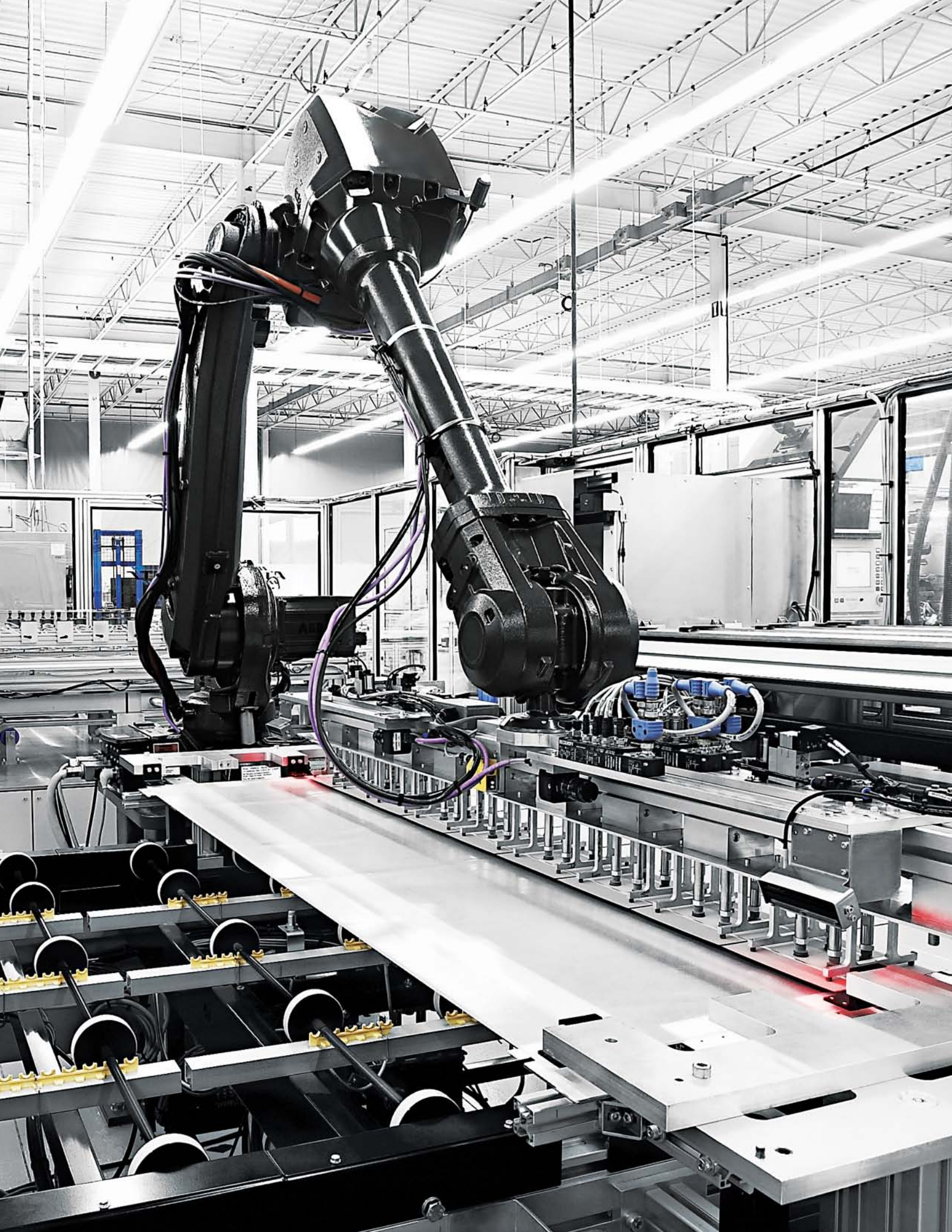




SOLAR MODULES

Turnkey Automation



Why ATS?

