

PACK Module EOL Test System 2026

Spec Sheet & RFQ Guide for Module and PACK Lines — NEGUP MACHINE

What the gate does

A **PACK module EOL test system** is the end-of-line gate on a module or PACK line. In one scripted sequence it re-reads module voltage and AC internal resistance, verifies BMS communication over **RS485 and CAN**, checks protection-board behaviour and cell pressure difference, and issues a PASS/FAIL verdict bound to the serial number. NEGUP MACHINE builds the module platform at **8–40 independent channels** and the high-voltage PACK platform at **1–8 channels**, at **±0.05% FS + 0.05% RD** accuracy with up to **94%** bidirectional energy feedback.

Table 1 — The channel ladder

Medium-voltage module aging / EOL (BT30V~150V)	8/16/24/32/36/40 CH	Charge 0–150 V, discharge 3–150 V	20 mA–10 A up to 500 A	90%
High-voltage module PACK aging / EOL (BT200V~2000V)	1–8 CH	HF 20–1000 V / LF 100–2000 V	50 mA–1000 A	94%
Power cell aging (BT5V30A~1500A)	8/16/24/32 CH	Charge 0–5 V, discharge 1.5–5 V	20 mA–10 A up to 1500 A	85%
Cell capacity conversion & grading	8/16/24/32 CH	Charge 0–5 V, discharge 1.5–5 V	20 mA–10 A up to 1500 A	85%
Portable PACK analyzer (BP100V20A-2CH)	2 CH	Output 5–100 V, 2–24 S	20 mA–20 A	92%

Channel count follows line rate, not budget. Size channels so that total test time divided by channel count stays below your line takt.

Table 2 — Full SPECS table

Input power	AC 380 V ±10%, 50 Hz	Three-phase industrial supply; 220 V single phase on the portable analyzer
Power factor	≥99%	No reactive-power penalty
Sampling resolution	AD 16 bit	Resolves small voltage steps on a half-charged module
Input impedance	≥0.5 Ω	Keeps the measurement loop stable at high current
AC/DC accuracy	±0.05% FS + 0.05% RD (25 °C ±10 °C)	Station-to-station consistency matters more than absolute accuracy
Set resolution	1 mV / 1 mA	Required for fine SOC and DCIR recipes
Current response time	10 ms (10%–90% FS)	Step changes land inside the recipe window
Current switching time	20 ms	Charge-to-discharge transitions do not overshoot
Communication	TCP/IP host; RS485 and CAN to BMS	The station speaks to both MES and the pack electronics
Protection / cooling	IP20, forced air cooling, independent ducts	Forward airflow then exhaust extends fan life
THDi	≤5%	Harmonic distortion inside plant limits
Fixture form	OT terminal / crocodile clip, same or different mouth; battery probe on cell class	Determines changeover time between variants

Table 3 — The module EOL sequence

1. Identify	Serial and recipe version bound to the batch record	Barcode / RFID to host over TCP/IP
2. Voltage & OCV	Total module voltage and cell-string OCV	16-bit sampling, 1 mV set resolution
3. IR & DCIR	AC internal resistance and DCIR against recipe	Custom point selection on the DCIR map
4. Charge / discharge	Current follows the command across the window	Independent double closed loop per channel
5. Balance & pressure difference	Cell-to-cell voltage spread in the module	BMS sampling over RS485 and CAN
6. Protection behaviour	Over/under-voltage, over-current, thermal trips	Fault injection and DTC read-back
7. Temperature characteristic	Voltage response across the temperature band	Optional external acquisition channels
8. Verdict & export	PASS/FAIL per serial, raw traces retained	Excel / TXT export, configurable permissions

Stage six is what separates a real EOL system from a data logger: tripping a protection threshold on purpose and confirming the BMS reported it needs firmware hooks and a safe fault fixture.

Energy feedback arithmetic

Feedback efficiency is **85%** on power-cell systems, **90%** on medium-voltage module systems, **94%** on high-voltage module PACK systems and **92%** on the portable analyzer. On a plant discharging **10,000 kWh a month** through module aging, a 94% feedback design recovers roughly **9,400 kWh a month** that a resistive-burn design would lose as heat — plus the cooling load it would have added. That recovery, not throughput, is usually what pays back the machine.

RFQ acceptance criteria

Voltage & current window: exact charge and discharge ranges; state whether aging runs on the same channels.

Channel count: channels at your line takt, with the arithmetic shown.

Accuracy class: $\pm 0.05\%$ FS + 0.05% RD at $25\text{ }^{\circ}\text{C} \pm 10\text{ }^{\circ}\text{C}$; AD 16 bit; set resolution 1 mV / 1 mA.

Dynamic performance: current response 10 ms; switching 20 ms; state whether rapid transitions appear in your profile.

Energy feedback: declared feedback efficiency per class; annual kWh recovery at your duty cycle.

BMS interface: RS485 and CAN supported; DBC or protocol document supplied with the machine.

Data & integration: per-serial PASS/FAIL record; export format; TCP/IP host integration documented.

Acceptance: trial run on your own modules with documented first-pass yield and repeatability.

NEGUP MACHINE builds the chain around the gate: the **PACK module EOL comprehensive testing system** and **module PACK aging testing system** as described here, the **power cell aging system** and **cell capacity conversion and grading system** upstream, the **portable battery pack detection analyzer** for field and after-sales work, and the **NG-007 EOL test system** and **NG-008 comprehensive tester** at PACK level. Systems are CE certified through China Inspection and Quarantine and insured with Ping An Property and Casualty Insurance. Tell us your module voltage window, BMS protocol and shift volume and we size the channel count to the process rather than to a datasheet.

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