

Automated Battery Module & PACK Assembly Lines 2026

The 2026 equipment market · the three-section station architecture · throughput & capex benchmarks · the buyer's RFQ spec sheet — NEGUP MACHINE

Why the line is the product

A battery pack is only as good as the line that built it. Cell grade and chemistry set the ceiling, but the assembly line decides whether that ceiling is reached on every unit or lost to a misaligned module, a cold weld or a missing torque value. In 2026 the buyers winning on warranty and yield specify the line — station by station — before the building is finished. Automated module and PACK assembly lines are now one of the fastest-growing corners of battery equipment spending.

Table 1 — 2026 battery module / PACK line equipment market

Worldwide module PACK line market, 2025	USD 8.82 billion	PW Consulting / PMR, 2026
Worldwide module PACK line market, 2032F	USD 25.49B, 16.37% CAGR	PW Consulting / PMR, 2026
Asia-Pacific share, 2025	USD 5.16 billion (largest)	PW Consulting / PMR, 2026
Fully-automatic line segment, 2025	USD 6.60 billion	PW Consulting / PMR, 2026
Battery pack assembly line market, 2025	USD 8.4 billion	Dataintelo, 2026
Battery pack assembly line, 2034F	USD 22.6B, 11.6% CAGR	Dataintelo, 2026
Lithium-ion share, 2025	67.3% (~USD 5.7B)	Dataintelo, 2026
Square (prismatic) fully-auto subset, 2025	USD 1.02B → 1.62B (2032)	360iResearch, Sep 2026

Automation, not manual benches, is where the money goes: the fully-automatic segment is already the majority of the market.

Table 2 — Throughput, quality and capex by application

Utility-scale ESS (prismatic 314–587 Ah)	12–22 PPM (Lead 587Ah 22 PPM)	≥99% first-pass	~USD 1.5–3.5M per GWh
C&I / residential ESS	8–15 PPM; 0.5–2 GWh/yr	first-pass ≥98%, final ≥99.5%	modular; changeover ≤4 h
EV gigafactory pack	thousands cells/h; 4–6 PACK/h per GWh	70–80% OEE first 6 mo	USD 50–150M/line; 15–25% capex
Automation level	fully-auto <0.5 ppm defects	semi-auto suits 1–10 GWh	semi-auto = value balance

Table 3 — Acceptance criteria to write into the RFQ

Cell handling & polarity	AI polarity detection + 6-axis robotic pick; 5 cells/grip	100% at infeed
Welding (busbar / tab)	Laser yield ≥99.5%; up to 6 kW; clean + scar inspect	inline, every joint
Module compression	10–1,500 kgf; travel logged	per module
First-pass / final yield	≥98% first-pass; ≥99.5% final	per line, per shift

EOL electrical gate	insulation R, dielectric (IEC 62619), BMS comm, ACIR, no-load V	100% of packs
Traceability	per-cell/module/PACK barcode → MES	every unit
Changeover & OEE	changeover ≤4 h; OEE ≥85%	line KPI
Standards	UN R100, IEC 62619, EU 2023/1542, CE 2006/42/EC, IEC 60825-1	design & export

The station architecture

A production-ready line runs three sequential sections. **Cell sorting**: forklift load, six-axis robotic handling (5 cells/grip), barcode scan, OCV test with OK/NG sortation, adhesive, end-plate and laser engraving. **Module line**: AI polarity detection, pole cleaning, busbar loading, laser welding, weld-scar inspection, harness install and weld, shell insertion and DCIR check. **PACK assembly**: liquid-cold-plate clean and glue, module scan and box-in, voltage harness routing, BMS install and barcode binding, component and panel fit, EOL test, air-tightness test and gantry offload. Every station writes to MES so a single suspect cell is traceable from reel to shipped pack — the data fabric EU Battery Regulation (EU) 2023/1542 requires from 2027.

NEGUP MACHINE builds module and PACK assembly lines engineered for first-pass yield, throughput that protects margin, and per-unit traceability that survives a regulatory audit — for LFP-dominant, multi-format, standards-heavy energy-storage and EV production. NG-002 prismatic assembly line, NG-003 assembly line, NG-008 comprehensive tester, NG-007 EOL system, NG-013 / NG-014 grading and aging.