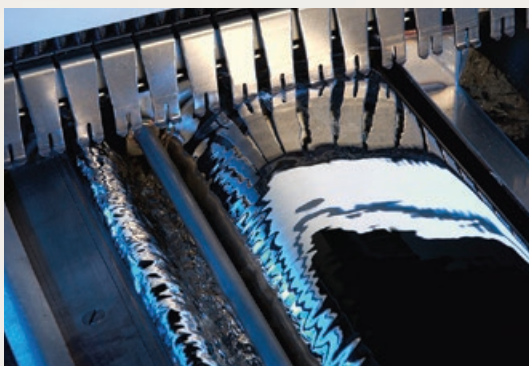
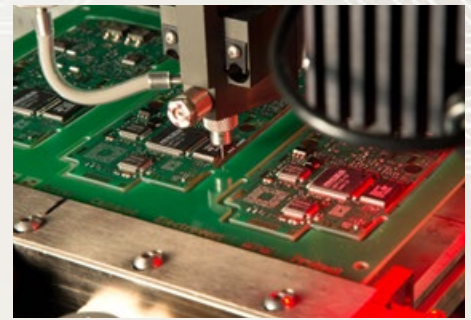


**MPM | Camalot | Electrovert  
Vitronics Soltec | Despatch**

## Together in Process Perfection



**Printers, dispensers, selective, reflow and wave soldering systems,  
cleaning systems, thermal processing equipment**

***Electronic Assembly Equipment***

**TW EAE**

A division of Illinois Tools Works

## Together in process perfection

ITW EAE brings together the world-leading brands of electronics assembly equipment. Brands with reputations for advancing process perfection. The combined knowledge and experience of the ITW EAE group is driving further innovation and speeding the development of next generation technology. New technology that can dramatically improve productivity and yields while reducing maintenance and cost of ownership.

**MPM | Camalot | Electrovert | Vitronics Soltec | Despatch**



## In-lined manufacturing for faster delivery

ITW, and all of its divisions, are afforded the opportunity to leverage highly refined manufacturing practices that have improved our factory and supply chain operations. This has significantly increased our shipment velocities, allowing us to deliver industry leading lead-times and responsiveness.

## Process optimization, training and 24/7 support

We are committed to high-quality products backed by application and process expertise. After installation we will help optimize your equipment for maximum performance over its lifetime. We offer operator training, equipment protection and preventative maintenance programs to ensure 24/7 machine availability. We provide on-site technical support, remote diagnostics and telephone support and quick access to spare parts.

## Open Apps for Industry 4.0 interfaces

The operating systems in most ITW EAE equipment feature open architecture source code which provides customers and third parties the capability of developing custom interfaces in support of Industry 4.0 initiatives and communication with Manufacturing Execution Systems (MES).

# Industry 4.0

# *Electronic Assembly Equipment*

## **Meeting the increasing demands of automotive, smart device and semiconductor manufacturers**

With the exponential growth of electronics in cars, smart phones and homes, manufacturers are demanding improvements in throughput, yield and performance. Miniaturization and other technical challenges require continuous advancement in manufacturing equipment.

ITW EAE is focused on developing technology that addresses the needs of these markets. We have a strong relationship with the world's leading manufacturers and work directly with them to identify areas that need further innovation. We are actively pursuing the benefits to be realized by Industry 4.0 and the resulting improvements in yield, overall equipment effectiveness, and lights out factory capabilities envisioned by our collective customers.



Automotive, Smart Device,  
Semiconductor

# MPM

Today's MPM® printers are engineered and built to the highest standards. They are built on a solid foundation of proven technology and incorporate the most successful ideas and systems from prior MPM printer models. From new print head technology to vision system development, today's leading Momentum family of printers are ready to meet the most exacting manufacturing challenges.



**Designed to meet the demand for increasing throughput, yield and performance requirements from automotive, smart device and semiconductor manufacturers.**



## **ENCLOSEDFLOW™ PRINT HEAD**

EnclosedFlow ensures optimal aperture filling for fine pitch devices and crisp uniform printing with less waste. Print fine features such as 01005s and 0.3mm pitch CSPs with up to 50% greater volume and 25% lower deviation than squeegee blades!

## **PRINTRACK™**

PrinTrack™ adds traceability, data harvesting, and reporting to your printing process. With PrinTrack, you always have easy access to all pertinent information that can be used to track products and optimize the process.

## **OPENAPPS™**

MPM's OpenApps is an open architecture source code which provides the capability of developing custom interfaces in support of Industry 4.0 initiatives and communication with Manufacturing Execution Systems (MES).

# Electronic Assembly Printers

## MPM® EDISON™

Edison™ is ideally suited for the burgeoning Automotive and Smart device manufacturing markets. It is the industry's most accurate printer with +/- 15µ @ 6σ wet print repeatability. Total throughput is lightning fast due in part to the highly-efficient, patented parallel processing of the stencil shuttle system, stencil wiping, and vision alignment system.



Fastest

Most Accurate

## MOMENTUM® ELITE

The MPM® Momentum® Elite is the top-performer of the Momentum series, boasting the highest throughput and shortest cycle times of all. Its vision system is driven by servos for speed, and it's configured with a highly-efficient triple track rail system featuring an input buffer, a central processing section, and an output buffer.



