



LI-ION POWER TECHNOLOGY CO.,LTD.

3.2V 176AH

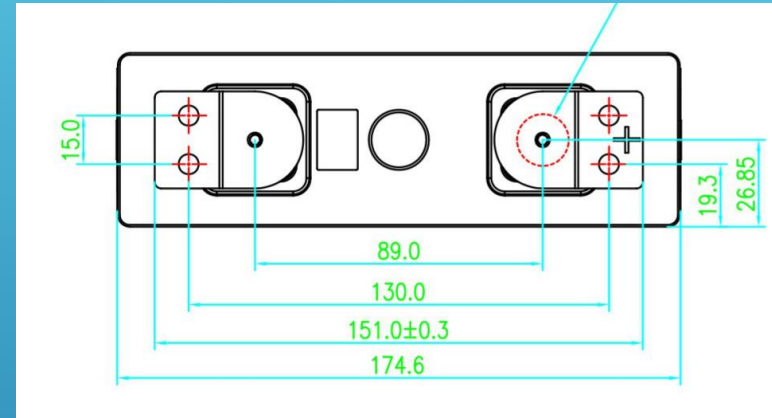
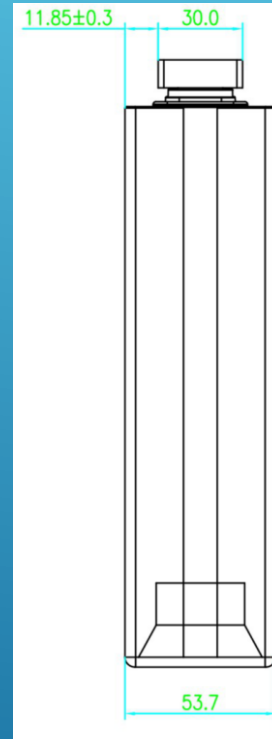
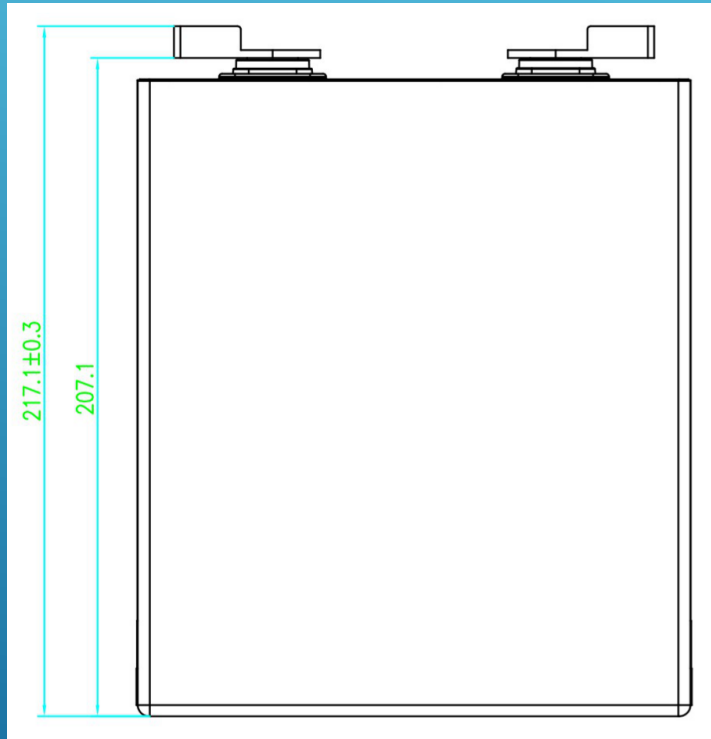
——LPT176AF

