Approval Sheet

Title: Approval sheet for GPRHC063N013

Revision: 0

To: Brands Group

Fr: GPI INTERNATIONAL LTD.

GP Part Number	Description	Customer P/N
GPRHC063N013	GP60AAAH2BMJ-2U1+8941	

	Initiator	Checked by	Approved by		
			PM	BU	GPII
Name	XY Li	Sunny Yeung	Vivian fong	Daniel Tong	
Date	2017-08-31	2017-08-31	2017-08-31	2017-08-31	

Attachment:

Item	Revision	Prepared by	Checked by	Approved by
Data Sheet	06	XH Ye	Ling Guan	Vivian Fong
Battery drawing	2	XuYang Li	XuYang Li	Sunny Yeung
Connector spec	/	/	/	/
Product Specification	0	JW Zhu	WL Zhong	Vivian Fong

Approved by Customer		
Name		
Date		

Modification History:

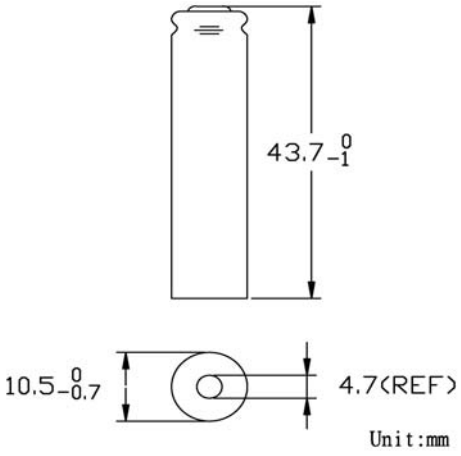
Rev.	Description	Initiator	Checked by	Date
0	First issue	XuYang Li	Sunny Yeung	2017-08-31

The drawing link to the document drawing no. TPD8941.

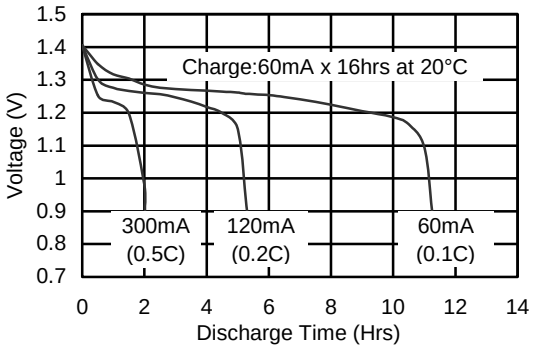
GP Batteries DATA SHEET

Model No.: GP60AAAH

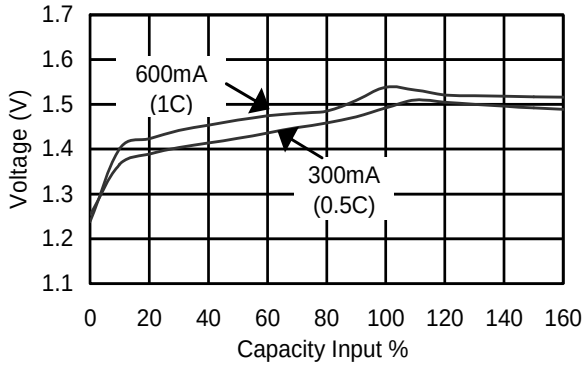
Type	:	Rechargeable Nickel Metal Hydride Cylindrical Cell
Nominal Dimension (with Sleeve)	:	Φ = 10.5mm H = 43.7mm
Applications	:	Recommended discharge current 60 to 1800mA
Nominal Voltage	:	1.2V
Capacity	:	Rated: 600mAh Typical: 630mAh When discharged at 120mA to 1.0V at 20℃
Charging Condition	:	60mA for 16 hrs at 20℃
Charging Retention		80% of rated capacity after cell storage at 20℃ for 12 months When discharged at 120mA to 1.0V at 20℃
Fast Charge	:	300mA to 600mA (0.5 to 1C) charge termination control recommended control parameters: -ΔV : 0-5mV DT/dt : 0.8℃/min (0.5 to 0.9C) 0.8 - 1℃/min (1C) TCO : 45 - 50℃ Timer : 105% nominal input (for ref. only)
Service Life	:	>500 cycles (IEC standard)
Continuous Overcharge	:	60mA maximum current for 1 year. No conspicuous deformation and/or leakage
Weight	:	13.0g
Internal Resistance	:	Average 40mΩ upon fully charged (Max. 60mΩ) at 1000Hz
Max. Charging Voltage	:	1.5V at 60mA charging
Ambient Temperature Range	:	Standard Charge : 0 to 45℃ Fast Charging : 10 to 45℃ Discharge : -20 to 50℃ Storage : -20 to 35℃



