



Lithium-ion Battery Pack Specification

Model: YS24-18-N

Customer	Gacell A/S		Customer Model	YS24-18-N
Approved by	Checked by	Prepared by	Date	Version
			2020/06/11	A1

Customer Signature

Customer Confirmed	Date

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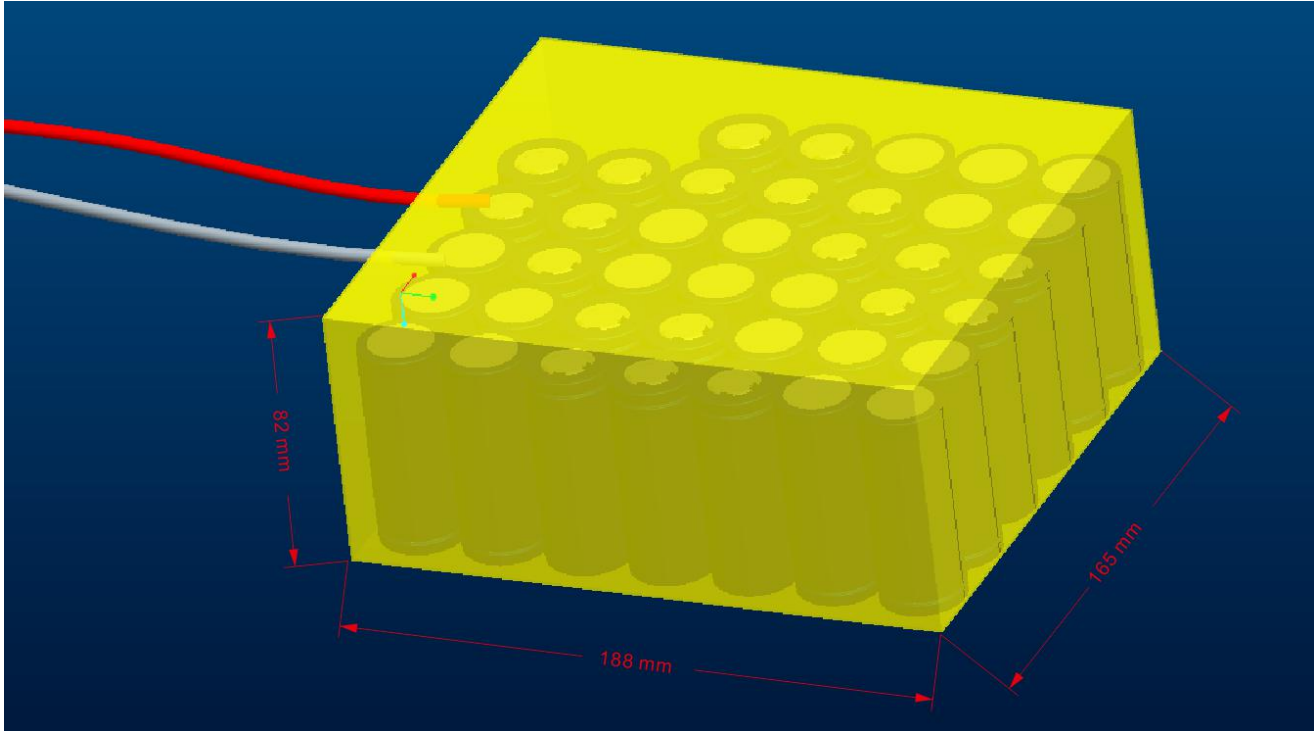
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1. Scope

This specification is applied to 24-18-8S5P battery Manufactured by MaxLi Company Limited.

2. Product appearance

2.1 Pictures



2.2 Label:

 **GACELL** A/S
Sletten 17
7500 Holstebro
www.gacell-power.dk

Item number:15582
Li-Ion Rechargeable Battery
Voltage:24V Capacity:18Ah
Energy:460.8Wh Prod.:25.07.2020
IEC No.: 8ICR27/67-5 Black: - Red: +

Safety advice:
Do not crush, incinerate, short circuit,
dismantle or immerse in any liquid or
it may vent and rupture.