TECHNICAL DATA SHEET

6000 life cycles  
2C Continuous  
3C Peak

**MSDS**  
**UN38.3**

# DIMENSION



# PHOTOS





# GENERAL SPECIFICATION

No.	Parameter	Specification	Condition
1	Typical capacity	*177.7Ah	At 88A discharge current (25°C CC+CV)
2	Minimum capacity	*176.0Ah	At a 88A discharge current (25°C CC+CV)
3	Operating voltage	2.5 – 3.65V(>0°C) 2.0 – 3.65V(≤0°C)	N.A.
4	Impedance(1kHz)	≤0.40m Ω	At a fresh state
5	Shipping capacity	*20%~50%SOC	SOC conformity at the same bath
6	Operating temperature (charging)	0 – 55°C	See paragraph 2.2
7	Operating temperature (discharge)	-20 – 55°C	See paragraph 2.3
8	Weight	≤3.984 kg	including hard case and cap
9	Self-discharge	≤3%/Month	Count after fresh cell need Standard Charge to 50%SOC and storage at 25±2°C for 3 month



# CHARGING

No.	Parameter	Specification	Condition
1	Standard charge current	0.5C	25±2°C
2	Standard charge voltage	3.65V	
3	Standard charge method	0.5C constant current charge to 3.65V for cell, then switch to constant voltage charge until charge current declines to ≤0.05C	
4	Standard charge temperature	25±2°C	Cell temperature
5	Absolute charge temperature (Cell temperature)	0 – 55°C	Stop charging once cell Temperature is outside this range regardless of the charging mode adopted
6	Absolute charge voltage	3.80V max.	Stop charging once voltage exceeds this voltage regardless of the charging mode (including regeneration) adopted



# CHARGING

## 7 Other Charge Conditions (Modes)

Cell Temperature	Standard Charge (Charge current)	Fast Charge (Charge current)	Rush Charge (Charge current)
$\leq 0^{\circ}\text{C}$	Charging not allowed	Charging not allowed	Charging not allowed
$0-10^{\circ}\text{C}$	Charging current 0.1C when the SOC < 80%	Charging not allowed	Charging not allowed
$10-15^{\circ}\text{C}$	Charging current 0.2C	Charging not allowed	Charging not allowed
$15-20^{\circ}\text{C}$	Charging current 0.3C	Charging current 0.5C	Charging not allowed
$20-45^{\circ}\text{C}$	Charging current 0.5C	Charging current 0.7C	Charging current 1C
$45-55^{\circ}\text{C}$	Charging current 0.3C While the voltage $\leq 3.65\text{V}$		
$> 55^{\circ}\text{C}$	Charging not allowed		



# DISCHARGING

No	Parameter	Specification	Condition
1	Standard discharge current	88.0A	25±2°C
2	Maximum discharge current (continuous)	176.0A	25±2°C
3	Maximum discharge current (long pulse)	352.0A	3 minute duration maximum followed by a "zero current rest period" of same duration
4	Maximum discharge current (short pulse)	528.0A	60 second duration maximum while cell Temperature ≤ 50°C and SOC>40%SOC; 10 second duration maximum while cell Temperature ≤ 50°C and SOC≤40%SOC;
5	Discharge cut-off voltage	2.5V 2.0V	minimum(>0°C) minimum(≤0°C)
6	Standard discharge temperature	25±2°C	Cell temperature
7	Absolute discharge temperature	-20 – 55°C	Stop discharging once cell Temperature is outside this range regardless of whether continuous or pulse current is adopted



# REGENERATION

Regeneration means a cell is charged by pulse current regenerated during application. The regenerated voltage should be strictly regulated at all SOC and Cell Temperature. The magnitude and duration of pulse charging current should be strictly regulated according to the SOC and Cell Temperature listed on the table below. Regeneration charging of the cell outside this allowable condition may cause permanent internal damage to the Product and shall render LPT's warranties under the Contract inapplicable, thereby releasing LPT from any liability in connection therewith.