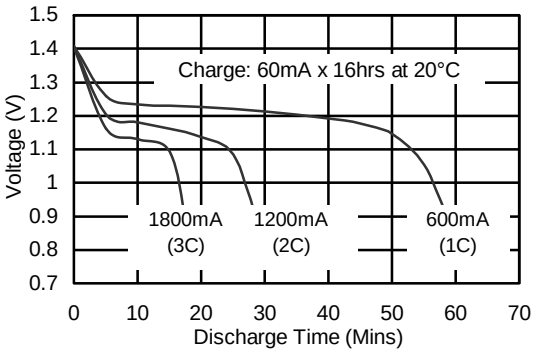
Low Rate Discharge



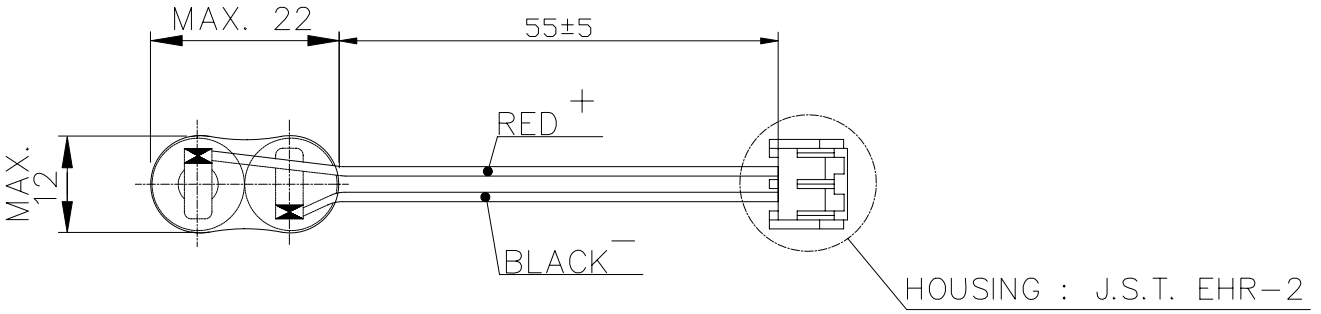
Fast Charge (Charge Control Required)

