



VALVE-REGULATED
SEALED LEAD
ACID BATTERY

GFMJ/GFMJ-E

High Performance Gel Type

Product Guide



Advanced Battery Technology

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Introduction

ABT-GFMJ/GFMJ-E are VRLA Gel battery technology, incorporate key raw material and use the modern specialized gel equipments for production. Gel electrolyte design with thick positive plate technology and patented gel electrolyte and filling technique which guarantee long service life and super reliability. They are widely used in telecommunication, power supply system, energy storage, UPS and EPS system, solar energy and cycling applications

Technical Features

- **Plate**

Following our research on corrosion effect during battery life, we have improved the technology of grid alloy, lead paste formula additive. During manufacturing process with high temperature and high humidity this process solidify, increase the content of $4\text{PbO}\cdot\text{PbSO}_4\cdot\text{H}_2\text{O}$, improving the binding ability of active material and grid pasting, avoiding early capacity loss due to barrier layer between active material and grid paste.

- **Gel electrolyte**

Fumed Silica used for Gel electrolyte ensuring even distribution inside battery and with no acid stratification.

High quality electrolyte ensures a high level of filling gel electrolyte in box between and over the plates and separators which give perfect heat dispersion and prevent thermal runaway caused by water loss, and gel electrolyte protects active materials from shedding.

- **Special separator**

PVC-SiO₂ micro-porous separator ensures low internal resistance, high porosity, intense absorption of gel electrolyte and long cyclic life.

- **Patented relief valve**

Multi-fold vent system, comprised of proprietary gel-specialized low-pressure safety valve with acid filtering and flash arrester, minimizes bulging and prevents flashback explosion from external ignition source.

- **Long service life**

The grid is made of lead-calcium-tin alloy which prevent against corrosion effect, and operate in a proper way the gas recombination technology.

Low density of gel electrolyte decelerate corrosion of plate grids;

Plates cured by high-temperature and high-moisture process forming long life $4\text{PbO}\cdot\text{PbSO}_4\cdot\text{H}_2\text{O}$ crystal structure; Efficient container formation process, guarantee for the plates quality;

Design life: 2V GFMJ series 15 years, 12V GFMJ series 12 years, 12V GFMJ-E series 10 years

Cycle life: Under standard using conditions, 2V GFMJ series 25% DOD cycle 3500 times; 12V GFMJ series 25% DOD cycle 2950 times; 12V GFMJ-E series 25% DOD cycle 2600 times.

- **Deep discharge performance**

With excellent anti-deep discharge performance, the battery can be connected in load after 100% discharge and recover the original capacity after 4 weeks.

Strong recharge recovering ability after battery deep discharge, excellent long cyclic endurance performance.

- **Low self-discharge rate**

Low self-discharge rate, average month rate $\leq 2\%$;

Gel electrolyte with high purity; storage at ambient temperature 20°C for two years, the rest capacity remains more than 50%.

Technical Features

- **Reliable sealing performance**

Patented and time tested integrity terminal sealing of "O" ring, pressing nuts and secondary epoxy resin ensures leakage free operation.

Exceptional gas recombination performance, no acid leakage and no gas emission in operation which can provide batteries to be installed with equipment and also inside cabinet which require no specific ventilated battery room.

- **Wide working temperature range**

The operation temperature range is $-20^{\circ}\text{C}\sim 55^{\circ}\text{C}$, and the recommended optimal temperature is $20^{\circ}\text{C}\sim 5^{\circ}\text{C}$.

The high quality electrolyte design ensure the battery can work in high temperature or over discharge condition, preventing dry up of the battery.

Thickened ABS (FV0 is optional) container and cover are shock and vibration resistant, prevents leakage and container deformation.



Applications

- Telecommunication base station, exchange station
- Dedicated telecommunication station for power system, military station.
- Data transmission and TV signal transmission
- EPS/UPS
- Wind, solar energy and wind/pv hybrid power system

