



MISUM SYSTECH

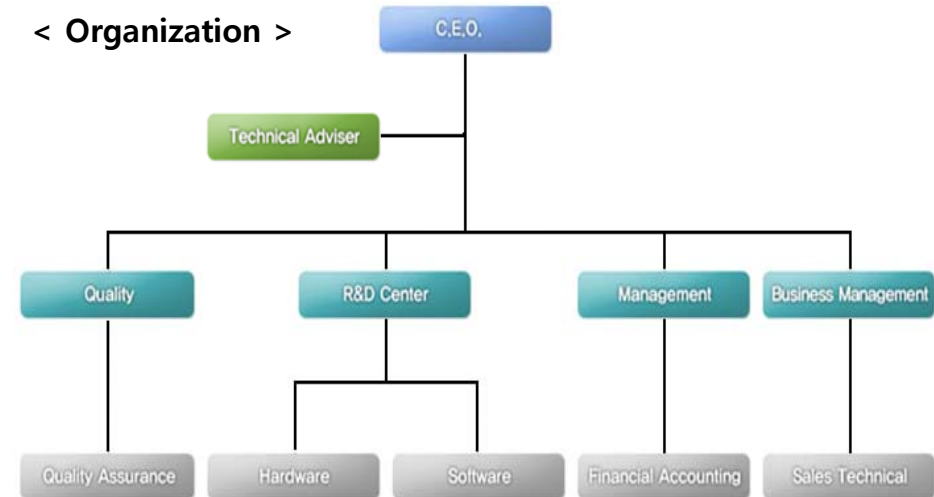
Battery Management & Test System

Company Profile

BMS & Tester



< Organization >



- ❖ Established Year : 2006
- ❖ Located in Anyang City, KOREA
- ❖ Business Item :
 - . Battery Management System(BMS)
 - . Battery Test Equipment
 - . Solar Tracking System
 - . Motor Controller

Company History

BMS & Tester

2006

Misum Systech Co.,Ltd established

Developed the test equipment (40ch) PCM of cellular phone



2007

Developed the test equipment (7, 10, 13-cell) of EV & Scooter BMS.



2008

Developed the Solar tracking system used in Solar power plant (1MWh).



Developed the test equipment (108-cell) of HEV BMS



Developed the test equipment (4cell) of Notebook SCM



2009

Developed the BMS (73-cell) of UPS



2010

Got Certification of ISO 9001/14001, Venture & INNO BIZ



Company Certification

BMS & Tester

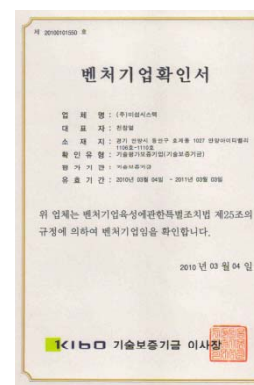
ISO9001



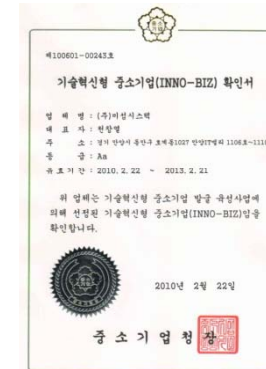
ISO14001



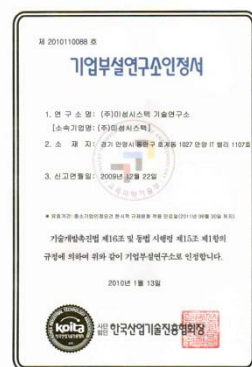
Venture



INNO-BIZ



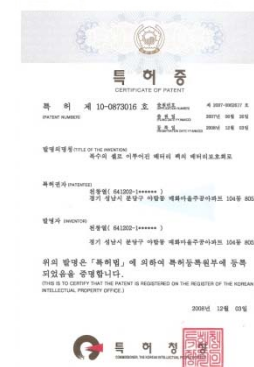
R&D



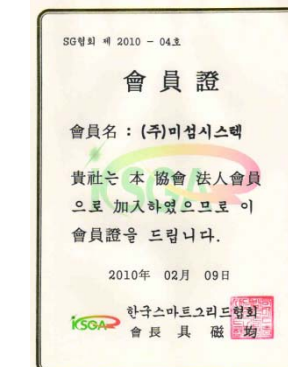
Registration



Patent



Smart Grid



Why use BMS?