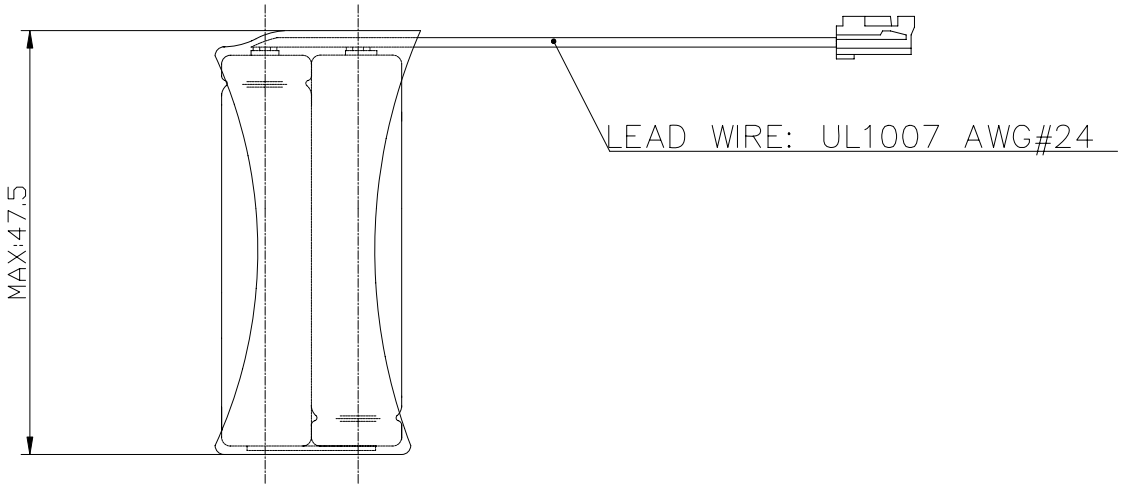


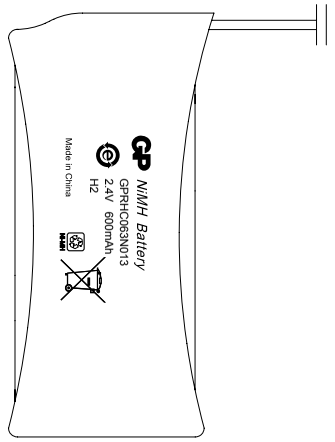
High Rate Discharge



REVISIONS				
LTR	DESCRIPTION	SIGNATURE AND DATE		
		DWN	CHK	AUTH
1	增加套腸方向	2012-10-07		
2	更改印字内容	2013-01-07		







Pad print direction
H2--GP date Code
H--Aug(month)
2--2012(year)

REMARKS:
1.) BATTERY TO BE COVERED BY SHRINKAGE SLEEVE

TO : Amy cy Lam
PD0319

NOTICE: 1.DO NOT SCALE THIS DRAWING 2.REMOVE ALL SHARP EDGE UNLESS OTHERWISE SPECIFIED	DIMENSIONS ARE IN mm AND INCLUDE PLATED FINISHES * TOLERANCE REQUEST: NO DEC.PT. ±0.50 1 DEC.PT. ± 0.10 2 DEC.PT. ± 0.05	SIGNATURE	DATE	MODEL NO.: GP60AAAH2BMJ		GP Batteries
		DRAWN		Division : RBD	NOMINAL VOLTAGE: 2.4V	TITLE: GP60AAAH STACK UP BATTERY
		CHKD		CELL TYPE: NiMH	CAPACITY: 600mAh	
		APPD		Page 1 of 1	SCALE: none	DWG NO. : TPD8941 REV. NO.: 2

Manufacturer reserves the right to alter or amend the design, model and specification without prior notice.

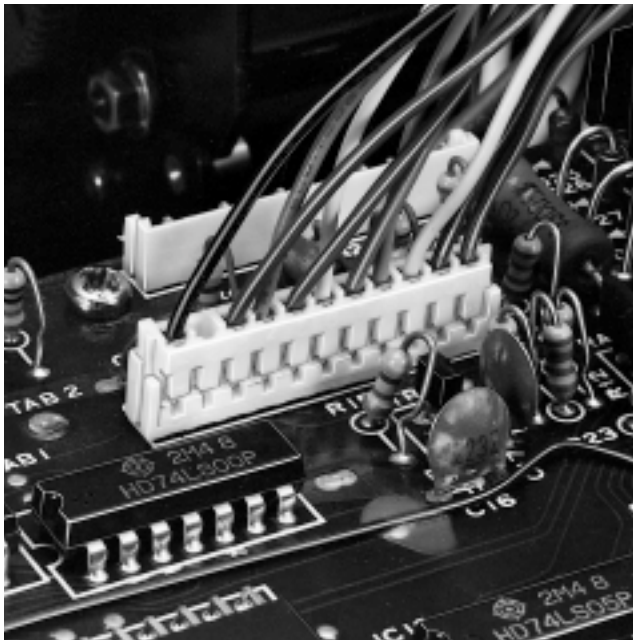
(GEF0010)