## MOMENTUM® Hi-E

The MPM® Momentum® Hi-E is a single-rail printer with servo motors, rather than stepper motors, driving the Vision system at higher speed and thus increasing throughput and cutting cycle time.

High Performance

## MOMENTUM® BTB

The MPM® Momentum® BTB is a Back to Back configurable Momentum printer. BTB configurability allows dual lane processing for higher throughput, but without increasing line length or capital investment. It's the ultimate in flexibility in the proven Momentum platform.

## MPM® 100

The MPM® 100 is a hard-working, value-priced printer utilizing the robust, reliable Momentum series platform that has been proven to be at the top of its class in facilities around the world. Featuring a modest footprint, it grows with the user; innovative patented features can be added on or retrofitted as needed as throughput demands grow.



Production Value

# Camalot

Speed, stability, and precision are hallmarks of CAMALOT automated dispensing systems. Innovative gantry designs, even in smaller, more compact footprints, enable rapid acceleration for faster throughput. Bedrock stability enables the highest level of precision for applications ranging from solder paste to underfill to adhesive dispensing and advanced 'jetting' techniques.



**Innovation, performance and flexibility driven specifically toward the needs of the Automotive, Smart device and Semiconductor markets.**



## **CAMALOT® PRODIGY™**

The Camalot® dispenser is designed and built to deliver high-speed, extremely accurate dispensing. To enable 1.5g's of acceleration, Camalot engineers resourced over two decades of experience with linear motors and advanced motion control systems.

## **HIGH-SPEED AND EXTREMELY ACCURATE DISPENSING**

Advanced linear-drive architecture, combined with exceptional frame stability enables greater precision at higher speeds, resulting in consistently higher yields. The Camalot Prodigy boasts a +/- 35µ 3 Sigma dot placement accuracy at full speed.

## **DUAL MODE WEIGHT SCALE**

A patented closed-loop weighing process measures dispense patterns and automatically compensates for material viscosity for maximum accuracy.

Smarter, Faster and

# Electronic Assembly Dispensers

Advanced pump technology designed by Camalot®

## DYNAMIC DUAL HEAD (DDH)

The first and only dual head system that automatically corrects for part to part inconsistencies. This patented technology dramatically increases productivity with no sacrifice to yield and is compatible with Jetting and needle-based pump technologies. The DDH option uses an innovative mini XY drive system on a second Z-Axis to correct in real-time any part to part variances.



2 dispensers in one



## NUJET™

“Compact, Fast and Flexible”, NuJet eliminates the use of a needle and incorporates a state-of-the-art pneumatic actuator that generates an operating frequency of up to 300Hz. Controlling the piston with a pneumatic actuator and closed-loop software achieves a high degree of accuracy and repeatability for consistent process results. With a slim-line design and low mass the pumps can be pitched down to 28mm apart for optimal dual-head dispensing.

Compact, Fast and Flexible



## NANOSHOT™

NanoShot™ offers high speed - up to 600 Hz, and ultra-fine resolution, with dot sizes < 300 microns, this patent pending pump features state-of-the-art motion control technology, simple maintenance and quick changeover.

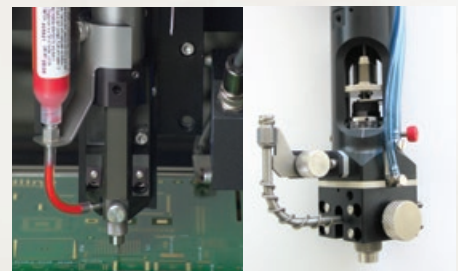


## SMARTSTREAM™

SmartStream™ is a unique patented non-contact dispense method designed and manufactured by Camalot. A controlled stream of material is dispensed using positive displacement with a piston, which does not contact seat or nozzle. SmartStream dispenses a column of material with each cycle instead of a single sphere.

## SERVO DRIVE AUGER SCREW PUMPS: 635 SD AND 680 SD

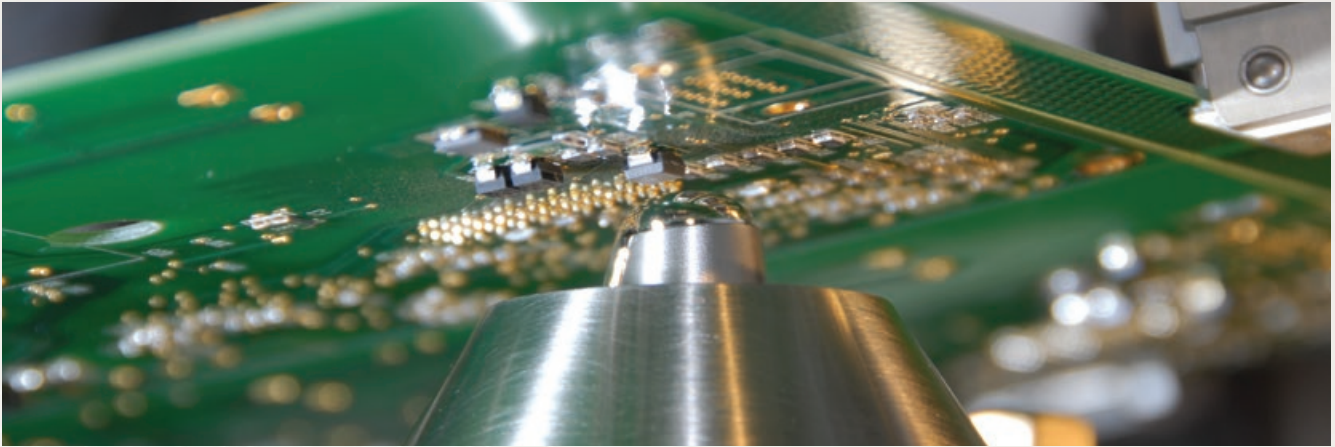
The 635 SD is ideally suited for dot type applications of most materials. With precise material delivery and controllable dispense speed. The 680 SD pumps delivers high flow rates and also incorporate a patented positive shutoff that eliminates dripping of lower viscosity materials in line type applications. For highly abrasive materials both pump systems offer more wear resistant carbide auger screws.



