



FocusPower Ni-MH Batteries Specification

Model No: FP-MH-D9000B

Prepared by:	Date:
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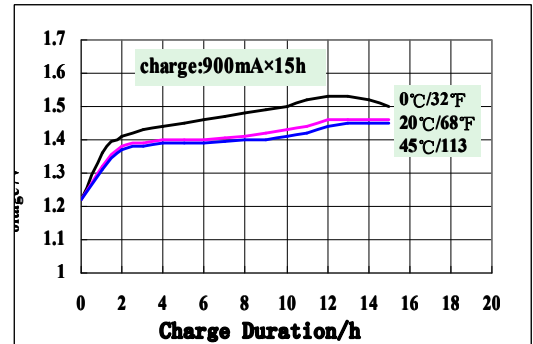
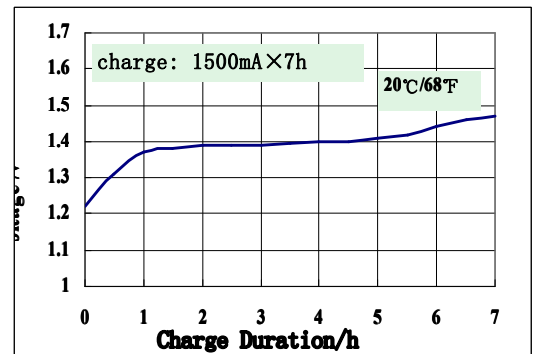
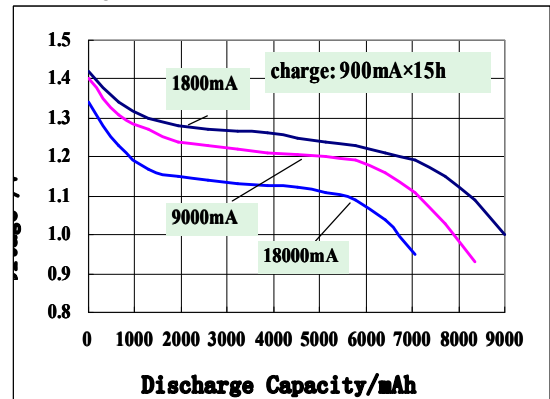
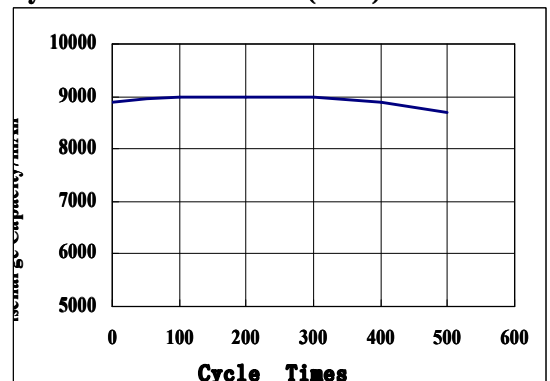
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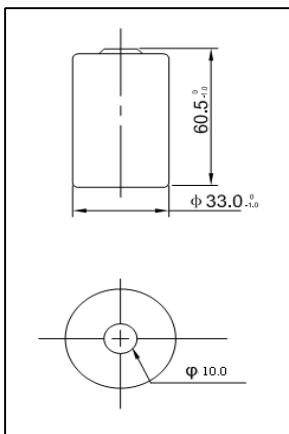
Postcode: 528437

Type: FP-MH-D9000B
Specification of single cell

Nominal Voltage		1.20V	
Capacity		0.2C Discharge	1C Discharge
	Minimum	9000mAh	8100mAh
	Typical	9900mAh	9000mAh
Dimensions	Diameter	mm	
	Height	33.0 ^{-1.0}	
Weight		60.5 ^{-1.0}	
Internal impedance At 1000 Hz		162gram	
		13mΩ After charge	
Charge	Standard	900mA(0.1C) × 15hrs	
	Rapid	1500mA × 7hrs	
Ambient Temperature	Charge	Standard	0~45°C
		Rapid	10~40°C
	Discharge		-20~65°C
	Storage		-20~45°C

Typical Characteristics
Standard charge characteristics:

Rapid charge characteristics:

Discharge characteristics at various rate

Cycles test: IEC61951-2(2003) 7.4.1


Dimensions with tube


Note:

- ① Nominal capacity, rated at 0.2C, 20°C
- ② Typical capacity, Weight and internal impedance are for reference only.
- ③ Typical characteristics, for reference.
- ④ Cycle life test according to IEC Standard.

Performance

Before proceed the following tests the cells should be discharged at 0.2C to 1.0V cut off. Unless otherwise stated, tests should be done within one month of delivery under the following conditions.

