



Hong Kong TAC Industrial Co., Ltd
香港艺洲实业有限公司

FLAT C, 9/F WINNING HOUSE NO.72 AND74 WING LOK STREET H.K
 TEL: 00852-51230576 HTTP://WWW.TACBATTERY.COM

File No.PIF
 Version: A1
 Date: 2018-7-18

Customer/客户: _____

Lithium iron Phosphate Battery

Specification

磷酸铁锂电池说明书

MODEL:IFM12-90E2-01 (12.8V9Ah)

Prepared By/Date 编制/日期	Checked By/Date 审核/日期	Approved By/Date 批准/日期

Customer Approval	Signature/Date(签名/日期)
	Company Name(公司名称)
	Company Stamp(公司印章)



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Amendment Records

(修正记录)

Edition (版本)	Description (记述)	Prepared by (编制)	Approved by (批准)	Date (日期)
A0	First Edition	Menglei		2018-07-18
A1	Add the BMS info	Vicky		2018-07-19

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1. Scope (适用范围)

This specification is applies to describe the related Battery product in this Specification and the Battery/cell supplied by Hong Kong TAC Industrial Co., Ltd only.

本说明书只适用于描述本规格书中相关的产品以及香港艺洲实业有限公司提供的电池。

2. Product Specification (产品技术规格)

Table 1 (表 1)

No. (序号)	Item (项目)	General Parameter (常规参数)	Remark (备注)
1	Rated Capacity (额定容量)	9.0Ah	Standard discharge (0.2 C ₅) after standard charge (0.2 C ₅) (0.2C 标准充电后 0.2 C ₅ 标准放电)
2	Minimal Rated Capacity (最小容量)	8.5Ah	
3	Nominal Voltage (标称电压)	12.8V	
4	Cycle Life (循环寿命)	Higher than 60% of the Initial Capacity of the Cells (初始容量的 60%)	<ul style="list-style-type: none"> ◆ Charge: <u>CC@0.2C</u> to 14.6V, then CV till current to 0.05C ◆ Rest: 30min. ◆ Discharge: 0.2C to 10.0V ◆ Temperature: 20±5°C ◆ Carry out 2000cycles ◆ 先以 0.2 C₅ 恒流充电至 14.6V, 再恒压充电至电流小于 0.05C ◆ 搁置: 30min. ◆ 放电: 0.2 C₅ 放至 10.0V ◆ 温度: 20±5°C ◆ 循环 2000 次
5	Discharge cut-off voltage (放电截止电压)	10.0V	10.0V(recommended) 10.0V (推荐值)
6	Charging cut-off voltage (充电截止电压)	14.6V	14.6V (recommended) 14.6V (推荐值)
7	Cell and assembly method (电芯和组装方式)	IFR18650EC-1.5AH or IFR26650EC-3.3AH	4S6P or 4S3P
8	Housing material (外壳材料)	ABS+PC housing/ ABS+PC 塑胶外壳	

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Continuous the table 1 (续表 1)

No. (序号)	Item (项目)	General Parameter (常规参数)	Remark (备注)
9	Standard charge (标准充电)	0.2C constant current(CC) charge to 14.6V,then constant voltage (CV) 14.6V charge till charge current decline to ≤0.05C 0.2C 恒流充电至 14.6V, 再 恒压 14.6V 充电直至充电电 流≤0.05C	Charge time : Approx 7h (充电时间:大约 7 个小时)
10	Standard discharge (标准放电)	Constant current 0.2C Cut-off voltage 10V (持续电流: 0.2C 截止电压:10V)	
11	Maximum Charge Current (最大充电电流)	4A	
12	Continuous Discharge Current (持续放电电流)	4A	
13	Operation Temperature Range (工作温度范围)	Charge (充电) : 0~45°C Discharge (放电) : -10~60°C	60±25%R.H.
14	Storage Temperature Range (储存温度范围)	Less than 1 year : 0~25°C (小于一年: 0~25°C) Less than 3 months:-5~35°C (小于 3 个月:-5~35°C)	60±25%R.H. at the shipment state (出货态时的湿度范围)
15	Weight (重量)	Approx/大约: 1.22Kg	
16	Max. Dimension (最大尺寸)	High/高度:94mm-99mm Width/宽度: 65mm Length/长度: 151mm	

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3. Performance And Test Conditions (电池性能及测试条件)

3.1 Standard Test Conditions (标准测试条件)

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 $15\sim 30^{\circ}\text{C}$ and humidity 25~85%RH.