Certification

- CE
- UL
- GOST
- ISO9001
- ISO14001
- OHSAS18001

Standards

- IEC60896-21/22: 2004
- DIN43539-T5
- IEC61427-2005
- YD/T1360-2005
- GB/T 22473-2008

General Specifications

Battery Type	Nominal Voltage (V)	Nominal Capacity C ₂₀ (Ah)	Dimension								Weight		Short circuit current(A)	Internal resistance (mΩ,20℃)	Terminal Type
			Length		Width		Height		Overall Height with Poles		Kg	Ibs			
			mm	inch	mm	inch	mm	inch	mm	inch					
6GFMJ-33	12	33	198	7.80	166	6.54	170	6.69	170	6.69	14	30.87	1010	8.50	M6XΦ16
6GFMJ-50	12	50	276	10.87	174	6.85	169	6.65	198	7.79	21	46.3	1525	7.64	M8XΦ16
6GFMJ-65	12	65	310	12.20	174	6.85	209	8.23	236	9.29	30	66.1	1540	7.35	M8XΦ16
6GFMJ-65E	12	65	310	12.20	174	6.85	209	8.23	236	9.29	27	59.5	1540	7.25	M8XΦ16
6GFMJ-85	12	85	414	16.30	174	6.85	218	8.58	228	8.98	37	81.6	2060	5.85	M8XΦ16
6GFMJ-85E	12	85	414	16.30	174	6.85	218	8.58	228	8.98	34	74.89	2060	5.19	M8XΦ16
6GFMJ-100	12	100	513	20.20	163	6.42	218	8.58	228	8.98	44	97.0	2950	3.91	M8XΦ16
6GFMJ-100E	12	100	513	20.20	163	6.42	218	8.58	228	8.98	40	88.21	2950	3.91	M8XΦ16
6GFMJ-120	12	120	513	20.20	232	9.13	218	8.58	228	8.98	52.3	115.3	2980	3.86	M8XΦ16
6GFMJ-120E	12	120	513	20.20	232	9.13	218	8.58	228	8.98	47	103.41	2980	3.66	M8XΦ16
6GFMJ-150	12	150	513	20.20	232	9.13	218	8.58	228	8.98	63.8	140.7	3020	3.65	M8XΦ16
6GFMJ-150E	12	150	513	20.20	232	9.13	218	8.58	228	8.98	59	129.81	3020	3.55	M8XΦ16

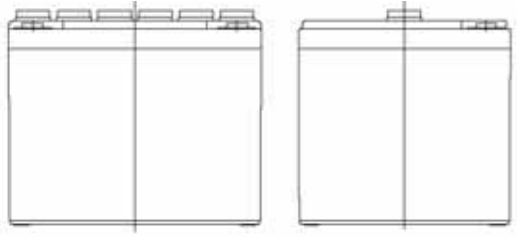
General Specifications

Battery Type	Nominal Voltage (V)	Nominal Capacity C ₁₀ (Ah)	Dimension								Weight		Short circuit current(A)	Internal resistance (mΩ, 20°C)	Terminal Type
			Length		Width		Height		Overall Height with Poles		Kg	lbs			
			mm	inch	mm	inch	mm	inch	mm	inch					
6GFMJ-200	12	200	513	20.20	296.5	11.67	218	8.58	228	8.98	82.8	182.6	3050	3.20	M8XΦ16
6GFMJ-200E	12	200	513	20.20	296.5	11.67	218	8.58	228	8.98	75.5	166.1	3050	3.11	M8XΦ16
GFMJ-200	2	200	171	6.73	107	4.21	334	13.15	344	13.54	14.8	32.6	2800	0.68	M8XΦ18
GFMJ-300	2	300	171	6.73	151	5.94	334	13.15	344	13.54	21.3	47.0	3600	0.54	M8XΦ18
GFMJ-400	2	400	211	8.31	175	6.89	334	13.15	344	13.54	30	66.1	4350	0.45	M8XΦ18
GFMJ-500	2	500	243	9.57	174	6.85	334	13.15	344	13.54	35.5	78.3	5020	0.39	M8XΦ18
GFMJ-600	2	600	302	11.89	177	6.97	334	13.15	344	13.54	44	97.0	5860	0.33	M8XΦ18
GFMJ-800	2	800	410	16.14	175	6.89	334	13.15	344	13.54	60	132.3	6900	0.28	M8XΦ18
GFMJ-1000	2	1000	478	18.82	175	6.89	334	13.15	344	13.54	71	156.5	8000	0.24	M8XΦ18
GFMJ-1200	2	1200	346	13.62	310	12.20	335	13.19	357	14.06	85.5	188.5	9600	0.165	M8XΦ18
GFMJ-1500	2	1500	401	15.79	351	13.82	340	13.39	350	13.78	107	235.9	12000	0.184	M8XΦ18
GFMJ-2000	2	2000	490	19.29	350	13.78	340	13.39	350	13.78	140	308.4	16000	0.12	M8XΦ18

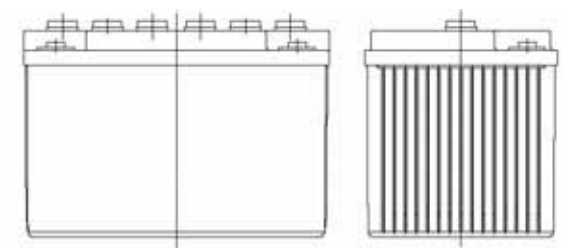
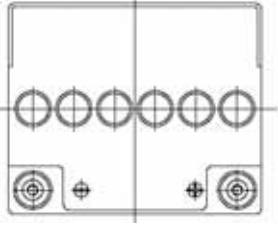
Remarks: Internal resistance value within the table above is measured with "HIOKI 3551 BATTERY HITESTER" resistance tester for the battery in fully charged state and at ambient temperature 20±5°C.



