

Battery Cell Sorting Machine 2026

Spec Sheet & RFQ Guide for Cell Sorting and Matching — NEGUP MACHINE

What the gate does

A **battery cell sorting machine** measures every cell before module assembly — open-circuit voltage (OCV), AC internal resistance at 1 kHz, DCIR where required, capacity from the grading step and the K-value self-discharge rate from a rest period — and drops each cell into its grade bin. NEGUP MACHINE builds sorting machines with **5 to 32 grade bins plus a dedicated NG channel**, **0–5 V / 0–200 mΩ** measurement channels, barcode binding and MES export. Sorting is the last gate at which rejecting a cell is still free.

Table 1 — Sorting parameters and group targets

Open-circuit voltage (OCV)	Spread ≤ 5 mV inside one group; ≤ 10 mV at 50% SOC	0–5 V channel, class down to ± 0.1 mV, after 2–4 h rest
AC internal resistance (1 kHz)	Spread ≤ 0.5 mΩ, or $\leq 10\%$ of the group mean	Four-wire Kelvin probe at the terminals or can
DC internal resistance (DCIR)	$\pm 1\%$ to $\pm 5\%$ inside a group at a fixed SOC	Current pulse at 50% SOC, voltage step recorded
Capacity	$\leq 1\%$ of nominal inside one group	Standard full charge and discharge at the grading step
K-value (self-discharge)	≤ 0.04 – 0.05 mV/h absolute; ≤ 0.01 mV/h spread in a group	$K = (V_1 - V_2) / \Delta t$ over a 24–48 h rest at a held temperature
Outlier screen	K above batch mean + 3σ is quarantined, not sorted	Statistical screen in the host software
Appearance and dimensions	100% rejection of swelling, leakage and pole damage	Vision and laser gauge at the infeed

The K-value is the parameter that pays for the machine: a cell with an internal micro-short passes capacity and a single OCV reading.

Accelerated screen: 40–50 °C for 36–48 h; ambient rest: 21–36 days. Both need a temperature hold of about ± 2 °C.

Table 2 — Bin ladders and throughput benchmarks

9-channel cylindrical sorter, 18650–32700	$\geq 5,000$ cells/h (≥ 80 cells/min); 500-cell hopper	Voltage $\pm 0.01\%$ rdg; IR $\pm 0.1\%$ rdg (HIOKI-class meter)	LITH Machine spec, 2026
11-channel cylindrical sorter, 18650/21700	4,000 cells/h	Voltage ± 0.1 mV; IR $\pm 0.5\%$ rdg	CowinLink spec, 2026
10-bin automatic cylindrical sorter, 32700	Up to 4,500 cells/h; $\geq 99.5\%$ sorting accuracy	8 OK + 1 NG bins; under 1 kW; 250 kg	Semco Infratech spec, 2026
5-bin prismatic sorter (4 OK + 1 NG)	450–700 cells/h; 99% yield	0.001 V / 0.1 mΩ; cells 55–270 × 18–60 × 90–225 mm	Semco Infratech spec, 2026
Configurable OCV/IR platform, 8/16/32 bins	Up to 4,000 cells/h	Voltage 0–5 V ± 1 mV; IR 0.1–100 mΩ ± 0.1 mΩ	Higgs Boson Systems spec, 2026
Parallel test architecture on ESS pack lines	2.8 s per cell takt	Voltage accuracy $\pm 0.01\%$	China pack-line practice report, 2026

Read the numbers per cell, not per hour. A 4,000 cell/h head over 16 hours moves about 64,000 cells, roughly 0.3 GWh a year of 21700-class cells. The same head on prismatic cells runs at 450–700 cells/h, but a 314 Ah cell carries about 1 kWh, so one slow machine still matches a multi-gigawatt-hour prismatic line.

Table 3 — Sorting by cell format

Handling	Hopper and belt feed; can dents are the risk	Servo clamp, copper probes on the poles	Vacuum pad or tray; no edge-seal crease
First measurement	OCV and AC IR at the can	OCV and AC IR at the terminals	OCV and AC IR at the tabs
Dominant reject	IR drift and feed damage	K-value outliers and pole damage	Seal wrinkles, tab misalignment, swelling
Practical bin ladder	8–32 bins plus NG	4–10 bins plus NG	5–12 bins plus NG
Rest before sorting	≥24 h at a held temperature	24–48 h, K screened after grading	24–48 h, dimension check first
Cell identity	Barcode or laser-marked code	Matrix code on the case	Code on the pouch or a tray map

Buy the recipe library, not the fixture: a plant sorting cylindrical cells today and planning a prismatic line next year should be able to switch in software plus a probe swap.

RFQ acceptance criteria

Cell envelope: min/max length, width and height per format; whether prismatic and pouch share the machine.

Measurement class: voltage 0–5 V at ± 0.1 mV; IR 0–200 m Ω at ± 0.1 m Ω or $\pm 0.5\%$ rdg; name the reference meter.

Bin ladder: grades needed at your step, a dedicated NG channel, and cells per bin.

Throughput: cells per hour per format at your takt, not the headline figure for the fastest format.

K-value protocol: rest time, temperature hold, accelerated or ambient method, and how K data reaches the machine.

Data and integration: barcode binding, per-cell record, MES/ERP interface, recipe and permission control.

Changeover: minutes to switch format, what has to be exchanged, and whether it is software-only.

Acceptance test: sorting accuracy, false-reject rate, and a trial run on your own cells before final payment.

NEGUP MACHINE supplies the **cell sorting machine** alongside the **NG-013 cell grading machine**, the **NG-014 PACK aging machine**, the **NG-007 EOL test system** and the **NG-008 comprehensive tester**, plus **battery assembly equipment** and **PACK assembly lines**, so the sorting gate, the grading step and the end-of-line gate can be commissioned as one measuring chain. Systems are CE certified through China Inspection and Quarantine and insured with Ping An Property and Casualty Insurance. Tell us your cell format, cells per shift and matching tolerances and we size the measurement class and bin ladder to the process rather than to a datasheet.

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