- ❖ Battery is not a stable voltage source, so it is necessary to know its status , especially to be used HEV(EV).

The screenshot displays the ADVISOR 2002 software interface. On the left, there is a 'Vehicle Input' section with a top-down diagram of a car and a plot titled 'Fuel Converter Operation Prius.pn 1.5L (43kW) from FEA model and ANL test data'. The plot shows Torque (Nm) on the y-axis (0 to 120) versus Speed (rpm) on the x-axis (0 to 4000). Several efficiency curves are plotted, labeled with efficiency values: 0.45, 0.4, 0.36, 0.3, 0.25, 0.2, 0.15, and 0.15. The right side of the interface is a parameter configuration table for various vehicle components.

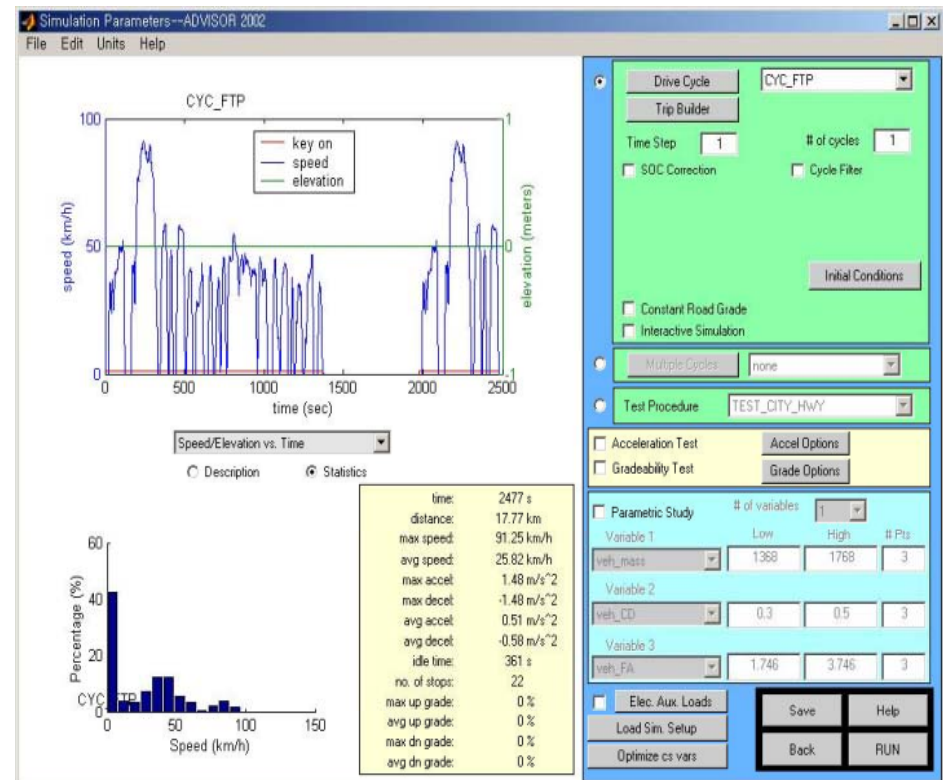
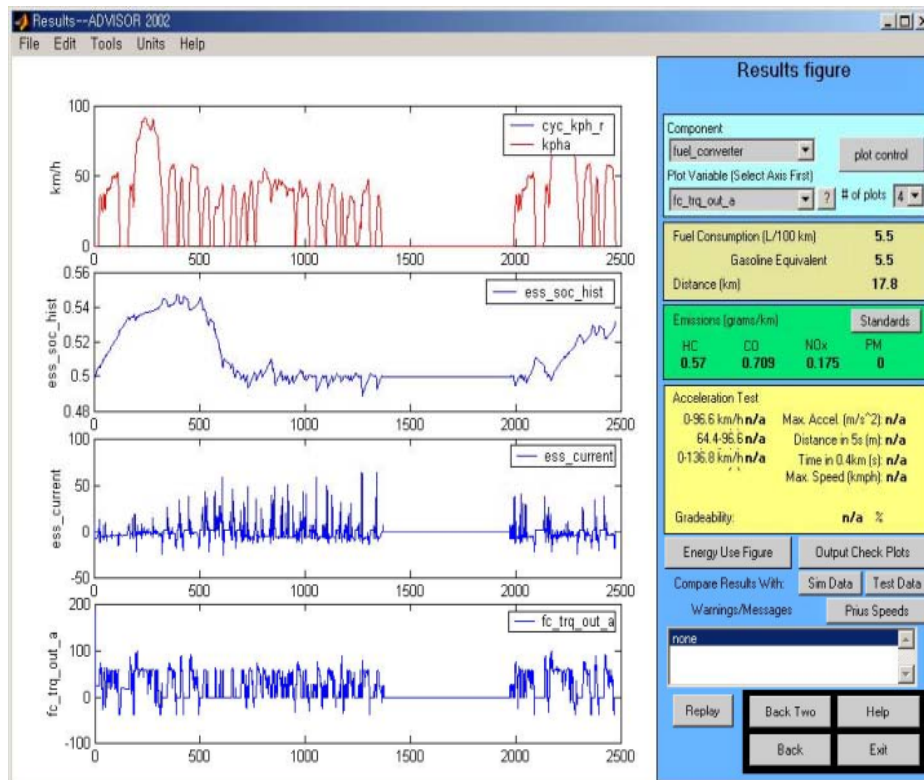
Component	version	type	max pwr (kW)	peak eff	mass (kg)
Vehicle	?	VEH_PRIUS_JPN			918
Fuel Converter	ic	si	43	0.39	137
Exhaust Aftertreat	?	EX_SI			11
Energy Storage	nimh	ESS_NIMH6	40	308	40
Energy Storage 2	?	ess 2 options			
Motor	?	MC_PRIUS_JPN	31	0.91	57
Motor 2	?	motor 2 options			
Starter	?	starter options			
Generator	reg	reg	15	0.84	33
Transmission	pgcvt	pgcvt		0	0
Transmission 2	?	trans 2 options			
Clutch/Torq. Conv.	?	clutch/torque converter			
Torque Coupling	?	TC_DUMMY			
Wheel/Axle	Clr	Clr			0
Accessory	Const	ACC_PRIUS_JPN			
Acc Electrical	?	acc elec options			
Powertrain Control	prius	PTC_PRIUS_JPN			

