

# FCP-500 & FCP-1000

Lead Carbon Battery

## Introduction

# Introduction of Manufacturer

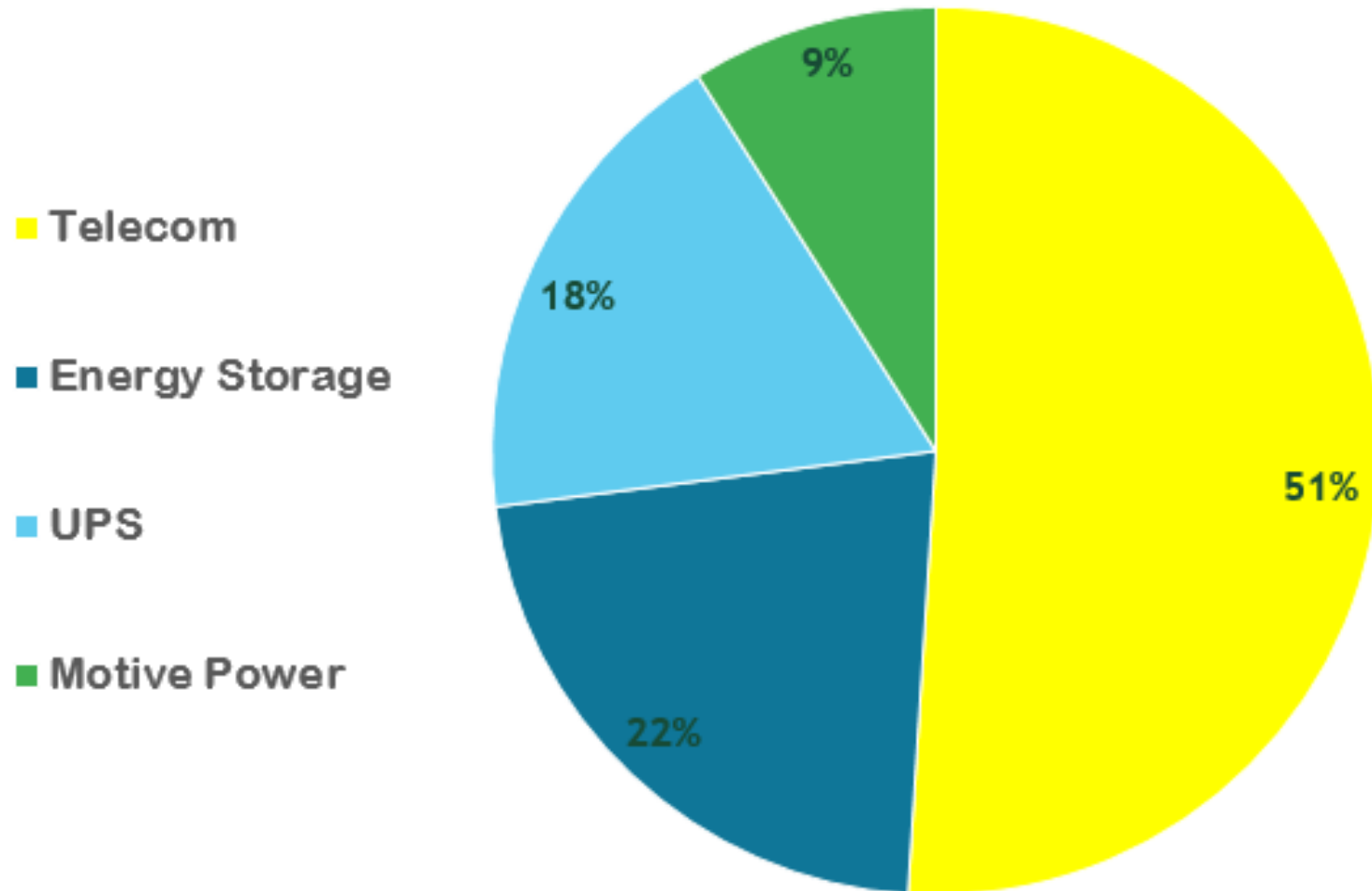
## Shandong Sacred Sun Power Sources Co.,Ltd

- ▶ Founded in 1991.
- ▶ Became public company in 2011 (Stock Code : 002580)
- ▶ With approximate 2,000 employees.
- ▶ With total production scale of 6 million KVAh per year.
- ▶ Products include VRLA, Lithium Ion battery, system integration of renewable energy and energy storage.
- ▶ One of China's top 3 industrial battery manufacturers.