JST
Crimp
2.5mm
(.098") pitch

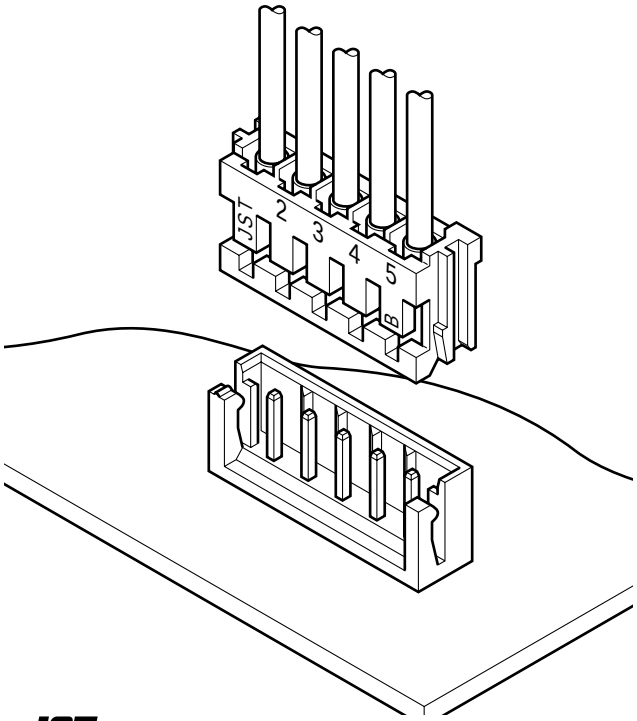
EH CONNECTOR

Radial Tape

Disconnectable Crimp style connectors



This, the thinnest, 2.5mm (.098") pitch connector, is 8.1mm (.319") in height after mounting and 3.8mm (.150") in width. It is designed to meet the demand for the high-density connection of internal wires to printed circuit boards. It is compact, highly reliable and low in cost.



Features

• Compact and slim

This connector is designed to be compact and unusually thin. It measures only 8.1mm (.319") high after mounting and is just 3.8mm (.150") wide.

• Highly reliable contact

The contact has long dimples near the center that ensure continuity of low voltage and low current circuits at all times, even under conditions of vibration and abusive prying.

• Polarizing guides

The header and housing have guides to prevent improper mating.

• Whisker prevention

The contact material is treated with a reflow process, and the square post is copper-undercoated and tin/lead-plated for whisker prevention.

• Easy and effective crimping

Although the contact is compact, it has a long wire strip length, 2.6±0.4mm (.102"±.016"). This long length is very useful for automatic crimping and when crimping shielded wires.

Specifications

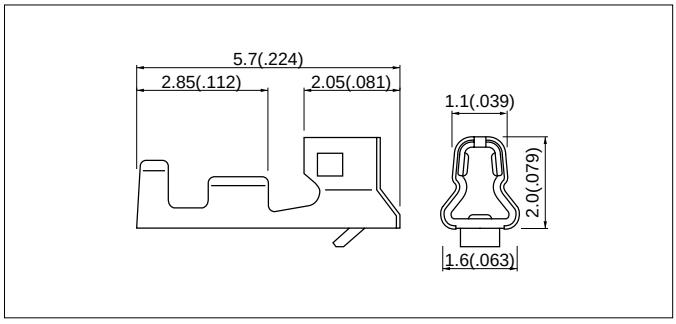
- Current rating: 3A AC, DC (AWG#22)
- Voltage rating: 250V AC, DC
- Temperature range: -25˚C to +85˚C
  (including temperature rise in applying electrical current)
- Contact resistance: Initial value/10m Ω max.
  After environmental testing/20m Ω max.
- Insulation resistance: 1,000M Ω min.
- Withstanding voltage: 800V AC/minute
- Applicable wire: AWG #32 to #22
- Applicable PC board thickness: 0.8 to 1.6mm(.031" to .063")

* Contact JST for details.

