misum

MISUMSYSTECH

Specially Customized
BATTERY PACK & BMS
EQUIPMENT

Misum Systech

pursues powerful and profitable enterprise

We specialize in developing and producing the battery pack and battery management system which control life time, protecting and monitoring of rechargeable battery. Our technology based on developing test equipment (Battery pack, BMS, PCM, SM) for inspecting protection module to doable calibration, function test, and system protection. Through continuous research and development of our technology, we developed and improved battery feature, safety and longer life time for high voltage and high capacity BMS and battery pack which is applicable to Electric Vehicle, Smart Grids and etc. Now, we are ready to supply the existing high level of products.
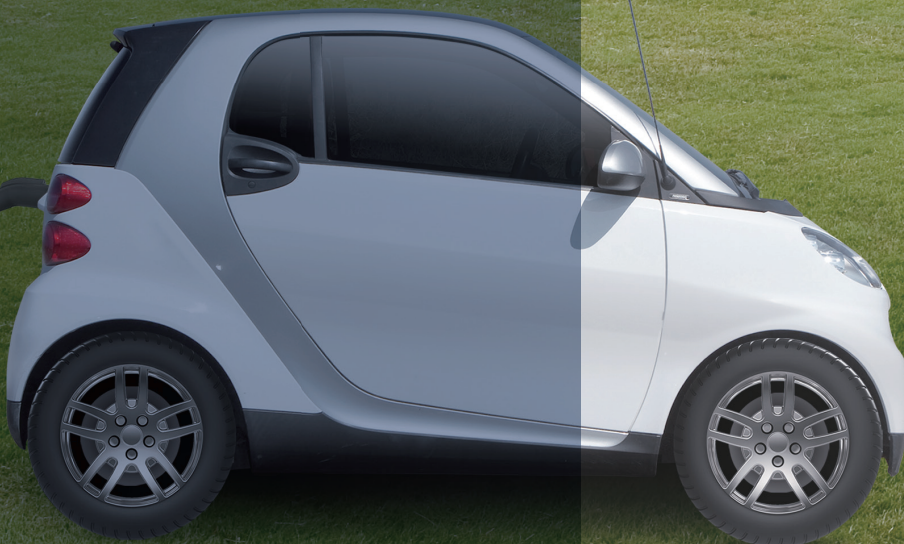
History

2017
Developed Travel Adopter Tester
Developed 2kWh Kickboard battery pack (18650cell)

2016
Developed 1Cell Dual PCM Test Equipment
Developed HV Block 3S (with Slave 240S) NANI BMS

2015
Developed 74V, 75Ah Golf cart BMS
Developed 72V, 63Ah e-Scooter battery pack (18650cell)

2014
Developed 3kWh battery pack (18650Cell)
Developed BMS Tester (4~24Series)

2013
Developed NFC test equipment for smart phone
Developed UPS BMS with AC impedance (8, 16, 30cell)

2012
Developed QTP-BUS BMS
Developed PCM test equipment for i-phone5

2011
Developed BMS for hybrid tractor (for 300V)
Developed BMS for electric bus (for 684V)

2010
Developed 1Cell PCM Test Equipment
Developed 2~4Cell Smart Module PCM Test Equipment

2009
Developed PCM for mobile phone repeater
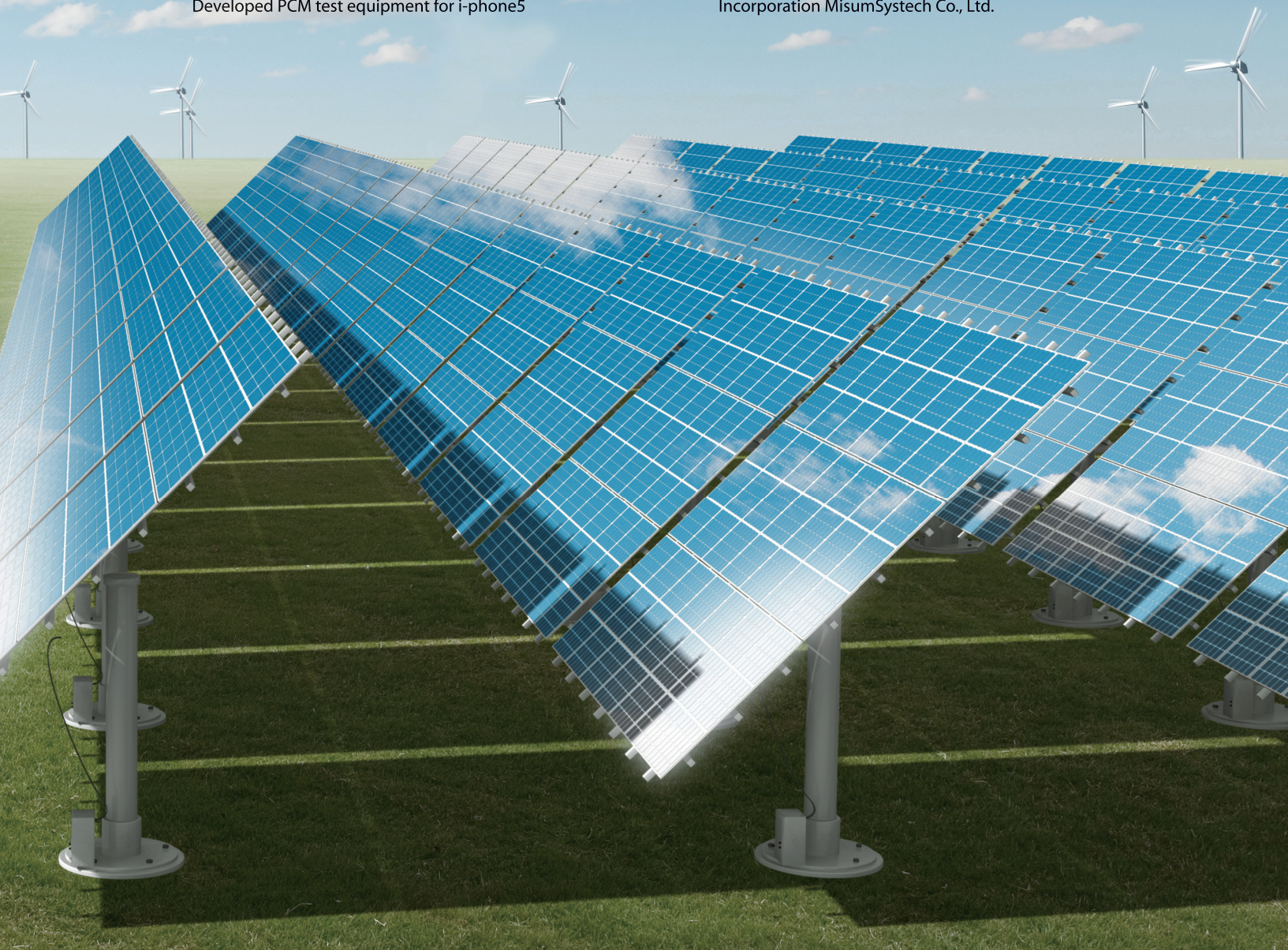Developed BMS for UPS of power source equipment (73cell)