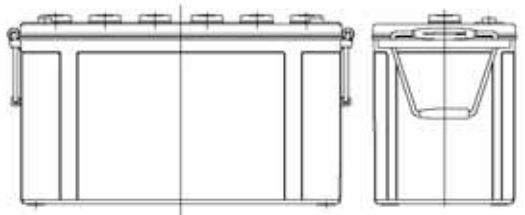
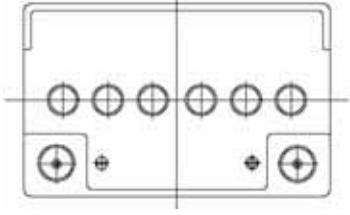
Battery structure and terminal layout



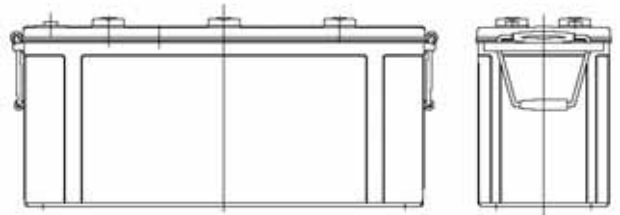
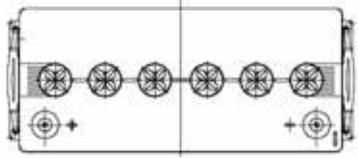
6GFMJ-33



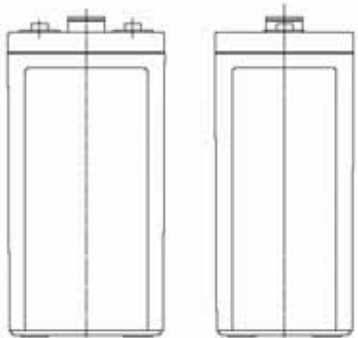
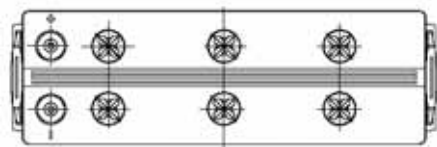
6GFMJ-50、65/65E



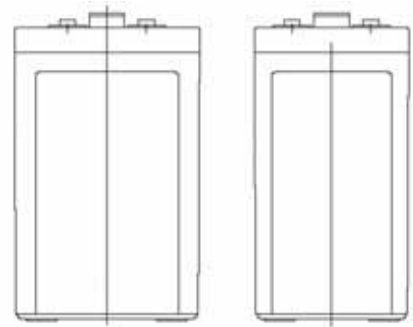
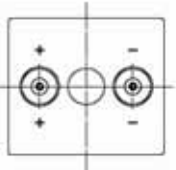
6GFMJ-85/85E



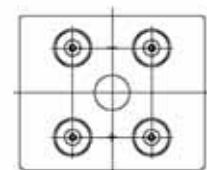
6GFMJ-100/100E、120/120E、150/150E、200/200E



