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Sony Corporation
Sony Energy Devices Corporation

Product Information

Fortelion™
Energy Storage Module and System
with Sony's Olivine-type Lithium Iron Phosphate Cell

Main Features of the Energy Storage Module

1. Long Lifespan with Deep Cycles

Consumers can anticipate that rechargeable olivine-type lithium-ion iron phosphate batteries will have a long useful life of 20 years when charged/discharged once daily at room temperature (23℃), thanks to their inherently supe rior properties. Furthermore, Sony has achieved a long-lasting charge/discharge cycle that does not depend on DOD*.

* DOD = Depth of Discharge: The ratio of discharged energy in proportion to a cell's rating capacity. A factor that influences the useful life of many rechargeable batteries.

2. High Performance Safety

The contained iron phosphate cells, which boast excellent thermal stability and storage characteristics, are not susceptible to thermal runaway, and do not require additional room ventilation.

In addition, the energy storage module's usage can be controlled safely by monitoring the status of the internal batteries and communicating the outcome to a linked external battery management system or controlling unit.

3. Quick Charge

The high power output construction of rechargeable olivine-type lithium-ion iron phosphate batteries facilitates a charge of 90% or more in just one hour.

4. High Scalability

Variables such as the voltage and capacity can be customized for different applications by connecting multiple modules either in series or in parallel. Furthermore, at 19 inches (2U), the module size is also suitable for fitting to standard computer server racks.

5. Eco-Friendly

Iron (lithium iron phosphate) is used as the electrode material, thus enabling reduced environmental impact in comparison to rechargeable lithium-ion batteries that instead use rare metals with extremely limited reserves, and which are therefore in low supply.

In comparison to lead-acid batteries and nickel cadmium (Ni-Cd) batteries, lithium-ion batteries have lower energy loss when discharging the stored electrical energy (= high 'charge/discharge efficiency').

Specifications

Energy Storage Module – IJ1001M

Features:

- Powered by Sony's iron phosphate cells, "Fortelion"
- A built-in self-monitoring function detects any abnormality within the module itself
- Multiple modules can easily be connected either in series or in parallel

	IJ1001M	Remarks
Cell Type	LFP (Iron phosphate)	-
Energy / Capacity	1.2kWh / 24Ah	Nominal: 0.2ItA, +23deg. C
Nominal Voltage	51.2V	-
Maximum Discharge Current / Power	50A / 2.5kW	-
Standard Charge Conditions	57.6V / 24A	-
Status Monitor	Voltage, Current, Temperature, SOC, and so on	-
Operating Temperature	Discharge: -20deg. C to +60deg. C Charge: 0deg. C to +45deg. C	Room temperature usage / storage is recommended
Storage Temperature	-40deg. C to +65deg. C	
Weight	Approx. 17kg	-
Dimensions	W432 * D421 * H80 mm	Excluding attachment fixtures

Controller Unit – IJ1002C (Designed for IJ1001M)

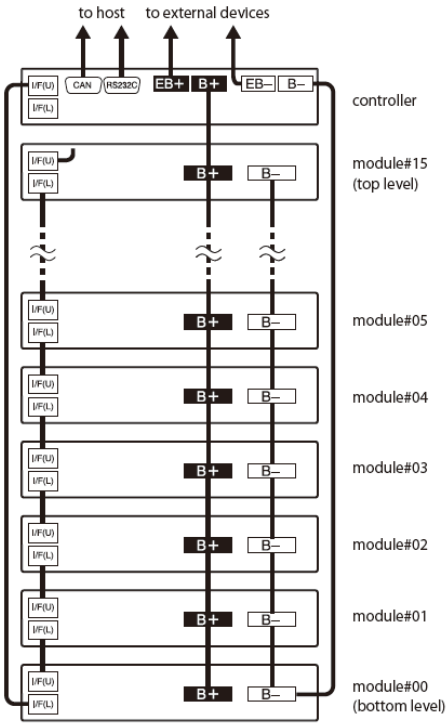
Features:

