9220 Dual Bay Series
Low Voltage/High Current Cycler

Automated Characterization, Power Cycling, & Life-Cycle Testing of Low Voltage/High Current Batteries

NHR
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Key Features

- Single output up to 40V/3,600A/72kW per system
- Parallel expansion up to 7,200A
- Built-in digital measurements including Ah & kWh
- Multiple safety layers to protect battery/DUT
- SCPI, VXI-11, & LabVIEW control via LAN interface
- NI-Compliant LabVIEW Drivers
- 87% efficiency returning discharge power to facility
- Crane/hoist lifting hangers & robust casters

High Current Battery Testing

The 9220 Dual Bay Series Test System is designed for testing all battery chemistries including lead-acid, lead-cadmium, and other low voltage, high current, large format batteries (LFB) typically used in energy storage systems (ESS). The system is bi-directional requiring no additional equipment to charge or discharge the unit-under-test (UUT). Additionally, the built-in measurement system eliminates external measurement devices by providing time-stamped digital readings for voltage, current, power as well as Ah and kWh.

9220 Dual Bay Test System front panel view

Recycle Discharge Power Back to the Facility

Unlike typical high-current systems which convert battery discharge power into waste heat, the 9220 Dual Bay converts up to 87% of the battery discharge power into usable electrical power that precisely matches the facility's AC line. This process, called regeneration, results in lower operating costs, reduces air-conditioning usage, eliminates expensive water cooling systems, and often provides enough savings to payback the entire system within a few years.
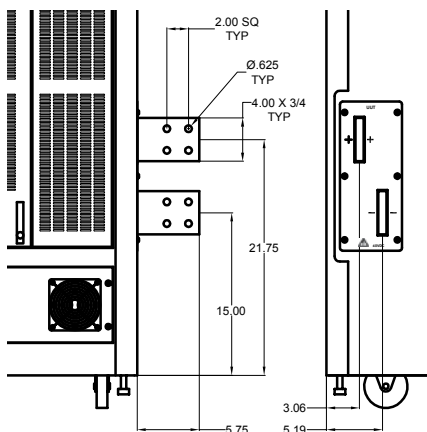
Figure 1 - Caster & output connections

System Cabinet Features for Easy Installation

The 9220 Dual Bay has been designed with vertical lifting hangers at each corner allowing the entire system to be lifted using a 4-point hoist or crane. Each hanger has been designed to safely support up to 3000 lbs. when the system is lifted with ½" grade 8 bolts.

The system has been equipped with robust casters (Fig.1) permitting easy movement for final placement within or reconfiguration of the laboratory.

Output connections are solid 4"x ¾" (102mm x 19mm) buss bars which have been staggered to minimize the risk of accidental shorting. Each buss bar provides four 5/8" (15.88mm) mounting holes on 2" (50.8mm) centers allowing for easy connection of additional buss bars or heavy duty power cables.

