

**NIMH**

**CONRAD**

**energy**

**700**

**Akku**

**Nickel-Metal-Hydrid-Akku**

**Rechargeable**

**700 mAh**

**1,2 V**

**Einzelzelle**

Die Akkus nicht kurzschließen, verbrennen,  
gewaltsam öffnen. Auf die richtige Polarität achten.  
(+/-) Do not short-circuit, burn or force open the  
batteries. Please insert correctly (+/-).

**700**



100%



80%



**Data Sheet**

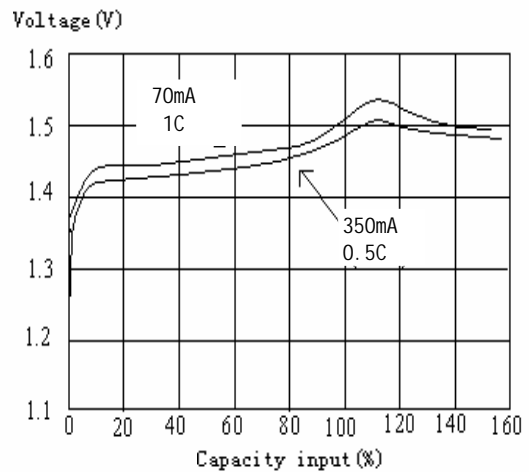
Model No : VGP28AA700

Document Number ERS-2001-J-Y Edition: A

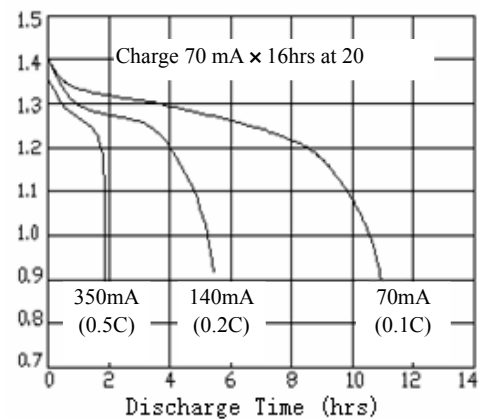
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Type :	Rechargeable Nickel Metal Hydride Cylindrical Cell
Nominal Dimension : (with sleeve)	$\phi=14.5\text{mm}$ H=28.5mm
Applications:	Recommended discharge current 70 to 2100 mA
Nominal Voltage:	1.2V
Capacity:	Minimum: 650mAh Typical: 700mAh when discharged at 0.2C to 1.0V at 20
Charging Condition:	70mA for 16 hrs at 20
Fast Charge:	350mA to 700 mA(0.5 to 1C) charge termination control recommended control parameters: V: 0~5mv DT/dt : 0.8 /min(0.5 to 0.9 C) 0.8~1 /min(1C) TCO : 45~55 Time : 105% nominal input For reference only
Service life :	> 500 cycles (IEC standard)
Continuous overcharge :	70mA maximum current for 48 hrs No conspicuous deformation and/or leakage
Weight:	about 13.5g
Internal Resistance:	Max40m $\Omega$ upon fully charged at 700HZ
Max. Charging Voltage :	1.5V at 70mA charging
Ambient Temperature Range :	Standard charging : 0 to 45 Fast charging : 10 to 45 Discharging : -20 to 50 Storage : -20 to 35

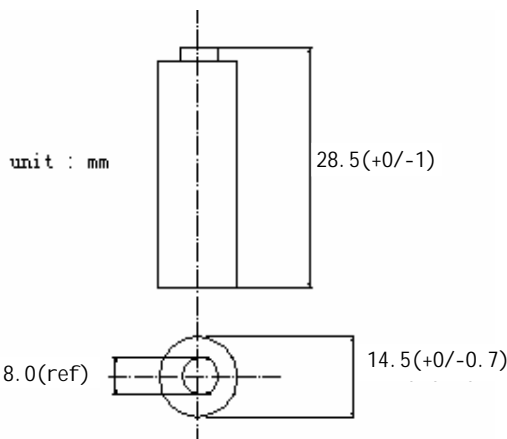
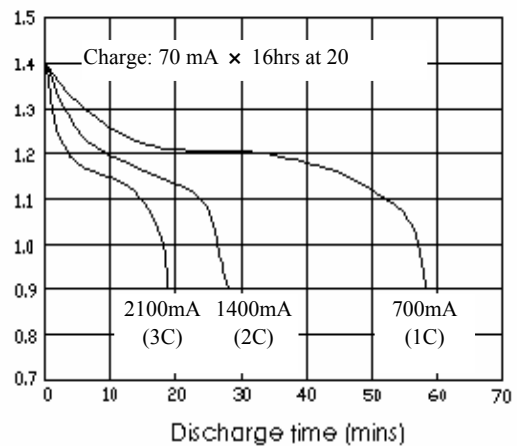
Fast charge(charge control required)



Low rate discharge  
Voltage (v)



High rate discharge  
Voltage (V)



## 1 . SCOPE

This specification governs the performance of the following VIGORPOWER Nickel-Metal Hydride Cylindrical Cell and its stack-up batteries

Model: VGP28AA700

Cell Size: 28AA

The data involving nominal voltage and the approximate weight of stack-up batteries shall be equal to the value of the unit cell multiplied by the number of cells in the battery. For example, a stack-up battery consists of three unit cells:

Nominal Voltage of stack-up battery =  $1.2 \times 3 = 3.6V$

## 2 . RATINGS

Description	Unit	Specification	Conditions
Nominal voltage	V	1.2	Unit cell
Typical Capacity	mAh	700	Standard charge/ Discharge
Minimum Capacity	mAh	650	Standard charge/ Discharge
Standard charge	mA	70(0.1C)	Ta=0~45 (see note1)
	hr	16	
Fast charge	mA	700(1C)	- V=0~5mV/cell or Time cut off = 105% input capacity Temp. cut off = 45~50 Ta =10~45 dT/dt = 0.8~1 /min
	hr	1.05 approx (see note 2)	
Trickle charge	mA	35~70	Ta = 0~45
Discharge cut off voltage	V	1.0	Unit cell
Maximum Discharge Current	mA	2100(3C)	Ta = -20~50
Storage Temperature		-20~35	Discharge state
Typical Weight	gram	about 13.5	Unit cell

## 3. PERFORMANCE

Unless otherwise stated, tests should be done within one month of delivery under the following conditions

Ambient Temperature Ta :  $20 \pm 5$

Relative Humidity :  $65 \pm 20\%RH$

Notes: Standard Charge/Discharge Condition

Charge :  $70mA(0.1C) \times 16hrs$

Discharge:  $140mA(0.2C)$  to 1.0V/cell

Test	Unit	Specification	Condition	Remarks
Capacity	mAh	650	Standard Charge / Discharge	Up to 3 cycles are allowed
Open Circuit Voltage (OCV)	V	1.25	Within 1hr after standard charge	Unit cell

Test	Unit	Specification	Condition	Remarks
Internal impedance(Ri)	mΩ	40	Upon fully charge (1KHZ)	Unit cell
High Rate Discharge (0.5C)	minute	108	Standard Charge , 1hr rest before di scharge	
High Rate Discharge (1C)	minute	48	Standard Charge , 1hr rest before di scharge	
Overcharge	N/A	No leakage nor explosion	70mA(0.1C) charge for 48hrs	
charge Retention	mAh	420(60%)	Standard charge Storage: 28 days at RT or 7 days at 45 Standard discharge	
IEC Cycles Test	Cycle	> 500	IEC 61951-2 (2003)	(see note 3)
Accelerated Cycls Life	Cycle	300	Charge: 350mA(0.5C) Discharge:350mA(0.5C) to 1.0V/cell End of life:60% of nominal capacity	Cycling charging cut off condition: - V = 0~5V/cell or time cut off = 105% of input capacity
Leakage	N/A	No leakage nor deformation	Fully charged at 700mA (1C), stand for 14 days	
Short Circuit	N/A	Leakage & deformation may occur, but no explosion is allowed	After standard charge. short circuit the cell at 20+/-5 until the cell temperature returns to ambi ent temperature. (The resistance of the inter-connecting circuitry shall not exceed 0.1 ohm.)	
Vibration Resistancs	N/A	change of voltage V < 0.02V change of internal impedance R < 5mΩ	Charge at 0.1C for 16hrs and then leave for 24hrs check battery before after vibration Amplitude: 1.5mm Vibration: 3000CPM (any direction for 60mins)	Unit cell
Impact Resistance	N/A	change of voltage V < 0.02V change of internal impedance R < 5mΩ	Charge at 0.1C for 16hrs and then leave for 24hrs check battery before/ after drop Height: 50cm Thickness of the wooden board: 30mm Direction is not specified Test for 3 times	Unit cell

#### 4. CONFIGURATIONS,DIMENSIONS AND MARKINGS

Please refer to the related drawing.

#### 5. EXTERNAL APPEARANCE

The cell / battery shall be free from cracks,scars, breakage, rust, discoloration, leakage and deformation

## 6. WARRANTY

One year limited warranty against workmanship and material defects.

## 7. CAUTION

1. Batteries should be charged prior to use
2. For charging methods please referred to our technical handbook
3. Use the correct charger for Ni-Cd or Ni-MH batteries
4. Do not reverse charge batteries
5. Do not subject batteries to adverse condition such as extreme temperature, deep cycling and excessive over charge/over discharge.
6. 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
7. 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.
8. Keep away from children. If swallowed,contact a physician at once.
9. Do not short circuit batteries, permanent damage to batteries may result
10. Do not incinerate or mutilates batteries, may burst or release toxic material.
11. Do not solder directly to cells or batteries.
12. Store batteries in a cool dry place,Always discharge batteries before bulk storage or shipment.
13. If find any noise,excessive temperature or leakage from a battery, please stop its use.
14. When using a new battery for the first time or after long term storage, please fully charge the battery before use
15. When using a new batterie in use with semi-used batteries, over-discharge may occur.
16. Do not mix new batteries in use with semi-used batteries, over-discharge may occur.
17. When connecting a battery pack to a charger, ensure correct polarity.
18. When the battery is hot, please do not touch it and handle it, until it has cooled down.
19. Do not remove the outer sleeve from a battery pack nor cut into its housing.
20. When find battery power down during use, please switch off the device to avoid over discharge.
21. Unplug a battery by holding the connector itself and not by pulling at its cord.
22. After use, If the battery is hot. Before recharging it, allow it to cool in a well-ventilated place out of direct sunlight.
23. Never put a battery into water or seawater

Notes: 1. Ta: Ambient Temperature.

2. Approximate charge time from discharged rate, for reference only.

3. IEC61951-2(2003) Cycle Life Test:

Cycle No.	Charge	Rest	Discharge
1	0.1C×16hrs	none	0.25C×2hrs20mins
2-48	0.25C×3hrs10mins	none	0.25C×2hrs20mins
49	0.25C×3hrs10mins	none	0.25C to 1.0V/cell
50	0.1C×16hrs	1-4hr(s)	0.2C to 1.0V/cell
Cycle 1 to 50 shall be repeated until the discharges duration on any 50th cycle becomes less than 3hrs			