  **Li-Ion**

Tested and approved to UN38.3

3.Product Configuration

No.	Item	Criteria	Remark
1	Li-ion Cylindrical Cell	26650-3.2V Typical: 3.6Ah	40PCS (8S5P)
2	PCM	LiFePO4-8S25A same port for charge and discharge	
3	Connector	Output connector: JST VLP-02V Signal wire connector: JST-PHR3	
4	Shell	Epoxy resin board and PVC wrapped	
5	Communication	SAE j1939	

4.Product Specification

Table 1 :

No.	Item	Rated Performance		Remark
1	Rated Capacity	Typical	18Ah	Discharge at 0.2C after standard charge fully.
		Minimum	17Ah	
2	Nominal Voltage	25.6V		
3	Voltage at end of Discharge	20V		
4	Charging Voltage	29.2V±0.1V		
5	Charge Protection voltage	3.75V±0.1V		Single Section Protection Voltage
6	Discharge Protection voltage	2.5V±0.1V		Single Section Protection Voltage
7	Internal Impedance	≤70mΩ		
8	Standard Charge	Constant Current 0.5C Constant Voltage 29.2V 0.01C cut-off		

9	Standard Discharge	Constant current 0.2C end voltage 20V	
10	Maximum Charge Current	15A	23 ± 3°C is recommend Operation Temperature, 60±25%RH Bare Cell
11	Maximum Continuous Discharge Current	25A	23 ± 3°C is recommend Operation Temperature, 60±25%RH Bare Cell.
12	Operation Temperature Range	Charge: 0~45°C	
		Discharge: -20~60°C	
13	Storage Temperature Range	0~40°C	
14	Battery Voltage of Shipment	26.4V~27.2V	
15	Storage Humidity Range	60±25%RH.	
16	Product Dimension	L: 188mm	
		W: 165mm	
		H: 82mm	

5.Product Performance

5.1 Standard Testing Conditions

Test should be conducted with new batteries within one week after shipment from our factory and the cells shall not be cycled more than five times before the test. Unless otherwise defined, test and measurement shall be done under temperature of $20\pm 5^{\circ}\text{C}$ and relative humidity of 45~85%. If it is judged that the test results are not affected by such conditions, the tests may be conducted at temperature $15\sim 30^{\circ}\text{C}$ and humidity 25~85%RH.

5.2 Measuring Instrument or Apparatus

5.2.1 Dimension Measuring Instrument

The dimension measurement shall be implemented by instruments with equal or more precision scale of 0.01mm.

5.2.2 Voltmeter

Standard class specified in the national standard or more sensitive class having inner impedance more than $10\text{k}\Omega/\text{V}$

5.2.3 Ammeter

Standard class specified in the national standard or more sensitive class. Total external resistance including ammeter and wire is less than 0.01Ω .

5.2.4 Impedance Meter

Impedance shall be measured by a sinusoidal alternating current method(1kHz LCR meter).

5.3 Standard Charge\Discharge

5.3.1 Standard Charge :

Test procedure and its criteria are referred as follows:

Charging shall consist of charging at a 0.5C constant current rate until the cell reaches 29.2V. The cell shall then be charged at constant voltage of 29.2 Volts while tapering the charge current. Charging shall be terminated when the charging current has tapered to 0.01C. The cell shall demonstrate no permanent degradation when charged between 5°C and 45°C .

5.3.2 Standard Discharge

Cells shall be discharged at a constant current of 0.2C to 20.0Volts @ $25\pm 3^{\circ}\text{C}$.

5.4 Appearance

There shall be no such defect as flaw, crack, rust, leakage, which may adversely affect commercial value of battery.

