

# Battery Assembly Equipment 2026

The Spec & RFQ Guide for Cell, Module and PACK Assembly Lines — NEGUP MACHINE

## What battery assembly equipment covers

**Battery assembly equipment** spans two floors of the factory. Upstream, cell-assembly machines build the cell: winding for cylindrical cells, notching and stacking for prismatic and pouch, then filling and formation. Downstream, module and PACK equipment takes finished cells through sorting and grading, stack handling, polarity check, busbar laser welding, fastening, EOL electrical test and pack aging before shipment. Fully automatic lines already carry **75.1% of the 2025 module and PACK equipment market**, and a mid-speed 10–20 PPM square-module line prices at roughly **USD 7–14 million**. Buy the line as one chain: sorting accuracy feeds weld quality, weld quality feeds EOL yield, and grading plus aging decide what reaches the customer.

**Table 1 — The 2026 assembly equipment market in numbers**

| Global module & PACK equipment market, 2025    | USD 6.45 billion                             | PW Consulting, 2026             |
|------------------------------------------------|----------------------------------------------|---------------------------------|
| Forecast to 2032                               | USD 14.44 billion, 12.2% CAGR                | PW Consulting, 2026             |
| Fully automatic lines, 2025 share              | 75.1% of value; EV 75.8% of demand           | PW Consulting, 2026             |
| Regional 2025: APAC / Europe / North America   | USD 4.22B / 1.09B / 838.6M                   | PW Consulting, 2026             |
| Mid-stage cell-assembly equipment, 2025 → 2030 | RMB 21.5B → 64.6B, 24.6% CAGR                | Frost & Sullivan via HKEX, 2026 |
| Notching & stacking machines, 2025 → 2030      | RMB 7.3B → 29.0B, 31.8% CAGR                 | Frost & Sullivan via HKEX, 2026 |
| Winding machines, 2025 → 2032                  | USD 1.42B → 2.74B, 9.85% CAGR                | PW Consulting, 2026             |
| Cell stacking systems, 2025 → 2032             | USD 765.8M → 2,059M, 15.2% CAGR              | PW Consulting, 2026             |
| Square-module line pricing, 2026               | 10–20 PPM: USD 7–14M; high-speed: USD 21–42M | IndexBox, 2026                  |
| Line cost structure                            | Laser 15–25%, robots 20–30%, vision 10–15%   | IndexBox, 2026                  |

Automation is the default (75.1% fully automatic), and stacking is the fastest-growing category at a 31.8% CAGR as large-format prismatic and pouch designs displace winding.

**Table 2 — Line specs by cell format (real cells)**

| Cell intake & sorting | High-rate bin sorting $\pm 5$ mV / $\pm 10$ m $\Omega$ | Grade batching by capacity & IR         | Grade batching; thickness screening |
|-----------------------|--------------------------------------------------------|-----------------------------------------|-------------------------------------|
| Core assembly motion  | Series grouping, fixture pressing                      | Robotic stacking & box loading          | Vacuum gripping, Z-fold stacks      |
| Joining method        | Multispot laser / resistance weld                      | Busbar laser weld + screw torque        | Ultrasonic weld + flexible busbar   |
| Typical module takt   | 10–20 PPM pack-level                                   | 10–12 PPM line-level                    | 6–10 PPM line-level                 |
| Weld acceptance       | Shear $\geq$ host spec; spatter-free                   | Penetration 0.8–1.2 mm; Cpk $\geq 1.33$ | Weld strength $\geq$ foil-tear mode |
| EOL gate              | IR, voltage, hipot on every module                     | IR, voltage, hipot, EOL capacity        | IR, voltage, leak & swell check     |
| Downstream proof      | Pack aging 24–72 h                                     | Pack aging 48–72 h                      | Pack aging 24–48 h                  |

Winding remains dominant for cylindrical cells (49.8% of the 2025 winding market); stacking wins for large-format prismatic and pouch on energy density and cycle life.

**Table 3 — Assembly-line acceptance criteria for the RFQ**

| Committed takt    | PPM at your module spec, not demo cells; OEE ≥85%                   | full line                                        |
|-------------------|---------------------------------------------------------------------|--------------------------------------------------|
| Weld quality      | Shear strength to spec; penetration window; spatter-free; Cpk ≥1.33 | destructive sample per shift + inline monitoring |
| Cell handling     | ≤50 µm placement accuracy; zero cell damage in 10,000-cycle test    | stacking & handling stations                     |
| Sorting accuracy  | ±5 mV / ±10 mΩ grading repeatability; mis-sort <10 ppm              | cell intake                                      |
| EOL test coverage | IR, OCV, hipot, weld-check on 100% of modules                       | EOL gate                                         |
| Data traceability | Per-module genealogy to MES / OPC UA; batch recall ≤1 module        | system-level                                     |
| Line yield        | ≥98% first-pass yield documented on your cells                      | acceptance run                                   |
| Acceptance        | Trials on your cells and fixtures; documented yield and Cpk         | condition of payment                             |

## Winding, stacking, welding: the 2026 technology split

**Winding** stays dominant for cylindrical cells and grows at 9.85% CAGR to 2032 on cylindrical demand.

**Stacking** wins large prismatic and pouch formats: modern systems stack a layer in under one second at alignment tolerances below 50 µm, compounding at 31.8% CAGR to 2030.

**Joining:** busbar laser welding for high-volume automotive packs, screw fastening where serviceability matters, ultrasonic bonding for thin foils and flexible interconnects. Note: China's export controls effective November 8, 2025 now require licences for battery manufacturing equipment exports — confirm delivery terms in writing.

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NEGUP MACHINE supplies the equipment chain end to end: the **NG-002 prismatic assembly line** and **NG-003 assembly line** for stacked-cell handling, polarity check and busbar laser welding, the **NG-007 EOL test system** and **NG-008 comprehensive tester** for the electrical gates, and the **NG-013 cell grading machine** and **NG-014 pack aging machine** that sort and activate what the line produces. Tell us your chemistry, format and target takt, and we will size the line to the process rather than to a datasheet.

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