- Up to 16 modules can be connected to a controller
- Safely shuts down current in case of alarm
- The display shows the status of connected modules
- Integrates connected module status and exports the information through communication interface
- Acquired 'UL Subject 1973' safety standards accreditation in the combination with IJ1001M

	IJ1002C	Remarks
Operating Voltage Range	30 to 60V	Nominal: 0.2ItA, +23deg. C
Maximum Continuous Current / Power	100A / 5kW	Max current has to be within the operating range of the connected modules
Operating Temperature	Discharge: -20deg. C to +60deg. C Charge: 0deg. C to +45deg. C	Room temperature usage / storage is recommended
Storage Temperature	-40deg. C to +65deg. C	
Communication Interface	CAN / RS232C	-
Maximum number of module connection	Up to 16 modules	Parallel connection only (Serial connection: Please ask)
Weight	Approx. 8kg	-
Dimensions	W432 * D421 * H80 mm	Excluding attachment fixtures

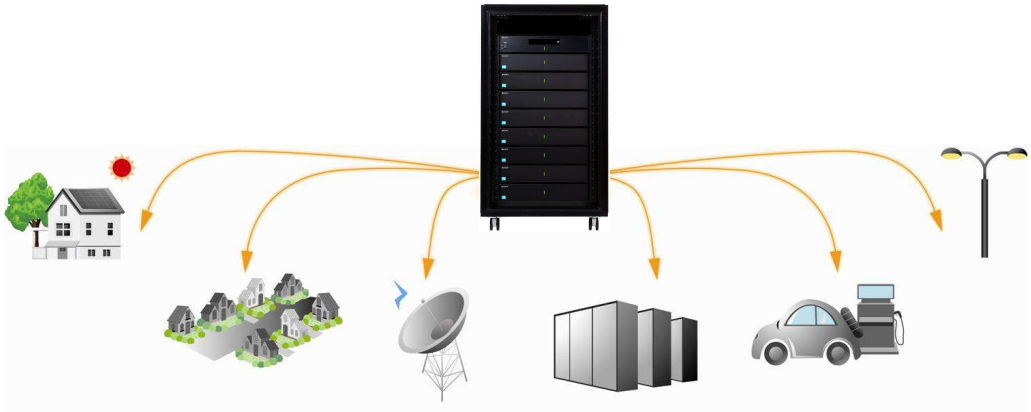
**Specifications are subject to change without notice*

System Configuration (Example)

	4 Modules + 1 Controller	16 Modules + 1 Controller
Energy / Capacity	4.8kWh / 96Ah	19.2kWh / 384Ah
Nominal Voltage	51.2V	
Maximum Discharge Current / Power	100A / 5kW	
Standard Charge Conditions	57.6V / 100A	
Weight (Excluding Racks)	Approx. 76kg	Approx. 280kg
Connection Image (In the case of 16 modules in parallel connection)		

Applications

- Energy storage for PV system installed homes and buildings to maximize onsite consumption
- Peak shift for commercial / industrial daily energy operations
- Community level or micro-grid applications
- Backup power source for wireless base stations, data centers
- Peak power supply for e-mobility charging stations



Sony's Iron Phosphate Cell "Fortelion"

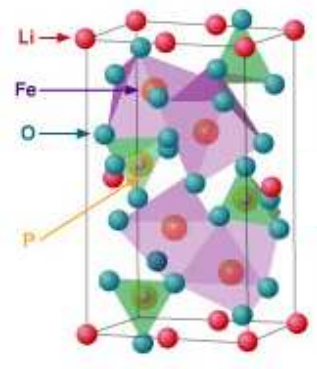
Development of olivine-type iron phosphate cell

Since commercializing the world's first lithium-ion battery in 1991, Sony has continued to focus efforts on the development and commercialization of technologies for lithium-ion batteries, which boast excellent energy efficiency and high energy/power density, among other superior properties.

