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Approved Date	
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Lithium iron Phosphate Battery Specification

MODEL: IFM12-120E2 (12.8V 12Ah)

Prepared By/Date	Checked By/Date	Approved By/Date

Customer Approval	Signature/Date
	Company Name
	Company Stamp

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Amendment Records

Edition	Description	Prepared by	Approved by	Date
A	First Edition	Johnson		2013-03-22

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1. Scope

This specification is applied to the LiFePO₄ battery pack without communication port distributed by Master Instruments Pty Ltd.

2. Specification

No.	Item	General Parameter	Remark
1	Rated Capacity	12.0Ah	Standard discharge (0.2C) after standard charge (0.2C)
2	Minimal Capacity	11.2Ah	
3	Nominal Voltage	12.8V	
4	Life Expectation	Residual capacity is more than 60% of the rated capacity	1) Charge: <u>CC@0.2C</u> to 14.6V, then CV till current to 0.05 C 2) Rest: 30min. 3) Discharge: 0.2C to 10.0V Temperature: 20±5°C Carry out 1500 cycles
5	Discharge cut-off voltage	2.0V/cell (≥ 8.0V)	10.0V recommended
6	Charging cut-off voltage	3.9V/cell (≤ 15.6V)	14.6V recommended
7	Assembly method	IFR18650EC-1.5AH	4S8P
8	Housing material	ABS	
9	Standard charge	0.2C constant current (CC) charge to 14.6V, then constant voltage (CV) 14.6V charge till charge current decline to ≤0.05C	Charge time : Approx 7.0h

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10	Standard discharge	Constant current 0.2C Cut-off voltage 10.0V	
11	Maximum Charge Current	12A@20 °C	
12	Maximum Continuous Discharge Current	24A@20 °C	Over current 100±20A (5~15mS)
13	Operation Temperature Range	Charge: 0~55°C	60±25%R.H.
		Discharge: -10~60°C	
14	Storage Temperature Range	Less than 1 year: 0~25°C	60±25%R.H. at the shipment state
		Less than 3 months:-5~35°C	
15	Approx. Weight	1.65Kg	
16	Dimension	L151*W99*H 95 mm	1. The height includes the terminals is 99mm 2. F2 terminals are used
17	Short Circuit Protection	Recover after charging	
18	Cell balancing	N/A	
19	AC Impedance	≤ 40mΩ	@50% SOC

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3. Performance And Test Conditions

3.1 Standard Test Conditions

Test should be conducted with new batteries within one week after shipment from our factory and the batteries shall not be cycled more than five times before the test. Unless otherwise specified, 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 15~30 $^{\circ}\text{C}$ and humidity 25~85%RH.

3.2 Measuring Instrument or Apparatus

3.2.1 Dimension Measuring Instrument

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

3.2.2 Voltmeter

Standard class specified in the national standard or more sensitive class having inner impedance more than 10k Ω /V

3.2.3 Ammeter

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

3.2.4 Impedance Meter

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

3.3 Standard Charge/Discharge

3.3.1 Standard Charge : 0.2C

Charging at 0.2C constant current until the battery reaches 14.6V. The battery shall then be charged at constant voltage of 14.6V while tapering the charge current. Charging shall be terminated when the current has tapered to 0.05C. Charge time is approx 7.0 hours, The battery shall demonstrate no permanent degradation when charged between 0 $^{\circ}\text{C}$ and 55 $^{\circ}\text{C}$.

3.3.2 Standard Discharge : 0.2C

Battery shall be discharged at a constant current of 0.2C to 10.0V @ $20 \pm 5^{\circ}\text{C}$

3.3.3 If no otherwise specified, the rest time between charging and discharging is 30min.

3.4 Appearance

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

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4. Handling of battery

4.1 Prohibition short circuit

Never short circuit battery. It generates very high current which causes heating of the battery and may cause electrolyte leakage, gassing or explosion that is very dangerous. The terminals may be easily short-circuited by putting them on conductive surface. Such outer short circuit may lead to heat generation and damage of the battery.

4.2. Mechanical shock

Falling, hitting, bending, etc. may cause degradation of battery characteristics.

5. Period of Warranty

The period of warranty is 12 months from the date of INVOICE. Master Instruments guarantees to give a replacement in case of battery with defects proven due to manufacturing process instead of the customer abuse and misuse.

6. Storing the Batteries

The batteries should be stored at room temperature, charged to about 30% to 50% of capacity. We recommend that battery to be charged once each three months to prevent over-discharge.

7. Drawing

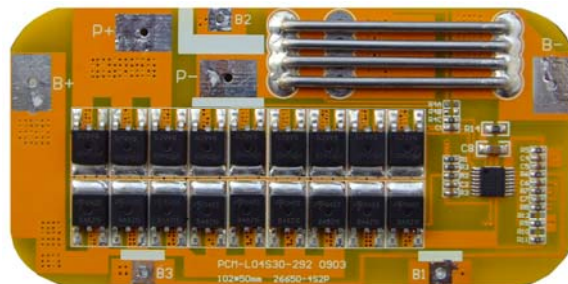
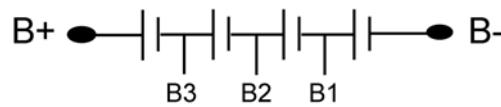


8. Any other item which is not covered in this specification shall be agreed by both parties.

Specification of PCM (WBQP137)

No.	Item		Parameter
1	Voltage	Charging voltage	DC:3.65V/cell
		Balancing voltage	N/A
2	Current	Balancing current	N/A
		Self-consume current	≤50μA
		Max. continuous charging current	30A
		Max. continuous discharging current	30A
3	Over-charging protection	Over-charging voltage	3.90±0.025V/cell
		Over-charging delay time	0.5S~1.5S
		Over-charging release voltage	3.8±0.05V/cell
4	Over-discharging protection	Over-discharging voltage	2.0±0.08V/cell
		Over-discharging delay time	50~150mS
		Over-discharging release voltage	2.50±0.1V/cell
5	Over-current protection	Over-current voltage	0.15±0.025V
		Over-current	100±20A
		Over-current delay time	5ms~15ms
		Release condition	Remove load then charging
6	Short circuit protection	Function condition	External short circuit
		Delay time	200~500us
		Release condition	Remove load, then charging
7	Impedance	Protection circuitry (MOSFET)	≤20mΩ
8	Temperature	Operation temperature	-40~+85℃
		Storage temperature	-40~+125℃

Size: L102*W50*T5mm



P+,P- = Charge+/-,Discharge+/-