9220 Series Dual Bay Specifications

	Model 9220-4904-48			Model 9220-4904-60			Model 9220-4904-72		
Programming Capability									
Operating States	Charge (Source), Discharge (Load), Standby, Battery Emulation								
Charge/Discharge Modes	Constant-Voltage(CV), Current (CC), Power (CP), Series Resistance (CR)								
Charging Envelope	0-40V, 32kW, 2400A			0-40V, 40kW, 3000A			0-40V, 48kW, 3600A		
Discharging Envelope	1-40V, 48kW, 2400A			1-40V, 60kW, 3000A			1-40V, 72kW, 3000A		
Slew Rate									
Voltage	0.012V/s – 80V/ms			0.012V/s – 80V/ms			0.012V/s – 80V/ms		
Current	0.68A/s – 12kA/ms			0.85A/s – 15kA/ms			1.02A/s – 18kA/ms		
Power	8W/s – 32kW/ms			10W/s – 40kW/ms			12W/s – 48kW/ms		
Resistance	2.5mΩ/s – 8.4Ω/ms			2.0mΩ/s – 6.7Ω/ms			1.7mΩ/s – 5.6Ω/ms		
Current Change Time	Less than 10mS								
Paralleling	Up to two (2) systems with synchronous set & measurement control								
Macro Test Profiles									
Development Source	LabVIEW or PowerPanel								
Maximum Steps	1000								
Minimum Time Delay	50uS								
Maximum Step Delay	1mS - 7 Days								
Programming	Range	Accuracy[1]	Res.[2]	Range	Accuracy[1]	Res.[2]	Range	Accuracy[1]	Res.[2]
Voltage	0-40V	0.1% + 0.1%	0.005%	0-40V	0.1% + 0.1%	0.005%	0-40V	0.1% + 0.1%	0.005%
Current	±2400A	0.2% + 0.2%	0.005%	±3000A	0.2% + 0.2%	0.005%	±3600A	0.2% + 0.2%	0.005%
Power (Charge)	32kW	0.3% + 0.3%	0.005%	40kW	0.3% + 0.3%	0.005%	48kW	0.3% + 0.3%	0.005%
Power (Discharge)	48kW	0.3% + 0.3%	0.005%	60kW	0.3% + 0.3%	0.005%	72kW	0.3% + 0.3%	0.005%
Resistance	0-8.4Ω	2%	0.005%	0-6.7Ω	2%	0.005%	0-5.6 Ω	2%	0.005%
Measurement (4-Wire)	Range	Accuracy[3]	Res.[2]	Range	Accuracy[3]	Res.[2]	Range	Accuracy[3]	Res.[2]
Voltage,	0-40V	0.05% + 0.05%	0.005%	0-40V	0.05% + 0.05%	0.005%	0-40V	0.05% + 0.05%	0.005%
Current	±2400A	0.1% + 0.1%	0.005%	±3000A	0.1% + 0.1%	0.005%	±3600A	0.1% + 0.1%	0.005%
Power	±48kW	0.12% + 0.12%	0.005%	±60kW	0.12% + 0.12%	0.005%	±72kW	0.12% + 0.12%	0.005%
Time	1mS - 1Yr	0.1%		1mS - 1Yr	0.1%		1mS - 1Yr	0.1%	
Control									
Communications	LAN (Ethernet)								
Drivers	SCPI, VXI-11, LabVIEW (Non-OS Specific)								
Software Tools	Windows based applications including Power Panel, Firmware Update & Calibration								
Safety									
Isolation AC Input	1000V AC Input to DC Output/1000V AC Input to chassis								
Isolation UUT Input	600V UUT to chassis								
Programmable Limits	Over-Voltage (OV), Under-Voltage (UV), Over-Power (OP), Internal Over Temperature								
Interlocks	External user input, emergency stop, and rear service doors								
Watchdog Timer	Continuously monitors control communications								
Physical									
Operating Temperature	0-35°C full power								
Output Connections	Buss Bars								
Cabinet Dimensions (HxWxD)	83.25 x 56.56 x 34.5"/2115 x 1436 x 876mm including lift tabs and casters								
Facility Input	3ϕ, 50-60Hz 380VAC, 400VAC, 480VAC (input voltage to be specified at time of order)								
Input Power									
3ϕ 380VAC	64 A			80 A			96 A		
3ϕ 400VAC	62 A			77 A			92 A		
3ϕ 480VAC	51 A			64 A			76 A		
Cabinet Weight	2150lbs/975kg			2450lbs/1111kg			2750lbs/1247kg		
Calibration	Semi-Automatic, closed cover with standard lab equipment								

[1] Accuracies are % of Set + % of Range,
[2] Resolutions are % of Range unless otherwise indicated
[3] Measurement Accuracies are % of Reading + % of Range

Ordering Information

	Series	Voltage (40V)	Power Level (kW)
Model Number Construction	9220	-4904	-48

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