测试必须使用出厂时间不超过一个星期的新电池，且未进行过五次以上的充放电循环。除非特别说明，否则测试会在温度 $20\pm 5^{\circ}\text{C}$ ，相对湿度 45~85%的条件下进行。如果经鉴定测试结果不受上述条件影响，测试也可以在温度 $15\sim 30^{\circ}\text{C}$ ，相对湿度 25~85%RH 的条件下进行。

3.2 Measuring Instrument or Apparatus (测量器具及设备)

3.2.1 Dimension Measuring Instrument (尺寸测量器具)

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

尺寸测量器具的精度等级应不小于 0.01 mm。

3.2.2 Voltmeter (伏特计)

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

按照国家标准指定规格等级或采用灵敏度更高的，测量电压时内阻不应小于 $10\text{k}\Omega/\text{V}$ 。

3.2.3 Ammeter (安培计)

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

按照国家标准指定规格等级或采用灵敏度更高的，包括电流表及电线在内的总电阻应小于 0.01Ω 。

3.2.4 Impedance Meter (电阻计)

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

内阻测试仪测量原理应为交流阻抗法 (1KHz LCR)。

3.3 Standard Charge/Discharge (标准充放电)

3.3.1 Standard Charge : 0.2C

标准充电: 0.2C

Charging shall consist of charging at a 0.2C constant current rate until the battery reaches 14.6V. The battery shall then be charged at constant voltage of 14.6V volts while tapering the charge current. Charging shall be terminated when the charging current has tapered to $0.05 C_5\text{A}$. Charge time: Approx 7.0h, The battery shall demonstrate no permanent degradation when charged between 0°C and 45°C .

电池先以 0.2C 恒流充电至 14.6V，再以 14.6V 恒压充电至电流减小到 $0.05 C_5\text{A}$ ，充电时间大约为 7 个小时。在 $0^{\circ}\text{C}\sim 45^{\circ}\text{C}$ 内充电电池应没有永久损害。

3.3.2 Standard Discharge : 0.2C

标准放电: 0.2C

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Battery shall be discharged at a constant current of 0.2C to 10.0V @ 20° ± 5C

电池以 0.2C 恒流放电至 10.0V @ 20° ± 5C

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

如果没有特别说明，电池充放电间隔时间为 30 分钟。

3.4 Appearance (外观)

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

电池外观应没有破裂、污渍、生锈、漏液等影响市场价值的缺陷存在。

4. Handling of battery (电池操作注意事项)

4.1 Prohibition short circuit (禁止电池短路)

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 poles 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.

An appropriate circuitry with PCM shall be employed to protect accidental short circuit of the battery pack.

避免电池短路。短路会产生很高的电流而使电池发热以及电解液泄漏，产生有毒气体或爆炸是非常危险的。电极端连接在导电物体表面很容易短路，外部短路会导致发热及损害电池。选用一个适当的保护电路可以在意外短路时保护电池。

4.2.Mechanical shock (机械撞击)

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

跌落、碰撞、弯曲等等都可能降低电池的性能。

5. Others (其它)

Prevention of short circuit within a battery pack (电池内部的短路预防)

Enough insulation layers between wiring and the cells shall be used to maintain extra safety protection.

The battery pack shall be structured with no short circuit internally, which may cause generation of smoke or firing.

在电池和引线之间应该有足够的绝缘层用于安全保护。电池的包装构成应没有导致起烟、起火的短路情况。

6. Period of Warranty (保质期)

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

电池的保质期从出货之日算起为 12 个月。如果证明电池的缺陷是在制造过程中形成的而不是由于用户滥用及错误使用造成，本公司负责退换电池。

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7. Storing the Batteries (电池的存放)

The batteries should be stored at room temperature, charged to about 30% to 50% of capacity.

We recommend that batteries be charged about once per three months to prevent over-discharge.

电池应当在室温下存放，应充到 30%至 50%的电量。如长时间储存，建议每三个月充一次电以防止电池过放电。

8. Other Chemical Reaction (其它的化学反应)

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.