Additional interface details: 'Load File' is set to 'PRIUS_JPN_defaults_in', 'Drivetrain Config' is 'prius_jpn', and 'Auto-Size' is checked. A 'Scale Components' table shows max pwr, peak eff, and mass for various components. At the bottom right, 'Cargo' is 136, 'Calculated Mass' is 1332, and 'override mass' is checked at 1368. Buttons for 'Save', 'Help', 'Back', and 'Continue' are visible.

Why use BMS?

BMS & Tester

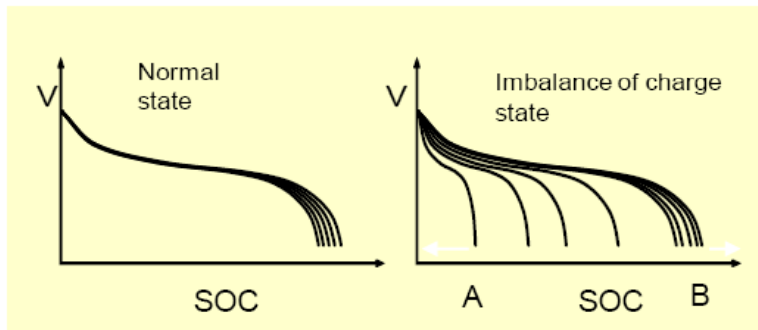
HEV(EV) Power Pattern Analysis



Why use BMS?

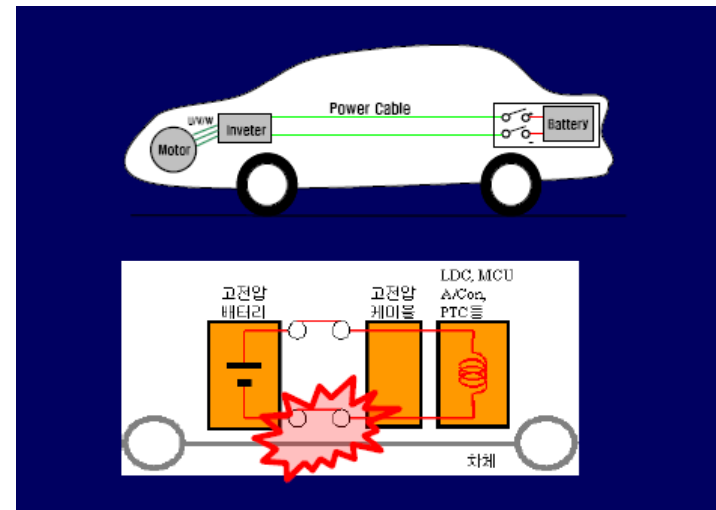
❖ Management & Maintenance on Battery System