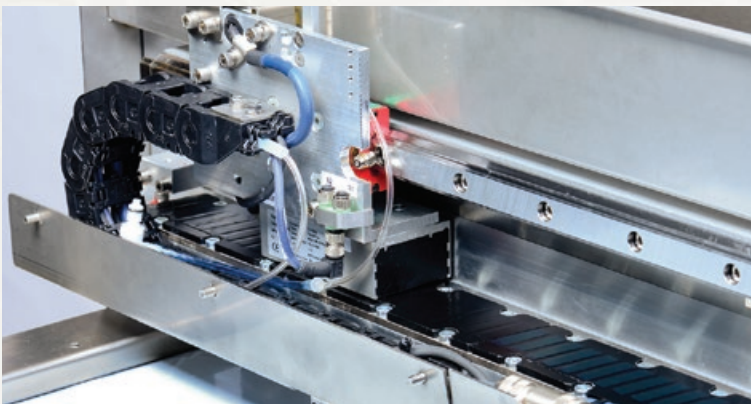
Highly Versatile

# Vitronics Soltec

Vitronics Soltec brings the next dimension to selective soldering technology. It's what you need today to meet the growing challenges of high yields, cost effective production and process control.



**The flexibility to meet current and future challenges in mixed production, fine pitch soldering and process control for the selective soldering process.**



## **HIGH FREQUENCY FLUXING**

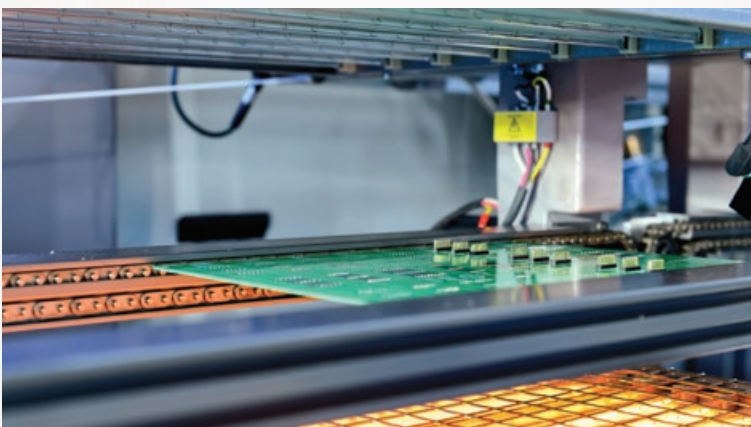
High frequency, high-speed, drop jet fluxing meets every cycle time and drop size requirement and increases the process window up to 5 times. Clogging is reduced with larger hole dimension of 180µm.

## **CLOSED-LOOP FLUX FLOW CONTROL**

Integrated mass flow meter has capability to measure during the whole flux cycle directly in the supply circuit to the nozzle.

## **CLOSED-LOOP PREHEATER MANAGEMENT**

Active and precise control of PCB temperature. with automatic adjustment of lamp power to reach desired temperature at the end of the preheat cycle. Improved process control and board to board repeatability with no additional cycle time





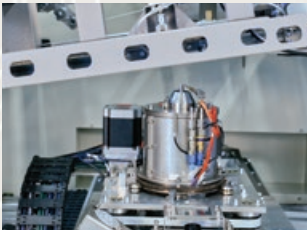
# Selective Soldering Solutions

## **ZEVA<sup>TM</sup>**

The ZEVA brings patented soldering technology that excels at meeting the challenges of miniaturization. Tilting allows the ZEVA to solder at any angle to guarantee proper soldering results for the ever decreasing pitch of components. ZEVA can process three PCBs simultaneously for high throughput in a high mix environment and offers a choice of wettable and non-wettable nozzles.



## Fine pitch soldering



### **SELECTWAVE SOLDERPOT**

ZEVA features point-to-point or drag soldering with a rotating nozzle to reduce cycle time. The solderpot is covered to minimize nitrogen consumption and dross formation. On the ZEVA a movable electromagnetic solderpot allows soldering under an angle.



The patented Solder Drainage Conditioner (SDC) unit is designed to ensure stable wave dynamics and bridge-free soldering.