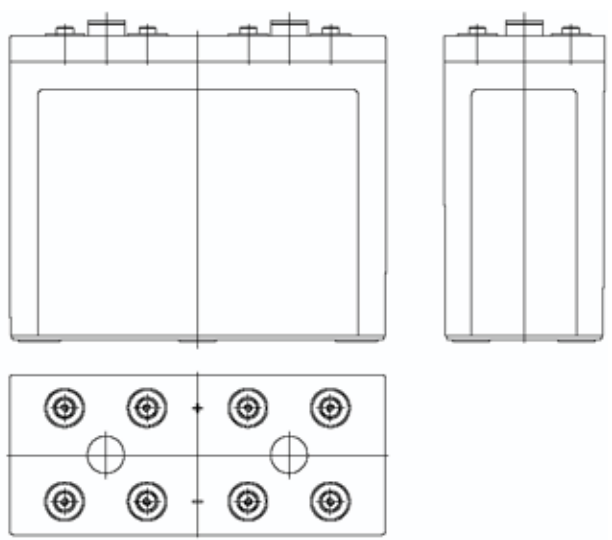
GFMJ-200、300



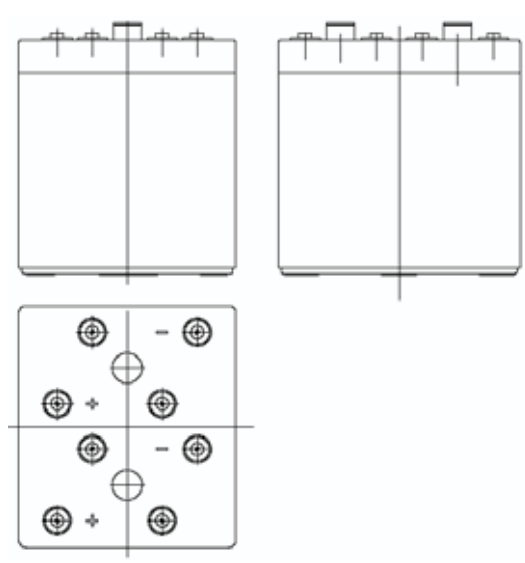
GFMJ-400、500、600



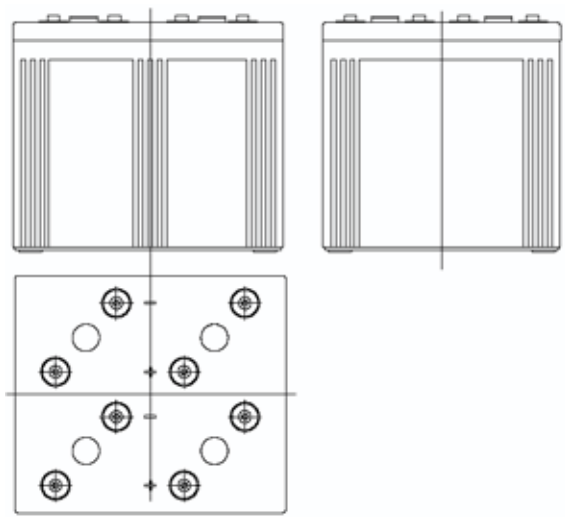
Battery structure and terminal layout



GFMJ-800, 1000

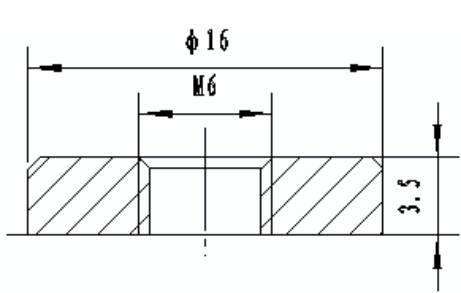


GFMJ-1200

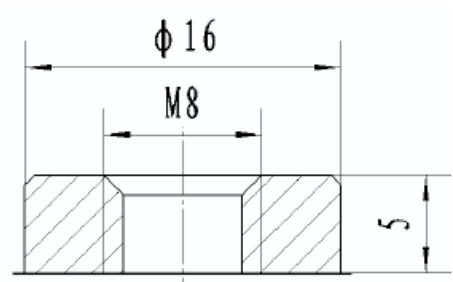


GFMJ-1500, 2000

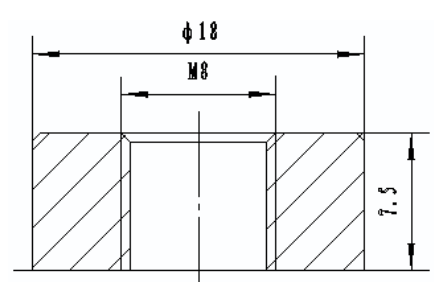
Terminals



M6XΦ16



M8XΦ16

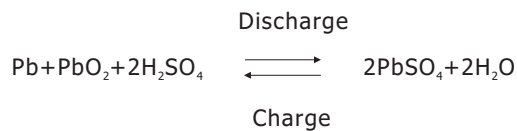


M8XΦ18

Technology

Working and sealing principle

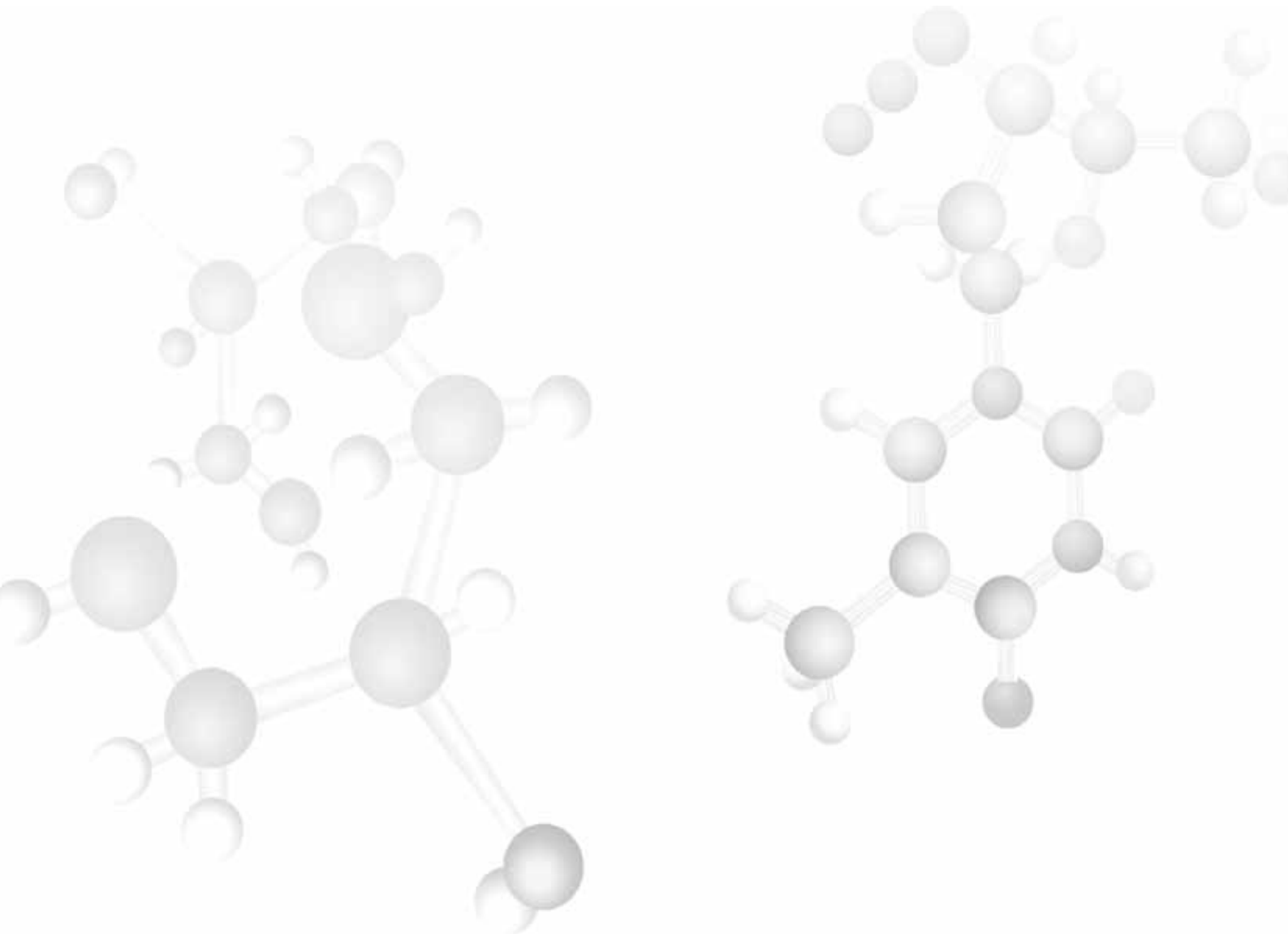
In the charge and discharge process of ABT-GEL battery, it occurs to below reaction in the battery inside



At the later stage of charging or over-charge condition, oxygen would be evolved from positive electrode and hydrogen would be evolved from negative electrode. The negative electrode is made of high pure lead-calcium alloy, which inhibit the hydrogen evolution. The battery apply special gel electrolyte technology, and the gel is with three dimensional net porous structure, and also with some tiny cracks as gas passage. The oxygen from positive electrode get to negative through the special gel and rapidly react with the spongy lead existing on the negative electrode and produce water. This process is called gas recombination and no water loss during it. The battery is sealed in this way and achieve maintenance free.

Reaction in the process

1. $\text{H}_2\text{O} \longrightarrow 2\text{H}^+ + 1/2\text{O}_2 + 2\text{e}^-$
2. $\text{O}_2 + 2\text{H}_2\text{SO}_4 + 2\text{Pb} = 2\text{PbSO}_4 + 2\text{H}_2\text{O}$
3. $\text{PbSO}_4 + 2\text{H}^+ + 2\text{e}^- \longrightarrow \text{Pb} + \text{H}_2\text{SO}_4$



Performance Data

Constant current discharge performance for GFMJ/GFMJ-E 12V (A, 20°C)