- To respond to the cell characteristic inside the Battery System
- To respond to Battery Heating
- To respond to the trouble of Battery System



- BMS Diagnosis Function Error
- Each Cell Characteristic difference by Environmental temperatures (Charge/Discharge Effectiveness and self-discharging rate)

Battery Pack Cell Change

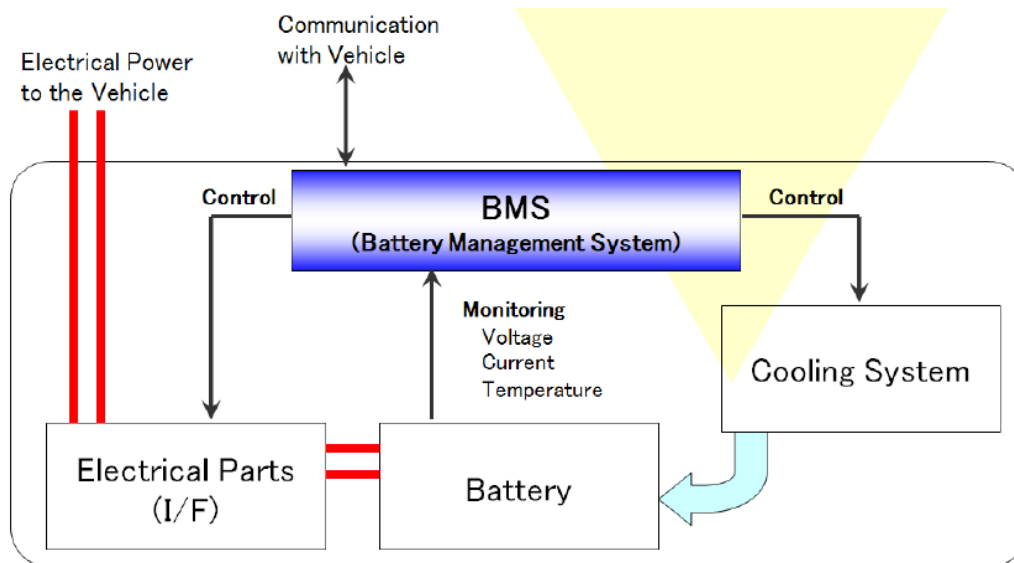


Isolation trouble on the Battery System

Why use BMS?

