

LIM Series Industrial Lithium Ion Batteries

LIM30HL

LIM50EL

LIM50EL-13



Creating the Future of Energy

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Line Up

LIM30HL Series

03



	Nominal Voltage(V)	Nominal Capacity(Ah)	The Number of Cells
LIM30HL-8	28.8	31.5	8
LIM30HL-12	43.2		12

LIM50EL Series

04



	Nominal Voltage(V)	Nominal Capacity(Ah)	The Number of Cells
LIM50EL-8	30.4	50	8
LIM50EL-12	45.6		12

LIBMII (Battery Management System)


05

LIM50EL Series

07



	Nominal Voltage(V)	Nominal Capacity(Ah)	The Number of Cells
LIM50EL-13	49.4	50	13



GS Yuasa has maintained a strong leadership position in lithium-ion technology since the mid-1990s, when we first delivered cells for handheld devices. Our commitment to innovation has driven our expansion into various industrial and space/aerospace applications, including the International Space Station. Building upon our highly reliable technology, we introduced the LIM Industrial Battery Series, which has been in mass production since 2002 and continues to serve customers worldwide as a trusted energy storage solution. It is worth noting that LIM cells and modules are designed and manufactured in Japan, ensuring the highest quality standards.

Features of the LIM Series

1 Wide range applications

The LIM series is divided into two types, a high energy product with large capacity and the high-power product which delivers high current charge and discharge. The lineup has various module capacities making it possible to design suitable sizes for the various customer needs.

2 High Reliability

Excellent battery safety design.

High safety and reliability is realized by using a Battery Management System (BMS) and each battery module has a module monitoring PCB. This explains the rich installation record that has been achieved over more than 20 years since the start of mass production in 2002.

3 Long life

Designed to achieve long life.

The LIM50EL module has a calendar life performance of more than 15 years at 25°C or 11,000 cycles at 100% DOD. The LIM30HL module has a cycle life performance of more than 30,000 cycles at 100% DOD.

4 High charge and discharge current performance

The high power type battery has an industry leading 600A (20C) charge and discharge performance. The high energy type battery also shows excellent performance with maximum discharge current at 300A (6C).

5 PSOC (PARTIAL STATE OF CHARGE)

The LIM technology is not affected by partial state of charge (PSOC) operation. The formation of sulfate crystals that cause early failure in other batteries is not a factor.

Product

High Energy Modules

LIM50EL Series

Features

- Maximum discharge rate of 6C,
Maximum charge rate of 2.5C
- Tolerance to cold temperatures of up to -20°C (-4°F)
- High cycle life performance (More than 11,000 cycles*)

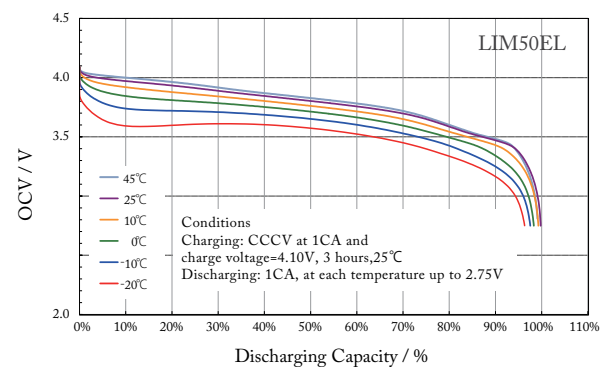
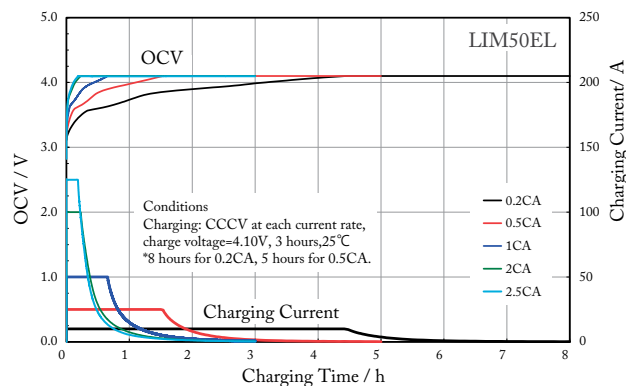
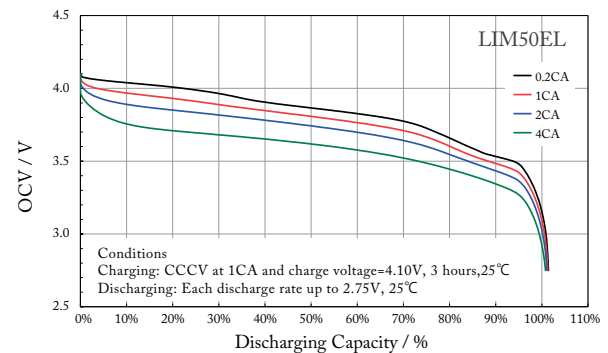
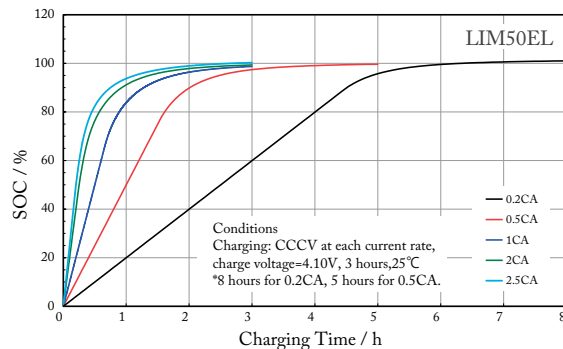
*At DOD 100%, Temp 25°C



