

USE CASE · BATTERY & POWER ELECTRONICS TEST

Cycle, characterize and verify packs and modules — on the cyclers you already own.

From bench characterization to end-of-line pack test: CC-CV profiles, capacity and balance checks, isolation and contactor verification, with BMS telemetry and cycler data logged side by side and safety limits watching every second.

13

interfaces on one retrofitted pack stand

0

new instruments purchased

280

cell voltages + 56 temps logged at 1 Hz

2

paralleled 650 V cyclers retained

What you're up against

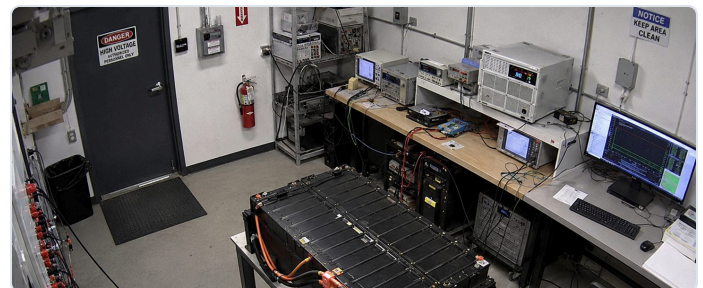
- Cyclers, supplies, loads and the BMS all speak different protocols — SCPI, CAN, serial, Modbus
- Over-voltage, over-temperature and isolation limits must be enforced continuously, not just at step boundaries
- Cell-level data means hundreds of channels per pack
- Legacy sequencers can't add the tests engineering asks for — balance-circuit checks, module screening, serial capture

How the suite handles it

- One workbook drives the cycler over SCPI/TCP, the BMS over CAN and serial, plant I/O over Modbus, sensors over DAQmx
- Safety limits evaluate live signals with delay filtering; a fault aborts the run and alerts by text
- Array variables carry cell voltages and temperatures; waveform displays show them to the operator
- Parallel branches run charge control and BMS monitoring together, with wait-for-all joins
- Every step logs its instrument traffic; EB Playback replays it with the pack camera

A typical sequence

CC-CV charge with parallel BMS monitor		
1	Start CAN	PACK_CAN1 · DBC-defined BMS signals
2	Start Instr.	NHR 9300 cycler · logged
3	Write Inst	NHR 9300: Output on · CC 160 A
4	Start Parallel	Branch BMS_Monitor:
4a	If Any	Max_Cell_V > 4.20 or Max_Cell_T > 55 → Abort
4b	Wait	1 s · Goto 4a
5	If All Once	Pack_V ≥ 87.6 → switch to CV
6	Wait	until Read_I < 5 A (timeout 7200 s)
7	Write Inst	NHR 9300: Output off
8	Wait Parallel	All · log capacity · End



Traction pack under test — the station camera feed EB Playback aligns with the cycler and BMS data

Typical instruments and interfaces

NHR 9300 cyclers**GW Instek / BK Precision / Rigol****BMS over CAN + RS-232****NI-XNET / Vector CAN****cDAQ analog****Modbus I/O**

“Everything above was bought for the price of software.”

Tier-1 automotive supplier, traction pack end-of-line stand: balance-circuit testing, module screening, BMS serial capture and plant traceability added — both cyclers, the BMS and plant I/O retained.