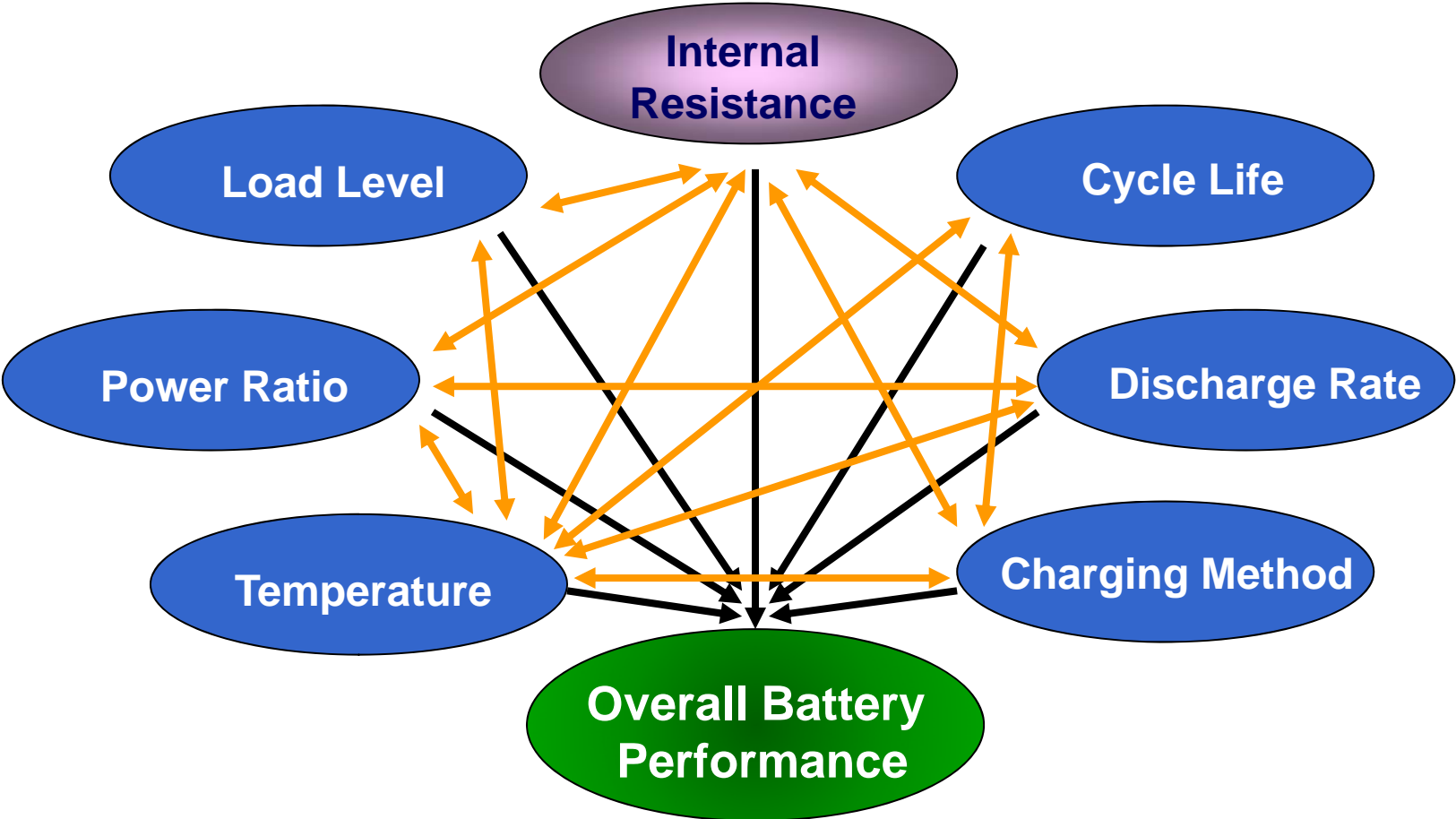
❖ To deliver the correct information of Battery System to the controller in Automobile

- . Battery's State Of Charge(SOC)
- . Charge/Discharge Power Limit
- . Battery Diagnostic Trouble Code(DTC)
- . Battery Stage Of Health(SOH)



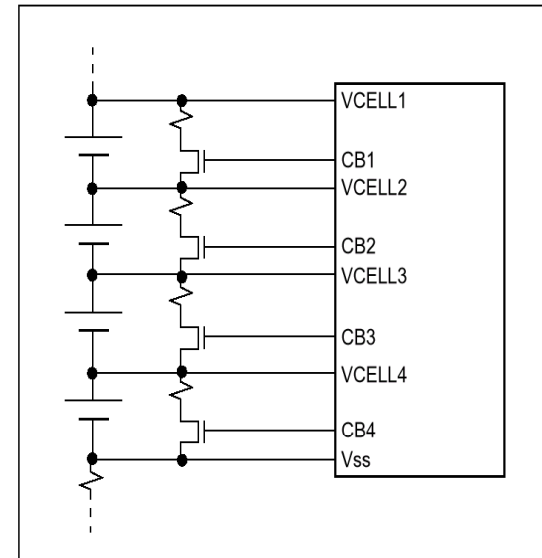
Battery System's structure

SOC Algorithm



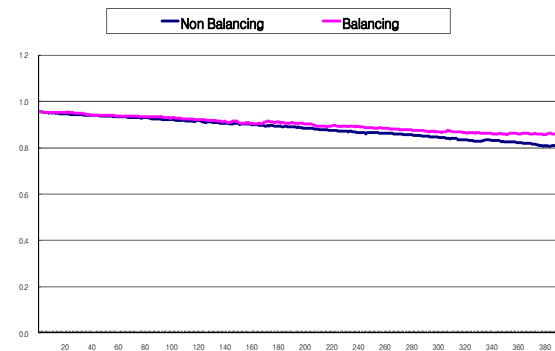
Protection

- ❖ Over Voltage & Reverse Charge
- ❖ Under Voltage Discharge
- ❖ Over Current & Short
- ❖ Over Temperature



Balancing

- ❖ Charging
- ❖ Discharging
- ❖ Charging & Discharging



BMS Design Issue

BMS & Tester

- ❖ Need to develop the optimized circuit considering Performance, Reliability, & Price
 - . BMS's performance, reliability/durability, Price
 - . Correlation with the Battery (Characteristic, Durability, & Stability, etc.,)

