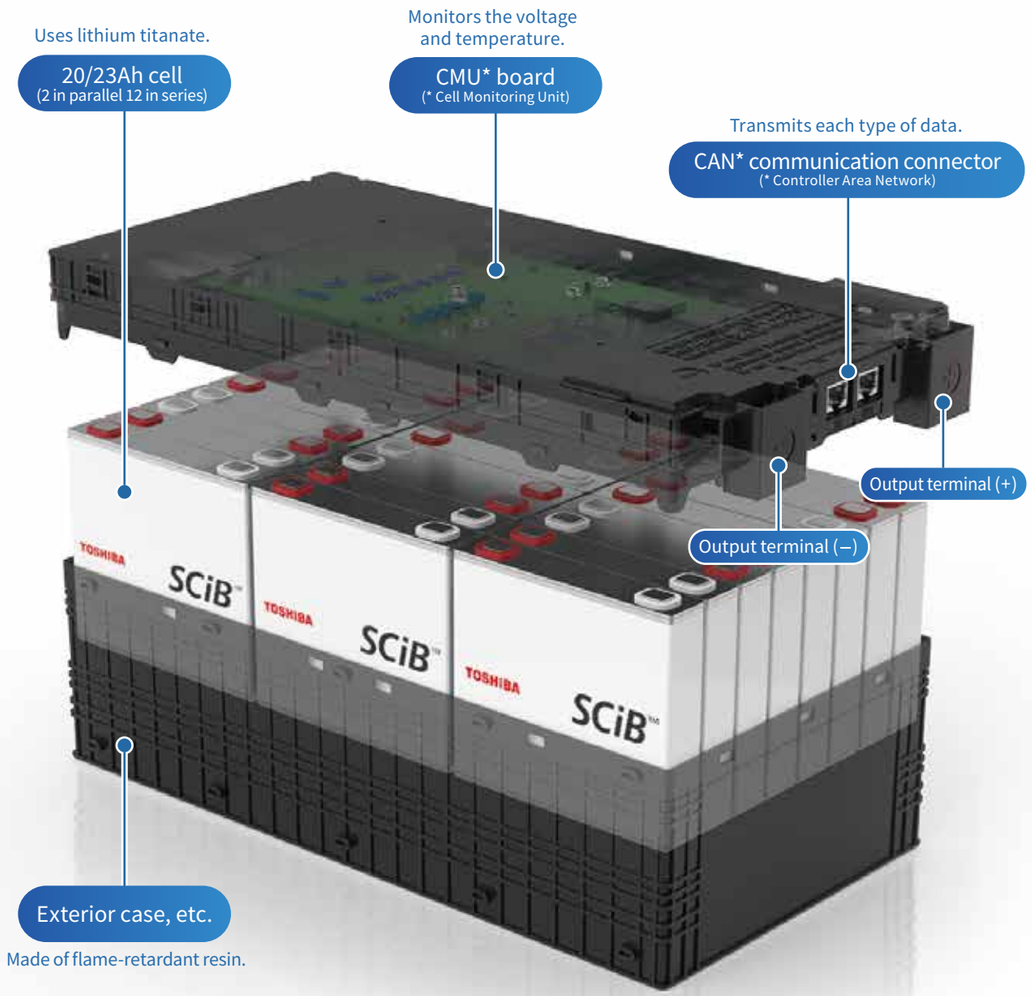
TOSHIBA

Toshiba Rechargeable Battery *SCiB*™

Battery System Components

SCiB™ Type3 Battery Module

Capable of constructing various scales of battery systems



* This is an image illustration.

Several SCiB™ cells are combined to provide user-friendly modules.Depending on the requirement, battery systems of various sizes can be built. This product can be used in a wide range of applications that support social infrastructure, from public, industrial, electric power and transportation systems to general households.

The robustness of the Type3 battery module has been enhanced for various types of applications. The pressure resistance and vibration resistance have been improved so that this product can be used at up to -30 ° C and 2000 m of altitude.

Examples of module application

Various types of cart

Go-cart, golf cart, etc.

Uninterruptible power system (UPS)

Communication equipment, traffic light,etc.

Gantry crane

Shipping and discharging of cargo, Charge of regenerative electric power

Electric propulsion ship

The source of power of a electric propulsion ship

BESS* for public and industrial applications (*Battery energy storage system)

Disaster prevention, BCP, energy saving, etc.