2008
Developed BMS test equipment for hybrid vehicle
Developed Solar tracking system for solar station (1MWh)

2007
Developed smart module test equipment for 2~4cell
Developed BMS for e-Bike

2006
Developed PCM test equipment for 1cell
Incorporation MisumSystech Co., Ltd.

Business Area & Capability

▶ Cell

- ▶ Spot Welding
- ▶ Laser Welding

▶ BMS

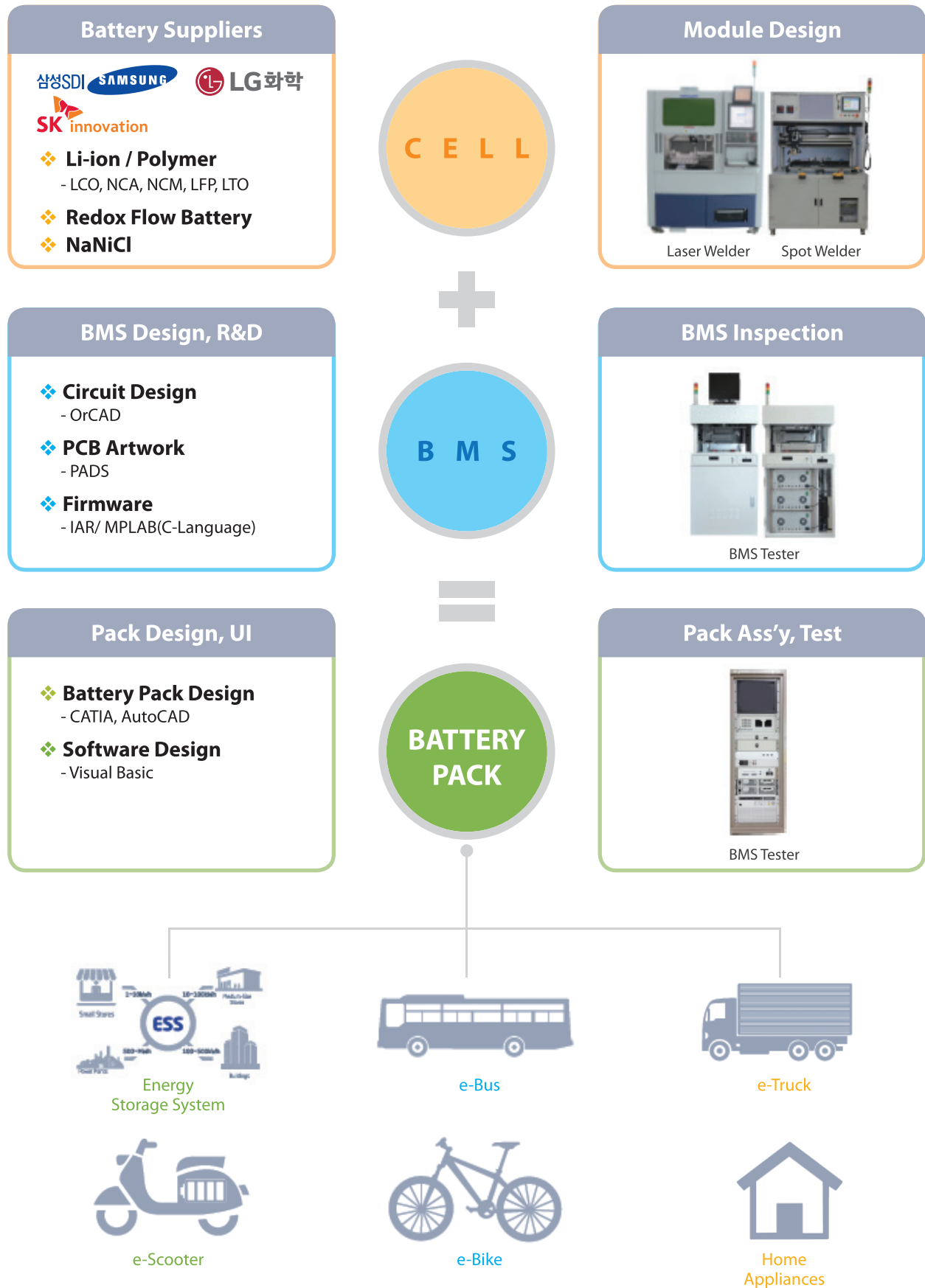| Capability	Description
Circuit Design	OrCAD
PCB Artwork	PADS
Firmware Design	IAR / MPLAB(C-Language)
F/W Write & Calibration	BMS Tester(MS-159)
Function Test	BMS Tester(MS-159)