Standards

0 Recognized E60389
1 Certified LR20812
2 R75089

Contact

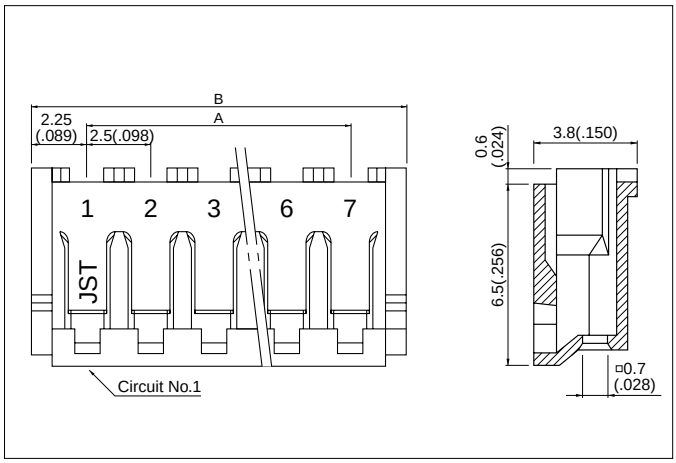


Model No.	Applicable wire			Q'ty / reel
	mm²	AWG #	Insulation O.D. mm(in.)	
SEH-001T-P0.6	0.05 to 0.3	30 to 22	1.0 to 1.9(.039 to .075)	10,000
SEH-003T-P0.6L	0.032 to 0.08	32 to 28	0.5 to 1.1(.020 to .043)	

Material and Finish
Phosphor bronze, tin-plated

Note: 1. Contact JST for gold-plated contacts.
2. SEH-003T-P0.6L is not TÜV approved.

Housing



Cir-cuits	Model No.	Dimensions mm(in.)		Q'ty / bag
		A	B	
2	**EHR- 2**	2.5(.098)	7.0(.276)	1,000
3	**EHR- 3**	5.0(.197)	9.5(.374)	1,000
4	**EHR- 4**	7.5(.295)	12.0(.472)	1,000
5	**EHR- 5**	10.0(.394)	14.5(.571)	1,000
6	**EHR- 6**	12.5(.492)	17.0(.669)	1,000
7	**EHR- 7**	15.0(.591)	19.5(.768)	1,000
8	**EHR- 8**	17.5(.689)	22.0(.866)	1,000
9	**EHR- 9**	20.0(.787)	24.5(.965)	1,000
10	**EHR-10**	22.5(.866)	27.0(1.063)	1,000
11	**EHR-11**	25.0(.984)	29.5(1.161)	1,000
12	**EHR-12**	27.5(1.083)	32.0(1.260)	1,000
13	**EHR-13**	30.0(1.181)	34.5(1.358)	1,000
14	**EHR-14**	32.5(1.280)	37.0(1.457)	1,000
15	**EHR-15**	35.0(1.378)	39.5(1.555)	1,000

Material
Nylon 66, UL94V-0, natural (white)

1. SCOPE

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

GP Model : GPRHC063N013 (GP60AAAH2BMJ-2U1+8941)
Cell Size: AAA

The data involving nominal voltage and the approximate weight of the 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 unit cell = 1.2V
Thus, nominal voltage of stack-up battery = 1.2 V × 2 = 2.4 V