(This system is only available for Japan)

Renewable energy

Solar power generation facilities, etc.

* Nominal capacity per module (kWh): Type3-20 (1.10 kWh), Type3-23 (1.24 kWh)

Characteristics of Type3 battery module for the stationary / industrial applications

* SOC: State of Charge

Safety
Low risk of fire or explosion

Long life
Cycle life of **20,000** times or more

Low-temperature operation
Usable even at **-30°C**

High input/output
Large current can be input/output

Rapid charging
Charges to about **80%** of the capacity in **12 minutes**

Wide effective SOC*range
Available SOC range of **0-100%**

*The above value were measurement using a Type3-20 battery module under specific conditions.

Battery system block diagram

1 BMU
(Battery Management Unit)

2G type

BMU monitors the cell voltage and temperature of each battery module, and protects the battery if an abnormality is detected. Additionally, this measures the charge/discharge current, and calculates the SOC value. Furthermore, this notifies the upper controller of the battery information, measurement/calculation information, etc. via Ethernet or CAN communication.

2 Contactor
(MC)

S type (Standard) H type (High current)

The contactors are installed respectively to the positive terminal and negative terminal of the main circuit to shut down the main circuit in response to instructions from BMU if an abnormality occurs in the battery.

* The drive signal cable comes with the H type.

3 Current leak sensor (ELS)

ELS

The current leak sensor detects leakage in response to instructions on the fault diagnostic signal from the upper controller after the main circuit is shut down.

4 Current sensor
(HCT)

C type

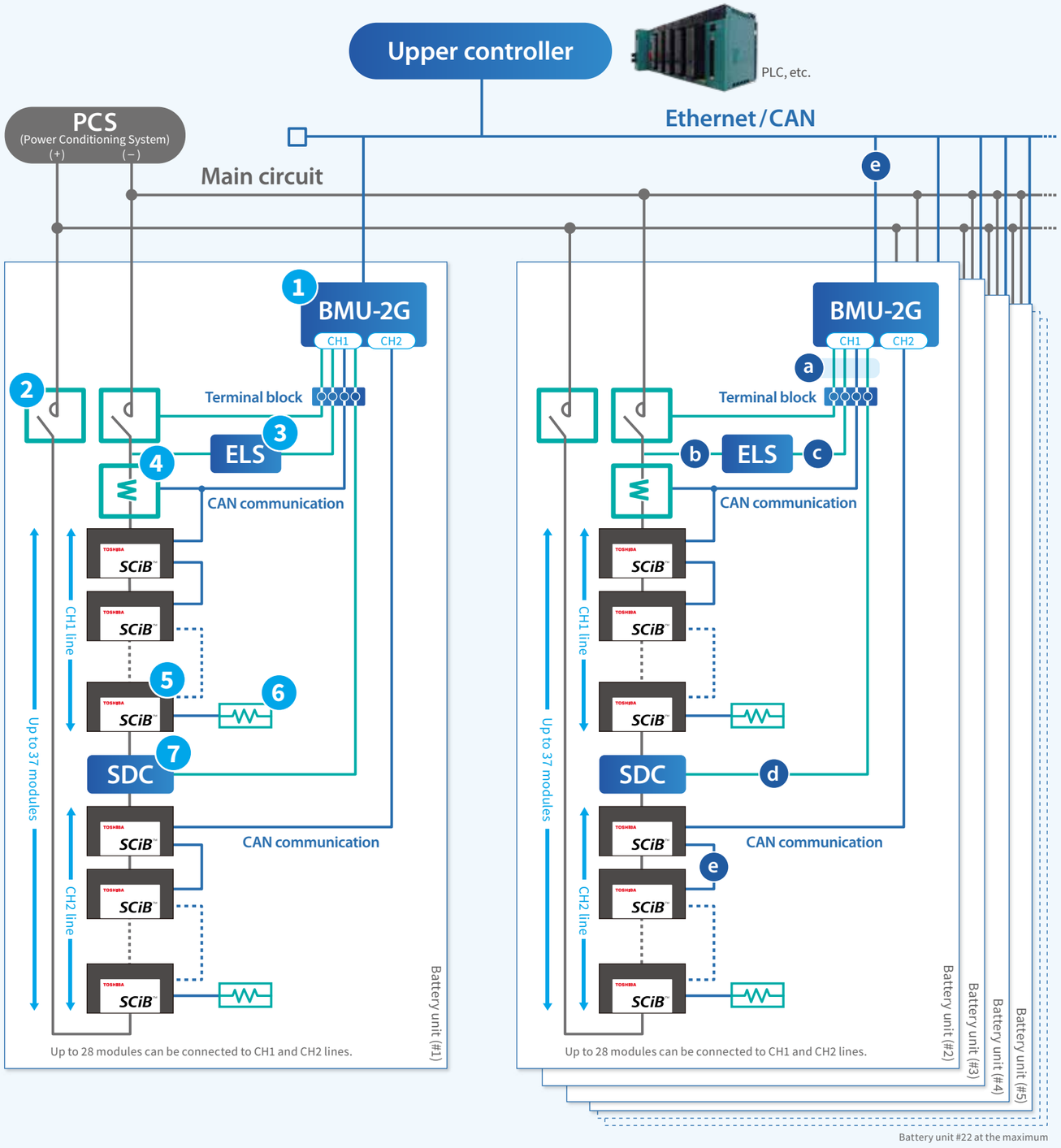
The current sensor measures the charging/discharging current. The measured data is sent to BMU via CAN communication. (only for BMU-2G)