	LIM50EL-8	LIM50EL-12
The number of cells	8	12
Nominal Capacity (Ah)	50	
Nominal Voltage (V)	30.4	45.6
Maximum charge and discharge current (A)	Charge: 125 (2.5C), Discharge: 300 (6C)	
Ambient Temperature (C)	$-20^{\circ}\text{C} \sim +45^{\circ}\text{C}$	
Weight (kg, lbs)	18.0kg 39.68Lbs.	27.0kg 59.52Lbs.
Dimension (L×W×H / mm, in)	440 × 219 × 128 mm 17.32 × 8.62 × 5.05 in	617 × 219 × 128 mm 24.29 × 8.62 × 5.04 in

Applications

- UPS
*Uninterruptible Power Supply
- ESS
*Energy Storage System
- AGV
*Auto Guided Vehicle



The data is for reference purposes.
Actual performance varies by condition

Product

High Power Modules

LIM30HL Series

Features

- Maximum charge and discharge rate of 20C
- High cycle life performance (More than 30,000 cycles*)
- Tolerance to cold temperatures of up to -20°C(-4°F)

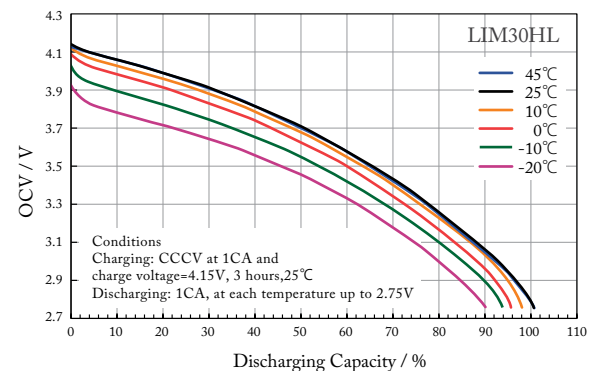
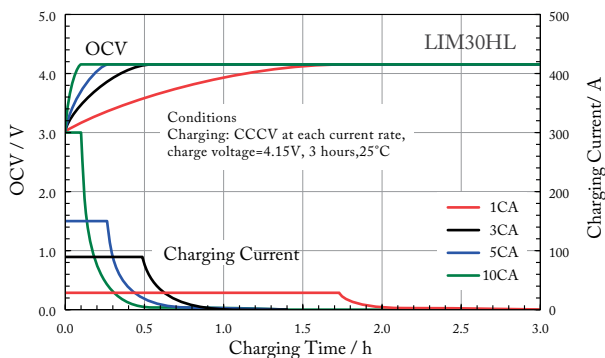
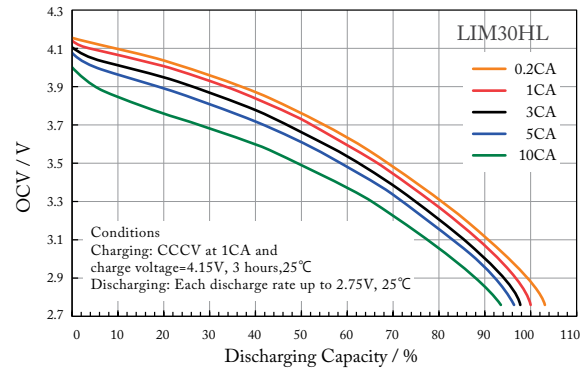
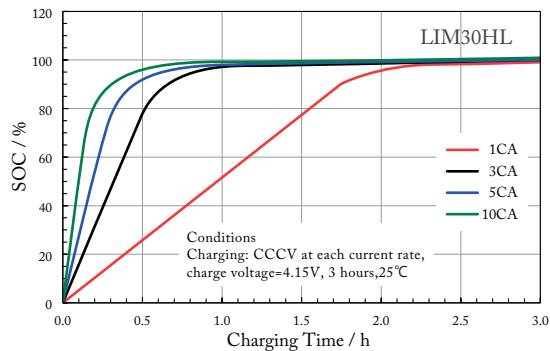
*At DOD 100%, Temp 25°C