### **PRECISION WAVE HEIGHT CONTROL**

Designed to control the wave height of the Selectwave through a camera. Measures without contact and no additional cycle time. Improves process control and board-to-board repeatability.



## Flexibility

### **ZEVA<sup>TM</sup>**

ZEVA delivers the best value in the high-speed selective soldering market. The ZEVA platform leverages proven, market-leading fluxing, preheating and soldering technology to meet the growing challenges of high yields, cost effective production, and process control. Designed with the flexibility to match your specific application and the ability to execute on-the-fly changeovers.

## Proven Performance

# Vitronics Soltec

Vitronics Soltec has a long history of reflow systems that have proven their capability worldwide and has established a reputation for superior reliability. Robust design combined with the industry's best heat transfer system consistently deliver benchmark thermal performance, precise process control, and superior value in a 24/7 environment.



**Best-in-class thermal performance and improved sustainability, driving power and nitrogen consumption to a minimum.**

## CENTURION



### **CENTURION™ REFLOW SOLDERING**

The Centurion™ is a forced-convection SMT reflow system with tight, closed-loop process control, built for today's high-throughput PCB assembly environments. With the best heat transfer in the industry, the Centurion is able to run any profile at the lowest set point possible, which minimizes the thermal differences over the product and uses less energy.

### **DUAL LANE WITH INDEPENDENT LANE SPEED CONTROL**

Dual lane and Dual speed conveyor doubles throughput and allows 2 different boards to run in parallel, a good value for high-mix low-volume customers.

# Industry's best heat transfer

# Reflow Soldering Solutions

## COST OF OWNERSHIP

With an efficient heat transfer design, Centurion provides low energy consumption. Its reliable and robust design, backed by over 20 years of SMT experience and capability, ensures high up-time even with the toughest reflow requirements. Our patented CATHOX™ further reduces cost of ownership by reducing the maintenance needs through cutting-edge technology of flux treatment. The new 'idle mode' option will further reduce cost of operation.

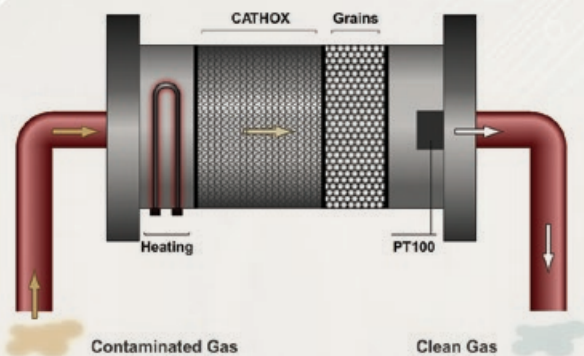
## INDUSTRY-LEADING THERMAL PERFORMANCE

With Centurion's new design backed by our experiences with its prior generations, we achieved better thermal transfer even with wider process chamber. Our knowledge and experience in process control ensure repeatability across the ovens required by the most demanding customers and the most challenging process requirements in the world.

# Cost effective



## CATHOX CATALYTIC THERMAL OXIDIZER



# Reduced maintenance

## MAINTENANCE AND ACCESSIBILITY

The patented CATHOX™ (Catalytic Thermal Oxidizer) dramatically reduces maintenance requirements while keeping a clean process environment. It is very effective in removing volatile compounds from the process tunnel during reflow. In thermal oxidation, organic vapors are converted to hydrocarbons, which are captured by a filter. Centurion's design also ensures that when maintenance is required, you have easy access and can do the maintenance job with few tools required.

## AUTOSET™ PROFILE/RECIPE GENERATOR

AUTOset™ provides easy management of the reflow process with accurate profile prediction and increases uptime by eliminating the time to profile. A must-have for high-mix low volume customers.

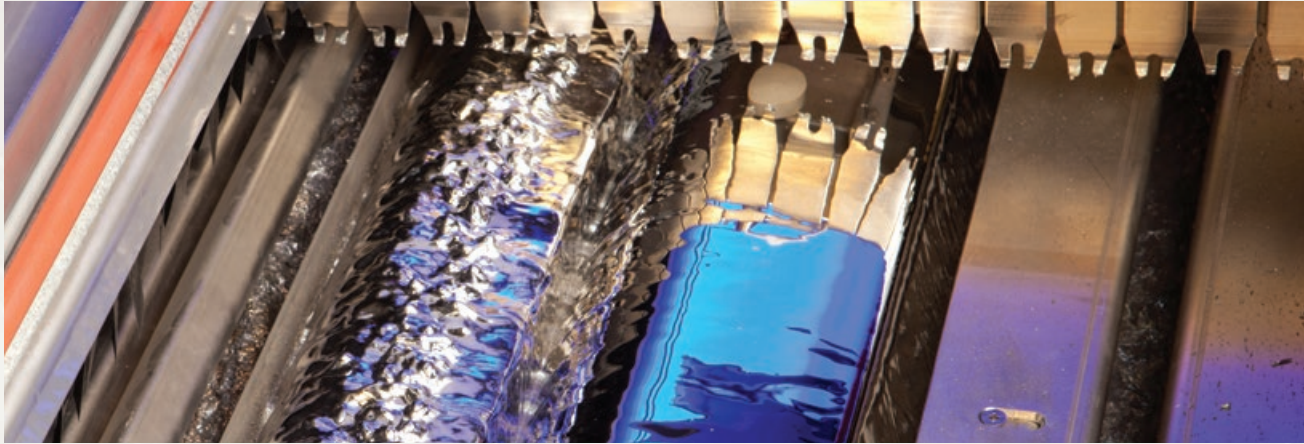
## PRECISE CONTROLLED COOLING

Market-proven cooling technology to change from high-temp recipe to low-temp recipe, with controlled cooling over multiple zones. This will reduce recipe changeover time to a minimum. Recommended for high-mix low volume customers to increase uptime.



