

**Nidec**

Conversion

## Power Conversion & Battery Energy Storage Systems







## THE VALUE OF EXPERIENCE

**18** Service Centers

**9** Manufacturing Sites

**12** Engineering & Design Facilities

**9.1GWh** In Operation Across the Globe

**155** Projects

# THE NEXT GENERATION IN POWER CONVERSION

Introducing the next generation of Power Conversion Systems for BESS which are world class for power density, efficiency, and durability.

Drawing on decades of experience in medium and high voltage inverters for heavy duty applications in harsh environments plus a proven track record in the field, these power converters are robust and highly reliable.

**They are also best-in-class in availability and safety.**



# WHY CHOOSE NIDEC CONVERSION?

With 12 engineering & design teams,  
9 manufacturing sites, 18 service  
centers and more than 9.1GWh of  
Power Converters installed globally,  
we are well positioned to serve you.

## ONE STOP SHOP

Nidec is a one stop shop for renewable energy solutions. We can provide stand-alone inverters or full turnkey microgrids, based on your needs whether it is a greenfield project or to retrofit an existing plant.

## STRONG SYSTEM INTEGRATION KNOW-HOW

Our expertise in System Integration is one of our greatest assets. We speak your language and can assist with engineering, design, project management & commissioning to make sure your project gets built for optimum performance to ensure your ROI.

## PLUS OPERATING & MAINTENANCE

We offer a complete range of customized service contracts with varying durations to support your needs from routine inspections to the full Operation & Maintenance of the site, including our Nidec By-Your-Side Remote assistance services.

## TOTAL COST OF OWNERSHIP

Our Converters are designed to reduce Total Cost of Ownership, which means they offer the following benefits:

- Reduce Mean Time to Repair (MTTR)
- Reduced spare parts
- Maximize availability
- Optimized efficiency, even at low power

## LIFE CYCLE SUPPORT

24 hours per day, 7 days per week





# RUGGED & ROBUST

Drawing on extensive experience in providing equipment in harsh, abrasive environments, our converter cabinets are extremely robust and built to last.

## ADVANCED COOLING FOR HIGH EFFICIENCY

The power converters are equipped with an innovative hybrid cooling system which ensures maximum efficiency and safety no matter what the external ambient temperature.



### INNOVATIVE HYBRID COOLING

One of the outstanding features of the inverter is its innovative cooling system which significantly reduces auxiliaries' consumption, maximizing the availability of energy to be sold to the grid.

### ADVANCED COMMUNICATION

Our Power Converters integrate numerous industrial communications protocols that allow for seamless integration with any supervisory software at both the plant and grid level.

### RELIABLE GRID CONNECTION

Our converters' firmware incorporates a wide range of dynamic network support features, all configurable to meet local grid or utility requirements. These are based on our more than forty years of experience in Power Quality.



LIFE CYCLE  
SUPPORT



ABLE TO MEET  
LOCAL GRID & UTILITY  
REQUIREMENTS



BUILT TO  
ENDURE



ADVANCED COOLING  
SYSTEM



CONFIGURABLE FOR OPTIMUM  
PERFORMANCE



VERY HIGH  
AVAILABILITY &  
RELIABILITY



# THE DIFFERENCE IS IN THE CONTROL

## WIDE COMMUNICATION OPTIONS

Our Power Conversion Systems integrate numerous industrial communications protocols that allow full compatibility with all control solutions. A dedicated optical fiber pair for fast Ethernet connection is available to connect each unit with the main equipment (Local SCADA, Power Plant Controller, etc.).

Other communication options for SCADA connections and remote monitoring available are: Modbus TCP, Modbus RTU, Ethernet IP, Profinet and Profibus.

## REAL TIME CONTROL & DIAGNOSTICS

Our inverters can easily be integrated inside plant control and monitoring systems, such as Data Loggers, SCADA and Power Plant Controller, to guarantee the centralized control of the generation plant and the required performances at the point of common coupling with the main grid.

Using ARTICS Smart Energy, Nidec's power and energy management suite, plant production can be optimized and integrated with the other components of the electrical grid, back-up generators, storage systems and loads to obtain a seamless smart grid control. The suite provides a full set of applications, covering SCADA/ HMI functions with historical data and event acquisition, reporting, diagnostic tools for predictive and preventive maintenance, data security and encryption and local/ remote access control.

## INVERTER

The ES 1500 firmware draws on more than a decade of demonstratable field experience to offer a wide range of dynamic network support features, all configurable.