	LIM30HL-8	LIM30HL-12
The number of cells	8	12
Nominal Capacity (Ah)	31.5	
Nominal Voltage (V)	28.8	43.2
Maximum charge and discharge current (A)	600 (20C)	
Ambient Temperature (°C)	Charging: -10 Deg C ~ + 45 Deg C Discharging: -20 Deg C to 45 Deg C	
Weight (kg, lbs)	17.5kg 38.58Lbs.	27.0kg 59.52Lbs.
Dimension (L×W×H / mm, in)	440 × 219 × 128 mm 17.32 × 8.62 × 5.05 in	617 × 219 × 128 mm 24.29 × 8.62 × 5.04 in

Applications

- AGV
*Automatic Guided Vehicle
- RTG
*Rubber Tired Gantry Crane
- Diesel Hybrid Train



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Product

Battery Management System (LIBM II)

The LIM50EL and LIM30HL batteries require appropriate battery management to protect the battery from over discharge, over charge, over heating etc. Each battery module is equipped with a battery monitoring PCB which measures and sends signals of cell voltage and module temperature to a battery management PCB (LIBMII) which protects the battery in case of overcharge, overdischarge, over heating or over current. Redundant domain LIBMIIs are available as an option.

Features

- **Balancing Function**
Used to balance cell voltage of connected batteries.
- **State of Charge(SOC) Calculation**
Automatically calculates SOC which can be monitored in real time via display.
- **Multiple Banks (Strings) Monitoring**
A domain (system) LIBMII is provisioned as a master over multiple parallel strings. The domain LIBMII provides a consolidated view.
- **High Voltage String Specification**
Max DC1800V



LIBMII Specifications

	Standard Type	High Voltage Type
Input Voltage (V)	DC21~27	
Max Series Connection (Module)	26	53
Max Parallel Connection (Bank)	72	36
Ambient Temperature (°C)	-20 Deg C ~ + 65 Deg C	
Mass (g)	230 (Circuit Board), 800 (Touch Panel)	
Dimension (L×W×H/mm, in)	130×185×30(Circuit Board) mm, 59.5×169.5×137(Touch Panel) mm 5.12×7.28×1.18(Circuit Board) in, 2.34×6.67×5.39(Touch Panel) in	

■ Optional

Network card for monitoring Lithium ion battery
(Acroware-iGYnetworkAgent)

■ Web interface

Lithium ion battery charge and discharge status, battery voltage etc., can be monitored via network.

■ Logging Function

Records charging current, cell voltage, SOC and battery temperature. Recorded data can be downloaded by web interface or collected using SD card memory.