由于电池是利用化学反应的原理，所以随时间的增加电池的性能会降低，即使是存放很长一段时间而不使用。如果使用条件如充电、放电及周围环境温度等情形不在指定的使用范围内，会使缩短电池的使用寿命，或者会产生漏液导致设备损坏。如果电池长周期不能充电，即使充电方法正确，这样需要更换电池了。

9. Photo and drawing : (照片和尺寸图)



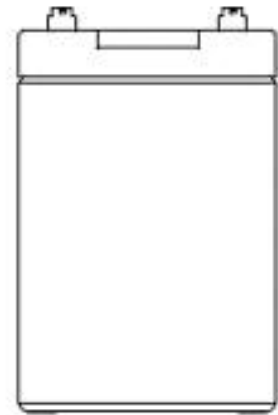
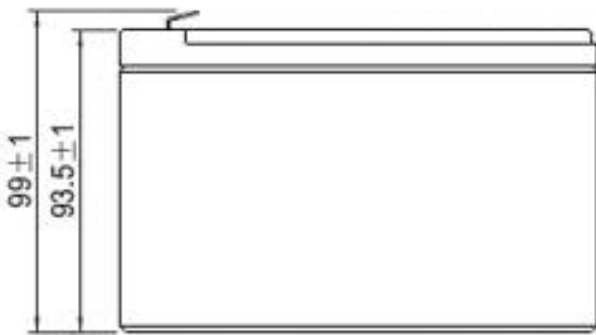
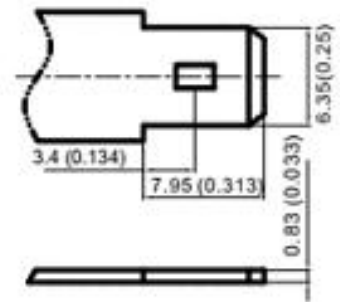
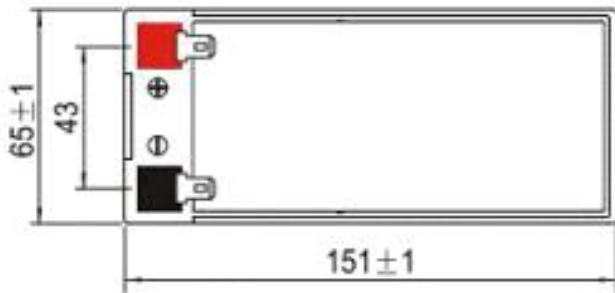


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Housing drawing :



NO	Items	Units: mm	Remark
1	Length/长度:	151mm	Max.
2	Width/宽度	65mm	Max.
3	Height/长度	99mm	Max.
4	Terminal	6.35mm	Tin plated copper
5	Plastic house		Color: Black Material: ABC+PC

10. Any other items which are not covered in this specification shall be agreed by both parties.
 本说明书未包括事项应由双方协议确定

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Appendix 1 PCM parameter

1	電壓/Voltage	充電電壓/Charge voltage	DC:14.6V/ 3.65V/cell		
		單節均衡電壓/The balance voltage for single cell	Min	Typ	Max
			3.55V	3.60V	3.65V
2	電流/Current	單節均衡電流 /The balance current for single cell	67mA	75mA	83mA
		消耗電流(自耗) /Consume current	≤50μA		
		最大持續充電電流 /Max continuous charge current	4A		
		最大持續放電電流 /Max continuous discharge current	4A		
3	過充保護 (單節)/Overcharge protection(single cell)	過充電檢測電壓/Overcharge detection voltage	3.875V	3.90V	3.925V
		過充電檢測延時時間 /Overcharge detection delay time	500mS	1000mS	1500mS
		過充電恢復電壓 /Overcharge recover voltage	3.75V	3.80V	3.85V
4	過放電保護 (單節) /Over discharge protection(single cell)	過放電檢測電壓 /Over discharge detection voltage	1.92V	2.00V	2.08V
		過放電檢測延時時間/Over discharge detection delay time	10mS	100mS	150mS
		過放電恢復電壓 /Over discharge recover voltage	2.40V	2.50V	2.60V
5	過電流保護/Over current protection	過電流檢測電流 Over current detection current	5A	6A	7A
		過電流檢測延時時間 /Over current detection delay time	5ms	10ms	15ms
		恢復狀態/Restorative status	斷開負載, 自動恢復/		
6	短路保護/Short circuit protection	檢測狀態/Detection status	外部短路 /External short circuit		
		檢測延時時間/Detection delay time	100us	300us	600us
		恢復狀態/Restorative status	斷開負載, 自動恢復/		
7	內阻/Internal resistance	保護線路 (MOSFET)/Protection circuit	≤ 50mΩ		
8	溫度/Temperature	工作溫度範圍/The range of working temperature	-40—+85℃		
		儲存溫度範圍.The rang of the store	-40—+125℃		



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temperature

Appendix 2 Pack performance drawing