Battery Type	End Voltage (V/cell)	Discharge time																		
		5min	10min	15min	20min	30min	45min	1h	1.5h	2h	3h	5h	8h	10h	20h	24h	48h	100h	120h	240h
6GFMJ-33	1.60	92.2	67.2	52.3	43.9	32.1	25.1	19.1	14.8	11.4	8.6	5.8	4.0	3.3	1.78	1.52	0.80	0.41	0.36	0.19
	1.65	87.5	64.8	51.3	43.2	31.7	24.7	18.7	14.6	11.4	8.6	5.8	4.0	3.3	1.78	1.52	0.80	0.41	0.36	0.19
	1.70	82.4	61.4	50.3	42.2	31.4	23.9	18.7	14.4	11.4	8.6	5.8	4.0	3.3	1.78	1.52	0.80	0.41	0.36	0.19
	1.75	76.3	57.1	48.6	40.5	30.4	23.2	18.4	14.2	11.4	8.6	5.8	4.0	3.3	1.78	1.52	0.80	0.41	0.36	0.19
	1.80	65.1	52.0	45.6	37.8	28.7	22.4	18.2	13.8	11.0	8.3	5.6	4.0	3.3	1.72	1.45	0.80	0.41	0.36	0.19
6GFMJ-50	1.60	139.7	101.8	79.3	66.5	48.6	38.1	28.9	22.5	17.2	13.1	8.8	6.0	5	2.70	2.31	1.22	0.63	0.55	0.29
	1.65	132.5	98.2	77.8	65.5	48.1	37.4	28.4	22.2	17.2	13.1	8.8	6.0	5	2.70	2.31	1.22	0.63	0.55	0.29
	1.70	124.8	93.1	76.2	64.0	47.6	36.2	28.4	21.8	17.2	13.1	8.8	6.0	5	2.70	2.31	1.22	0.63	0.55	0.29
	1.75	115.6	86.5	73.7	61.4	46.1	35.2	27.9	21.5	17.2	13.1	8.8	6.0	5	2.70	2.31	1.22	0.63	0.55	0.29
	1.80	98.7	78.8	69.1	57.3	43.5	33.9	27.5	20.9	16.7	12.5	8.5	5.9	5	2.60	2.20	1.22	0.63	0.55	0.29
6GFMJ-65	1.60	181.5	132.3	103.1	86.5	63.2	49.5	37.6	29.2	22.4	17.0	11.4	7.8	6.5	3.51	3.00	1.58	0.81	0.71	0.38
	1.65	172.3	127.7	101.1	85.1	62.5	48.6	36.9	28.8	22.4	17.0	11.4	7.8	6.5	3.51	3.00	1.58	0.81	0.71	0.38
	1.70	162.2	121.0	99.1	83.1	61.8	47.1	36.9	28.3	22.4	17.0	11.4	7.8	6.5	3.51	3.00	1.58	0.81	0.71	0.38
	1.75	150.3	112.4	95.7	79.8	59.9	45.8	36.2	28.0	22.4	17.0	11.4	7.8	6.5	3.51	3.00	1.58	0.81	0.71	0.38
	1.80	128.3	102.4	89.8	74.5	56.6	44.1	35.8	27.2	21.7	16.3	11.1	7.7	6.5	3.38	2.86	1.58	0.81	0.71	0.38
6GFMJ-85	1.60	237.4	173.1	134.8	113.1	82.6	64.8	49.1	38.2	29.2	22.3	14.9	10.2	8.5	4.59	3.93	2.07	1.06	0.93	0.49
	1.65	225.3	166.9	132.2	111.3	81.8	63.5	48.2	37.7	29.2	22.3	14.9	10.2	8.5	4.59	3.93	2.07	1.06	0.93	0.49
	1.70	212.2	158.3	129.5	108.7	80.8	61.5	48.2	37.1	29.2	22.3	14.9	10.2	8.5	4.59	3.93	2.07	1.06	0.93	0.49
	1.75	196.5	147.0	125.2	104.4	78.3	59.8	47.3	36.6	29.2	22.3	14.9	10.2	8.5	4.59	3.93	2.07	1.06	0.93	0.49
	1.80	167.8	133.9	117.4	97.4	74.0	57.6	46.8	35.5	28.4	21.3	14.5	10	8.5	4.42	3.74	2.07	1.06	0.93	0.49
6GFMJ-100	1.60	279.3	203.6	158.6	133.0	97.2	76.2	57.8	44.9	34.4	26.2	17.5	12	10.0	5.40	4.62	2.43	1.25	1.09	0.58
	1.65	265.0	196.4	155.5	130.9	96.2	74.7	56.7	44.3	34.4	26.2	17.5	12	10.0	5.40	4.62	2.43	1.25	1.09	0.58
	1.70	249.6	186.2	152.4	127.9	95.1	72.4	56.7	43.6	34.4	26.2	17.5	12	10.0	5.40	4.62	2.43	1.25	1.09	0.58
	1.75	231.2	172.9	147.3	122.8	92.1	70.4	55.7	43.0	34.4	26.2	17.5	12	10.0	5.40	4.62	2.43	1.25	1.09	0.58
	1.80	197.4	157.5	138.1	114.6	87.0	67.8	55.0	41.8	33.4	25.0	17.0	11.8	10.0	5.20	4.40	2.43	1.25	1.09	0.58

Performance Data

8

GEL
GFMJ/GFMJ-E
SERIES

Performance Data

Performance Data

Constant current discharge performance for GFMJ/GFMJ-E 12V (A, 20°C)