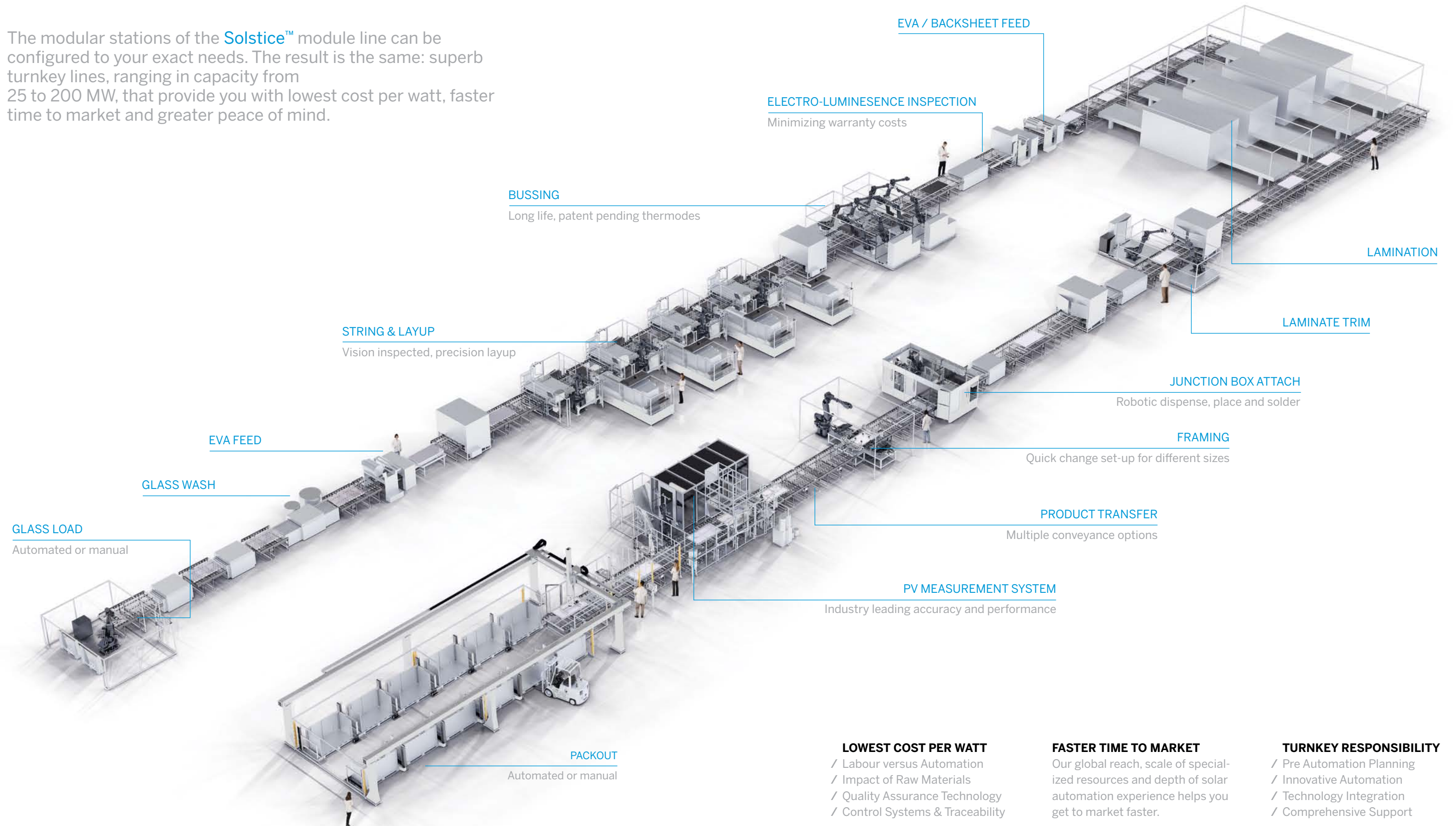
- / Decades of solar experience
- / Over 30 years in automation
- / Global presence and scale

The Result?

- / Lowest cost per watt
- / Faster time to market
- / Tailored to your needs

The Power of Modular Thinking

The modular stations of the **Solstice™** module line can be configured to your exact needs. The result is the same: superb turnkey lines, ranging in capacity from 25 to 200 MW, that provide you with lowest cost per watt, faster time to market and greater peace of mind.



LOWEST COST PER WATT
 / Labour versus Automation
 / Impact of Raw Materials
 / Quality Assurance Technology
 / Control Systems & Traceability

FASTER TIME TO MARKET
 Our global reach, scale of specialized resources and depth of solar automation experience helps you get to market faster.