# REGENERATION

1. Regeneration voltage 3.65V maximum
2. Allowable regeneration current and duration

SOC	Cell Temperature				
	$\leq 0^{\circ}\text{C}$	$0^{\circ}\text{C}-10^{\circ}\text{C}$	$10^{\circ}\text{C}-20^{\circ}\text{C}$	$20^{\circ}\text{C}-55^{\circ}\text{C}$	$\geq 55^{\circ}\text{C}$
>95%	Charging not allowed	Charging not allowed	Charging not allowed	Charging not allowed	Charging not allowed
80%-95%	Charging not allowed	Charging not allowed	$\leq 1\text{C}, \leq 5\text{s}$	$\leq 1\text{C}, \leq 10\text{s}$	Charging not allowed
50%-80%	Charging not allowed	$\leq 1\text{C}, \leq 5\text{s}$	$\leq 1\text{C}, \leq 10\text{s}$	$\leq 1.5\text{C}, \leq 10\text{s}$	Charging not allowed
$\leq 50\%$	Charging not allowed	$\leq 1\text{C}, \leq 10\text{s}$	$\leq 1.5\text{C}, \leq 10\text{s}$	$\leq 2.0\text{C}, \leq 10\text{s}$	Charging not allowed

After each regeneration pulse, there should be a “rest period” with duration equal to or long than the relevant regeneration pulse. A “rest period” can either be discharging or zero current state. No regeneration is allowed within a “rest period”.



# LOW TEMPERATURE DISCHARGE CAPACITY

No.	Parameter	Specification	Condition
1	Capacity at 25°C	* $\geq 176.0\text{Ah}$	Standard Charge at 25 $\pm$ 2°C, Standard Discharge at 25 $\pm$ 2°C (Cell Temperature in both cases)
2	Capacity at 0°C	* $\geq 140.8\text{Ah}$	Standard Charge at 25 $\pm$ 2°C, Standard Discharge at 0 $\pm$ 2°C (Cell Temperature in both cases)
3	Capacity at -10°C	* $\geq 132.0\text{Ah}$	Standard Charge at 25 $\pm$ 2°C, Standard Discharge at -10 $\pm$ 2°C (Cell Temperature in both cases)
4	Capacity at -20°C	* $\geq 123.2\text{Ah}$	Standard Charge at 25 $\pm$ 2°C, Standard Discharge at -20 $\pm$ 2°C (Cell Temperature in both cases)



# TEMPERATURE RISE

The cells shall be allowed to cool down by unrestricted natural convection in a reasonably large room with stable Ambient Temperature. The temperature of each shall be measured with calibrated thermal couple sensor(s) capable of capturing data logging with respect to time. The temperature should be measured at the center of cell surface. Temperature rise is defined as temperature after discharge minus temperature just before discharge.

No.	Parameter	Specification	Condition
1	Temperature Rise (continuous)	$\leq 10^{\circ}\text{C}$	When a cell is discharged at a 0.5C current for a period of 2 hour
2	Temperature Rise (pulse)	$\leq 5^{\circ}\text{C}$	When a cell is discharged at a 3C current for a period of 10s at any SOC



# STORAGE AND CYCLE PERFORMANCE

No.	Parameter	Specification	Condition
1	Recoverable Capacity (short term)	* $\geq 170.7\text{Ah}$	Standard Charge to 50% SOC, storage at $25\pm 2^{\circ}\text{C}$ for 30 days
2	Recoverable Capacity (long term)	* $\geq 165.4\text{Ah}$	Standard Charge to 50% SOC, storage at $25\pm 2^{\circ}\text{C}$ for 183 days
4	Absolute Storage Temperature	$-30 - 55^{\circ}\text{C}$	The cell is prohibited to be stored at the temperature outside of the specification
5	Cycled Capacity	$\geq 140.8\text{Ah}$ within 2000 Cycles	Charge and Discharge Current: 1C, Temp. : $25\pm 2^{\circ}\text{C}$



# PRODUCT END OF LIFE MANAGEMENT

This cell is designed to service with a finite life time. Client shall develop and implement an active tracking system to monitor and record impedance of each Product in its entire service life. Client and/or its customer shall stop using any of the Products when its impedance exceeds 250% of the value when it was fresh. Failure to comply with this requirement shall render LPT's warranties under the Contract inapplicable, thereby releasing LPT from any liability in connection therewith.