▶ Battery Pack

Capability	Description
Battery Pack Design	CATIA, AutoCAD
Software Design	Visual Basic
Communication	CAN, RS-485, TCP/IP
Battery Pack Test	Pack Tester(MS-166)

▶ ETC

Capability	Description
Research Institute	MisumSystech has many researchers with more than 10 years experience
Software Design	MisumSystech has automatic product line that can cover massive product
Battery Pack Test	MisumSystech has a variety of equipment for reliabillty test

Battery Suppliers

삼성SDI SAMSUNG LG화학
SK innovation

❖ **Li-ion / Polymer**
 - LCO, NCA, NCM, LFP, LTO

❖ **Redox Flow Battery**
❖ **NaNiCl**

Module Design

Laser Welder   Spot Welder

BMS Design, R&D

❖ **Circuit Design**
 - OrCAD

❖ **PCB Artwork**
 - PADS

❖ **Firmware**
 - IAR/ MPLAB(C-Language)

BMS Inspection

BMS Tester

Pack Design, UI

❖ **Battery Pack Design**
 - CATIA, AutoCAD

❖ **Software Design**
 - Visual Basic

Pack Ass'y, Test

BMS Tester

C E L L

+

B M S

=

BATTERY PACK

Energy
Storage System

e-Bus

e-Truck

e-Scooter

e-Bike

Home
Appliances

Battery Pack

Use our thermal management technology to effectively utilization and maximizing efficiency of battery which apply to high capacity battery as HEV, PHEV, E-BUS, UPS, and E-Scooter. We can configure in a series, parallel or a mixture of both to deliver the desired voltage, capacity, or power density.

Cordless Mop Cleaner

▎**Cell** : Li-ion 18650 (NCM)
▎**Capacity** : 31.6Wh (14.4V/2.2Ah)
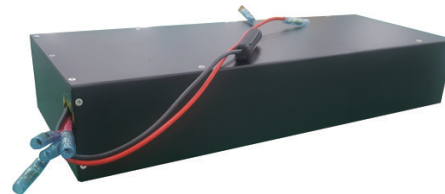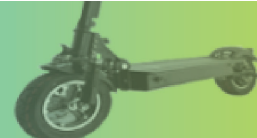▎**Configuration** : 4S1P
▎Protection Circuit Module

Lawn Trimmer

▎**Cell** : Li-ion 18650 (NCM)
▎**Capacity** : 118.8Wh (18V/6.6Ah)
▎**Configuration** : 5S3P
▎Protection Circuit Module

e-Bike

▎**Cell** : Li-ion 18650 (NCM)
▎**Capacity** : 378Wh (36V/10.5Ah)
▎**Configuration** : 10S3P
▎Protection Circuit Module

Kickboard

▎**Cell** : Li-ion 18650 (NCM)
▎**Capacity** : 1.2kWh (50.4V/24.0Ah)
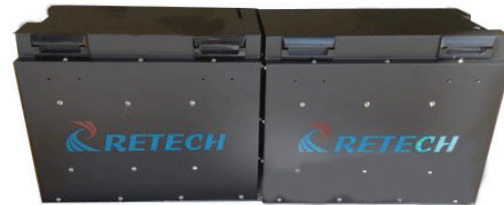▎**Configuration** : 14S8P
▎Protection Circuit Module

e-Scooter

- **Cell** : Li-ion 18650 (NCA)
- **Capacity** : 2.16kWh (72V/30Ah)
- **Configuration** : 20S10P
- Battery Management System

Road Sweeper

- **Cell** : Li-ion 18650 (NCM)
- **Capacity** : 24kWh (48V, 461Ah)
- **Configuration** : 7S162P x 2 Packs
- Battery Management System