* The CAN communication connector is to be prepared by customers.

5 Battery module (MDL)

Type3

The battery module consists of 24 cells (2 in parallel and 12 in series), and incorporates the cell monitoring unit (CMU) that monitors the voltage and temperature of these cells.



6 Termination plug (TP)

The termination plug is the termination resistor for CAN communication.

7 Service disconnect
(SDC)

SDC-750 SDC-1500

The service disconnect is used to disconnect the main circuit when installing / removing the battery module or during the maintenance work. The built-in fast acting fuse to protect the battery in the case of external short circuit.

* SDC-1500 does not have a built-in protection fuse.
Use a commercially-available fuse additionally.

The example of fuse use
- HINODE ELECTRIC (750GH-200UL)
- Mersen (HP10NH2GPV200B)

Cable types

a BMU connection cable

Use the BMU connection cable to connect between BMU and other components, upper device, maintenance device, and 12VDC power source.

b Current leak sensor main circuit cable

Use this cable to connect to the connector used for the current leak sensor main circuit connection.

c Current leak sensor connection cable

Use this cable to connect to the current leak sensor control signal connector.

d SDC-750 fitting detection cable

Use this cable to connect to the fitting detection connector of the service disconnect.

* The cable for SDC-1500 is to be prepared by customers.

e Connection cable for Ethernet/CAN communication

This cable is to be prepared by customers.

Use this cable for the CAN-communication connection between BMU-2G and the upper communication (Ethernet), module, BMU, or current sensor (C type).

Recommended cable (STP straight cable, category 5e or higher)
Note: The CAN communication cable extension length cannot exceed 40 m.

Component		Connector	Remarks
BMU-2G	Main on the CH1 side	Dedicated	Mixed with other control cables
	Sub on the CH2 side		
HCT	Current sensor (C type)		Common to IN/OUT
MDL	Battery module	RJ45	IN/OUT independent

*Cable end is to be appropriately processed by customers.

Products required for constructing the battery system

Battery module (MDL)

Type3

*This module cannot be used stand-alone.

Product name	Type3-20	Type3-23	Dimensions	W190×D361×H125mm (not include protruding portion)
Model	FM01202CCA04A	FM01202CCB01A	Max.charge/ discharge current	160 A (continuous), 350 A (rush current)
Nominal capacity	40Ah(1.10kWh)	45Ah(1.24kWh)	Nominal voltage	27.6V
Weight	Approx 14 kg	Approx 15 kg	Range of battery voltage	18.0 to 32.4V
Ambient temperature	-30 to 45 °C		Major built-in functions	Cell voltage measurement, module temperature measurement, cell balancing*, CAN communication * Function to even differences in voltage among cells connected in series
Ambient humidity	85%RH or less (no condensation)			