■ Modbus/TCP, SNMP Communication

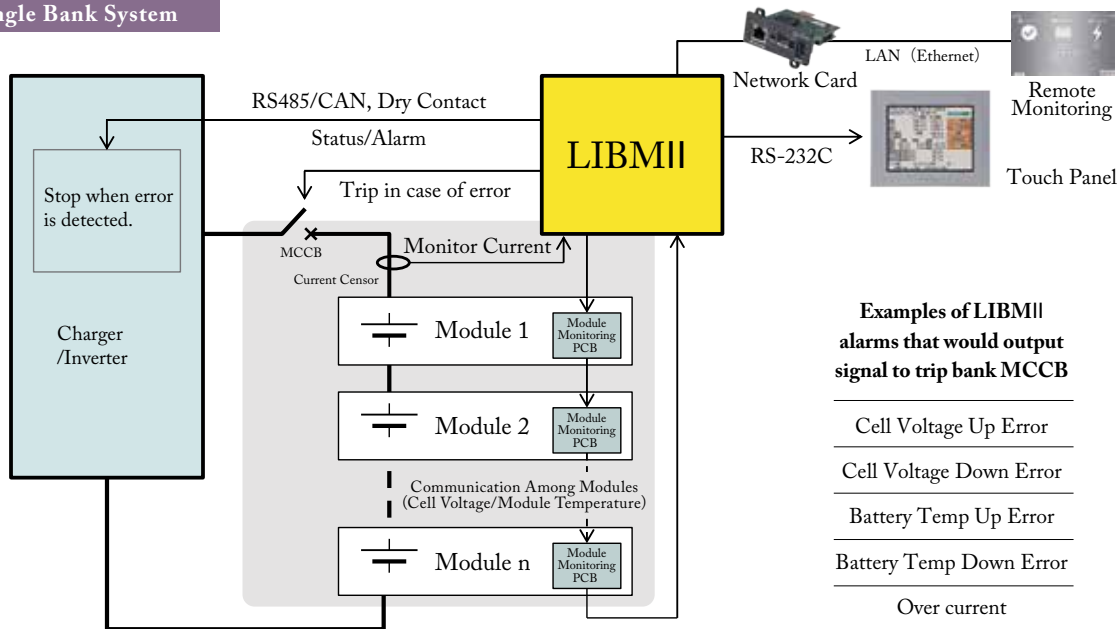
Having multiple types of communication makes it possible to interface with various types of customer devices including remote monitoring systems.



Battery Management System Overview

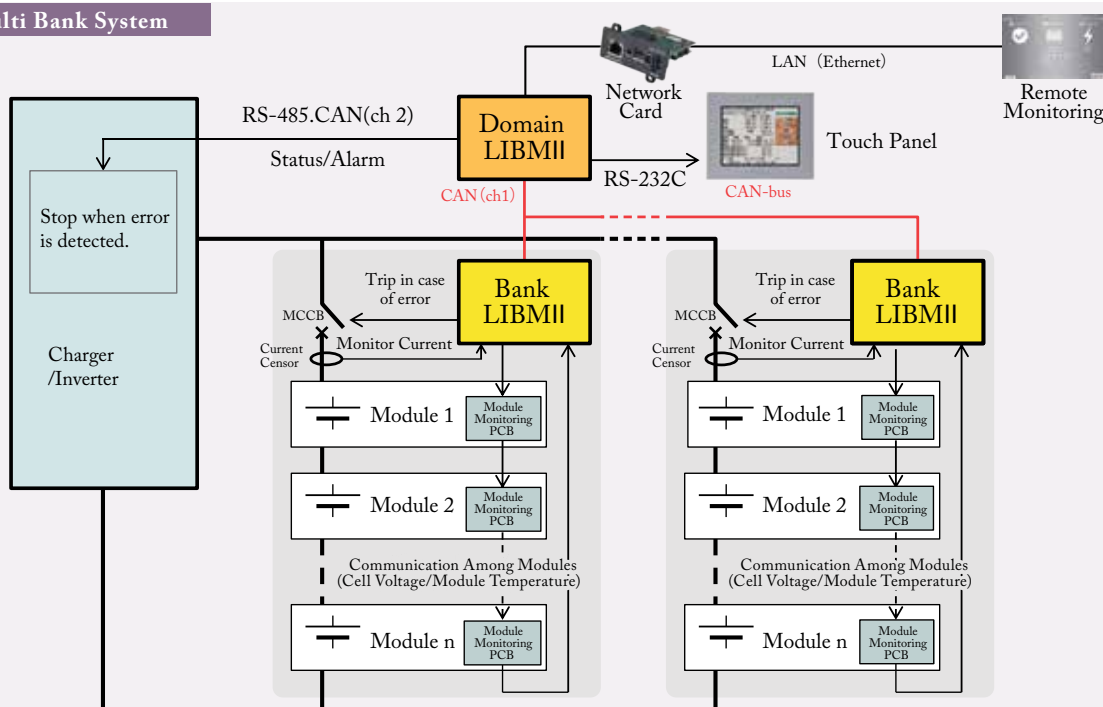
The LIBMII collects data from the module monitoring PCB and outputs status of the battery to an external device. In case of an abnormality, the LIBMII will independently send a signal to the bank MCCB to disconnect the battery bank. For a single battery bank application, only one LIBMII is required. In case of multiple battery banks, one LIBMII for each bank and a domain LIBMII are required to monitor all banks.