Battery Type	End Voltage (V/cell)	Discharge time																		
		5min	10min	15min	20min	30min	45min	1h	1.5h	2h	3h	5h	8h	10h	20h	24h	48h	100h	120h	240h
6GFMJ-120	1.60	335.2	244.3	190.3	159.6	116.6	91.4	69.4	53.9	41.3	31.4	21.0	14.4	12	6.48	5.54	2.92	1.50	1.31	0.70
	1.65	318.0	235.7	186.6	157.1	115.4	89.6	68.0	53.2	41.3	31.4	21.0	14.4	12	6.48	5.54	2.92	1.50	1.31	0.70
	1.70	299.5	223.4	182.9	153.5	114.1	86.9	68.0	52.3	41.3	31.4	21.0	14.4	12	6.48	5.54	2.92	1.50	1.31	0.70
	1.75	277.4	207.5	176.8	147.4	110.5	84.5	66.8	51.6	41.3	31.4	21.0	14.4	12	6.48	5.54	2.92	1.50	1.31	0.70
	1.80	236.9	189.0	165.7	137.5	104.4	81.4	66.0	50.2	40.1	30.0	20.4	14	12	6.24	5.28	2.92	1.50	1.31	0.70
6GFMJ-150	1.60	419.0	305.4	237.9	199.5	145.8	114.3	86.7	67.4	51.6	39.3	26.25	18	15	8.1	6.93	3.65	1.88	1.64	0.87
	1.65	397.5	294.6	233.3	196.4	144.3	112.1	85.1	66.5	51.6	39.3	26.25	18	15	8.1	6.93	3.65	1.88	1.64	0.87
	1.70	374.4	279.3	228.6	191.9	142.7	108.6	85.1	65.4	51.6	39.3	26.25	18	15	8.1	6.93	3.65	1.88	1.64	0.87
	1.75	346.8	259.4	221.0	184.2	138.2	105.6	83.6	64.5	51.6	39.3	26.25	18	15	8.1	6.93	3.65	1.88	1.64	0.87
	1.80	296.1	236.3	207.2	171.9	130.5	101.7	82.5	62.7	50.1	37.5	25.5	17.7	15	7.8	6.6	3.65	1.88	1.64	0.87
6GFMJ-200	1.60	558.6	407.2	317.2	266	194.4	152.4	115.6	89.8	68.8	52.4	35	24	20	10.8	9.24	4.86	2.50	2.18	1.16
	1.65	530	392.8	311	261.8	192.4	149.4	113.4	88.6	68.8	52.4	35	24	20	10.8	9.24	4.86	2.50	2.18	1.16
	1.70	499.2	372.4	304.8	255.8	190.2	144.8	113.4	87.2	68.8	52.4	35	24	20	10.8	9.24	4.86	2.50	2.18	1.16
	1.75	462.4	345.8	294.6	245.6	184.2	140.8	111.4	86	68.8	52.4	35	24	20	10.8	9.24	4.86	2.50	2.18	1.16
	1.80	394.8	315	276.2	229.2	174	135.6	110	83.6	66.8	50	34	23.8	20	10.4	8.8	4.86	2.50	2.18	1.16
6GFMJ-65E	1.60	177.9	129.7	101.0	84.8	61.9	48.5	34.9	28.6	22.0	16.7	11.2	7.6	6.5	3.44	2.94	1.55	0.79	0.70	0.37
	1.65	168.9	125.1	99.1	83.4	61.3	47.6	34.4	28.2	22.0	16.7	11.2	7.6	6.5	3.44	2.94	1.55	0.79	0.70	0.37
	1.70	159.0	118.6	97.1	81.4	60.6	46.2	33.8	27.7	22.0	16.7	11.2	7.6	6.5	3.44	2.94	1.55	0.79	0.70	0.37
	1.75	147.3	110.2	93.8	78.2	58.7	44.9	33.4	27.4	22.0	16.7	11.2	7.6	6.5	3.44	2.94	1.55	0.79	0.70	0.37
	1.80	125.7	100.4	88.0	73.0	55.5	43.2	32.5	26.7	21.3	16.3	11.1	7.4	6.5	3.31	2.80	1.55	0.79	0.70	0.37
6GFMJ-85E	1.60	232.7	169.6	132.1	110.8	80.9	63.5	45.6	37.4	28.6	21.9	14.6	10.0	8.5	4.50	3.85	2.03	1.04	0.91	0.48
	1.65	220.8	163.6	129.6	109.1	80.2	62.2	45.0	36.9	28.6	21.9	14.6	10.0	8.5	4.50	3.85	2.03	1.04	0.91	0.48
	1.70	208.0	155.1	126.9	106.5	79.2	60.3	44.4	36.4	28.6	21.9	14.6	10.0	8.5	4.50	3.85	2.03	1.04	0.91	0.48
	1.75	192.6	144.1	122.7	102.3	76.7	58.6	43.8	35.9	28.6	21.9	14.6	10.0	8.5	4.50	3.85	2.03	1.04	0.91	0.48
	1.80	164.4	131.2	115.1	95.5	72.5	56.4	42.5	34.8	27.8	21.3	14.5	9.8	8.5	4.33	3.67	2.03	1.04	0.91	0.48

Performance Data

Constant current discharge performance for GFMJ/GFMJ-E 12V (A, 20°C)