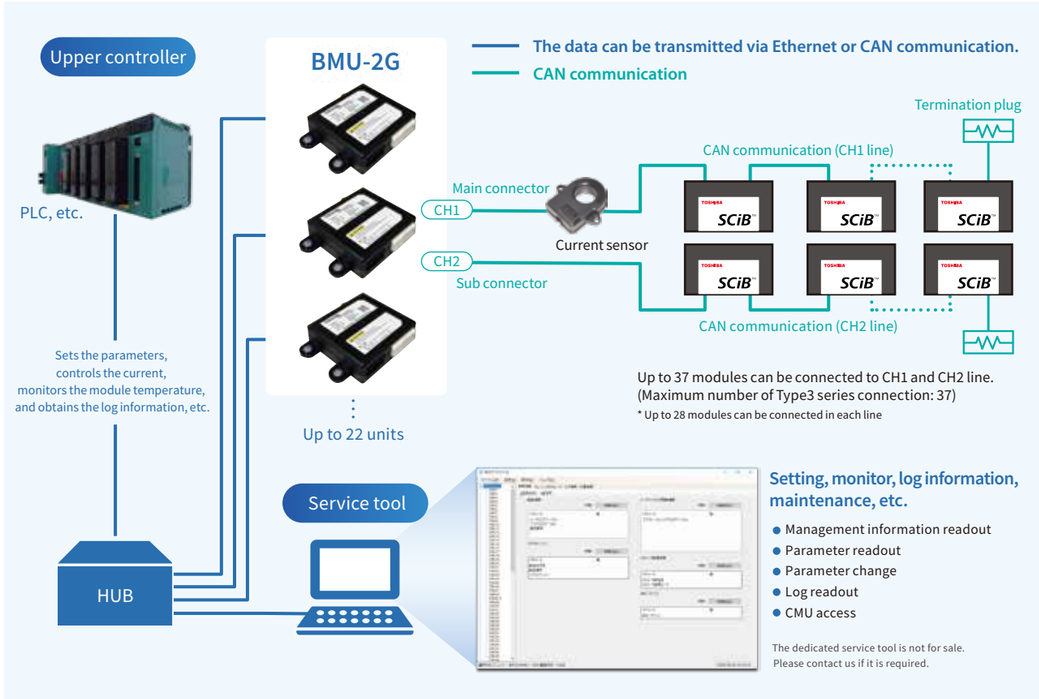
Combine the battery module and battery system components for using.

