

2026 Battery Assembly Line Cost Guide

Price bands, the six cost modules, the payback model and a one-page RFQ checklist — NEGUP MACHINE

1. Price bands by capacity (turnkey, FOB China)

Line class	Annual capacity	Automation	Reference investment
Pilot / R&D line	5-30 MWh/yr	Manual + semi-auto	USD 220,000-750,000
Semi-automatic line	30-120 MWh/yr	Key stations auto	USD 700,000-2,200,000
Mid-scale auto line	120-350 MWh/yr	Full auto + MES	USD 2,300,000-6,800,000
Automotive-grade line	350-800 MWh/yr	Robotic, CTP	USD 7,000,000-18,000,000+
CTP line, 4 PPM	1 GWh/yr/shift	Auto, U-shape	USD 1,200,000-1,800,000

Note: the 4 PPM CTP line at USD 1.2-1.8M per GWh/shift shows why a single “line price” ranges 5x — station count, redundancy, CTP capability, HV test and the traceability layer set the gap, not margin.

2. The six system modules

Module	Share of cost	Price band (USD)
Cell pre-processing & sorting	12-18%	180,000-950,000
Module assembly & welding	30-40%	450,000-6,200,000
Harness, BMS & fastening	10-15%	140,000-2,100,000
End-of-line testing	18-25%	260,000-4,800,000
Vision & traceability	5-10%	90,000-1,400,000
Conveyor, fixtures, MES	8-15%	120,000-2,600,000

3. Five cost drivers

- Cell format: prismatic line 25-40% more than cylindrical at equal throughput.
- Automation depth: full robotic adds 60-120% but operators 6-12 → 2-3 per shift.
- High-voltage class: +12-22% above 800 V automotive grade.
- Traceability & MES: +7-15% for per-pack SN binding and audit evidence.
- Liquid-cooled pack: +8-18% for cooling-plate air-tightness test.

4. Semi-auto vs automatic payback

Metric	Semi-auto	Fully auto
Operators / shift	6-8 (8-12 cyl.)	2-3
Modules / 8h shift	About 180	About 420
Format changeover	About 2 h	15-18 min
Weld yield (1st run)	About 92%	97.5%
OEE after upgrade	About 62%	About 81%
Published payback	12-18 mo	18-36 mo

Rule of thumb: below ~5,000 modules/month, semi-automatic wins on capital; above it, automation pays. A hybrid layout reaches ~85% of automatic output for ~60% of the investment.

5. Cost per GWh benchmark (2026)

Scope	2026 benchmark	Source
Integrated line, cell to pack	USD 35-55M / GWh	IndexBox

LFP-focused line	USD 35-42M / GWh	IndexBox
NMC / high-nickel line	USD 45-55M / GWh	IndexBox
Pack assembly only	USD 1.5-3.5M / GWh	Pack practice
PACK automation market	USD 48.5B, +18.3%	IIM

6. One-page RFQ checklist

- Annual capacity in MWh and packs per shift.
- Automation level and store count per station.
- Three year-one cell formats + two year-three formats.
- Station list with acceptance tests: yield, sorting accuracy, weld pull, HiPot leakage, changeover time.
- Commissioning, training, warranty and spare-parts scope.
- Freight, installation and duty quoted separately.

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