TRACER®
HIGH PERFORMANCE BATTERIES

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Data Sheet
BP2568 - 12v 24Ah $LiFePO_4$ Battery Pack

Product Name	$LiFePO_4$ Battery Pack
Battery Model Spec	$LiFePO_4$ - 9288120 4S3P 12.8V 24Ah
File Revision	A2

Amendment Records

Revision	Description	Issued Date
A2	Change BMS	2015-06-28

1 Scope

This document describes the performance characteristics and testing methods for $LiFePO_4$ batteries produced by Tracer Power, a division of Cell Pack Solutions Ltd.

2 Product type and model number

2.1 Product type

$LiFePO_4$ Battery Pack

2.2 Model number

$LiFePO_4$ - 9288120 4S3P 12.8V 24Ah (BP2568)

3 Rated performance

Table 1: Rated Performance

#	Item	Rated performance	Remark
1	Nominal capacity	24Ah±5%	Standard discharge after standard charge
2	Nominal voltage	12.8V	Mean operation voltage during standard discharge after standard charge
3	Equivalent Lithium Content (ELC)	28.8g	
4	Voltage at end of discharge	8.0V	Discharge cut-off voltage
5	Charging voltage	14.0~14.6V	
6	Impedance	< 40mΩ	
7	Standard charge	Constant current: $0.2C_5A$ Constant voltage: 14.0V Cut-off current: ≤ $0.02C_5A$	
8	Standard discharge	Constant current: $0.2C_5A$ End voltage: 8.0V	
9	Maximum charge	Constant current: 10A	Screw terminal connections must be used
10	Maximum continuous discharge current	30A	
11	Peak discharge current	90A	For 10ms
12	Operation temperature range	Charge: 0~40°C Discharge: -10~60°C	60±25% R.H
13	Cycle life	> 1400 cycles	Charging/discharging in the below condition: Charge: standard charge Discharge: 10A to 8.0V Rest time between charge/discharge: 30min Until the discharge capacity < 60% of NC
14	Storage temperature	≤1 month: -20~45°C ≤3 months: -20~35°C ≤1 year: 0~25°C	60±25% R.H Best: 10~25°C for long-time storage
15	Weight	Approx: 2.9kg	
16	Case Dimensions	Thickness: 110mm Width: 165mm Length: 160mm	To widest points, with handle folded down.

4 Supplied items

- Tracer 12V 24Ah $LiFePO_4$ Battery Pack
- Mains 4A Fast Charger fitted with DC charge connector (TR8205)
- Neoprene Carry Case
- T-bar to Torberry connection lead (TR8122)
- Eyelet to 12V cigar socket (TR8125)

5 Battery case features

- T-bar socket rated to 30A output or 10A input.
- +ive and -ive screw terminals rated to 30A output or 10A input.
- DC charge socket rated to 5A.
- Built-in Fuel Gauge - 5 colour LED fuel gauge mounted externally to show charge level.
- Waterproof to IP64 standard.
- Spring loaded folding handle.

6 Electrical performances

Table 2: Battery Electrical Performances

#	Items	Test procedure	Requirements
1	Nominal voltage	The average value of the working voltage during the whole discharge process.	12.8V
2	Discharge performance	The discharge capacity of the battery, measured with $0.2C_5A$ down to 8.0V within 1 hour after a standard charge at 25±5°C	Discharge ≥ Minimum capacity
3	Capacity retention	After 28 days storage at 25±5°C, after having been standard charged and discharged at $0.2C_5A$ to 8.0V (the residual capacity is above 90% of nominal capacity)	Discharge time ≥ 4.5h
4	Cycle life	Charging/discharging in the below condition: Charge: standard charge at 25±5°C Discharge: 10A to 8.0V Rest time between charge/discharge: 30min Until the discharge capacity < 60% of nominal capacity	> 1400 cycles
5	Storage	(Within 3 months after manufactured) The battery is charged with $0.2C_5A$ to 40-50% capacity and stored at ambient temperature 25±5°C, 65±20% RH for 12 months. After the 12 months storage period, the cell is fully charged and discharged to 8.0V with $0.2C_5A$	Discharge time ≥ 4h

7 Fuel gauge specifications

Built-in Fuel Gauge - 5 colour LED fuel gauge mounted externally to show charge level.
LED Status:

3 green & 2 red:	Battery fully charged	13.2V
2 green & 2 red:	Over 50% capacity	13.0V
1 green & 2 red:	Over 20% capacity	12.9V
2 red:	Less than 20% capacity	12.4V
1 red:	Less than 10% capacity	12.0V
No lights:	Battery empty	8.0V

8 Standard test conditions

Any tests are to be conducted with new batteries that have not been cycled more than five times before the test. Unless otherwise defined, test and measurements done under a temperature of 20±5°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°C and humidity 25~85% RH.

9 Cautions in use

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

9.1 Handling

Do not expose to, or dispose of the battery in fire.
Do not put the battery in a charger or equipment with wrong terminals connected.
Avoid short-circuiting the battery.
Avoid excessive physical shock or vibration.
Do not disassemble or deform the battery.
Do not immerse in water.
Do not use the battery mixed with other different make, type, or model batteries.
Keep out of the reach of children.

9.2 Charge and discharge

Battery must be charged in appropriate charger only.
Never use a modified or damaged charger.
Do not leave the battery in a discharged state for over 24 hours.

9.3 Storage

Store the battery in a cool, dry and well-ventilated area.

9.4 Disposal

Regulations vary for different countries, dispose of in accordance with local regulations.
Dispose of responsibly by contacting your local refuse centre.

10 Battery operation instruction

10.1 Charging

Charging current: Must not surpass the highest charging current which is specified within Table 1.
Charging voltage: Must be regulated to the charging voltage specified within Table 1.
Charging temperature: The battery must be charged in the ambient temperature scope in Table 1.
Use constant electric current and constant voltage to charge.
Do not reverse charge.
The battery electrode and the cathodes must not meet as this can damage the battery.

10.2 Discharging current

The discharge current must not surpass the highest discharge current specified in Table 1.
An oversized discharge current can cause the battery's nominal capacity to reduce and the battery to overheat.

10.3 Electric discharge temperature

The battery must be discharged in the ambient temperature scope specified in Table 1.

10.4 Over-discharge

When excessively discharged the battery should always be charged immediately after use to ensure the battery maintains nominal capacity and does not deteriorate.

10.5 Storing the batteries

The battery should always be stored in conditions as specified in Table 1.
If the battery is left unused for a period longer than 6 months it should be placed on charge.

11 Period of warranty

Tracer $LiFePO_4$ batteries are covered by a 12 month limited warranty. The warranty covers premature failure due to defects in materials and/or workmanship. Any breakage caused by accidental damage or as a result of abuse or misuse is not covered. The warranty is limited to the original purchaser and is not transferable.
The warranty is void if the serial number is removed from the product or if the battery has been modified in any way. Please charge your battery directly after each use. Leaving your battery in discharged state will seriously and permanently damage its performance. Please note we cannot upheld warranty claims in these circumstances. Your battery will degrade over time and with use, such degradation is not covered by warranty.

12 Other - Chemical reaction

Because batteries utilise 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.

13 Note

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