Micro Mobility

- **Cell** : Li-ion 18650 (NCM)
- **Capacity** : 6.11kWh (51.1V, 119.7Ah)
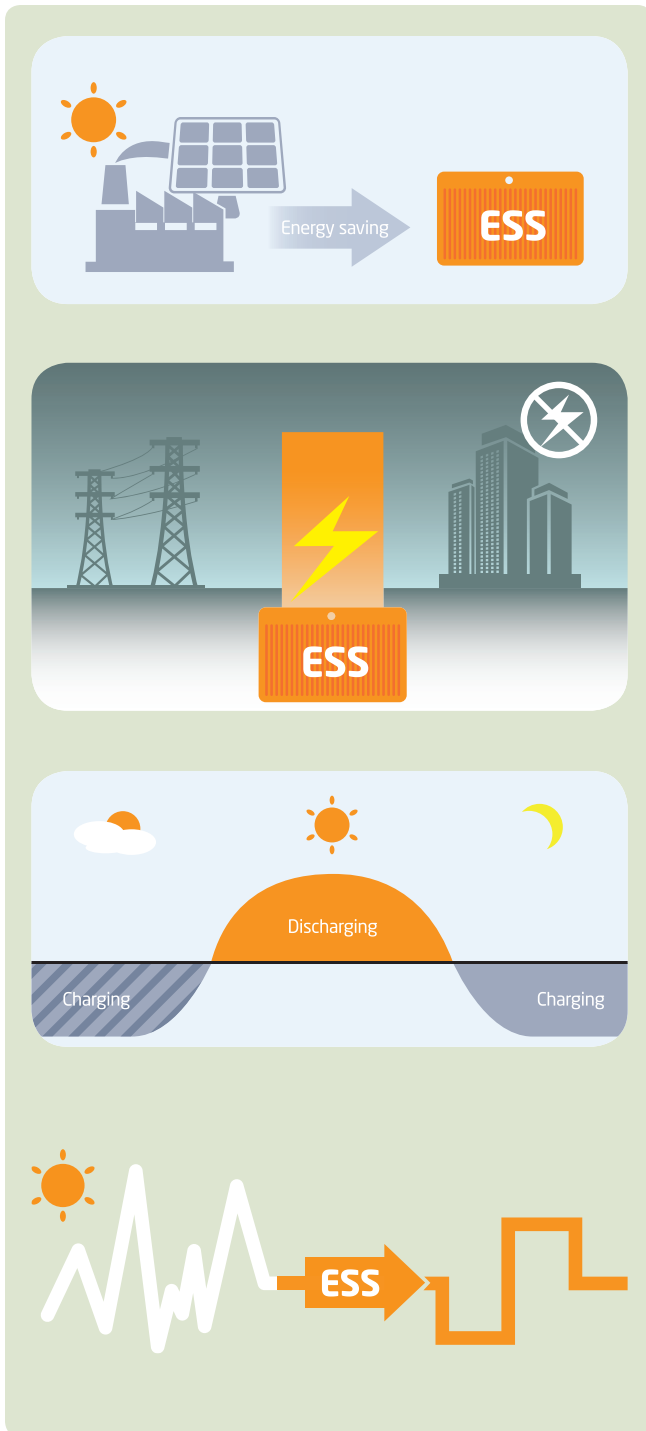- **Configuration** : 14S42P
- Battery Management System

Golf Cart

- **Cell** : Li-ion 18650 (NCM)
- **Capacity** : 5.8kWh (51.1V/114Ah)
- **Configuration** : 14S40P
- Battery Management System

ESS(Energy Storage System)

We offer wide range of Energy Storage System from kWh for residence
use to MWh for Smart Grid and utility industry.

Why need ESS?

Why need ESS?

We developed an effective and
efficient approach that enables energy
produced by either thermal generation or
wind / solar renewable sources to be stored.

Risk of power outages

Energy storage fundamentally improves the
way we generate, deliver, and consume electricity.
Energy storage helps during emergencies like power
outages from storms, equipment failures
and many other reasons.

Peak Shaving and Load leveling?

With our wide range of Energy Storage System
that is saved electricity in low demand and use
thstored electrical energy in peak time of hign
demand

Clean Energy integration and energy independence

its ability to balance power supply and
demand instantaneously which makes power
networks more resilient, efficient and cleaner.

Numerical Analysis on Improvement of Cooling Effects in Battery Pack using ANSYS v13.0

ESS Application

1~10kWh

Homes Small Stores

10~100kWh

Medium-Size Stores Schools / Community Centers (Fire Stations)

