Battery Statement

Product Model： TL -MAK-18（B）	**Product Name：** 18V Li-ion Battery for Makita Power Tools
The file number： RD1-PS-MAK18B-3D0	**Version：** 2.0
Scope of application: this product specification is applicable to 18V 3.0Ah li-ion battery for Makita Power Tools	

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1. Technical Parameters

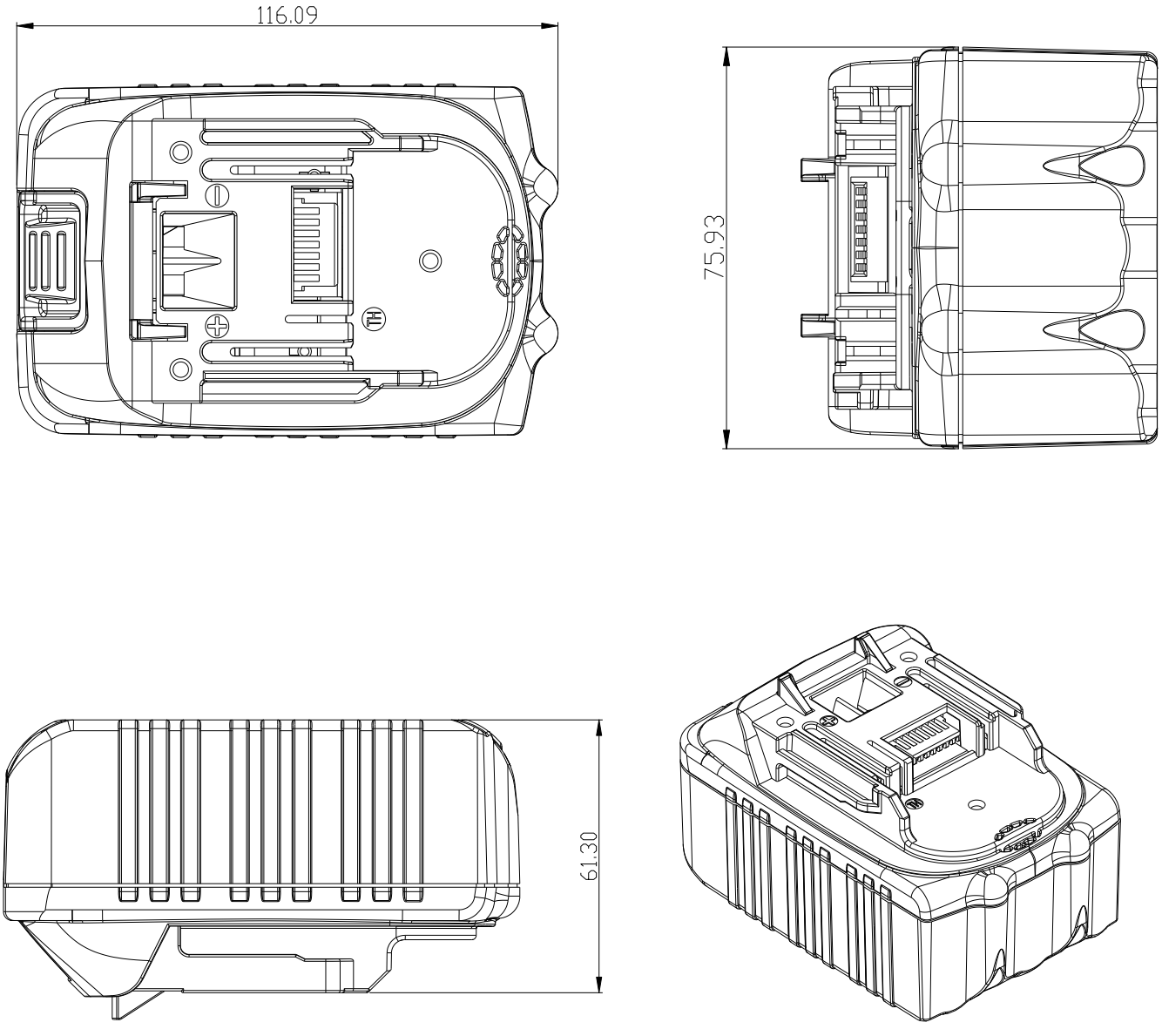
No.	Article	Specifications / Scope	Remarks
1.	Type of Battery Cells	Li-ion 18650	
2.	Nominal Voltage	18V	
3.	Nominal Capacity	3.0Ah	
4.	Charging Mode	CC/CV	
5.	Charging Voltage Limit	21V	
6.	Standard Charge Circuit	600mA	
7.	Fast Charge Circuit	3A	
8.	Max Charge Current	6A	Constant current charge
9.	Internal Resistance	≤110mΩ	
10.	Standard Discharge Circuit	600mA	
11.	High-rate Discharge	15A	
12.	Maximum Discharge Current	20A	Continuous discharge
13.	Discharge End Voltage	12.5V	
14.	Protective Functions	Overcharge protection	21±0.25V
15.		Over discharge protection	No
16.		Cell Voltage Inbalance Protection	Charger will stop charging when the voltage is unbalanced.
17.		Overheat Protection for Charging	NTC 60℃ temperature switch 70℃
18.		Short Circuit Protection	No
19.	Static Power	＜20uA	When the battery is no-load
20.	Work Environment	Charge：0～40℃ Discharge：-20～+40℃ Maximum relative humidity: 85%	
21.	Recycling Life	≥150 Times	