5.5 Initial Performance Test

Table 2:

Item	Measuring Procedure	Requirements
(1)Open-Circuit Voltage	The open-circuit voltage shall be measured within 24 hours after standard charge.	$\geq 27.2V$
(2) AC Impedance Resistance	The Impedance shall be measured in an alternating current method (1kHz LCR meter) after standard charge at $20\pm 5^{\circ}C$.	$\leq 70m\Omega$
(3) Nominal Capacity	The capacity on 0.2C discharge shall be measured after standard charge at $23\pm 2^{\circ}C$.	Discharge Capacity $\geq 18Ah$

5.6 Cycle Life

Table 3 :

No.	Item	Criteria	Test Conditions
1	Cycle Life (0.5C)	Higher than 80% of the Initial Capacities of the Cells	Carry out 2000 cycles charging/ Discharging in the below condition. ◆ Charge: Standard Charge, per 5.3.1 ◆ Discharge: 0.5C to 20.0V ◆ Rest Time between charge/discharge: 30min. ◆ Temperature: $20\pm 5^{\circ}C$

6.PCM Specification

6.1 Using scope: The document applies to Li-ion Battery protection module for MaxLi Battery Ltd.

6.2 Environment request: ROHS.

6.3 Function description: Over charge protection, Over discharge protection, Over current protection
Short circuit protection

7.Storage and Transportation

7.1 Storage:

7.1.1 The Li-ion battery pack should be stored in a cool, dry and well-ventilated area. and should be far from the fire and the high temperature.

7.1.2 The best Voltage in storage is 25.6V~27.2V.

7.1.3 The battery should store in the product specification book stipulation temperature range. the best storage temp. is 0 to 40°C. The best humidity is 60±25%.

7.1.4 If has surpasses above for 2 months the long time storage, suggested you should carry on additional charge and discharge to the battery.

7.2 Transportation

7.2.1 Do not mix the battery products with other cargo.

7.2.2 Do not immerse the battery products in water or allow it to get wet.

7.2.3 The highest temperature in transportation is lower than 50°C.

8. Use Attentions:

To ensure proper use of the battery please read the manual carefully before using it.

8.1 Handling

8.1.1 Do not expose to, dispose of the battery in fire.

8.1.2 Do not put the battery in a charger or equipment with wrong terminals connected.

8.1.3 Avoid shorting the battery

8.1.4 Avoid excessive physical shock or vibration.

8.1.5 Do not disassemble or deform the battery.

8.1.6 Do not immerse in water.

8.1.7 Do not use the battery mixed with other different make, type, or model batteries.

8.1.8 Keep out of the reach of children.

8.2 Charge

8.2.1 Battery must be charged in appropriate charger only.

8.2.2 Never use a modified or damaged charger.

8.2.3 Do not leave battery in charger over 24 hours.

8.2.4 Charging current: Can not surpass the biggest charging current which in this specification book stipulated.

8.2.5 Charging voltage: Does not have to surpass the highest amount which in this specification book stipulated to decide the voltage.

9.2.6 Charge temperature: The battery must carry on the charge in the ambient temperature scope which this specification book stipulated.

8.2.7 Uses the constant electric current and the constant voltage way charge, the prohibition reverse charges. If the battery positive electrode and the cathode meet instead, can damage the battery.

8.3 Discharge

8.3.1 The discharging current does not have to surpass this specification book stipulation the biggest discharging current, the over sized electric current electric discharge can cause the battery capacity play to reduce and to cause the battery heat.

8.3.2 Electric discharge temperature: The battery discharge must carry on in the ambient temperature scope which this specification book stipulated.

8.3.3 Disposal: Regulations vary for different countries. Dispose of in accordance with local regulations.

9. Period of Warranty

There is a Three years warranty for our export batteries from the date of shipment. If the problem happened during the warranty period, we are responsible to replace the defective ones according to the accurate analysis results. However, we won't take any responsibility if the problem is caused by the battery-related applications and related products.

10. Others

Because batteries utilize a chemical reaction, battery performance will deteriorate over time even if stored for a long period of time without being used. In addition, if the various usage conditions such as charge, discharge, ambient temperature, etc. are not maintained within the specified ranges the life expectancy of the battery may be shortened or the device in which the battery is used may be damaged by electrolyte leakage. If the batteries cannot maintain a charge for long periods of time, even when they are charged correctly, this may indicate it is time to change the battery.

11. Note

Any other items which are not covered in this specification shall be agreed by both parties.