## GRID-CONNECTED FUNCTIONS:

### FAULT RIDE-THROUGH

#### VOLTAGE RIDE-THROUGH

Industry-leading active and reactive power injection along positive and negative sequences

#### FREQUENCY RIDE-THROUGH

+/- 6 hz widest range in industry

### GRID SUPPORT

#### ACTIVE POWER -vs- FREQUENCY

Active power modulation for primary frequency regulation (FSM, LFSM)

#### ACTIVE POWER -vs- VOLTAGE

Active power modulation for grid voltage support

#### REACTIVE POWER -vs- VOLTAGE

Reactive power modulation for primary voltage regulation

#### REACTIVE POWER -vs- ACTIVE POWER

Flexible reactive power modulation for variable power factor operation

#### FIXED REACTIVE POWER OR POWER FACTOR

Tracking of externally-computed setpoints for reactive power or power factor

### GRID INTERFACE

#### LINE MONITOR

Fully configurable thresholds for connection, re-connection and disconnection

#### POWER RAMPS

Configurable power ramp rates for connection and normal operation

## OFF-GRID FUNCTIONS:

### GRID FORMING

Powering of an off-grid island in parallel with or without other generators, and in presence of any kind of loads

### VIRTUAL INERTIA

Emulation on inertial behavior of rotating generators while grid forming

### BLACK START CAPABILITY

#### BLACK START

Bootstrap of an off-grid island as a sole generator, including inductive loads (e.g. motors)



# TURNKEY BESS SOLUTIONS

Our components and systems offer safe, reliable performance over their entire lifetime backed by nearly a century of experience in the design, manufacture and supply of electrical systems. Our expertise in power conversion, power management and power quality is your key to a successful project.



### BESS TURNKEY SYSTEMS

With over 9.1GWh in operation across the globe in more than 155 projects, Nidec is one of the world’s leading providers of large-scale energy storage solutions, so we can also be your electrical partner or provide a full turnkey system. Whether you are investing in Primary Frequency Regulation, Power Balancing, Peak Shaving, Energy Shifting or Microgrid applications, we have the right solution to fit your needs.

Our turnkey BESS Units consist of batteries, a power and energy management system, power conversions systems based on active front end inverter technology, along with transformers, cooling system and protective circuit devices and other safety features. Batteries can be configured in blocks up to hundreds of megawatts for use in various applications with different battery topologies according to performance requirements.

Nidec provides robust, modular solutions based on proven industrial technology that minimizes installation and maintenance times, prolongs system life and enhances safety.

### CONFIGURE A SAFE INVESTMENT

Battery sizing is one of the most critical steps in developing the optimal storage system. At Nidec we have developed an advanced lifecycle system modeling tool that allows us to take the user’s load profile and the battery manufacturer’s theoretical life cycle and run a simulation of how the batteries will actually perform to determine the ideal battery sizing for the application.

Our modular DC Blocks are highly standardized, allowing for efficient scalability while reducing installation costs. Enclosures meet the latest rigorous safety standards from permitting and fire agencies and systems are compliant with international grid codes, IEC standards, UL 9540, IEEE 1547, NFPA 855 and others.

Our systems are battery agnostic. Nidec has vast experience working with different types of batteries in various applications.

# FULL EQUIPMENT SUPPLY

The Nidec 5MWh DC block delivers high energy capacity in a compact footprint, ideal for space-limited sites. Its modular design maximizes energy density while reducing land and infrastructure costs, making it a practical choice for utilities and independent power producers.

Transportation and installation are simplified through a standardized, pre-assembled design. The unit ships easily using conventional methods and arrives factory-tested, enabling rapid deployment and faster project commissioning.

Built for safety, the system meets UL 9540 and NFPA 855 standards, ensuring compliance with stringent fire and electrical codes. Integrated aerosol suppression and advanced gas detection provide early warnings of thermal events, enhancing asset protection and operational security.

An advanced liquid cooling system maintains uniform cell temperatures, improving energy efficiency, extending battery life, and reducing thermal risks. Combined with robust safety features, the Nidec 5MWh DC block offers reliable, efficient, and secure energy storage for grid-scale applications.