2. RATINGS

Description	Unit	Specification	Conditions
Nominal Voltage	V	2.4	
Typical Capacity	mAh	630	Standard charge / discharge
Rated Capacity	mAh	600	
Standard Charge	mA	60(0.1C)	Ta = 0 ～45 ℃ (see Note 1)
	hr	16	
Fast Charge	mA	300(0.5C)～600(1C)	DT/dt=0.8℃/min (0.5 to 0.9C) 0.8~1℃/min (1C) -ΔV = 0 ~ 5mV/cell Timer cutoff=105% input capacity Temp. cutoff=45~50℃ Ta = 10~45℃ (see Note 2)
	hr	1.05 approx.(1C) 2.1 approx. (0.5C)	
Trickle Charge	mA	30(0.05C) ~60(0.1C)	Ta = 0 ～40 ℃
Maximum Discharging Current	A	1.8(3C)	Ta = -20 ～50 ℃
Discharge Cut-off Voltage	V/Pack	*2.0*	*Per Pack*
Storage Temperature	℃	-20 ～35℃	
Approx Typical Weight	Gram/Pack	29.0 (Approx)	

3. PERFORMANCE

Before proceed the following tests, the packs should be discharged at 0.2C to 2.0V cut-off. Unless otherwise stated, tests should be done within one month of delivery under the following conditions:

Ambient Temperature, T_a : 20 ± 5 ℃
Relative Humidity : 65 ± 20%RH
Notes: Standard Charge / Discharge Condition
Charge: 60mA (0.1C) ×16hrs
Discharge: 120mA (0.2C) to 3.0V

Test/Description	Unit	Specification	Conditions	Remarks
Capacity	mAh	≧600	Standard Charge / discharge	Up to 3 cycles are allowed
Open Circuit Voltage (OCV)	V/Pack	≧2.50	Within 14 days after standard charge	
Internal Impedance (Ri)	mΩ	≤ 160	Upon fully charge At 1kHz	
High Rate Charge (0.5C)	minute	≧108	Standard Charge, 1hr rest before discharge	
High Rate Discharge (1C)	minute	≧48	Standard Charge, 1hr rest, discharge by 600mA(1C) to 1.0V	Up to 3 cycles are allowed
Overcharge	mAh	No conspicuous deformation and / or leakage	60mA(0.1C) maximum current charge for 1 year	
Charge Retention	mAh	≧80% of original capacity	Standard Charge, Storage:12months at 20℃, Standard Discharge	
IEC Cycles Test	Cycle	> 500	IEC61951-2(2011) 7.5.1.2	(see Note 3)
Leakage Test	N/A	No leakage nor deformation	Standard charge stand for 14 days.	
External Short Circuit Test	N/A	No fire and no explosion	After standard charge, short circuit the cell at 20 ±5 ℃ until the cell temperature returns to ambient temperature. (The resistance of the interconnecting circuitry shall not exceed 0.1Ω.)	

Vibration Resistance	N/A	ΔV< 0.02V/cell ΔRi (Internal Impedance) < 5m Ω/cell	Charge at 0.1C for 16 hrs, 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	ΔV< 0.02V/cell ΔRi (Internal Impedance) < 5m Ω/cell	Charge at 0.1C for 16 hrs, and then leave for 24hrs,check battery before / after drop Height: 50cm Thickness of wooden board: 30mm Direction is not specified Test for 3 times	Unit Cell

4. CONFIGURATIONS, DIMENSIONS AND MARKING

Please refer to attached drawing

5. EXTERNAL APPEARANCE

The cell / battery shall be free from crack, 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-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 mutilate batteries ,may burst or release toxic material

11. Do not solder directly to cells or batteries.
12. Store batteries in a cool dry place.
13. If find any noise, excessive temperature or leakage from a battery, please stop its use.
14. When not using a battery, disconnect it from the device.
15. When using a new battery for the first time or after long term storage, please fully charge the battery before use.
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.
24. In order to maintain satisfactory cell / battery performance when being stored under extending period of time, cycling (i.e. charging and discharging) of the cell / battery within 6 months period is highly recommended. At least one times cycling should be conducted within one year

---

Notes: 1. T_a: Ambient Temperature

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

3. IEC61951-2(2011) 7.5.1.2 Endurance in cycles:

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/pack
50	0.1C ×16hrs	1 - 4hr(s)	0.2C to 1.0V/pack
Cycle 1 to 50 shall be repeated until the discharge duration on any 50th cycle become less than 3hrs			