TURNKEY RESPONSIBILITY
 / Pre Automation Planning
 / Innovative Automation
 / Technology Integration
 / Comprehensive Support

Sharpen your competitive edge with ATS

20 global locations. 15,000 automation projects. 2,400 employees. 1 trusted partner: ATS
Learn more at www.atsautomation.com/solar

Solar automation solutions



Cell Automation

Module Automation

Custom Automation

ATS strengths at work for you



PRE AUTOMATION SERVICES

AUTOMATION SERVICES

POST AUTOMATION SERVICES

CONTRACT EQUIPMENT MANUFACTURING

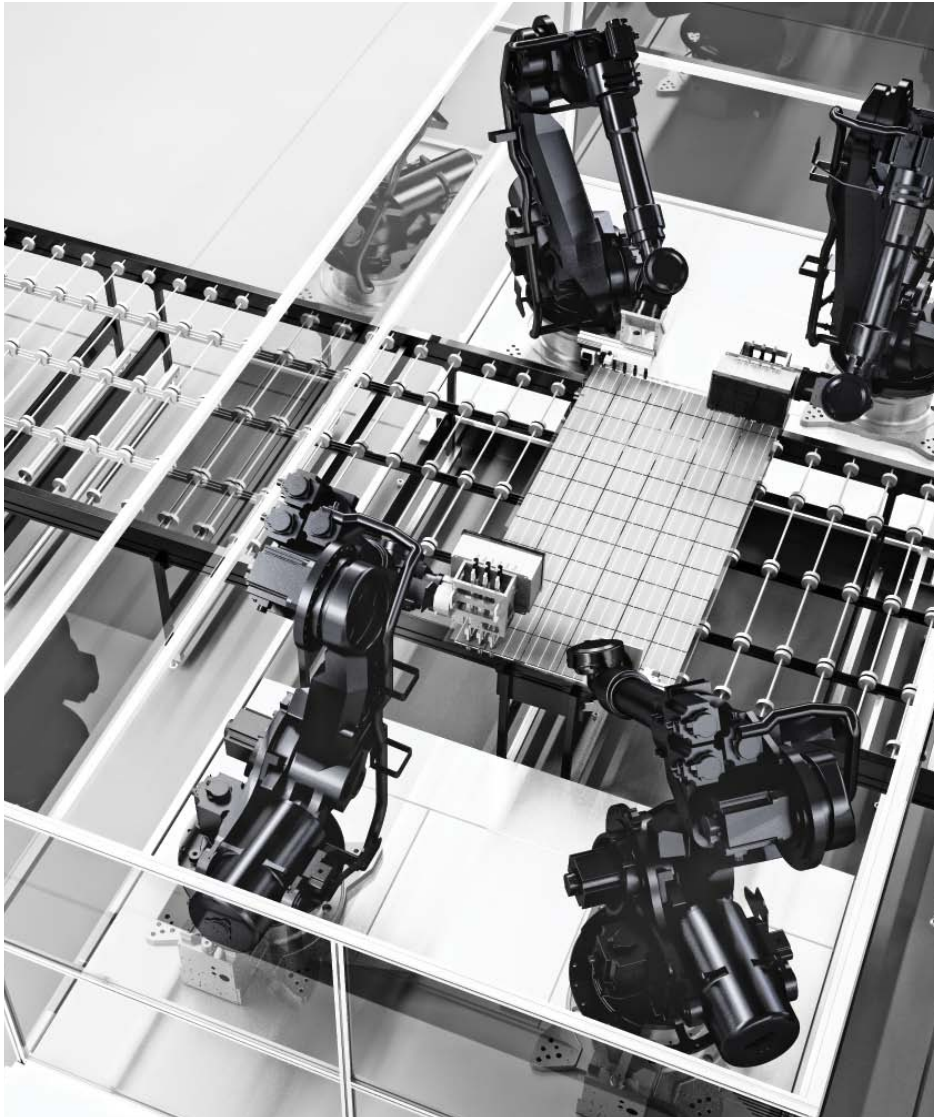
Turnkey



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AUTO BUSSING



/// Quality bussing increases line yield and improves module longevity. The ATS Solstice™ Auto Bussing station delivers reliable performance and quality modules, while lowering your operating costs through our long lasting thermode design.

Features Include

- / Long life, patent pending thermodes
- / Automatic thermode dressing
- / Lift and bypass for multi station work balancing
- / Robotically placed bus material
- / Auto bussing on glass
- / Strings up to 12 cells / 2 m long

