

# PV-360 Photovoltaic Coating System

## *In-line Thermal Diffusion and Selective Emitter Laser Doping Process*

The PV-360 is a high-volume coating system for crystalline solar cell manufacturing applications. The PV-360 processes up to 4,300 wafers per hour, leveraging USI's proprietary nozzle-less ultrasonic spray head technology to apply a thin, uniform layer of dopant. *Ultra-Spray®* technology provides a superior coating deposition compared to other technologies.

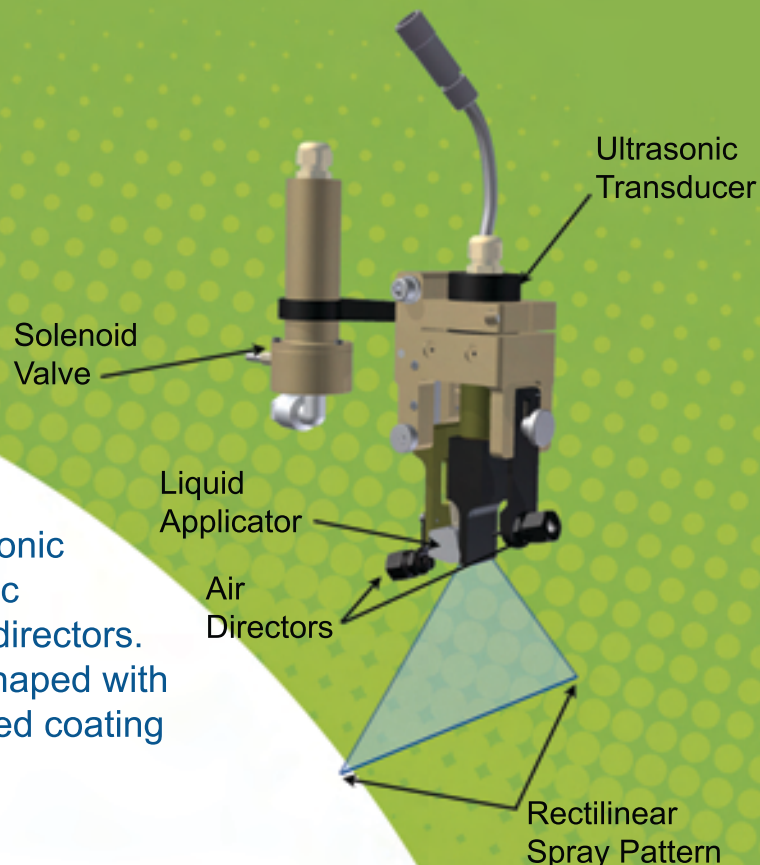
### Features

- Proprietary ultrasonic spray technology
- Aqueous & solvent based dopants
- Non-contact coating deposition
- Up to 95% transfer efficiency
- Integrates with any diffusion furnace
- Water-based conveyor cleaning system
- Automatic spray head cleaning system
- Closed-loop metering pump liquid delivery
- 5 lanes for 156 mm wafers
- 6 lanes for 125 mm wafers
- Optional double sided coating capability



# Nozzle-less Ultrasonic Spray Head Technology

USI's core technology consists of proprietary nozzle-less ultrasonic spray head technology for the thin, uniform application of a variety of low viscosity materials. The spray head consists of an ultrasonic transducer with a spray-forming tip, an ultrasonic generator, an external liquid applicator, and air directors. Spray is produced with ultrasonic energy and shaped with low pressure air for a more precise and controlled coating application.



## PV360 Coating System Specifications

|                      |  |
|----------------------|--|
| Coating Technology   | <b>Ultra-Spray Blade Head</b> <ul style="list-style-type: none"> <li>- Ultrasonic frequency - 45 kHz</li> <li>- Ultrasonic generator</li> <li>- Electronic controls for liquid flow</li> <li>- Electronic controls for air flow</li> <li>- Spray width up to 215 mm (8.5 inches)</li> <li>- Flow rate range 10 to 30 ml/min</li> </ul> |
| Liquid Delivery      | <b>PMP-200 Precision Metering Pump</b> <ul style="list-style-type: none"> <li>- Dual 100 ml capacity metering pumps</li> <li>- Automatic pump refill for continuous operation</li> <li>- Servo motor drive</li> </ul>  |
| Conveyor             | <ul style="list-style-type: none"> <li>- Continuous mesh belt</li> <li>- Teflon coated Kevlar construction</li> <li>- Water-based cleaning system</li> <li>- IR drying system</li> <li>- Conveyor speed: up to 1.8 m/min (6 ft/min)</li> </ul>   |
| Process Width        | 914 mm (36 in)   |
| Head Speed           | <ul style="list-style-type: none"> <li>- Spray stroke: up to 1,500 mm/sec (79 in/sec)</li> <li>- Return stroke: up to 1,500 mm/sec (79 in/sec)</li> </ul>  |
| Traversing Mechanism | <ul style="list-style-type: none"> <li>- Servo motor/gear box</li> <li>- Synchronous belt drive actuator</li> </ul>  |
| Wafer Dryer          | IR wafer drying system   |

|                        |  |
|------------------------|--|
| Process                | <b>Spray Stroke</b> <ul style="list-style-type: none"> <li>- Head moves from home to conveyor width</li> <li>- Spray is activated</li> </ul> <b>Return Stroke</b> <ul style="list-style-type: none"> <li>- Head returns home</li> <li>- Spray is not activated</li> </ul> <b>Home Position</b> <ul style="list-style-type: none"> <li>- Head stays at home until conveyor travels distance equal to spray pattern width; up to 215 mm (78.5 in)</li> </ul> |
| Control System         | <ul style="list-style-type: none"> <li>- Single Programmable Automation Controller (PAC)</li> <li>- Touch Panel Graphical User Interface (GUI)</li> <li>- Menus for process setup and recipe call up</li> </ul>  |
| Footprint              | 2,390 x 1,880 x 2,007 mm (94.1 x 74 x 79 in)   |
| Weight                 | 1,135 kg (2,500 lbs)   |
| DI Water Supply        | 19 LPM (5 GPM) @0.7 bar (10 psi)   |
| Power Requirements     | <ul style="list-style-type: none"> <li>- 480 VAC, 3-phase, 35 Amps (USA)</li> <li>- 380 VAC, 3-phase, 35 Amps (Europe/Asia)</li> </ul>   |
| Pneumatic Requirements | <ul style="list-style-type: none"> <li>- Clean, dry compresses air at 5.5 bar (80 psi) @ 566 l/min (20 SCFM)</li> <li>- Compressed nitrogen at 5.5 bar (80 psi) @ 283 l/min (10 SCFM)</li> <li>- 8,500 l/min (300 SCFM) exhaust in a 167 mm (6.6 in) duct</li> </ul>   |