology enables AeroBar mounting within 150 mm of the wafer. MP technology, combined with ultra-clean silicon emitter points and precision adjustment, provides ISO Class14644-12 ionization (0.01 μm particles or nanoparticles) and ISO 14644 Class 1 (0.1 μm particles) cleanliness, critical for smaller technology nodes. For processes that do not require extreme cleanliness, the optional air-assist accelerates ion delivery, providing faster discharge times and performance over longer distances.

MP technology is easy to adjust and features the ability to fine-tune voltage, frequency and balance to meet differing environmental and product sensitivity requirements. The 5635 AeroBars come with 50 mm spacing for emitters for lengths ≤600 mm for the densest, uniform ionization coverage.

Features

- ISO 14644-12 (0.01 μm particles) cleanliness
- Modulated pulse technology
- Excellent lateral uniformity
- Low field voltages
- Air-assist capability
- Optional software with easy-to-use interface with wide adjustability
- Alarm output signal

Benefits

- Compatible with all wafer technology nodes including 14 nm and below
- Precision balance, high ion output with long-term stability
- Uniform balance across the AeroBar
- Safe placement as close as 150 mm of the wafer or reticle
- Enhanced static charge neutralization at fast automation speeds
- Fast setup and easy optimization in any environment
- Communicate to tool or facility monitoring system

Input Voltage	24 VDC ±10%
Output Voltage	13.5 kV p-p (max), adjustable
Distance	150-1000 mm distance to surface; application & customer specification dependent
Frequency	Default setting at 5 Hz; adjustable from 1-33 Hz
Balance	Auto balancing system <±20V over time and across the bar length (measured in a controlled environment at 24" distance)
Ion Emission	Modulated pulse (MP) technology
Emitters	Single crystal silicon emitter points
Emitter Pitch	50 mm or 75 mm spacing between nozzles; 50 mm spacing only on the 450 mm and 600 mm lengths
Air Supply	Clean dry air (CDA) or nitrogen
Airflow	45 psi max gas pressure; 1-3.5 lpm/nozzle thru 8 mm OD one-touch fitting (optional)
Ionization Performance	15 sec (typ) with no air-assist, Vp-p Swing of 80 Vp-p; measured at 24" below an emitter center group of points
Cleanliness	Meets ISO 14644-12 cleanliness (0.01 µm particles or nanoparticles) and ISO 14644-1 (0.1 µm particles) using 45-50%
Ozone	<0.05 ppm
EMI	Below background level
Operating Env.	Temperature 15-35°C (59-95°F); humidity 30-60% RH, non-condensing
Bar Settings	DIP switches for general power settings; trimpots for fine tuning balance, frequency, and power output or use the serial output to the MP 5635 Bar Control software for fine adjustments
Enclosure	ABS chassis, stainless steel rails on the outside of the bar
Dimensions	3.1"H x 1.3"W x 18/24/34/39/45/51/57/63/69/75/81/87/93"L (78 x 34 x 450/600/850/1000/1150/1300/1450/1600/1750/1900/2050/2200/2350 mm)
Certifications	CE cULus RoHS2
Model 5601 Power Distribution Box	
Input Voltage	24 VDC for each bank of 4 bars; 5.6A total (0.7A max/port)
Communication	Ethernet (RJ-45) to/from PC; individual bar standby inputs
Alarm Output	Relay closure to ground
Output	8 RJ-45 ports (1 for each 5635 bar)
Indicators	Green PWR, Yellow COM, Red ALM, Blue USB LEDs
Weight	15 oz (420g)
Dimensions	1.2"H x 6.3"L x 3.6"W (3.1 x 16.0 x 9.2 cm)
Certifications	CE RoHS2

Simple Installation

The Model 5635 ionizing bar is quickly installed by simply plugging into a 24 VDC source and connecting an air line, (if air-assist is desired). Set the DIP switches for general power levels as defined in the user's manual to activate factory settings for a base discharge performance. Users can then fine-tune the control parameters from the bar or through the easy to use software GUI for installations where optimized balance, swing voltage and discharge times are desired. An alarm connection in the Signal and Power Junction Box enables a signal output to the tool or central computer for FMS monitoring.

Power Distribution Box (optional)

The Model 5601 Power Distribution Box can be used to centralize power and software control for up to 8 MP AeroBars.

Cleanliness

Model 5635 is designed to operate in and maintain ISO 14644-1 cleanliness (10 particles or less per m^3 for particles of 0.1 micron and larger). Model 5635 will also perform to ISO 14644-12 cleanliness (1200 particles or less per m^3 (34 particles per ft^3) for particles of 0.01 micron and larger) when operated at 45-50% output voltage setting and OpenJet nozzles with single crystal silicon emitters.

ISO Class 1 for 0.1 and 0.01 Micron Particles

ISO 14644-1 (1999) establishes 9 particulate class limits. A class is met when airborne particles-per-cubic-meter (or particles-per-cubic-foot) do not exceed the class limit. The following graph summarizes the class limit lines for particles between 0.1 micron and 5 microns.

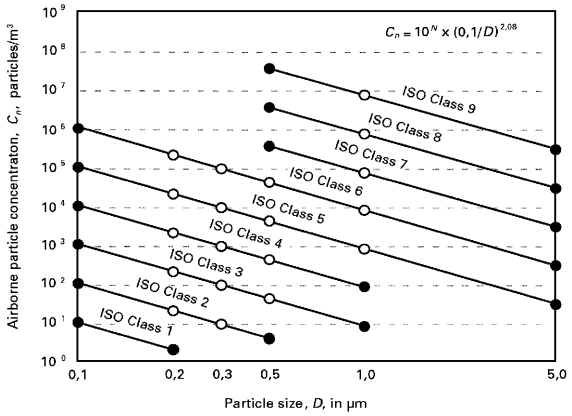

Chart from ISO 14644-1: Annex A - Informative.

Ordering Information

91-5635-xxxx-yy-zzzzz	xxxx (bar lengths): 450*/600*/850/1000/1150/1300/1450/1600/1750/1900/2050/2200/2350 mm; yy (nozzle spacing): -50 for 50 mm, -75 for 75 mm; zzzzz (nozzle type): OpenJet (QOU30)
33-5601-03	Model 5601 Power Distribution Box, 24 VDC; powers up to 8 MP AeroBars
14-21241	24 VDC Power Supply for Model 5601 Power Distribution Box (power cord ordered separately)
33-21491	Signal and Power Junction Box
92-5635-001	AeroBar MP Remote Serial Adapter Kit (includes RJ-45 splitter, USB to serial adapter, RJ-45 to DB9 adapter)
33-25625	24 VDC Power Converter with Power/Signal Junction Box Kit
25-0540-xx	CAT-5 with RJ-45 Ethernet Cable in 6, 10, 15 ft lengths, white
28-6370	Flat mounting clips. Recommended usage: 450-1150 mm, 2 clips; 1300-2050 mm, 3 clips; 2200 mm and above, 4 clips
32-22210	Horizontal rotatable mounting bracket. Recommended usage: 450-1150 mm, 2 clips; 1300-2050 mm, 3 clips; 2200 mm and above, 4 clips
32-22220	Vertical rotatable mounting bracket. Requires 2 brackets for each ionizer bar to hold one at the top and one at the bottom
33-5353	Flat Mounting Clip with Active/Screw Fasteners (2) for AeroBar. Recommended usage: 450-1150 mm, 2 clips; 1300-2050 mm, 3 clips; 2200 mm and above, 4 clips

*The 450 mm and 600 mm are only available with 50 mm nozzle spacing.

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