500~MWh

Solar / Wind Power Power Plants

ESS
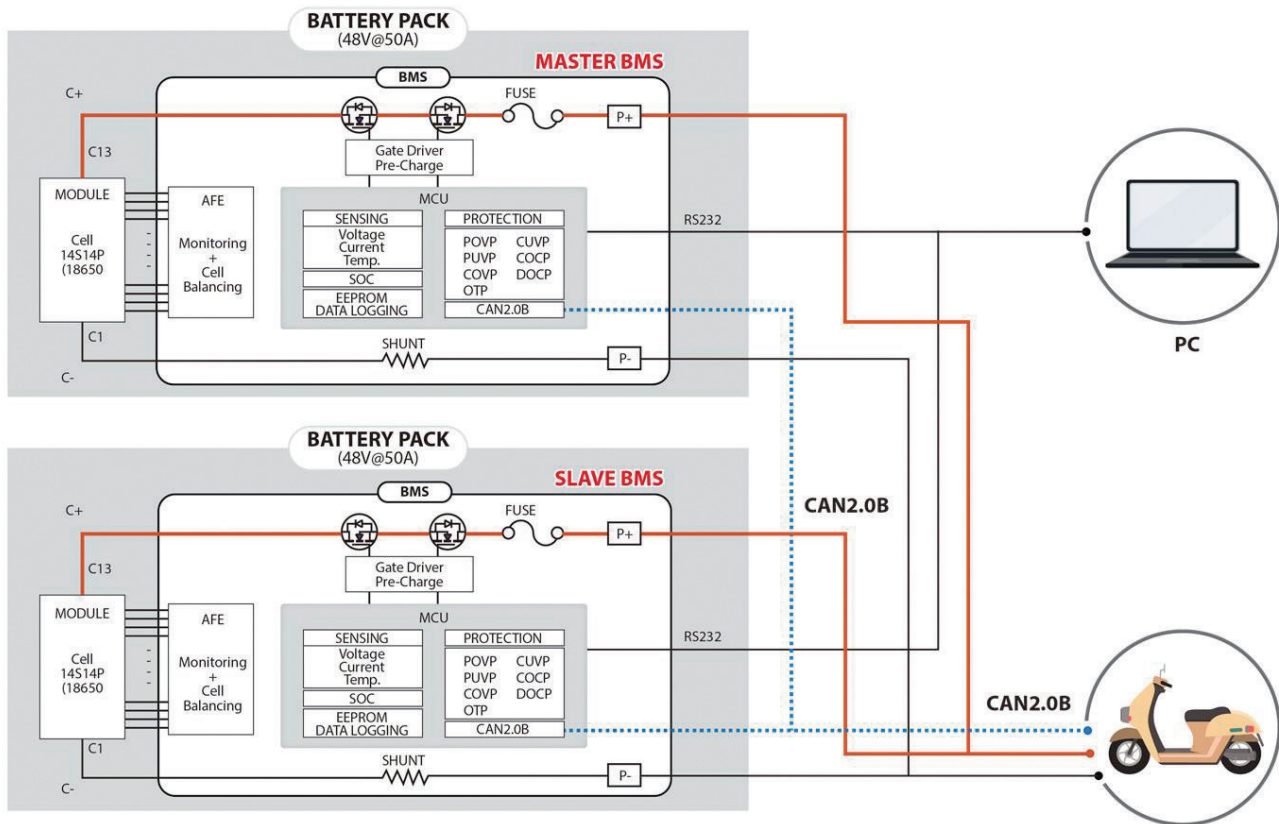
100~500kWh

Buildings Factories

Residence and Commercial   Industrial   UPS Utility Solution

BMS(Battery Management System)

Monitoring charging / discharging status of battery in UPS and EV / HEV system.
Management system which calculates charging status and increases a battery life
time; by cell unit measurement of voltage, current and temperature

Main Function

- OVP, UVP, OCP, OTP, Short Circuit
- Cell Balancing
- Power down
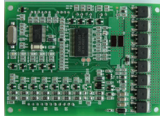- Calculate SOC/SOH
- Communication : CAN, RS-485 etc.
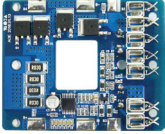
Application

- EV, HEV, PHEV, NEV
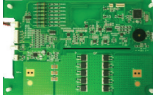- e-Bus, e-Tractor, e-Scooter, e-Bike
- UPS, Golf Cart

BMS & PCM Line-up
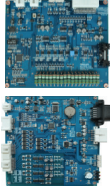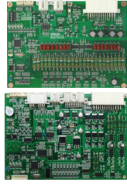
Model	MS-501	MS-711	MS-713	MS-1401	MS-2007	MS-701
Appearance						
Cell	18650	18650	18650	18650	18650	NMC
Series	5S	7S	7~8S	14S	20S22P	7S
Continuous Current [A]	20	10	6	200	20	3
Puise current [A]	50	20	18	300	120	16
Pack Over Voltage Prtection [A]	21.38	29.75	29.05~36	57.40	85	29.4
Pack Under Voltage Protection [A]	12.25	17.5	9.8~23.2	39.20	60	18.9
Cell Over Voltage Prtection [A]	4.275	4.25	4.15~4.5	4.10	4.25	4.2
Cell Under Voltage Prtection [A]	2.45	2.5	1.4~2.9	2.80	3	2.7
Charge OverCurrent Protection [A]	-	-	-	45	25	-
Discgarge Over Protection [A]	30	80	20~60	300	120	8
Short Current Protection	120	120	120	-	600	40
Voltage Sensing	PIC	AFC	AFC	AFC	-	PIC
Current Sensing	FET Rds_on	Shunt R	Shunt R	Hall CT	Shunt R	Shunt R
Themistor	x	1	2	8	4	x
Communication	-	12C	RS-242C	CAN	CAN, R5-232C	-
Cut off switch	N-CH MOSFET	P-CH MOSFET	P-CH MOSFET	Relay	-	P-CH MOSFET
MCU	-	-	-	-	PIC	-
FAN	-	-	-	o	-	-
Cell Balancing[mA]	-	10	10	10	30	-
PCB Size (W x L x T)	63x51x2	113x71.5x1.6	91x65x1.6	200x120x1.6	220x130x1.6	33x68x1.6
Application	Brush cutter	E-Bike	E-Bike	E-trikle	E-Scooter	Repeater
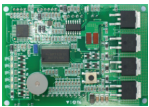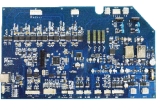
BMS & PCM Line-up