# Electrovert

As the complexity of board assemblies continues to increase, board manufacturers are looking for the best solution in a wave soldering system. The solution must meet their soldering expectations for today and far into the future. In the wave soldering industry, Electrovert® has a reputation for having the most innovative technologies, best performance, highest reliability, and as being the best investment over a long product life cycle.



**Highly repeatable performance and development of technologies that provide industry leading topside hole fill performance.**

## RELIABILITY

Proven performance and reliability are key. Electrovert holds the industry reputation as having the most reliable wave soldering that lasts the longest when compared to other brands. Board assemblers know the value in owning an Electrovert wave soldering system.

## SOLDER NOZZLE TECHNOLOGIES

Electrovert's UltraFill™, DwellMax™ Plus and DwellMax Ultra solder nozzles are designed to provide maximum top-side hole fill, provide the best hole fill quality, improve first pass yields, reduce dross, and promote easy maintenance. DwellMax Plus' extra-wide chip nozzle and modified UltraFill nozzle are ideal for soldering thick, high thermal mass circuit boards.

## FULL NITROGEN TUNNEL FEATURE (ELECTRA & VECTRAELITE)

Electrovert's full nitrogen tunnel with nitrogen inerting technology feature offers complete process capability and flexibility for all nitrogen soldering applications. The full nitrogen tunnel feature is an efficient design that maintains a very low oxygen environment of <50 ppm which is ideal for increased wetting effects and a significant reduction of dross



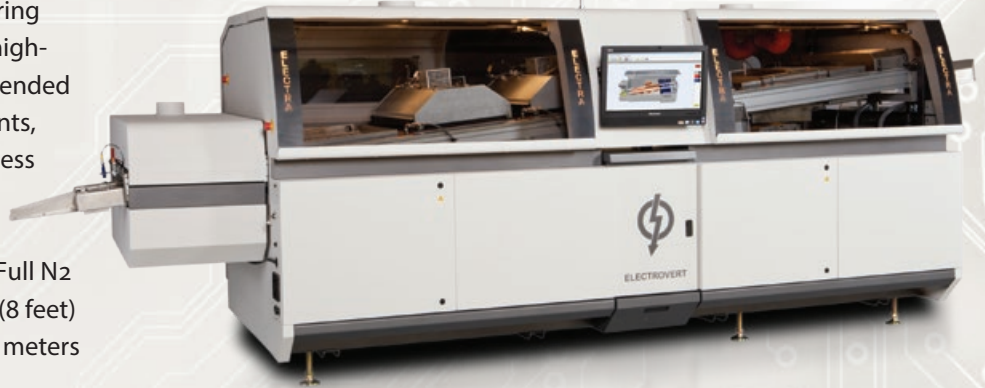
Made in USA

# Wave Soldering Solutions

## Proven Performance, World Class Results

### ELECTRA™

The Electrovert® Electra™ is an advanced, meticulously engineered wave soldering system designed for high-mass and high-volume manufacturers. Although intended for maximum throughput requirements, the Electra also offers maximum process flexibility and delivers world-class soldering results. Capable of 610 mm (24 in) process width with Short and Full N2 tunnel features and up to 2.4 meters (8 feet) of bottom side preheat and up to 1.8 meters (6 feet) of topside preheat.



### VECTRAELITE™

The Electrovert® VectraElite™ is ideal for medium-to-high mass board assemblies where fast changeover, process flexibility, and system reliability are required. The VectraElite combines innovative technology in an accessible, ergonomic platform with a zero-defect process at the lowest possible cost of ownership. Process width is 457mm (18 in) with optional 508mm (20 in), short and full N2 tunnel features.

### VECTRAES™

The Electrovert® VectraES™ is designed for low-to-medium mass board assemblies in a high volume production soldering environment that requires fast changeover, process flexibility, and system reliability.