## ▶ Shipment

- ▶ The Cell shall be shipped in voltage range of 3.2 ~ 3.4V or in accordance with customers' requirement. The remaining capacity before charging shall be changed depending on the storage time and conditions.

## ▶ Warranty

- ▶ The Warranty period of cell is made according to business contract, However, even though the problem occurs within this period, LPT won't replace a new cell for free as long as the problem is not due to the failure of LPT manufacturing process or is due to customer's abuse or misuse.
- ▶ LPT will not be responsible for trouble occurred by handling outside of the precautions in instructions. LPT will not be responsible for trouble occurred by matching electric circuit, cell pack and charger.
- ▶ LPT will be exempt from warrant any defect cells during assembling after acceptance.

## ▶ Precautions and Safety Instructions

- ▶ Lithium-ion rechargeable batteries subject to abusive conditions can cause damage to the cell and/or personal injury. Please read and observe the standard cell precautions below before using utilization. The customer is required to contact LPT in advance, if and when the customer needs other applications or operating conditions than those described in this document.
- ▶ LPT will take no responsibility for any accident when the cell is used under other conditions than those described in this Document.

## ▶ Standard cell Precautions

- ▶ a. Do not expose the cell to extreme heat or flame.
- ▶ b. Do not short circuit, over-charge or over-discharge the cell.
- ▶ c. Do not subject the cell to strong mechanical shocks.
- ▶ d. Do not immerse the cell in water or sea water, or get it wet..
- ▶ f. Do not disassemble or modify the cell.
- ▶ g. Do not handle or store with metallic like necklaces, coins or hairpins, etc.
- ▶ h. Do not use the cell with conspicuous damage or deformation.
- ▶ i. Do not connect cell to the plug socket or car-cigarette-plug.
- ▶ j. Do not make the direct soldering onto a cell.
- ▶ k. Do not touch a leaked cell directly.
- ▶ l. Do not use for other equipment.
- ▶ m. Do not use Lithium-ion cell in mixture.
- ▶ n. Do not use or leave the cell under the blazing sun (or in heated car by sunshine).
- ▶ o. Keep cell away from children.
- ▶ p. Do not drive a nail into the cell, strike it by hammer or tread it.
- ▶ q. Do not give cell impact or fling it.

## ▶ Cell Operation Instructions

### ▶ Charging

- ▶ a. Charge the cell in a temperature range of 0°C to + 50°C.
- ▶ b. Charge the cell at a constant current of 0.3C until 3.65V, and then at a constant voltage of 3.65V until 0.05C. Charge rates greater than 1C are NOT recommended. (C : Rated Capacity of cell)
- ▶ c. Use a constant current, constant voltage (CC/CV) lithium-ion (Li+) cell charge controller.
- ▶ d. Do not continue to charge cell over specified time.

### ▶ Discharging

- ▶ a. Recommended cut-off voltage to 2.2V. Recommended max continuous discharge current is 3C.
- ▶ b. For maximum performance, discharge the cell in a temperature range of -20°C to +50°C.

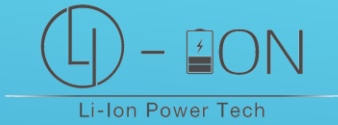
## ▶ Storage Recommendations

- ▶ In case of long period storage (more than 3 months), storage the cell at temperature range of -10 ~ +45°C, low humidity, no corrosive gas atmosphere, No press on the cell; After more than 3 months, the batteries need to be charged according to the standard charge and discharge process.





BATTERY PACKS MADE OF 3.2V 176AH CELLS



- ▶ HK HQ Office: BRIGHT WAY TOWER, NO.33 MONG KOK ROAD, KOWLOON, HONGKONG
- ▶ USA Office: 7427 South Main Street, Midvale, Utah 84047
- ▶ China Factory: No.8, Dongtin Lake Road, Economic and Development Zone, Qinhuangdao, China.

▶ **Welcome to Contact:**

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