# Certificates



# Annual Revenue %



# Specification of FCP Products

Specification		FCP-500	FCP-1000
Nominal voltage(V)		2	2
Nominal capacity ( Ah )		500	1000
Nominal capacity ( Wh )		1000	2000
Weight (kg)		41	75
Dimensions (mm)	Height	508	508
	Width	172	172
	Length	166	303
Mass energy density ( Wh/kg )		24	27
Volume energy density(Wh/L)		69.0	79
Maximum current	Charge	$0.2C_{10}A$	$0.2C_{10}A$
	Discharge	$0.4C_{10}A$	$0.4C_{10}A$
Cycle life ( 25°C )	70%DOD	4200	4200



# Features of FCP Products

- ▶ A new generation of valve regulated lead acid battery with large capacity and ultra long deep cycle life.
- ▶ More than 4,200 cycles at 70% DOD.
- ▶ Adoption of advanced lead-carbon technology, improved charge acceptance, reduced sulfation of negative plate, more suitable for PSOC conditions.
- ▶ Advanced manufacture technology, strict production standard, superior cell performance uniformity and reliability, more suitable for large scale energy storage.
- ▶ Modular design, easy installation.
- ▶ **Drastically reduce ambient temperature related costs (ie. heating and cooling).**



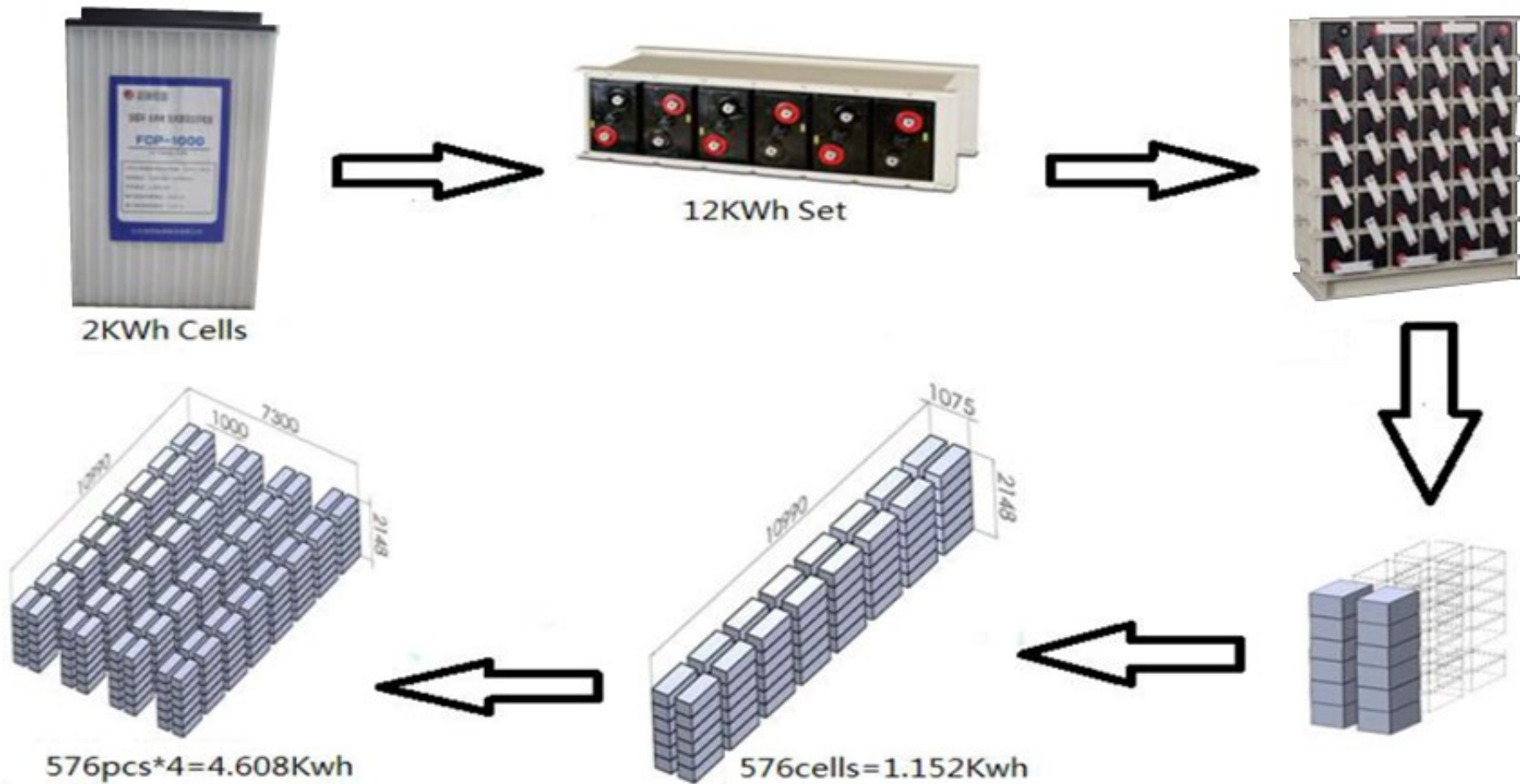
# Technology of Uniformity and Reliability