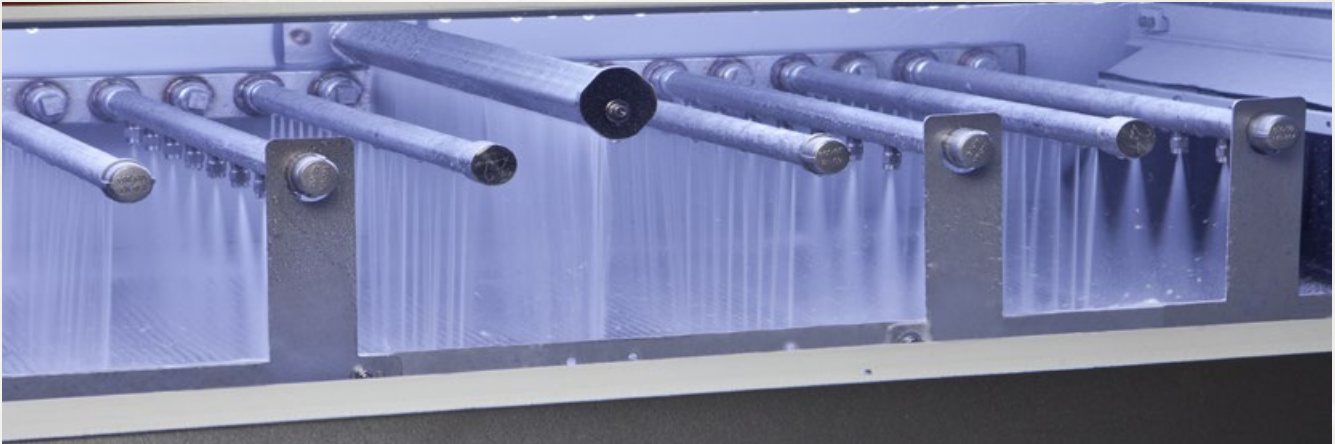
### FLUXING TECHNOLOGIES

As the complexity of board assemblies continues to increase, fluxing quality has become more of a focus to ensure soldering quality is achieved. Electrovert is ahead of competitors and offer the best fluxing technologies available in the marketplace. **ServoJet™** fluxing system provides the ultimate in precision deposition and hole penetration (OA version available for aggressive flux applications) while **ServoSonic™** and **ServoSpray™** fluxing systems are available for ultrasonic and value based solutions.



# Electrovert

With over 600 total units installed worldwide, the Electrovert® Aquastorm® is considered the industry's best for precision cleaning performance, quality construction, and life cycle durability. Superb design, robust construction, and quality engineering have ensured the long history and success of the Aquastorm. Combined with innovative features, technologies and performance, the Aquastorm continues to be the industry leader and benchmark for cleaners in the industry.



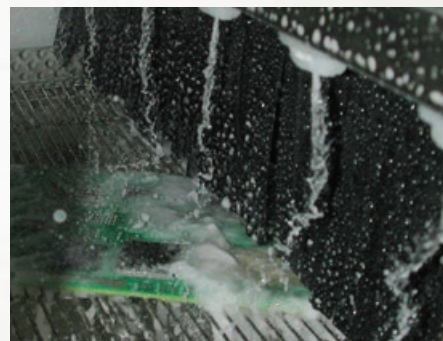
**Designed to provide complete cleaning process flexibility, superior cleaning and drying performance, process monitoring, and reliability.**

## **MIXED SPRAY TECHNOLOGY**

The clear advantage of the Aquastorm cleaners is the ability to deliver a combination of chemistry, thermal, and mechanical forms of energy at the PCB surface. Aquastorm utilizes mixed spray technologies including high-impact force for tight spaces, oscillating action for low pressure applications and complete flooding action for high pressure applications. Jet Impact Cleaning with omni-directional spray patterns greatly improves cleaning under low-standoff components, and eliminates shadowing effects. Chemical Isolation provides optimal process separation and minimizes chemistry consumption.

## **TORRID ZONE DRYING TECHNOLOGY**

Integrated into the machine cabinet, the Torrid Zone delivers a controlled dynamic process that effectively removes moisture from the PCB. Typical performance includes drying complex assemblies to within 0.1 gram of prewashed dry weight. The technology reduces exhaust requirements by 44% and uses 15% less power when compared with conventional drying systems.



# Cleaning Solutions

## Proven Cleaning Performance



### AQUASTORM® SERIES

The Electrovert Aquastorm is a versatile, high-performance cleaning system designed to optimize the PCB cleaning process while minimizing overall cost. It features the most advanced cleaning technologies in an energy-efficient design. Both the Aquastorm 100 and 200 are ideally suited to RMA and no-clean de-flux applications that require chemistry, as well as removal of water-soluble organic acid flux. It is also available in Stainless Steel model.

### AQUASTORM® FSM (FREE STANDING MODULE)

Aquastorm FSM is a free standing additional wash section that can be added to any existing in-line cleaning process. It is available for a 'straight DI' or 'chemical wash with chemical isolation' processes.



## Lead-Free Process Ready



### AQUASTORM® 50

Aquastorm 50 batch cleaner utilizes technologies as the same advanced cleaning technologies found in the Aquastorm in-line cleaners in a batch footprint.

### AQUASTORM® 60

Aquastorm 60 in-line cleaning system is ideal for PCB, semiconductor, and industrial cleaning type applications in which the manufacturing volume has outgrown the capability of a batch type cleaner and/or lack the floor space requirements of a typical in-line cleaner. For straight DI aqueous cleaning applications the total length is 6'9" (2103 mm) and for chemistry based applications the total length is 9'3" (2844 mm).

### MICROCEL™ CENTRIFUGAL CLEANING SYSTEM

MicroCel uses centrifugal energy for high-performance, complete cleaning of electronic circuit assemblies, precision parts, medical devices, wafers, and advanced packages including flip chips, MCMs, SIPs, BGAs, CSPs, and hybrid electronics.