Performance

- / 90 seconds per 6 string module

Optional

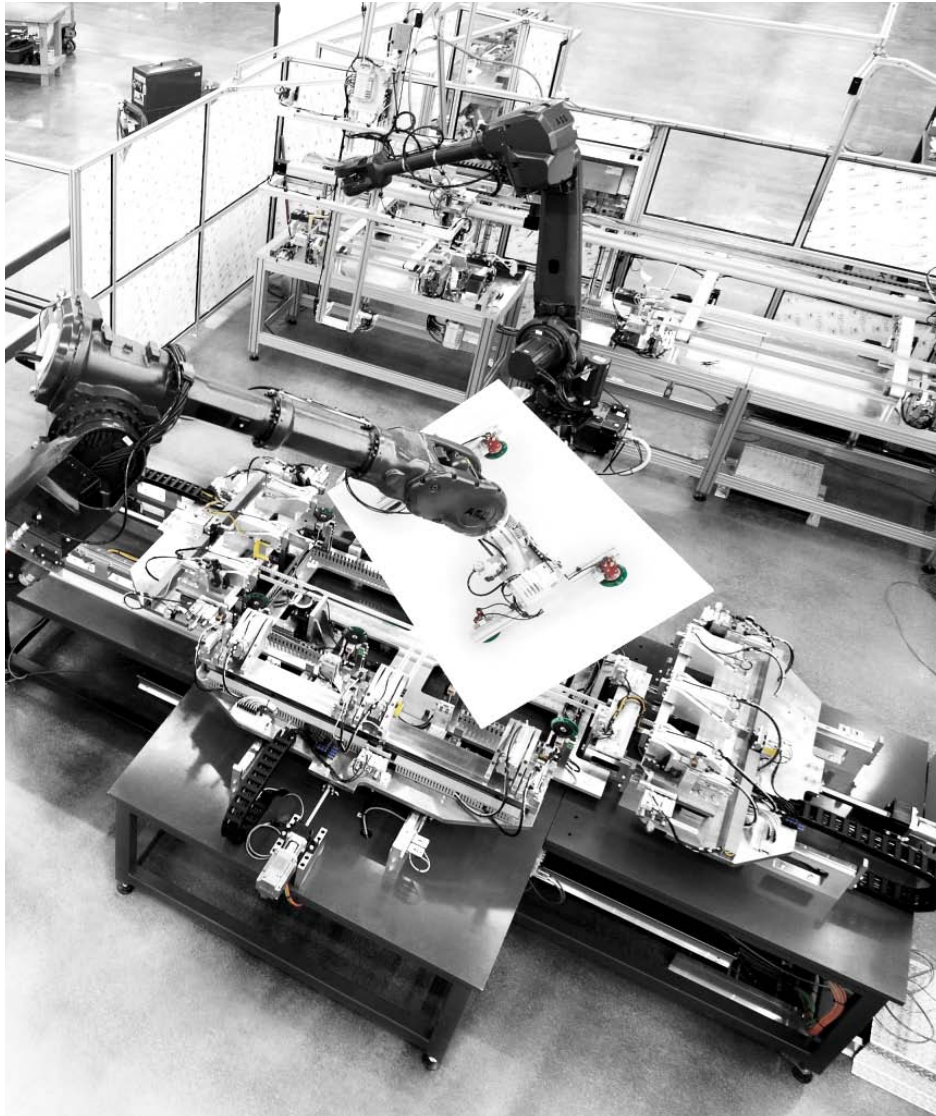
- / Auto bussing off-glass
- / Laser re-flow



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AUTO FRAMING



/// Framing provides the foundation for module mounting in the field. The ATS Solstice™ Auto Framing station is a robust solution with quick change set-up providing flexibility to manage different module sizes.

Features Include

- / Module width from 934 mm to 1064 mm
- / Module length from 1594 mm to 2030 mm
- / Quick change set-up for different sizes
- / Semi-automated frame key press, 6.6 kN force
- / Manually loaded frame infeed conveyors
- / Robotic load of framing station
- / Silicone dispensing
- / Auto glass flattening
- / Servo frame press with overload sensing
- / Soft touch module to conveyor unload

Performance

- / 55 seconds per module

Optional

- / 2 part silicone dispensing
- / Frame crimping



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PV MEASUREMENT SYSTEM



/// Maximized revenue generation comes from accurately rated modules. The ATS Solstice™ PV Measurement System helps achieve this by using an optimized combination of light source, instrumentation, and intelligent software, with testing at the cell or module level.

Features Include

- / IV Curve and Wp power rating
- / Closed loop compensation using reference cell calibrated to NREL standards
- / 18 bit data acquisition
- / Continuity testing (includes string/J-box connectivity and frame continuity)
- / Hi-Pot testing at 5,000 V with μ A current leak detection to verify safe isolation
- / Light source flexibility to suit a variety of applications
- / Module testing configured vertically or horizontally

Performance

- / +/- 1% accuracy*
- / Up to 1000 IV curve data points

Configurable software to pinpoint module rating, including:

- / Light source intensity compensation
- / Non linear load ramp to maximize data capture points at peak power
- / Curve fitting to optimize measurement repeatability
- / Temperature compensation
- / Dark IV Curve