2. Performance Testing Methods and Requirements

No.	Test Content	Test Condition	Requirement
1.	Surface	Visual inspection	The surface of the outer casing should be smooth without scratches, burrs and other mechanical damage. There should be no oxidation of exposed metal parts and no deformation of the rubber casing.
2.	Nominal Capacity	Ambient temperature 20±5℃ 1）Standard charging method: 0.2C charging to 21V, then using 21V constant voltage, end charging when the current is less than 0.01C and then put on hold for 30 minutes after charging. 2）Discharge to 0.25V with a constant current of 0.2C	Discharge capacity ≥90% of nominal capacity
3.	Charge Retention	At the ambient temperature of 20 ° c ±5 ° c, the battery is stored for 30 days after standard charging, and then discharge to 12.5v with 1C constant	≥70% nominal capacity
4.	Shipping Voltage	Test the voltage between the positive and negative terminals with a voltmeter before shipping	≥18.5V ＜20V
5.	High Temperature Resistance	At the ambient temperature of 40℃, charge full the battery with 0.2c, shelve it for 30 minutes, and then discharge the battery to 12.5v with 1C constant.	≥80% of nominal capacity
6.	Low Temperature Resistance	At the ambient temperature of 0℃, charge full the battery with 0.2c and shelve it for 30 minutes. Then the battery is put under the ambient temperature of -20℃ and discharge to 12.5v with 1C constant	≥65% of nominal capacity

7.	Anti-vibration performance	Place the fully charged battery on the vibration platform at room temperature, let the battery vibrate for 30 minutes according to the following parameters conditions: Displacement Amplitude:0.38mm(10-30hz); Frequency: 10-55hz (1oct/min), Direction :X,Y . Then check battery surface and function after test.	Battery surface should not be obviously damaged, no leakage, no smoke, no fire, no explosion.

3. Product Appearance Dimensions Drawing



4. Storage Requirements

1) Please store the battery in a cool and dry place. The storage temperature range is -10°C~+35°C.

2) During battery storage, the battery must be charged once every three months to avoid damage caused by excessive battery discharge.

5. Precautions

1) Do not reverse polarity charging

2) Do not burn or damage the battery, otherwise the battery will explode or release harmful gases.

3) Stop using the battery in case of noise, high temperature or leakage.

4) When the power is insufficient, stop using to avoid damage caused by excessive battery discharge.

5) Do not put the battery in the water.

6) Do not disassemble or press or hit the battery, which is prone to heat or fire.

7) Keep away from children.

8) Short circuit, overcharge or improper charging method will damage the battery.

9) Please use the appropriate charger to charge the battery

10) During the charging process with the original charger, when the battery is nearly full, the charger will occasionally appear red, yellow and green lights at the same time, which is normal.