Single Bank System



The LIBM II has two CAN Channels. Channel 1(ch1) is for monitoring battery status and Channel 2(ch2) is for communication with external devices.

Multi Bank System



Product

High Energy type (DC 48V Applications)

LIM50EL-13

Features

- Maximum charge and discharge rate of 1C
- Tolerance to cold temperatures of up to -20°C(-4°F)
- High cycle life performance (More than 11,000 cycles*)
- Can be installed on 19-inch rack (3U)

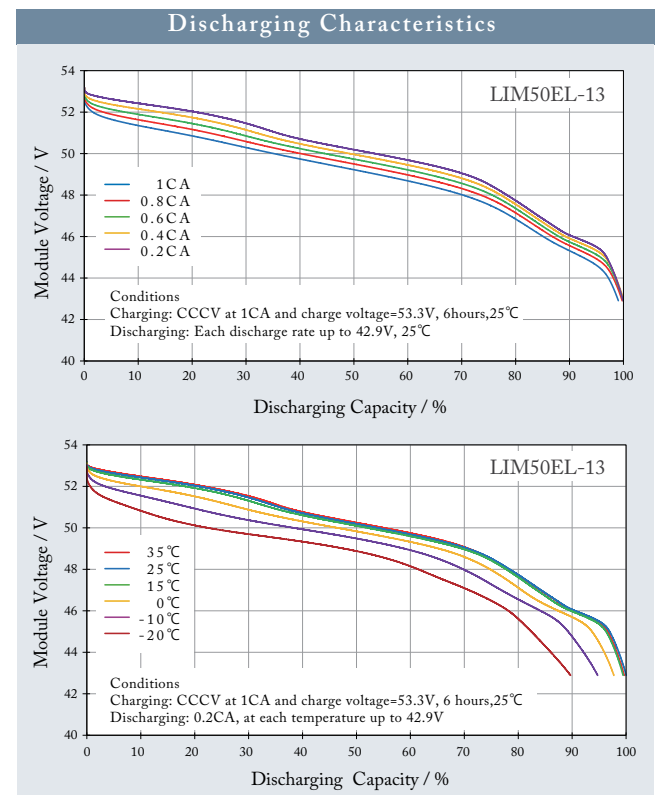
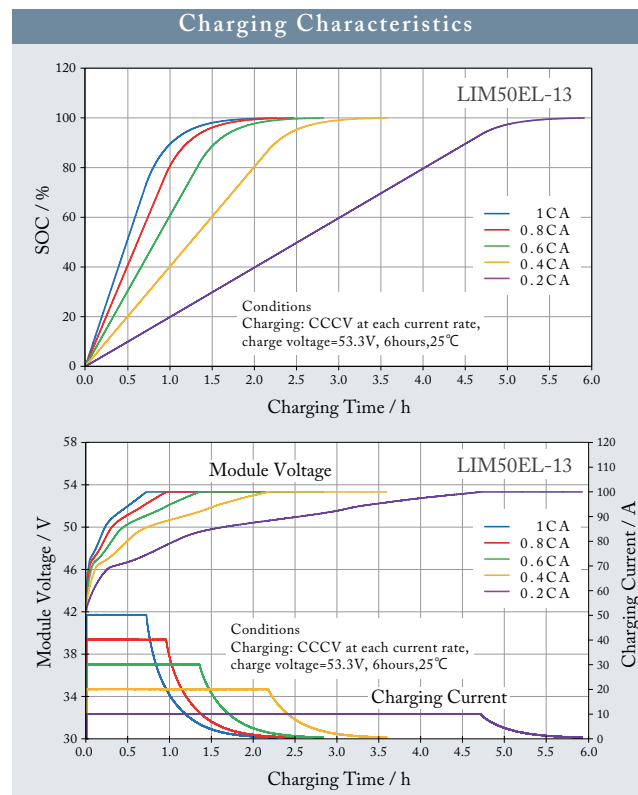
*At DOD 100%, Temp 25°C