Battery system components

Product name	Photo	Type	Model	Specification	Dimensions (mm)	Weight(g)	Remarks
BMU (Battery Management Unit)		2G type (BMU-2G-RJ45)	5P4E0124P001	Upper communication: Select from Ethernet/CAN Maximum number of Type3 series connection: 37* Maximum number of BMU connection: 22 * For BMU-2G, up to 56 modules can be connected.	W95.0×D88.0×H32.0 (Protrusions excluded)	130	Standard type
		1G type	FMW-GAA0001P	Upper communication: CAN Maximum number of Type3 series connection: 28 Maximum number of BMU connection: 16	W95.0×D88.0×H32.0 (Protrusions excluded)	115	BMU-2G upper compatibility BMU-2G is recommended for new adoption
Contactor (MC)		S type (Standard)	FMW-GAA0004P	Contact rated capacity: 800 VDC-100 A Coil rating: 12 VDC-583 mA ± 10%	W98.0×D44.0×H86.2	650	–
		H type (High current)	5P4E0092P001	Contact rated capacity: 750 VDC-200 A Coil rating: 12 VDC-3.3 A ± 10%	W111.0×D63.0×H74.7	750	Drive signal cable included (Cable length: 300 mm)
Current sensor (HCT)		C type (CAN communication type)	5P4E0094P001	Measurement range: -350 to 350 A High resolution	W51.4×D21.2×H71.5	67	Only for BMU-2G The CAN communication connector is to be prepared by customers.
		A2 type (Analog type)	FMW-GAA0071P	Measurement range: Channel 1: -30 to 30 A Channel 2: -350 to 350 A	W62.0×D43.5×H24.0	82	Application to BMU-1G/2G is allowed. C type is recommended for BMU-2G.
Service disconnect (SDC)		SDC-750P (Plug)	FMW-GAA0003P	Rated voltage: 750 VDC Rated current: 120 A or lower Fuse: 750 VDC - 125 A (built-in)	W149.5×D43.9×H97.0	585	Fast acting fuse
		SDC-750R (Receptacle)	FMW-GAA0012P				
		SDC-1500	5P4E0093P002	Rated voltage: AC/DC 1500V Rated current: 200 A or lower Fuse: Combined with a commercially-available fuse	W110.0×D76.75×H50.0	270	Examples of fuse applications: • HINODE ELECTRIC (750GH-200UL) • Mersen (HP10NH2GPV200B)
GND control relay		Main unit	FMW-GAA0005P	Contact rated capacity: 30 VDC-10 A (resistance load) Contact voltage (max) : 125 VDC Contact current (max) : 10 A Coil rated voltage: 12 V	W13.0×D29.0×H29.0	30	Not required for BMU-2G type
		Socket	FMW-GAA0013P		W19.5×D71.5×H54.0	40	
Current leak sensor (ELS)		–	FMW-GAA0002P	Ground pressure resistance range: DC ± 800 V Electric leakage detection resistance value: 500 ± 100 kΩ	W73.0×D62.0×H30.0 (Protrusions excluded)	90	–
Termination plug (TP)		–	5P4E0003P001	125Ω ± 5% or less (Allowable loss: 1/4W or more)	Overall length: 52.5	10	Termination resistor for CAN communication
BMU connection cable		–	FMW-HAA0002P	For connecting between BMU and module/Current leak sensor/electric leakage sensor/SDC/contactor/GND control relay, etc.	Cable length: 2000	530	Application to both types BMU-1G and CH1 side of BMU-2G
SDC-750 fitting detection cable		–	FMW-HAA0003P	Connection between SDC-750 and BMU	Cable length: 1000	20	The cable of SDC-1500 is to be prepared by customers.
Current sensor (A2 type) connection cable		–	FMW-HAA0066P	Connection between the current sensor and BMU	Cable length: 1000	37	Only for A2 type current sensor
Current leak sensor connection cable		–	FMW-HAA0005P	Connection between the current sensor and BMU	Cable length: 1000	30	–
Current leak sensor main circuit cable		–	FMW-HAA0006P	Connection between the electric leakage sensor and negative terminal contactor	Cable length: 1000	70	–

Characteristics of the second-generation BMU "BMU-2G"

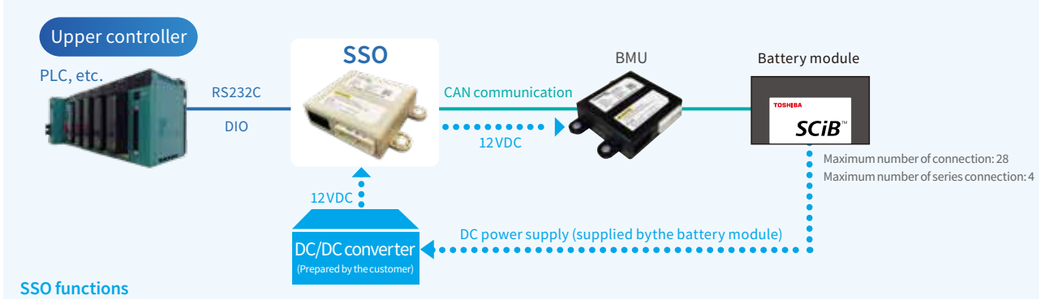
BMU-2G collects the information such as cell voltage or module temperature from each battery module in the battery unit, and performs controls, abnormality detection and diagnosis to protect the battery module.
Additionally, BMU-2G reads the total current of the battery unit from the current sensor, and performs the SOC calculation of the battery unit.



Under development

Gateway with a BMU self-startup option (SSO)

This gateway eliminates the need for an external power supply to start a system.
It allows the interface with an upper controller to be selected from CAN, RS232C, and Digital Input/Output (DIO), simplifying data communications with the upper controller.



SSO functions

Blackout startup
The BMU can be started without an external power supply. (Power is supplied from a battery module.)

Gateway function
Conversion from CAN to RS232C and DigitalInput/Output (DIO) and vice versa

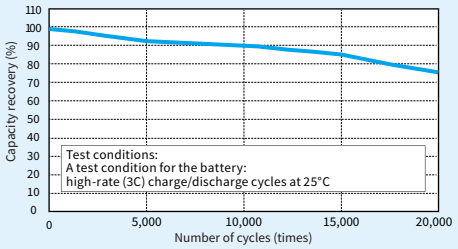
Self-shutdown function
This function prevents overdischarge of the battery, stops the BMU operation, disables the output of the DC/DC converter, and then shuts down the BMU power supply.