Model	MS-501	MS-711		MS-713	MS-1401	MS-2007	MS-701
Appearance							
Cell	NMC	NMC		NMC	NMC	NMC	NMC
Series	7S	10S	13S	20S	73S	90S	96S2P
Continuous Current [A]	30	80		100	150	400	210
Puise current [A]	60	300		850	300	424	294
Pack Over Voltage Prtection [A]	29.58	42.50	55.25	85	304.6	378	408
Pack Under Voltage Protection [A]	17.50	27.50	35.80	61	209.7	270	264
Cell Over Voltage Prtection [A]	4.23	4.33		4.25	4.18	4.20	4.25
Cell Under Voltage Prtection [A]	250	–		3.05	288	310	2.75
Charge OverCurrent Protection [A]	10	100		250	19	80	90
Discgarge Over Protection [A]	35	150		160	120	410	220
Short Current Protection	200	–		435	–	–	–
Voltage Sensing	Cap Charging	PIC		AFC	Cap Charging	AFC	AFC
Current Sensing	Shunt R	Shunt R		Shunt R	–	Hall CT	Hall CT
Themistor	1	1		20	37	–	4
Communication	RS-232C	RS-232C		RS-242C	RS-232C	CAN, RS-232C	CAN, RS-232C
Cut off switch	N-CH MOSFET	N-CH MOSFET		–	Relay	Relay	Relay
MCU	ATmel	ATmel		–	ATmel	PIC	PIC
FAN	o	o		–	o	o	o
Cell Balancing[mA]	3	–		–	60	–	o
PCB Size (W x L x T)	165x258.5x2	205.5x112x1.6		330x180x1.6	270x170x1.6	190x180x1.6 165x140x1.6	176x121x1.6
Application	Repeater	E-Scooter		Golf Cart	UPS	EV	Mini Car

MS-712	MS-1602	MS-2003	MS-2401M	MS-101	MS-1003	MS-2405
LFP	LFP	LFP	LFP	Lead acid	Zn-Br Redox Battery	NaNi
8S	16S	20S3P	24S4P	8S,16S,30S	10S(Stack)	HV Block 3S (with Slave 240S)
5	200	120	30	-	70	17.1
20	300	300	50	-	-	38
31	51.60	74	345.60	-	1200	696
15.60	40	46	249.60	-	1000	456
3.88	3.60	3.80	3.60	-	120	2.9
1.95	2.50	2.20	2.60	-	100	1.9
3.3	160	60	25	-	120	20
3.3	300	120	25	-	120	20
10	-	360	-	-	-	-
AFC	Cap Charging	AFC	-	-	Cap Charging	Cap Charging
Shunt R	Hall CT	Shunt R	Hall CT	Hall CT	Hall CT	Hall CT, Shunt R
-	2	5	6	-	5	6(PT-1000) 2(PTC)
RS-232C	CAN	CAN, RS-232C	CAN, RS-232C	MODBUS, RS-485	RS485, RS-232C,CAN	RS485, CAN TCP/IP
P-CH MOSFET	Relay	-	Relay	-	Relay	Relay
PIC	-	ATmel	ATmel	PIC	ATmel	STMicro
-	O	-	-	-	2	-
10	-	54	40	100	120	-
85x59x1.6	180x120x1.6	218x157x1.6	171x121x1.6	128x117x1.6 105x61x17	250x200x1.6	185x310x1.6
Solar Street Lamps	ESS	E-Bus	Hybrid Tractor	UPS	ESS	ESS

PCM Function Tester
IFTS-DPB(MS-177-2Ch / 20Ch)

This equipment is used for PCM function test to check thestate ofsingle IC PCM as well as dual IC PCM. It is applied for only 1Cell PCM and can consist ofup to 40 Channels

RS-232

PC   **MS-177 (20Ch)**   **Fixture**

Model		IFTS-CM
Dimensions	435(W)X500(D) X266(H)	3U Case 2Ch, 6U Case 20Ch
Weight	30kg	
Power	AC220V 1Φ, 50/60Hz	AC220V ±15%
Maximum power Consumption	Max. 1.6kW	
Maximun out voltage	DC5V	Variable
Maximum out current	20A/Channel	Variable
Voltage Output Accuracy	±0.05%RD + 1mV	
Current Output Accuracy	±0.1%RD +2mA	

Main Features

- IR, HDQ Voltage, CC
- IR – Vddvariable function
- Power pattern Via Hole inspection
- OVP, UVP, OCV, OCPV, IDR/THR
- PCM circuit R1, R2, C1, C2, C3 inspection

- 1Cell inspection& Max. 40Ch(20Ch x 2EA)
- Data Flash Image Write, Serial No. &Mfr Write
- Data Flash (EEPROM) Read/Verify, HDQ Confirm
- Impressed current of equipment monitoring (16bits)
- Short test (Max. 15A) : gradually applied to each channel

Proven Performance

- Texas Instruments, Seiko, Mitsumi, Hitachi, Ricoh IC test
- Samsung, LG, Apple, Nokia, Motorola Inspection

Application

Mobile Phone, MP3, Bluetooth

Smart Module F/W & Calibration Tester

UBTS-SM(MS-134-1Ch/10Ch)

This equipment is used for Firmware Write and Calibration for Smart Module PCM.
Through this inspection, secure quality for mass production and development.

RS-232

PC   **MS-134 (10Ch)**   **Fixture**

Model		UBTS-SM
Dimensions	435(W) X 500(D) X 220(H)	5U Case, 10Ch
Weight	24kg	
Power	AC220V 1Φ, 50/60Hz	AC220V ±15%
Maximum power Consumption	800W	
Maximun out voltage	DC5V~20V	Variable
Maximum out current	20A/ Channel	Variable
Voltage Output Accuracy	±0.05%RD + 1mV	
Current Output Accuracy	±0.1%RD +2mA	

Main Features

- Firmware Write/Verify
- Data Flash Write/Verify
- Current Gain Calibration
- Voltage Gain Calibration
- Initial C/V Offset calibration

- Temperature Offset Calibration
- Accuracy Voltage/Current/Temperature
- 3~4Cell Inspection & Max 60Ch(10Ch x 6EA)

Proven Performance

- Texas Instruments, Maxim-Dallas, Renesas IC

Application

Notebook, Camcorder, Digital Camera,
PDA, PMP, Power Tool

Smart Module Function Tester
IFTS-SM(MS-139-1Ch/10Ch)

This equipment is used for inspecting the current, voltage and temperature of Smart Module in lap top battery. It can do EEPROM data read / verify.

