



SOLAR PHOTOVOLTAIC INDUSTRY

CRYSTALLINE PV LOAD / UNLOAD AUTOMATION

As line throughput has continued to increase, the load and unload requirements for PV process and inspection tools have become more stringent. Higher throughputs require greater capacity and faster cycle-time, yet increasing yield targets demand gentler handling. Automation standards vary depending on the end factory which requires tools to be configurable to meet the material handling methodology.

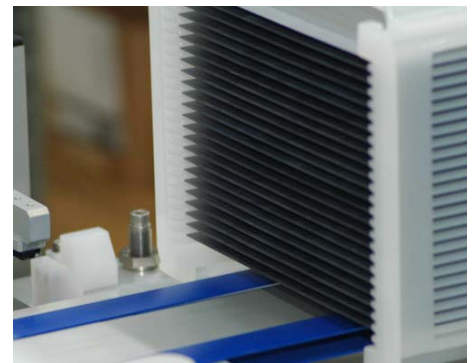
Load / Unload Configurations

Owens has developed customizable solutions for load / unload into

carriers, cassettes, and conveyors. Our cassette load/unload module includes fully automated cassette handling and buffering. Coin stack carriers are supported for both input / output configurations. We also have solutions for pick and place of cells from conveyors to bins/carriers using both delta robots and custom mechanisms.

Robust Handling

All of our solutions are designed with high yield, low breakage, robust handling methodologies. Owens will fully integrate the automation modules with your tool including any electro-mechanical and software customization. We will work closely with your team to identify the ideal automation solution for your specific application and requirements.

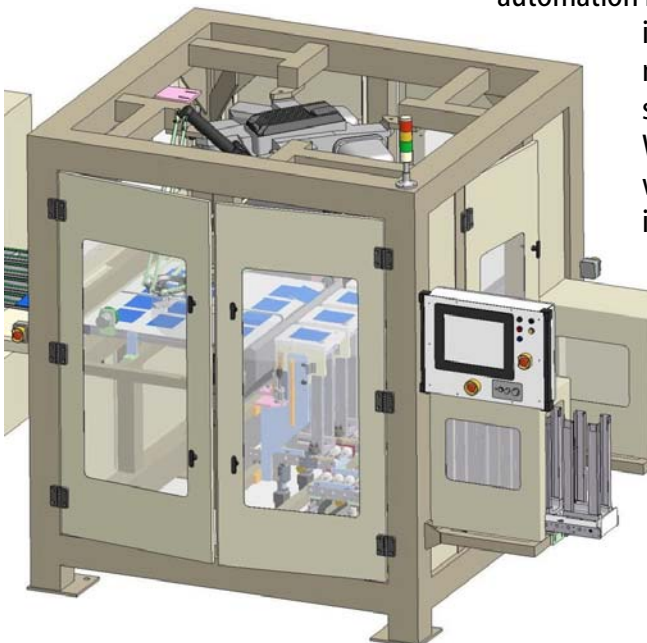


Cassette Input for Load Module

Owens' Solutions

Owens has built an outstanding reputation for the collaborative development of complex, production ready advanced technology equipment over our 25 year history.

Our in-depth experience providing robust, high speed automation solutions for the solar industry can help make your next technology introduction a greater success.



*High Speed
Conveyor to Carrier
Unload Module*



CRYSTALLINE PV LOAD / UNLOAD AUTOMATION (CONT'D)

Wafer and Cell Handling

- Cell dimensions: 125 x 125 and 156 x 156 mm
- Typical cell thicknesses: 150 to 300 um
- Throughput: Up to 3600 cells / hour
- Cell Breakage: less than 0.2%

Input / Output Configurations

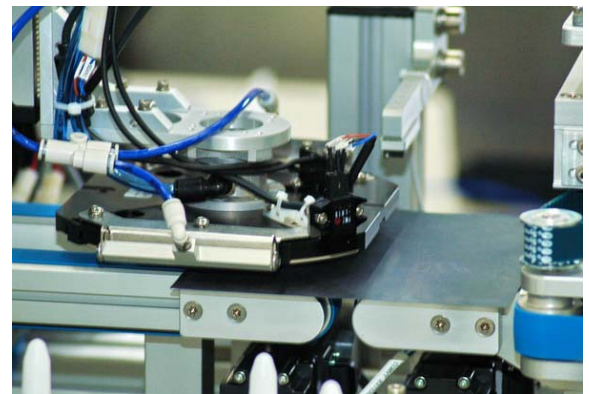
- Cassette: Standard or Custom
- Coin Stack: 3 wide input; 6 to 18 bin output
- Conveyor to Cassette or Coin Stack
- RFID and Carrier ID Supported

Factory Integration

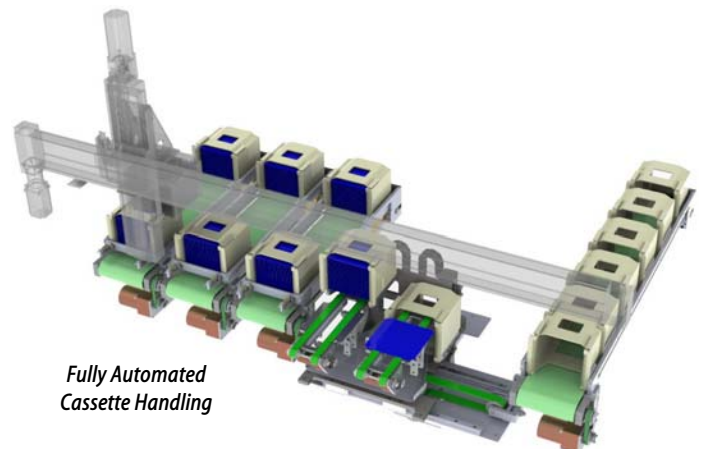
- Safety and Regulatory: NFPA, UL, CE, Local Jurisdiction
- Ergonomic Guidelines
- Standard communication to factory control software
- Standard User Interface and Recipe Management



*Input Load Module Options Support
Cassette or Coin Stack Loading*



Conveyor Pick from High Speed Conveyor



*Fully Automated
Cassette Handling*