Startup switch
This switch allows the gateway to start without an upper controller.

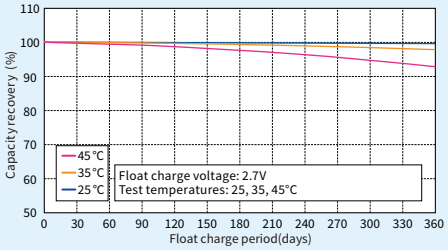
Specifications are subject to change without notice.

Characteristics of 20Ah cell

Cycle characteristics

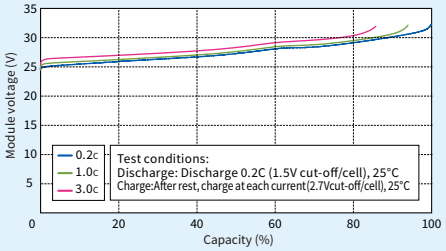


Float charge characteristics

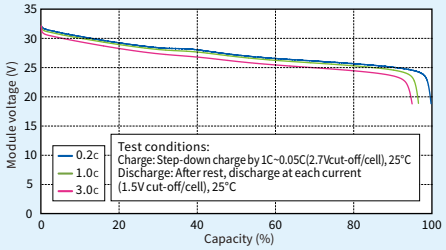


Module characteristics (Type3-20)

Charge characteristics (rate characteristics)



Discharge characteristics (rate characteristics)



* The values described in the technical materials, etc. are not guarantee values. The performance varies according to the customer's conditions for use.

Combination list

Maximum voltage		750V or less	910V or less	1200V or less
Number of Type3 battery module series connection *1		1 to 23	24 to 28	29 to 37
BMU	1G type	○	○	
	2G type *2	○	○	○
Contactor	S type (Standard)	○		
	H type (High current)	○		
Current sensor	C type (CAN communication type)	○	○	○
	A2 type (Analog type)	○	○	○
SDC	SDC-750	○		
	SDC-1500	○	○	○
Others	GND control relay	○	○	○
	Current leak sensor	○		
	Termination plug	○	○	○
Cable	BMU connection cable	○	○	
	SDC-750 fitting detection cable	○		
	Current sensor (A2 type) connection cable	○	○	○
	Current leak sensor connection cable	○		
	Current leak sensor main circuit cable	○		

*1: Number or series connection is calculated assuming the maximum charging voltage of a cell is 2.7 V. *2: For BMU-2G, up to 56 modules can be connected.

Confirmation items for customers

Please let us know about the items listed below when inquiring.

Item			Required specifications
Rating	Voltage		( )V
	Capacity		( )Wh/( )Ah
Discharge	Voltage	Upper limit voltage	( )V
		Lower limit voltage	( )V
	Current	Average current	( )A ( )sec or ( )h
		Max. operating current	( )A ( )sec
		Inrush current	( )A ( )ms
	Discharging time		( )h
Charging	Current value		( )A
	Charging time		( )h
Application	Operation procedures		
Environment	Installation place		(Indoor / Outdoor) (Fixed / Movable)
	Temperature		( )°C to ( )°C
	Altitude		( )m or lower
Schedule	Development period		
	Start of mass production		
Quantity			
Application			
Applied standard			
Others			

⚠ Safety precautions

- Do not use this product for facilities in which there is a risk to human life or a disruption to public functionality if the product fails or malfunctions (nuclear power generator controls, aerospace applications, traffic equipment, life support equipment, safety equipment, and others).
- This product is produced under strict quality controls, however it may malfunction depending on the operating environment and conditions. Please consider countermeasure design (redundancies, failsafe measures, etc.) if using this product in facilities in which failure of the product would be expected to cause a great loss or accident.
- The operating environment must be within the range of specifications noted in the catalog and instruction manuals. Using the product outside the specified range may cause injury, a re, or some other accident.
- Be sure to carefully read the instruction manuals before using this product so that you can use it correctly.
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<Agent>

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For detailed information of this product, please visit our Website. SCiB Search http://www.scib.jp/en/index.htm

The description in this catalog is as of February 2019.