Ambient temperature: $20 \pm 5^{\circ}\text{C}$

Relative Humidity: $65 \pm 20\%$

Note Standard Charge/Discharge Condition:

Charge: 900mA(0.1C) \times 15hrs

Discharge: 1800mA(0.2C) to 1.0V/cell

Table 1 Performance Test

Test	Unit	Specification	Condition	Remarks
Capacity	mAh	≥ 9000	Discharge at 0.2C to 1.0V/cell	Up to 3 cycles are allowed
Open circuit Voltage (OCV)	V	≥ 1.28	Within 1 hr after standard charge	Unit cell
Internal Impedance (Ri)	m Ω	≤ 13	Upon fully charge at 1kHz	Unit cell
Low Temperature Discharge	h	≥ 4	Standard Charge, Storage: 16 ~ 24hrs at $0 \pm 2^{\circ}\text{C}$; 0.2C discharge at $0 \pm 2^{\circ}\text{C}$	1.0V/cell cut off
Overcharge	N/A	No conspicuous Deformation and/or leakage	0.1C charge for 48hrs	
Charge retention	h	≥ 3	Standard charge Storage 28days Standard discharge(0.2C)	1.0V/cell Cut off
Storage	mAh	≥ 7200	Standard Charge, then store at $20 \pm 5^{\circ}\text{C}$ for 12 months, after completion of storage period, conduct capacity test.	
IEC Cycle Life Test	Cycle	≥ 500	IEC61951-2(2003) 7.4.1	
Safety Device operation	N/A	No explosion	Force discharge at 0.2C to a final voltage of 0V, then the current be increased to 1C and forced discharge continue for 60 min.	Leakage of electrolyte and Deformation are acceptable

Notes:

Please activate the battery once every 3 months according to the following method;

Charge at 0.1C for 15hrs, rest 10min, then discharge with 0.2C to 1.0V/cell.

Precautions to ensure the safety on battery

- 1) Batteries should be charged prior to use.
- 2) When using a new battery for the first time or after long term storage, please fully charge the battery before use.
- 3) For charging methods please reference to our technical handbook.
- 4) Use the correct charger for Ni-MH batteries.
- 5) Do not reversely charge batteries.
- 6) Do not short circuit batteries, permanent damage to batteries may result.
- 7) Do not incinerate or mutilate batteries, may burst or release toxic material.
- 8) Do not solder directly to cells or batteries.
- 9) Do not subject batteries to adverse condition such as extreme temperature, deep cycling and excessive overcharge/over discharge.
- 10) Store Batteries in a cool dry place.
- 11) Do not mix FocusPower Batteries with other battery brands or batteries of a different chemistry such as alkaline and zinc carbon.
- 12) Do not mix new batteries in use with semi-used batteries, over discharge may occur.
- 13) Avoid batteries being used in an airtight compartment. Ventilation should be provided inside the battery compartment; otherwise batteries may generate hydrogen gas, which could cause an explosion if exposed to an ignition source.
- 14) When connecting a battery pack to a charge, ensure correct polarity.
- 15) If find any noise, excessive temperature or leakage from a battery, please stop its use.
- 16) When the battery is hot, please do not touch it and handle it, until it has cooled down.
- 17) Do not remove the outer sleeve from a battery pack nor cut into its housing.
- 18) When find battery power down during use, please switch off the device to avoid over discharge.
- 19) When not using a battery, disconnect it from the device.
- 20) Unplug a battery by holding the connector itself and not by pulling at its cord.
- 21) After use, if the battery is hot, before recharging it, allow it to cool in a well-ventilated place out of direct sunlight.
- 22) Never put a battery into water or seawater.
- 23) During long term storage, battery should be charged and discharged once every three months.
- 24) Do not attempt to take batteries apart or subject them to pressure or impact. Heat may be generated or fire may result. The alkaline electrolyte is harmful to eyes and skin, and it may damage clothing upon contact.
- 25) Keep away from children. If swallowed, Contact a Physician at once.

Append: IEC61951-2 7.4 Endurance in cycles

Prior to the endurance in cycles test, the cell shall be discharge at 0.2C to a final voltage of 1.0V/cell. The following endurance test shall then be carried out, in an ambient temperature of $20 \pm 5^\circ\text{C}$, Charge and discharge shall be carried out at constant current throughout, using the conditions specified in table 2. Precautions shall be taken to prevent the cell-case temperature from rising above 35°C during the test, by providing a forced air draught if necessary.

Note---Actual cell temperature, not the ambient temperature, determines cell performance

Table 2 Endurance in cycles

Cycle number	Charge	Rest	Discharge
1	0.1C for 16h	none	0.25C for 2h 20min
2 to 48	0.25C for 3h 10min	none	0.25C for 2h 20min
49	0.25C for 3h 10min	none	0.25C to 1.0V/cell
50	0.1C for 16h	1h to 4h	0.2C to 1.0V/cell
<ul style="list-style-type: none">● It is permissible to allow sufficient open-circuit rest time after the completion of discharge at cycle 50, so as to start cycle 51 at an exact two-week interval. A similar procedure may be adopted at cycles 100, 150, 200, 250, 300, 350, 400 and 450.● If cell discharge voltage drops below 1.0V/cell, discharge may be discontinued.			

Cycles 1 to 50 shall be repeated until the discharge duration on any 50th cycle becomes less than 3h at this stage, a further cycle as specified for cycle 50 shall be carried out.

The endurance test is considered complete when two such successive cycles give a discharge duration less than 3h. The number of cycles obtained when the test is completed shall be not less than 500.