Cell Chemistry	LFP
Cell Capacity	315Ah
Charge/Discharge Power	0.5P
Configuration	12P416S
Nominal Capacity	5.031MWh
Voltage Range	1164V-1497.6V
Cooling	Liquid
Operation Temperature	- 30°C -50°C
Ambient Humidity	≤95%RH, no condensation
Altitude	≤2000m (≤4000m optional)
Corrosion Protection Level	CA (EN ISO 12944) C5 optional
Fire Protection	Aerosol & Water
Communication Interface	Ethernet
Dimension	6058*2438+2896
Weight	≤42t

### TURNKEY SYSTEMS IN 4 SIMPLE STEPS

**ANALYSIS**

- Location Analysis
- Asset Proposal
- Economical & Technical
- Feasibility Analysis
- Contract

**DESIGN**

- Layout Definition
- Dimensioning of the Assets
- Asset Definition
- Definitive Design

**MANUFACTURING & INSTALLATION**

- Asset Procurement
- Manufacturing
- Assembly
- Installation

**COMMISSIONING**

- Hw Configuration
- Hw Testing
- Sw Configuration
- Complete End-to-End Testing
- Training



TECHNICAL DATA

				ES15-1K9W			NEW PCS		
AC	Rated voltage (UNOM) +/- 20%	(1)	VAC	630	660	690	320	690	730
	Rated frequency (fNOM) +/- 10%		Hz	50,60					
	Rated current (INOM)	(2)	A	1960			4000		
	Rated active power (PNOM)	(2)(3)	kW	2138	2240	2340	2217	4780	5057
	Power factor			1 to 0 under-excited, over-excited					
	THDi @ full power			< 2%					
	Connection type			1 busbar for cable lugs connection per phase					
	Disconnection device			Circuit breaker					
	Surge protection			SPD					
	Distribution system			IT - Unearthed					
Required short-circuit ratio							> 5		
DC	Battery chemistry compatibility			Any					
	Maximum open circuit voltage		VDC	1500			1500 (2000 capable)		
	Full power maximum voltage		VDC	1500			1500 (2000 capable)		
	Minimum operating voltage @ PF=1		VDC	950	995	1040	453	976	1033
	Minimum operating voltage @ P=PNOM, PF=0 OE			1030	1060	1100	453	976	1033
	Independent inputs			1			1		
	Input configuration			Single busbar					
	Maximum current		A	2298			4900		
	Connection type			Busbar for cable lugs connection					
	Disconnection device			Load switch disconnecter					
Surge protection							SPD		
FEATURES	Efficiency (peak)	(4)		98.3%			98.7%		
	Isolation monitoring			Isolation Monitoring Device (IMD)					
	Ingress Protection (Outdoor)			IP54 (IP65 available as an option)					
	Cooling			Hybrid- Liquid and Air Cooled					
	Dimensions		in (m)	88.15x46.78x48.15 (2.24x1.19x1.22)			90.6x78.7x78.7 (2.3x2.0x2.0)		
	Weight		lbs (kg)	< 3175 (1440)			< 4000 (1815)		
	Operating temperature (min   max)	(5)	°C	-20 °C   50 °C					
	Operating humidity (min   max)			0%   95%					
	Operating altitude (a.s.l.)			1000 without derating - 4000 with derating					
FUNCTIONS	Grid forming			Standard					
	Black start			Available					
	Communication			Modbus TCP over Ethernet or F.O.					
	Safety standards			UL1741:2021, IEC 62109-1, IEC 62109-2, IEC 62477-1, IEC 62909, IEEE 1547:2018					
	EMC standards			IEC 61000-6-2, IEC 61000-6-4					
	Environmental standards			IEC 60068-2-2, IEC 60068-2-30, IEC 60068-2-78, IEC 62093					
(1) For details about operating voltage range during faults (xVRT), please refer to the product manual									
(2) @ TAMB=40 °C									
(3) Interpolation permitted based on rated voltage									
(4) Auxiliary power supply not included									
(5) -40 °C Optional									

INVERTER



**POWER CONVERSION SYSTEMS (PCS)**  
Leveraging its extensive expertise in power electronics, Nidec developed 4-quadrant, water-cooled power conversion solutions compatible with batteries rated up to 1500 V.

Nided PCS outdoor solution is designed for long duration (from 2 hours to 8 hours) BESS applications.

**Flexible:** Designed to address three distinct markets, our power conversion system offers unparalleled versatility. It can be configured to meet a wide range of requirements, ensuring optimal performance across various applications.

**2000 V Ready:** Our power conversion system is equipped to handle up to 2000 V, making it ready for the evolution of all applications. This capability ensures robust and reliable performance, enhancing efficiency, meeting power demands and reducing cost.

**High Power Density:** Designed for skid integration to reach one of the highest power densities in the market, maintaining maximum efficiency and performance without taking up valuable space.

**Quiet:** Eliminate disruptive operations with our cutting-edge technology. Our optional noise reduction kit guarantees that your power conversion process remains nearly silent without sacrificing efficiency or dependability.

At Nidec, we hold ourselves and our products to the highest standards of quality and safety. Our robust power conversion systems are housed in rugged enclosures that will meet the rigors of harsh outdoor conditions. Meeting protection standards such as NEMA 3R, safety standards such as UL1741 (SA & SB), and numerous IEC standards, allows us to confidently deploy our systems at your most difficult project locations.