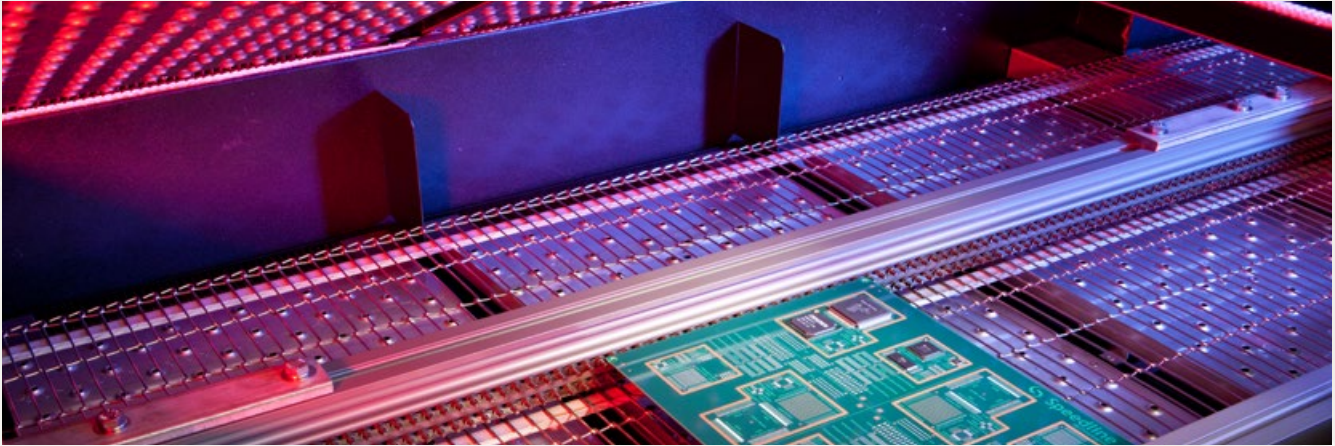


### INDUSTRIAL CLEANING

The process flexibility and reliability of the Aquastorm has proven to be valuable in a variety of applications including: parts cleaning, precision medical washing, renew/rework, pallet/fixture cleaning, debris removal, surface preparation, electronics and semiconductor, lens cleaning.

# Electrovert

The Electrovert® Omni series reflow soldering system offers a combination of industry proven technologies in an easy to use, reliable and efficient reflow system for high-end production requirements. From lead-free to hybrid processing, OmniMax ovens deliver high performance thermal processing. The OmniMax sets the standard for lowering power and nitrogen consumption rates.



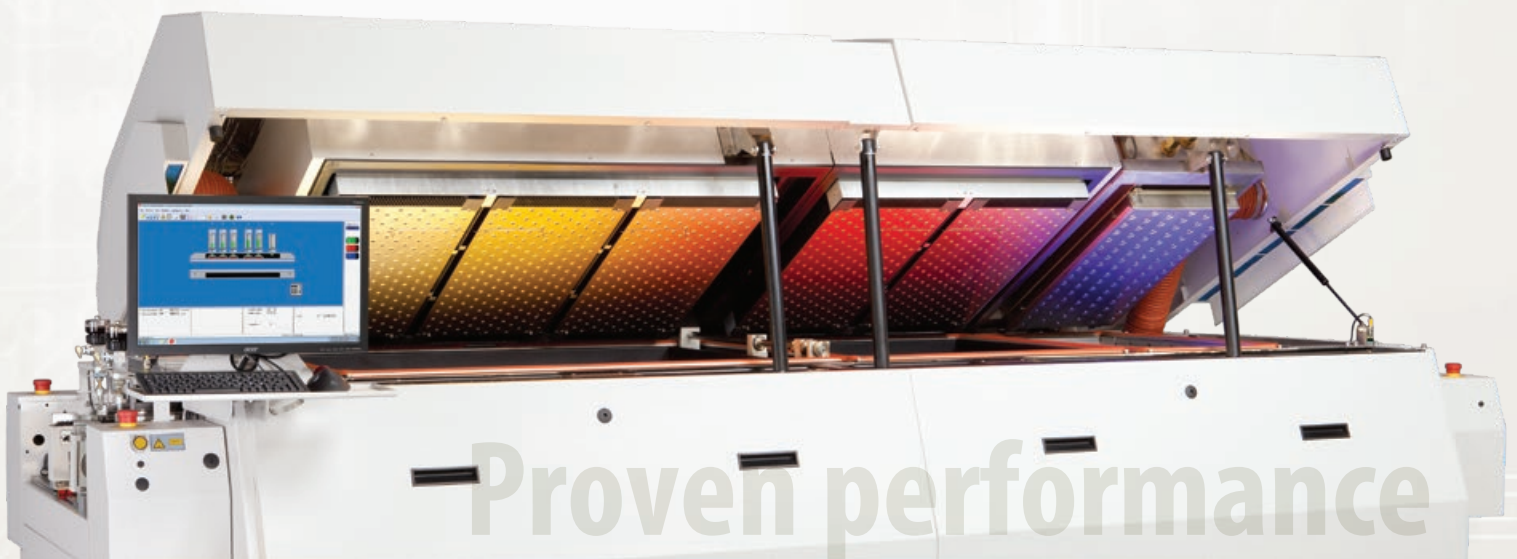
**Designed to deliver maximum thermal performance combined with exceptional process capability and control.**

## **INNOVATIVE COOLING TECHNOLOGY**

The air flow dynamics within the OmniMax/ES cooling zones are efficiently controlled for a balanced environment that can reduce nitrogen consumption up to 20-25%. The design includes a patented driplless cooling module that significantly reduces the potential for flux dripping in the cooling area. Strict separation between the heating and cooling areas produces a tight control of time-above-liquidus.