In recent years, Sony has also utilized its accumulated technologies and know-how in product development in the energy storage field, which continues to benefit from rapidly rising demand in Japan and abroad across a wide range of applications, such as backup power sources for data centers, schools and offices, as well as energy storage systems for group housing complexes. In 2009, Sony brought to market a proprietary lithium-ion battery, "Fortelion", uses an olivine-type lithium-ion iron phosphate as the cathode material, and took a solid step forward into the field of energy storage.

High Safety Performance

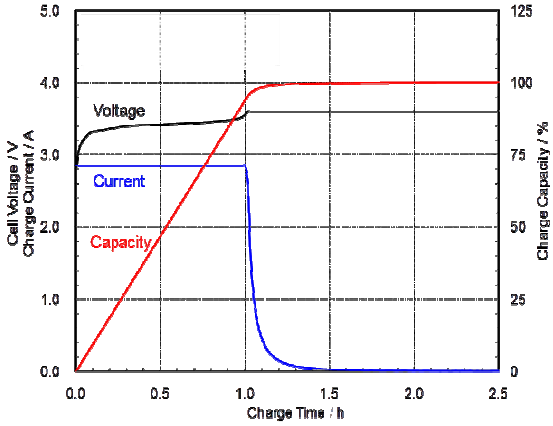
Superior heat stability based on a robust crystal structure



*With its covalently bonding crystal structure, the cathode material does not release oxygen easily even under high ambient temperature and prevents thermal runaway

Rapid Charging

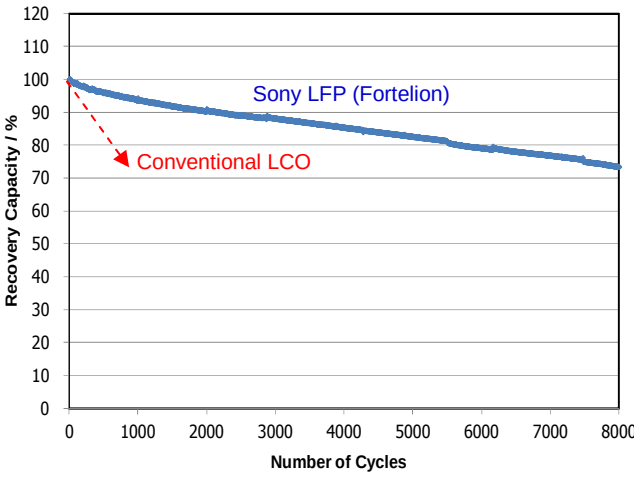
More than 90% can be charged in an hour



*Charge at 1ItA rate under ambient temperature of 23 deg. C

Excellent Cycle Life

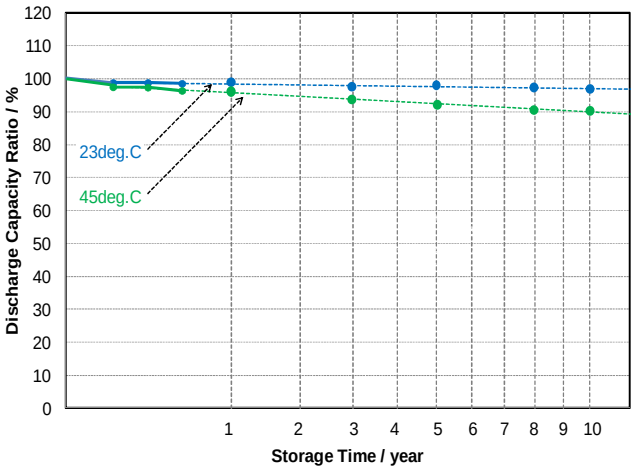
Approx 80% capacity after 6,000 cycles



*1ItA charge / discharge full cycles (100% DOD) at 23 deg. C

Strong Storage Characteristics

Over 90% capacity expected after 10 years



*Storage under fully charged condition. The data after 1 year is based on simulation

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