	LIM50EL-13
Number of cells	13
Nominal Capacity (Ah)	50
Nominal Voltage (V)	49.4
Maximum charge and discharge current (A)	50 (1C)
Ambient Temperature (C)	- 20 Deg C ~ + 50 Deg C
Weight (kg, lbs)	32.5kg 71.65lbs or under
Dimension (L×W×H / mm, in)	480×437×130mm 18.9×17.2×5.11 in *3U (Length not including 32mm handles)
Multiple Connection	32 units Maximum
User Interface	
- dry contact	2 ch
- communication 1	CAN 2.0B 1ch
- communication 2	RS-485 1ch

Applications

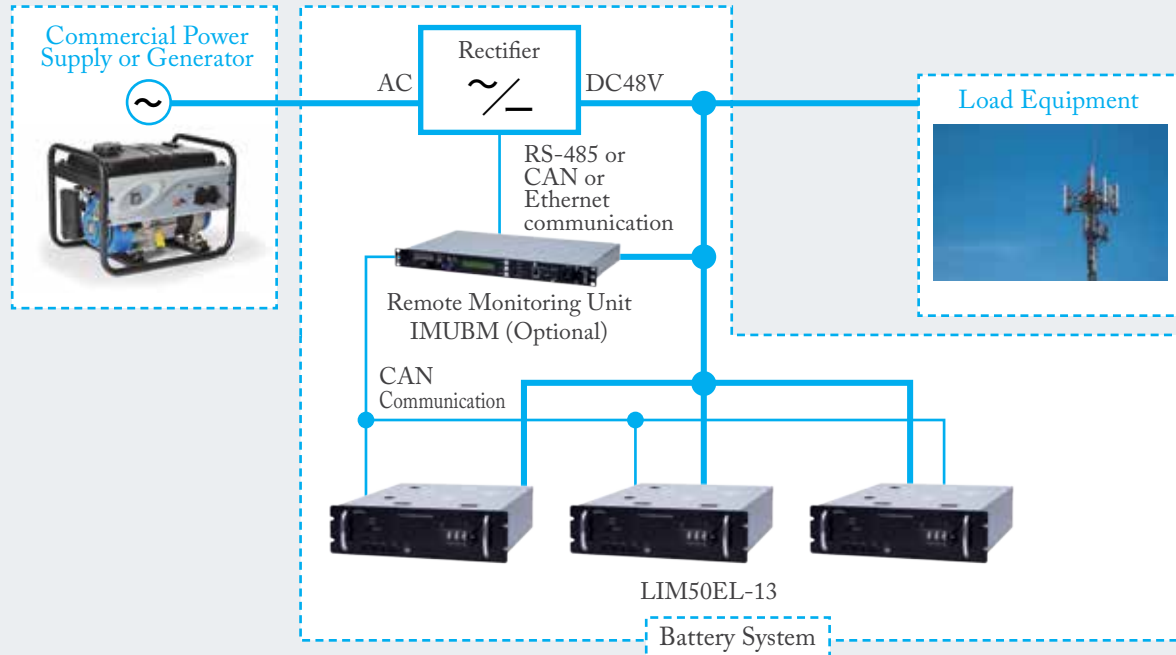
- Telecom
- CATV
*Community Antenna Television
- BTS
*Base Transceiver Station