- ▶ Strict manufacture standard and process control, uniformity control of raw materials and battery parts.
- ▶ Proprietary acid filling and battery formation technology to control the uniformity of electrolyte density and quantity.
- ▶ Hot-sealing technology of PP container and cover, integrated design of safety valve, advanced TIG terminal welding technology, eliminate battery leakage.
- ▶ Large system equipped with BMU (Battery Monitor Unit), monitor SOC and SOH (State of Health) of cells remotely and in real time.



# Indoor Modular Design and Installation

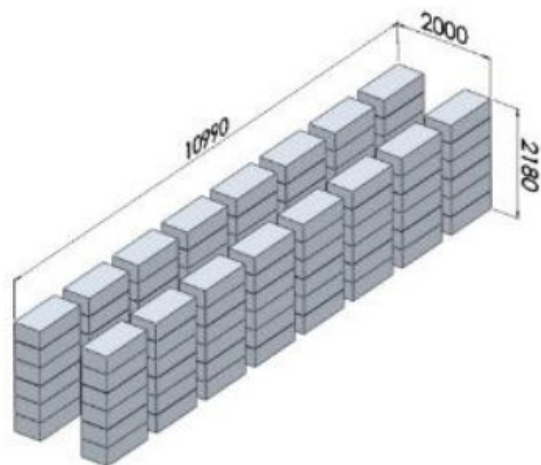
## Six Layer Module Stacking





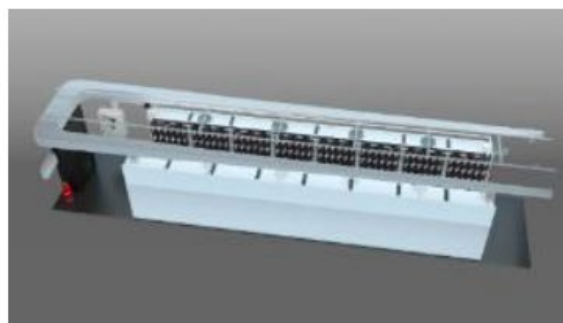
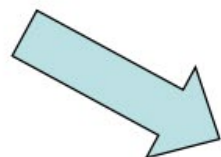
# Outdoor Container Type Modular

## Inner Container Installation

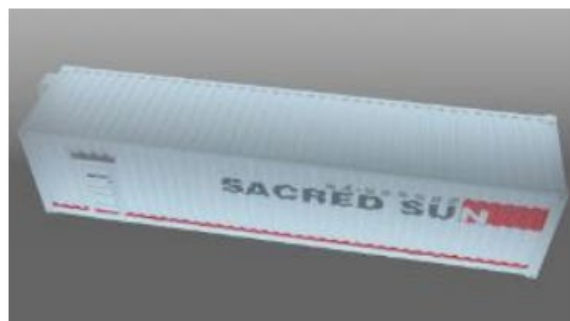
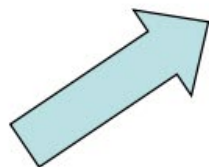