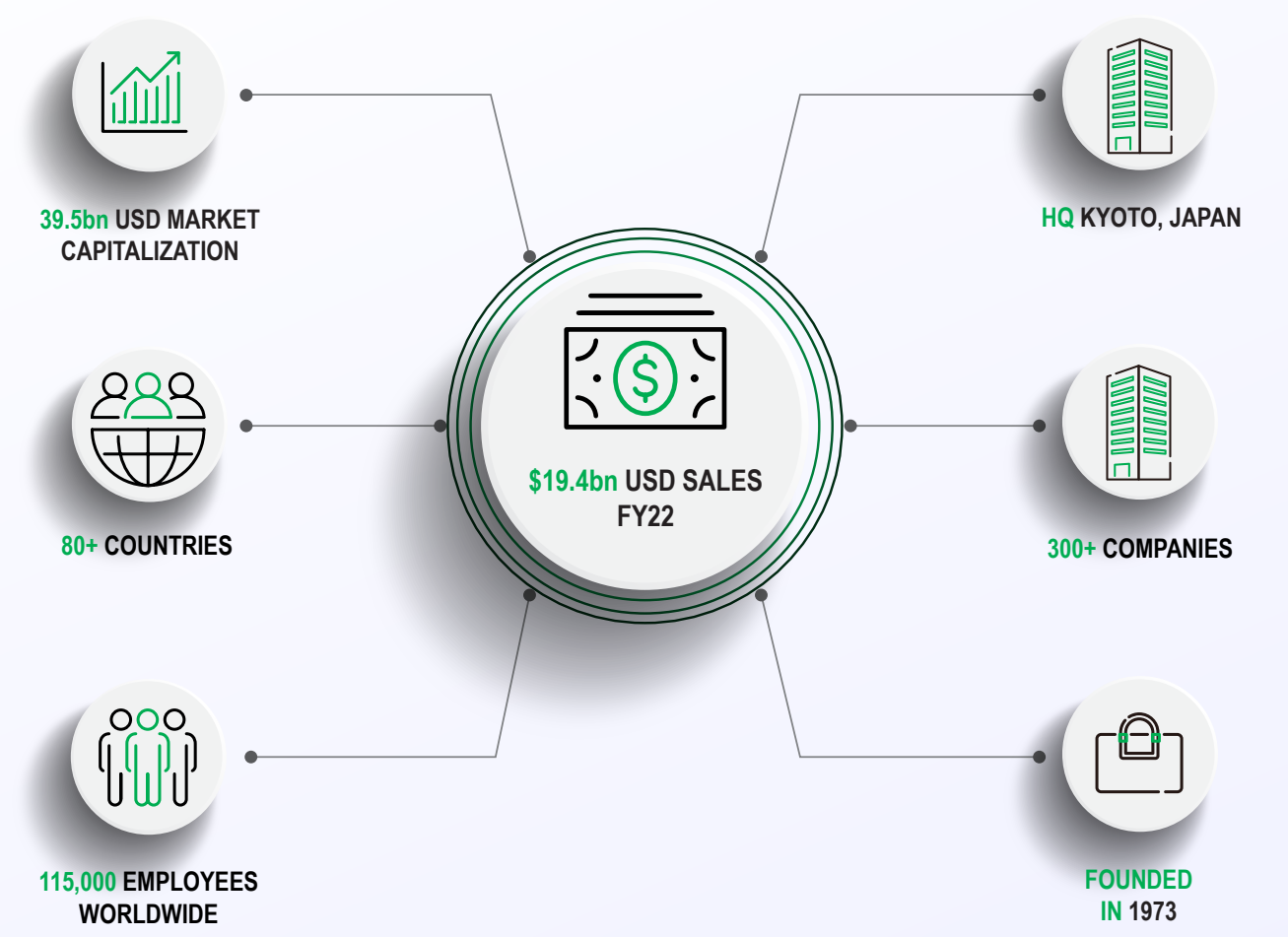




# ABOUT NIDEC CONVERSION

## A LEADING GLOBAL MANUFACTURER OF ELECTRIC MOTORS, CONTROLS AND POWER ELECTRONICS

Nidec is one of the most bankable names in Power Conversion. Founded in 1973, the company today generates \$20bn in revenues with a strong focus on designing, manufacturing, and delivering cost-competitive solutions that will help accelerate the energy evolution. The company can trace the roots of its technologies in power conversion back over 150 years – a testimony to the reliability and excellence of these products. Nidec – a name you can trust – will be around for the next 150 years and beyond.







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