BMS Configuration issue	<ul style="list-style-type: none"> • Master + Slave structure? • BMS alone vs. attached to package? • Volume? • How to integrate all electric components using 12V from battery?
Circuit Configuration issue	<ul style="list-style-type: none"> • Pack voltage measuring circuit ? • Current sensors? • Cell voltage sensing method? • Temperature sensing method? • Balancing circuit implementation method • Micro controller specification (8-bit ~ 32-bit) • Memory capacity?
Reliability/ Durability	<ul style="list-style-type: none"> • How to secure electromagnetic Tolerance, Ecology

- ❖ Cell Voltage sensing reduction method?
 - . Module unit sensing
 - . Chip usage?
- ❖ Balancing or not.
- ❖ Circuit's precision level?

Type of BMS

BMS & Tester

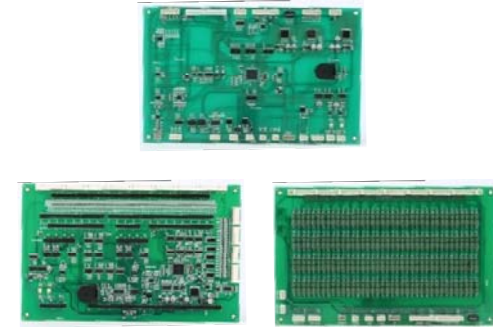
20Cell BMS



7Cell BMS



73Cell BMS



Application	NEV	E-Bike	UPS
Function	OVP, UVP, OCP, OTP	OVP, UVP, OCP, OTP	OVP, UVP, OCP, OTP
	Short Detection	Short Detection	SOC
	SOC	SOC	FAN Control
	Power Down	Passive Cell Balancing	Active Cell Balancing
characteristic	RS-232C	I ² C Charger Comm.	Cell Capacity 150Ah
	CAN Comm.		IGBT Control

Test Equipment _ Products

BMS & Tester

Tester for BMS



25~108 Cell BMS

Tester for PCM & SCM



**1Cell PCM Tester
20ch (40ch Available)
Mobile Battery Protection**



**1~2Cell Battery Pack Tester
(Soft & Hard Pack)**



**Notebook Smart Module
Calibration Equipment
Function Tester**

Test Equipment for Battery PCM

BMS & Tester

❖ Tool Concept

This test tool is used for inspecting the current, voltage, & temperature of PCM & SCM in the mobile phone battery.

It can measure the consuming current, do calibration thru the communication with PCM, and reconfirm the accuracy.



Test Equipment for PCM

❖ Main features

- 1~2-Cell inspection
- Calibration & Accuracy Test
- Protection inspection on V, C, & T
- EEPROM Write & Verify
- Data Flash Setup and Inspection thru RS-232C

❖ Proven Performance

- TI, Seiko, Mitsumi, Hitachi, Ricoh IC Test
- Apple i-Phone SCM inspection
- Nokia & Samsung PCM Test



Test Equipment for Lap-top

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❖ Tool Concept

This test tool is used for inspecting the current, voltage, & temperature of SM-Smart Module in the Lap-top battery.

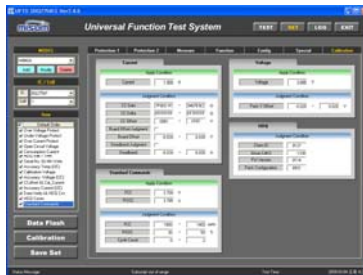
It can do EEPROM Data Read/Write, do calibration thru the communication with SM, and reconfirm the accuracy.

❖ Main Features

- Max. 4-Cell Inspection
- Calibration & Accuracy Test Smart Module products
- Protection inspection on V, C, & T
- Firmware Write & Verify
- Data Flash Setup and Inspection thru RS-232C

❖ Proven Performance

- TI, Maxim-Dallas, Renesas IC



Test Equipment for
Smart Module

Test Equipment for HEV BMS

BMS & Tester



❖ Tool Concept

This test tool is used for inspecting the current, voltage, & temperature of BMS in HEV.

It can do calibration thru the communication, and reconfirm the Register Data.

❖ Main Features

- Max. 108-Cell Inspection
- Calibration & Accuracy Test on BMS Products
- Protection inspection on V, C, & T
- Simulation on V, C, & T
- Data Flash Setup and Inspection thru RS-232C



**Test Equipment for
HEV BMS**

Partner

BMS & Tester



Thank you!