1.152MWh Module

6 layers 8 rows, double ranks design (mm)  
**10990 × 2000 × 2146**

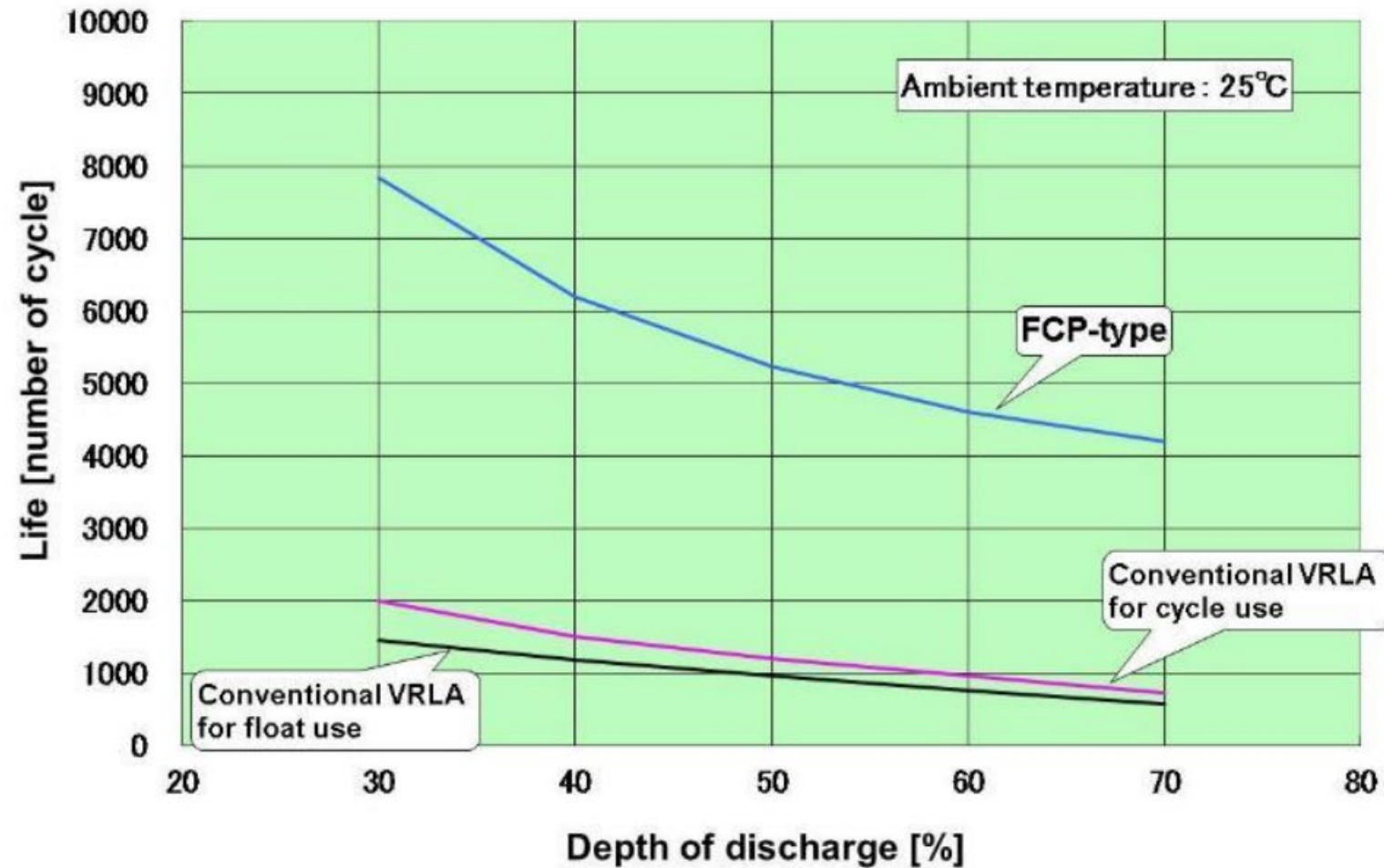


Inner container dimension (mm)  
**12010 × 2340 × 2690**

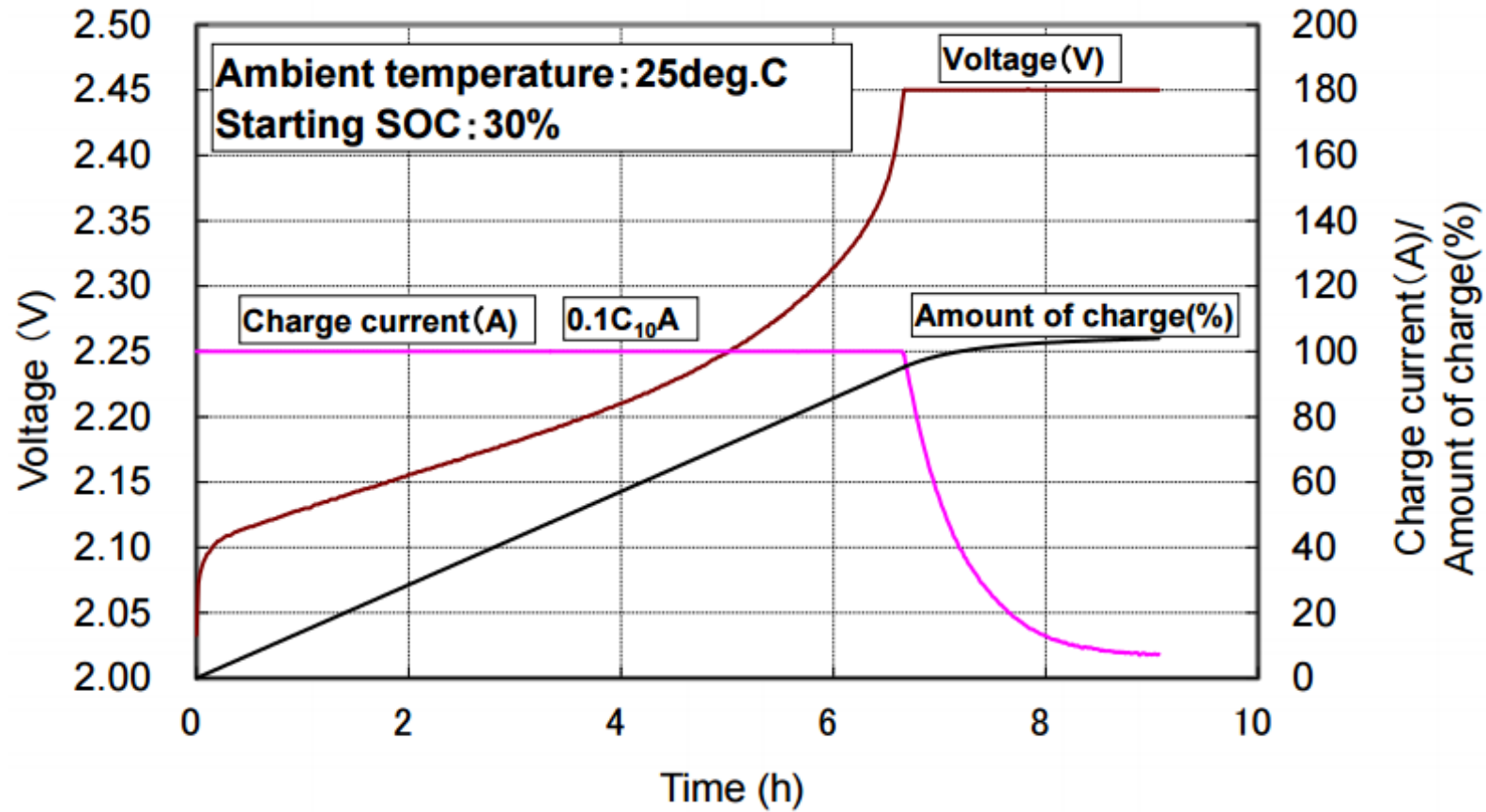


40 foot standard container

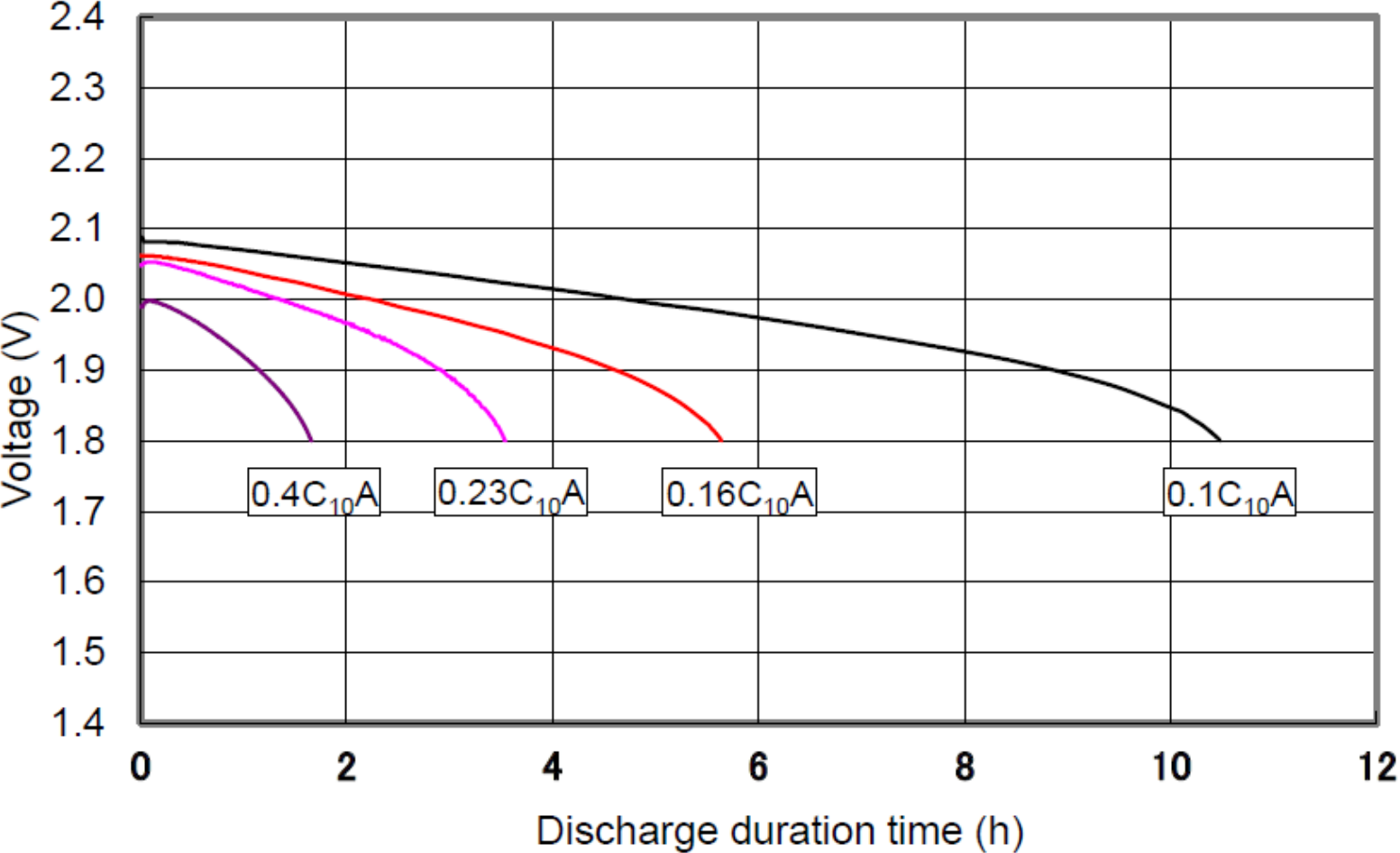
# Cycle Life of FCP Products



# Charge Characteristics of FCP-1000



# Discharge Characteristics of FCP-1000



# Advantage of FCP Products

Item	Illustration	FCP (cycle)	GNB	Lithium
Cycle Life	FCP has longer cycle life than conventional lead acid battery in PSOC application.	Good	Normal	Average
Temperature	Ability to operate to an environment above 28°C.	Good	Normal	Normal
Space Saving	The modular design and installation of FCP can effectively save space.	Average	Normal	Average
Equalization	The equalization circuit is not needed for FCP. The equalization charge can be carried out per 1 or 2 weeks.	Average	Average	Good