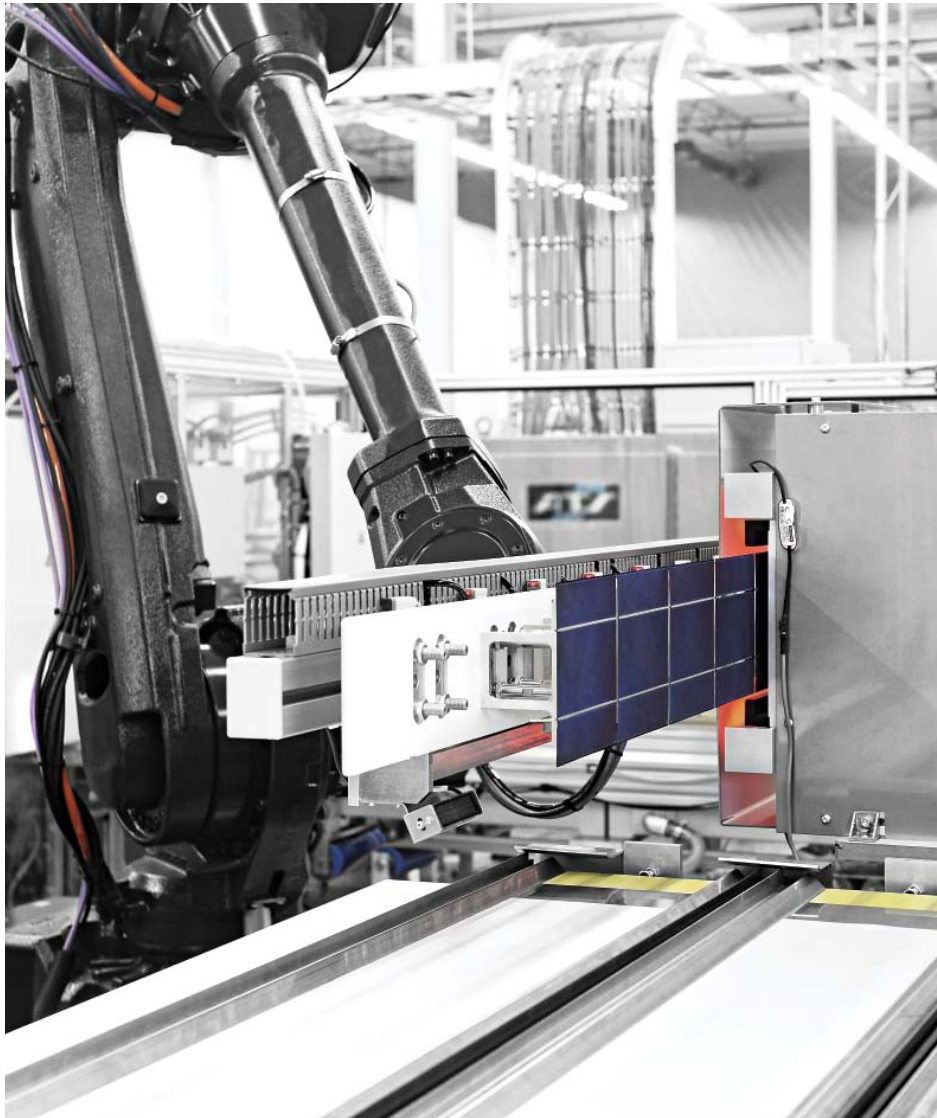
* Repeatability and accuracy contingent on numerous factors. ATS will review each customer's application and commit to capability accordingly.



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STRING & LAYUP



/// Producing high quality modules requires precision handling and placement of cells and strings; combined with in process inspections, the ATS Solstice™ String & Layup station uses industry standard stringers coupled with our virtually break-free layup to produce best-in-class modules.

Features Include

- / Inbound cell inspection for chips and cracks
- / Handles cells as thin as 140 μm
- / Strings up to 12 cells / 2 m long
- / Soft touch robot string handling
- / Tab preparation for bussing
- / SmartVision™ string inspection for ribbon placement, cell pitch, chips and cracks
- / Negligible layup breakage

Performance

- / 1200 cells per hour
- / String inspection repeatability of $\pm 0.038 \text{ mm}^*$
- / Vision guided string placement accuracy of $\pm 0.4 \text{ mm}^*$

Optional

- / Electro-luminescence (EL) inspections
- / Micro crack inspection
- / Incoming cell inspection
- / Layup rates greater than 1200 cells per hour
- / Customer preferred stringers
- / Off-glass module layup

* Repeatability and accuracy contingent on numerous factors. ATS will review each customer's application and commit to capability accordingly.



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