



INVINITY VS3-022 SIX PACK™ VANADIUM FLOW BATTERY

The flexible VS3 is the core building block of Invinity's energy storage systems. Self-contained and incredibly easy to deploy, it uses proven vanadium flow technology to store energy in an aqueous solution that never degrades, even under continuous maximum power and depth of discharge cycling. Our technology is non-flammable, easily adapts to different discharge durations, and requires little maintenance and upkeep.



SAFE Zero risk of thermal runaway, exceptional personnel safety for crews & first responders.



ECONOMICAL The lowest price per MWh stored and discharged over the lifetime of the battery.



LONG LIFE Suitable for 25+ years of constant cycling, matching the lifespan of solar & wind assets.



PROVEN Demonstrated performance in commercial applications in the field.

25+

YEAR LIFESPAN

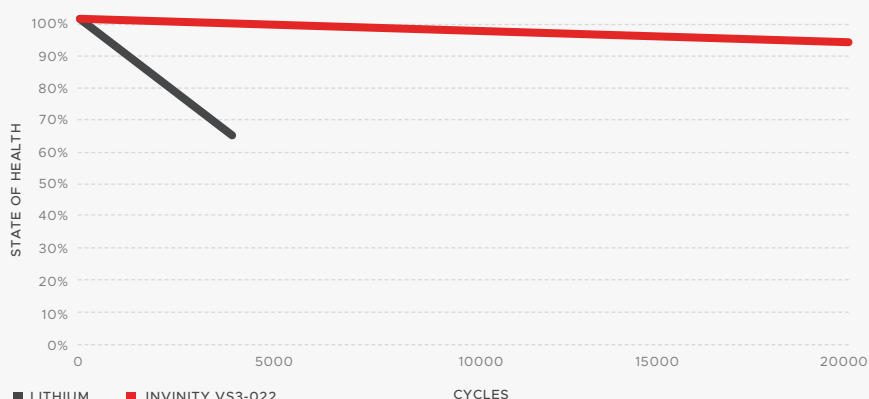
NON FLAMMABLE

2-12

HOUR DISCHARGE

UNLIMITED CYCLES

BATTERY CAPACITY AS A PERCENT OF ORIGINAL*



■ LITHIUM ■ INVINITY VS3-022

*Assumptions: No capacity augmentation



Strip foundation installation shown

INVINITY VS3-022 SPECIFICATIONS

PERFORMANCE		
Operating Voltage Range	Model A 750-950 VDC	Model B 1,000-1,400 VDC
Max. DC Current	Model A +/- 104 A	Model B +/- 78 A
Max. DC Power	78 kW	
Energy Storage Capacity	230 kWh rated	
Continuous Discharge	8 h @ 29 kW 4 h @ 52 kW 2.25 h @ 75 kW	
Overcurrent Protection Device	Integrated	
Depth of Discharge	0 - 100%	
Cycle Life	> 20,000 cycles	
Lifetime Throughput	> 4,000 MWh	
Annual Capacity Degradation	< 0.5% per year	
Max. DC Round Trip Efficiency (RTE)	75%	
Annual DC RTE Degradation	< 0.1% per year	
Battery Management System, Fault Protection, DC Disconnect	Integrated	
Response Time at DC Terminals	< 200 ms	
Peak Audible Noise	< 80 db (measured outdoors, at 1 m)	

AUXILIARY REQUIREMENTS	
Communications Interface	Modbus TCP
Auxiliary Input	External AC Supply
AC Auxiliary Supply	380-415 VAC, 3 Φ , 4 wire 50/60 Hz
Auxiliary Power, Nominal	3.6 kW



ENVIRONMENTAL	
Ambient Operating Temperature	-5°C to 45°C / 25°F to 110°F
Cooling	Integrated, Forced Air
Operating Humidity	0 to 95% RH
Environment	Indoor & Outdoor
Enclosure Rating	NEMA 3R and IP 54
Maximum Elevation	2,000 m / 6,500 ft above sea level
Wet Location Rating	Yes
Additional Cooling Required	None
Fire Suppression System Required	None
Secondary Containment	Integrated

STANDARD COMPLIANCE	
Battery Module Listing	UL 1973
Compliance	CE, IEC 62932, UL 9540, NFPA 855
Tested To	UL 9540A

PHYSICAL	
Dimensions (L x W x H)	6,058 mm x 2,438 mm x 2,591 mm 19' 10" 1/2 x 8' x 8' 6"
Weight (Flooded)	24,600 kg / 54,200 lbs
Mounting	Pad mount, strip foundation, or equivalent
Rec. Service Clearance	1,500 mm / 59" (Single stacked) 2,000 mm / 79" (Double stacked)

COMMUNICATION	
EMS and Third Party Monitoring	Ethernet or Fibre, TCIP/IP
Inverter Communication	Ethernet or Fibre, TCIP/IP
Monitoring	Cloud only

Flow batteries exhibit far greater capacity retention and less performance degradation over time than lithium ion batteries, and [Invinity's] system has quantitatively proven that. DNV

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The Global Leader in Utility-Grade Energy Storage



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