Safety	Superior safety performance. Low fire risk when overcharged. No need of extra protection circuit for FCP.	Good	Good	Normal
Well-adapted	This products can be used at area of poor electricity	Good	Normal	Average
Cost	Lower OPEX base on the cycle life and maintain cost	Good	Normal	Normal

# Comparison With Other Lead-Acid Batteries

Battery Type	Cycle Life	PSOC	Efficiency	Maximum Current	Cost
FCP	****	****	****	****	***
OPzV	***	***	*	*	**
Gel Battery (Flat Plate)	**	**	**	**	***
Conventional AGM Battery	*	*	***	***	*

From High to Low \*\*\*\* → \*

# Why Choose FCP ?

## Single Cell Technical Parameters

Test at 25°C		FCP-500	FCP-1000	Standard AGM
Nominal Voltage		2V	2V	2V
Nominal Capacity @25°C		500Ah(C <sub>10</sub> )	1,000Ah(C <sub>10</sub> )	1,000Ah
Nominal Capacity		1,000Wh	2,000Wh	2,000Wh
Weight		41kg (90lbs)	75kg (165lbs)	56kg (124lbs)
Dimension	Height	508mm (20")	508mm (20")	218mm (8.6")
	Width	172mm (6.8")	172mm (6.8")	670mm (26.4")
	Length	166mm (6.5")	303mm (11.9")	737mm (29")

# Why Choose FCP ?

## Module Technical Parameters

Test at 25°C		FCP-500-12	FCP-1000-12	Standard AGM
Nominal Voltage		12VDC	12VDC	12VDC
Nominal Capacity @25°C		500Ah(C <sub>10</sub> )	1,000Ah(C <sub>10</sub> )	1,000Ah
Weight		260kg (573lbs)	500kg (1,102lbs)	468kg (1,032lbs)
Cycle Time		3,500 Times	3,500 Times	1,200 Times
Shelf Life @		8 Months	8 Months	6 Months
Self Discharge Rate/Month		< 2%	< 2%	< 4%
DOD		80%	80%	80%
Temperature	Charge	0 ~ 40°C	0 ~ 40°C	0 ~ 28 °C
	Discharge	-15 ~ 45°C	-15 ~ 45°C	-15 ~ 28 °C
	Storage	-15 ~ 40°C	-15 ~ 40°C	-15 ~ 28 °C
Charge	Charge Voltage	14.4VDC (2.40V/cell)	14.4VDC (2.40V/cell)	14.1VDC (2.35V/cell)
	Voltage Range	14.4VDC ~ 10.8VDC	14.4VDC ~ 10.8VDC	14.1VDC ~ 10.8VDC
	Temperature Coefficient	-30mV/°C	-30mV/°C	-30mV/°C



# Potential Markets For FCP-type

- ▶ Renewable energy (Wind Power, Photovoltaic Power)
- ▶ Backup Power System demanding long deep cycle life of battery due to poor supply conditions.
- ▶ Factory, Building, Hospital
- ▶ Power Distribution Station
- ▶ Smart Community
- ▶ Micro Grid
- ▶ Railway
- ▶ Telecom



# FCP Battery Application Case

## Out of China (Example)

- ▶ 150KW Grid-Connected Energy Storage Projects of M&S Logistics Park
- ▶ Location - Peterborough, British
- ▶ PV - 1MW
- ▶ Model - FCP1000 (Lead Carbon Batteries)
- ▶ Quantity - 572pcs
- ▶ Launch Time - July 2016



# Main Users



NEPAL TELECOM



NETIA





**Azimuth  
Solar  
Products Inc.**

**THANK YOU**

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