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System Design

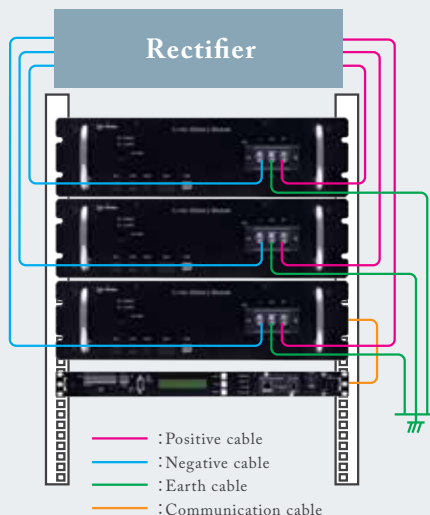
The LIM50EL-13 is a high-performance lithium ion battery module designed for telecom and other DC48V applications. It has a built-in BMS (Battery Management System) thus does not require an external BMS (LIBM II). An optional Remote Monitoring Unit (IMUBM) can also be installed to allow remote monitoring of the lithium ion battery status. The LIM50EL-13 has excellent cycle life performance and can charge at 1C thus reducing the Total Cost of Ownership (TCO) in regions with unstable or unavailable grid conditions.



Installation example

The LIM50EL-13 can be mounted on a 19 inch rack making installation and maintenance easy. In addition, using the LIM50EL-13 will save space and have less weight than lead acid batteries. Battery capacity can be flexibly increased to match customer needs by connecting multiple modules in parallel.

Wiring example



An example of Implementation in 19 inch Rack



Remote Monitoring Unit IMUBM (Optional)

IMUBM is a battery monitoring unit which can combine output signals and information from multiple modules connected in parallel. The size is only 1U, therefore this unit can be installed in same rack/cabinet as modules.

Product name	Battery Monitoring Unit
Input Voltage	DC38 ~ 60V
Dimensions (W×D×H)	W439 × D282 × H42mm (not including protruding part)
Weight	4kg
Ambient Temperature	- 20 ~ 50°C
external signal output Interface	Input signals : 2ch Out put signals : 7ch CAN, RS485, Ethernet (SNMP, Modbus TCP, Web Monitoring), USB1.1X1(TypeA)
Mutiple Connections	Max. 32 units

Application Examples

Telecom

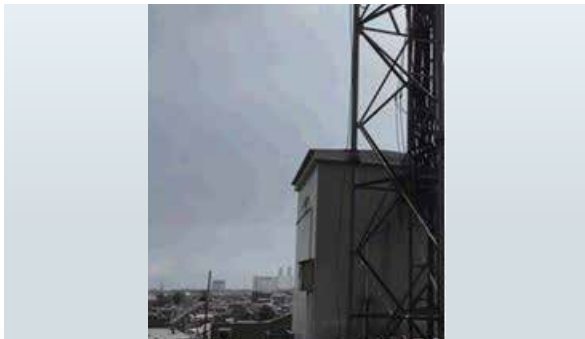
True Corporation Group

Application : Backup for Cable TV
Capacity : 2kWh
Operation Start Date : October, 2015



Axiata Group

Application : Backup for Base Station
Capacity : 12kWh
Operation Start Date : September, 2016



Industrial Equipment

ZPMC

Application : Automatic Guided Vehicle
Capacity : 316kWh/vehicle
Operation Start Date : Jan, 2017



Japan Freight Railway Company

Application : Train
Capacity : 67kWh
Operation Start Date : February, 2012



Sumitomo Heavy Industries Material Handling Systems. Co.,Ltd.

Application : Transfer Crane
Capacity : 14kWh/crane
Operation Start Date : July, 2008



Energy Storage

Tokyo Tama Intercity Monorail Co.,Ltd.

Application : Regenerative Power Absorption/
Emergency Running
Capacity : 75kWh(Power Absorption),
203kWh(Emergency Running)
Operation Start Date : July, 2016



Parker Hannifin Corp.

Application : Energy Storage
Capacity : 5MWh
Operation Start Date : Oct, 2016



Chugoku Electric Power Co.,Inc.

Application : Output Fluctuation Regulation
for Renewable Energy
Capacity : 1,350kWh
Operation Start Date : September, 2015



TOBU Railway co.,Ltd.

Application : Regenerative Power Absorption
Capacity : 104kWh
Operation Start Date : October, 2012





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