RS-232C

| PC | MS-134 (10Ch) | Fixture |

Model		IFTS-SM
Dimensions	435(W) X 500(D) X 266(H)	6U Case, 10Ch
Weight	24kg	
Power	AC220Vrms, 1Φ, 50/60Hz	AC220V ±10%
Maximum power Consumption	800W	
Maximun out voltage	DC5V	Variable
Maximum out current	20A / Channel	Variable
Voltage Output Accuracy	±0.05%RD + 1mV	
Current Output Accuracy	±0.1%RD +2mA	

Main Features

- CC, SCC
- IDR & THR
- Bank current
- 2nd Protection
- OVP, UVP, OCP

- Data FlashRead/Verify
- Serial Number Write/Verify
- Charge / discharge FET Control
- Accuracy Voltage/Current/Temperature
- 2~ 4 Cell inspections& Max. 60Ch (10Ch x 6EA)

Proven Performance

- Texas Instruments, Maxim-Dallas, Renesas IC

Application

Notebook, Camcorder, Digital Camera, PDA, PMP, Power Tool

IFTS-BM(MS-159-1Ch/3Ch)

This equipment used for F/W writing, Calibration and function test. It inspect current, voltage protection mode, consumption current and cell balancing measurement to check the state of BMS and applied to the full inspection and mass production.
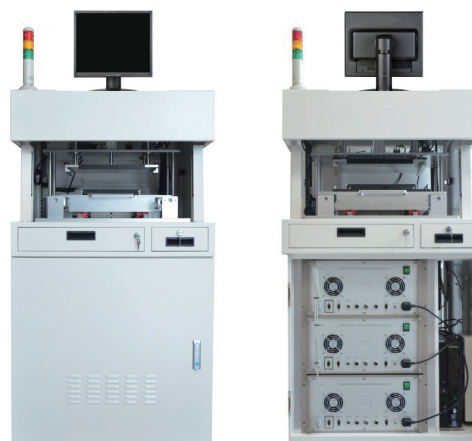
MS-159 (1Ch)   **MS-159 (3Ch)**

Model		IFTS-BM
Dimensions	435(W) X 500(D) X 220(H) 750(W) X 800(D) X 1500(H)	5U Case 1Ch 31U Case 3Ch
Weight	15kg / 120Kg	
Power	AC220V 1Φ, 50/60Hz	AC220V ±15%
Maximum power Consumption	Max. 1.6kW	
Maximun out voltage	Cell	DC5V	Variable
	Pack	DC72V (24Series)	Variable
Maximum out current		70A/Channel	Variable
Voltage Output Accuracy		±0.05%RD + 1mV	
Current Output Accuracy		±0.1%RD +2mA	

▶ Main Features

LED	Accuracy Voltage	COVP, CUVP, POVP, PUVP
Balancing	Accuracy Temperature	COCP, DOCP, COVP, DOVP
IDR / THR	Manufacture Date	Wake Up & Initialization
VCC / VPWR	Calibration Voltage	Over / Under Temperature
Firmware Write	Calibration Current	
Accuracy Current	Consumption Current	

▶ Application

Power Tool, e-bike, Robot cleaner and etc

Mobile Battery Pack Function Tester

UPTS-CM(MS-152-1Ch/4Ch)

This equipment is used for inspecting condition of cell or pack through charge/discharge operation, to make a precise measurement of performance characteristic, consumption current, ID/TH Resistor, initial resistance. Depends on the setting value, OK or NG will displayed.

RS-232C

Application Software

MS-152 (1Ch)

Pack   **Barcode Reader**

RS-232C

Model		UPTS-CM
Dimensions	435(W) X 530(D) X 135(H) (CM)	3U Case, 1Ch
Weight	19.4kg(CM) / 17Kg(O2)	
Power	AC220Vrms, 1Φ, 50/60Hz	AC220V ±10%
Maximum power Consumption	1.2kWh	
Maximun out voltage	DC5V	Variable
Maximum out current	20A / Channel	Variable
Voltage Output Accuracy	±0.05%RD + 1mV	
Current Output Accuracy	±0.1%RD +2mA	

Main Features

- THR, IR, SAR
- Insulation Voltage
- OCV, CCCV, DCCV, DOCP, VDQ
- Calibration and Accuracy Test

- 1~2 Li-ion Pack inspection & Max 4Ch
- Pack Serial Number Information, Result Display

Proven Performance

Texas Instruments, Maxim-Dallas

Application

Mobile Phone Battery Pack, Notebook Battery Pack

UPTS-SM(MS-154-1Ch/4Ch)

This equipment is used for inspecting condition of cell or pack through charge/discharge operation, to make a precise measurement of performance characteristic, consumption current, ID/TH Resistor, initial resistance. Depends on the setting value, OK or NG will displayed