## **ADVANCED HEATING CHAMBER**

The OmniMax and OmniES incorporate the patented IsoThermal™ Chamber Technology (ICT). This is an advanced, efficient heating chamber design that provides maximum thermal performance. Electrovert's innovative approach delivers highly efficient heat transfer throughout the entire process and product. Consistent thermal performance of the ICT promotes excellent zone separation, minimizes cross board  $\Delta T$ 's and allows for better control of time above liquidus.





# Reflow Solutions

## World class results



### **OMNI**MAX** 7, 10, AND 13 ZONE REFLOW SOLDERING**

The OmniMax offers precision IsoThermal convection for demanding thermal profile requirements and is ideal for applications that require more precise control of convection dynamics within each zone. The OmniMax has independent speed and temperature control between top and bottom within each individual zone as standard.

### **MAINTENANCE REDUCTION TECHNOLOGIES**

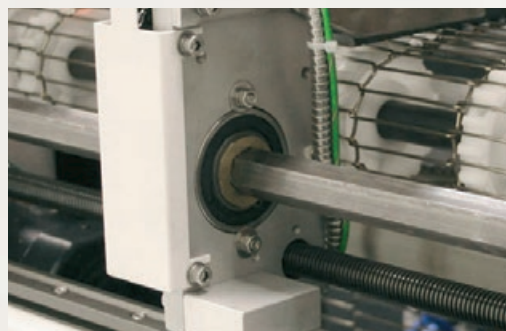
- Patented dripless cooling design extends maintenance in the cooling section and is easy to clean
- Intelligent Flux Control (IFC) system allows for full maintenance during production and can self-clean
- Full accessibility to all major assemblies through removable panels (front and back)

### **VERSATILE CONVEYOR SYSTEM**

A full range of conveyor features offer complete product and process flexibility supporting production throughput requirements. The range of features includes mesh belt conveyor, pin chain conveyor, and pin and mesh combinations. The precision center board support is synchronized with the pin chain and includes computer-controlled width positioning. It is auto-height retractable, and includes park features.

### **OMNI**ES** 5, 7, 10, AND 13 ZONE REFLOW SOLDERING AND CURING**

The OmniES offers a combination of innovation and industry-proven technologies in an easy-to-use, reliable oven for reflow soldering and curing applications. The OmniES includes independent blower control as standard. The OmniES series are available in hybrid or full convection models (full convection is field upgradeable). Through energy saving designs, the OmniES models are ideal for the majority of reflow applications. The OmniES delivers excellent thermal performance at the lowest cost of ownership.



# Manufacturing and Design Locations and Application Lab Facilities

## Lakeville, MN, USA

- ◆ Worldwide headquarters
- ◆ Despatch thermal processing R&D, prototyping, specials and manufacturing

## Hopkinton, MA, USA

- ◆ R&D, prototyping, specials
- ◆ Applications/demo Lab
- ◆ Dispenser and Printer R&D, Applications and Engineering located on-site.
- ◆ Full SMT lab demo capability
- ◆ All options for dispensers and screen printers are available on-site for application development
- ◆ Optical inspection and digital metrology

## Camdenton, MO, USA

- ◆ Electrovert R&D, prototyping, specials and manufacturing
- ◆ Applications/demo lab
- ◆ ISO-9001-2015 certified
- ◆ Electrovert R&D and supply chain management
- ◆ Software development and testing
- ◆ Every model of Wave, Reflow, and Cleaning system in lab and available for testing
- ◆ Product dedicated Application engineers to assist in process development and optimization
- ◆ Capability to test any solder alloy or paste
- ◆ Full semi-aqueous and DI water cleaning testing
- ◆ 600x digital microscope with camera
- ◆ X-ray analysis capability

## Oosterhout, Netherlands

- ◆ Vitronics Soltec R&D, prototyping, specials
- ◆ Applications/demo Lab
- ◆ Soldering solutions R&D
- ◆ Fully equipped demo facility with reflow, wave and selective machines.
- ◆ Various alloys E.g SAC305, SN100 available
- ◆ IPC certified application engineers located at factory to assist in process development and optimization
- ◆ Design Of Experiments to optimize process
- ◆ General and on demand, equipment training
- ◆ IPC certification training possibilities
- ◆ Technical seminars

## Suzhou, China

- ◆ MPM, Camalot, Vitronics Soltec and Despatch Manufacturing
- ◆ R&D and sustaining engineering
- ◆ Applications/demo lab
- ◆ ISO 9001 certified

## Singapore

- ◆ Dispenser and Printer Applications/demo lab

## Global Support

- ◆ Over 200 field service and application support technicians located around the world
- ◆ Spare parts locations around the world for faster response to your needs
- ◆ Demo and training facilities available worldwide