UPTS-SM(1Ch)   **UPTS-SM(4Ch)**   **Fixture**

Model		UPTS-SM
Dimensions	435(W) X 530(D) X 88(H)	2U Case, 1Ch
Weight	10Kg / 120Kg	
Power	AC220V 1Φ, 50/60Hz	AC220V ±15%
Maximum power Consumption	Max. 1.5kW	
Maximun out voltage	DC10V	Variable
Maximum out current	15A/ Channel	Variable
Voltage Output Accuracy	±0.05%RD + 1mV	
Current Output Accuracy	±0.1%RD +2mA	

▶ Pack test items

- IDR, IR, THR, SAR
- CCCV, DCCV, COCP, DOCP
- OCV1: Beginning of Charge
- OCV2: Charge Signal
- CCCV, DCCV, COCP, DOCP
- Communication: HDQ, SDQ, i2c

▶ EEPROM test items

- ACC. Voltage
- ACC. Temp
- ACC. Current
- EEPROM Write/Read
- Barcode Write/Read
- SBData-Standard : Standard SBS Commands
- SBData - Extended : Extended SBS Commands

Travel Adapter Function Tester

SFTS-TA(MS-165-1Ch/10Ch)

This equipment is used for inspecting state of travel adapterthroughAC Input & DC output. Depends on the setting value, OK or NG will displayed.

RS-232C

MS-165 (10Ch)

PC

APS-7100

Fixture
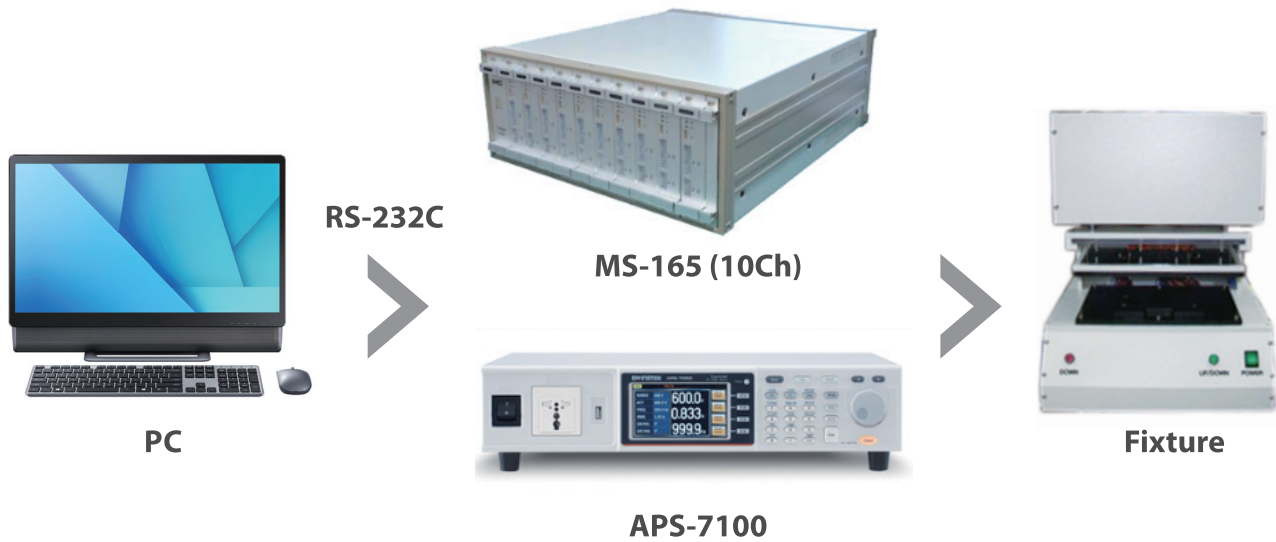
Model		SFTS-TA
Dimensions	440(W) X 500(D) X 180(H)	4U Case, 10Ch
Weight	8kg	
Power	AC220V 1Φ, 50 / 60Hz	AC220V ±15%
Maximum power Consumption	Max. 1.5kW	
Maximun out voltage	AC 310V	Variable
Maximum out current	8.4A / Channel	Variable

Main Features

- DC Voltage
- DC Current
- DC Ripple & Noise
- AC Voltage
- AC Current

- AC Power
- Efficiency
- Rise Time
- AFC(Adaptive Fast Charging)
- QC(Quick Charge 2.0, 3.0)

Earphone Function Tester
SFTS-EP(MS-158-1Ch/ 10Ch)

This equipment is used for inspecting state of earphonethroughmeasurement of resistor, consumption current and sensivity. Depends on the setting value, OK or NG will displayed.

RS-232C
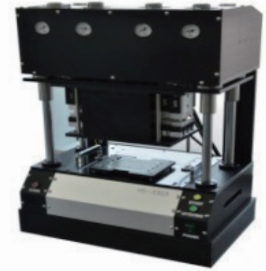
PC **MS-158 (10Ch)** **Fixture**

Model		SFTS-NF
Dimensions	440(W) X 500(D) X 180(H)	4U Case, 10Ch
Weight	8Kg	
Power	AC220V 1Φ, 50 / 60Hz	AC220V ±15%
Maximum power Consumption	Max. 1.5kW	
Maximun out voltage	DC 12V	Variable
Maximum out current	6.5A	Variable

▶ Main Features

- ON/OFF Switch Resistor   - MIC Sensitivity
- Down Switch Resistor   - Diode
- UP Switch Resistor
- Consumption Current

Business Partners

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삼성SDI SAMSUNG

LG LG화학

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SK innovation

LS Mtron

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