Battery Type	End Voltage (V/cell)	Discharge time																		
		5min	10min	15min	20min	30min	45min	1h	1.5h	2h	3h	5h	8h	10h	20h	24h	48h	100h	120h	240h
6GFMJ-100E	1.60	273.7	199.5	155.4	130.3	95.3	74.7	53.6	44.0	33.7	25.7	17.5	11.8	10.0	5.29	4.53	2.38	1.23	1.07	0.57
	1.65	259.7	192.5	152.4	128.3	94.3	73.2	52.9	43.4	33.7	25.7	17.5	11.8	10.0	5.29	4.53	2.38	1.23	1.07	0.57
	1.70	244.6	182.5	149.4	125.3	93.2	71.0	52.0	42.7	33.7	25.7	17.5	11.8	10.0	5.29	4.53	2.38	1.23	1.07	0.57
	1.75	226.6	169.4	144.4	120.3	90.3	69.0	51.3	42.1	33.7	25.7	17.5	11.8	10.0	5.29	4.53	2.38	1.23	1.07	0.57
	1.80	193.5	154.4	135.3	112.3	85.3	66.4	50.0	41.0	32.7	25.0	17.0	11.6	10.0	5.10	4.31	2.38	1.23	1.07	0.57
6GFMJ-120E	1.60	328.5	239.4	186.5	156.4	114.3	89.6	64.5	52.8	40.5	30.8	21.0	14.1	12.0	6.35	5.43	2.86	1.47	1.28	0.69
	1.65	311.6	231.0	182.9	154.0	113.1	87.8	63.6	52.1	40.5	30.8	21.0	14.1	12.0	6.35	5.43	2.86	1.47	1.28	0.69
	1.70	293.5	218.9	179.2	150.4	111.8	85.2	62.6	51.3	40.5	30.8	21.0	14.1	12.0	6.35	5.43	2.86	1.47	1.28	0.69
	1.75	271.9	203.4	173.3	144.5	108.3	82.8	61.7	50.6	40.5	30.8	21.0	14.1	12.0	6.35	5.43	2.86	1.47	1.28	0.69
	1.80	232.2	185.2	162.4	134.8	102.3	79.8	60.0	49.2	39.3	30.0	20.4	13.9	12.0	6.12	5.17	2.86	1.47	1.28	0.69
6GFMJ-150E	1.60	410.6	299.3	233.1	195.5	142.9	112.0	80.7	66.1	50.6	39.0	25.5	17.6	15.0	7.94	6.79	3.58	1.84	1.61	0.85
	1.65	389.6	288.7	228.6	192.5	141.4	109.9	79.6	65.2	50.6	39.0	25.5	17.6	15.0	7.94	6.79	3.58	1.84	1.61	0.85
	1.70	366.9	273.7	224.0	188.1	139.8	106.4	78.3	64.1	50.6	39.0	25.5	17.6	15.0	7.94	6.79	3.58	1.84	1.61	0.85
	1.75	339.9	254.2	216.6	180.5	135.4	103.5	77.2	63.2	50.6	39.0	25.5	17.6	15.0	7.94	6.79	3.58	1.84	1.61	0.85
	1.80	290.2	231.6	203.1	168.5	127.9	99.7	75.0	61.4	49.1	37.5	25.5	17.3	15.0	7.64	6.47	3.58	1.84	1.61	0.85
6GFMJ-200E	1.60	547.4	399.1	310.9	260.7	190.5	149.4	107.5	88.0	67.4	51.4	34.3	23.5	20.0	10.58	9.06	4.76	2.45	2.14	1.14
	1.65	519.4	384.9	304.8	256.6	188.6	146.4	106.0	86.8	67.4	51.4	34.3	23.5	20.0	10.58	9.06	4.76	2.45	2.14	1.14
	1.70	489.2	365.0	298.7	250.7	186.4	141.9	104.4	85.5	67.4	51.4	34.3	23.5	20.0	10.58	9.06	4.76	2.45	2.14	1.14
	1.75	453.2	338.9	288.7	240.7	180.5	138.0	102.9	84.3	67.4	51.4	34.3	23.5	20.0	10.58	9.06	4.76	2.45	2.14	1.14
	1.80	394.8	315.0	276.2	229.2	174.0	135.6	110.0	83.6	66.8	50.0	34.0	23.2	20.0	10.40	8.80	4.86	2.50	2.18	1.16



Performance Data

Performance Data

Constant current performance data for GFMJ/GFMJ-E 2V(A, 20°C)

Battery Type	End Voltage (V/cell)	Discharge time																	
		5min	10min	15min	20min	30min	1h	2h	3h	5h	6h	8h	10h	20h	24h	48h	100h	120h	240h
GFMJ-200	1.65	340	310	288	260	202	125	75	55	38	34	26.6	22.5	11.3	9.24	4.86	2.50	2.18	1.16
	1.70	320	295	260	227	190	123	73.7	54.4	37.1	32.2	25.8	21.3	11.1	9.24	4.86	2.50	2.18	1.16
	1.75	300	279	248	219	184	121	72.3	53.6	36.4	31.7	25.3	20.9	11	9.24	4.86	2.50	2.18	1.16
	1.80	280	265	229	202	170	112	69.4	51.2	35	30.5	24.3	20	10.8	9.24	4.86	2.50	2.18	1.16
	1.85	240	229	209	189	159	108	65.3	48	32.9	28.6	22.8	18.9	10.2	8.80	4.86	2.50	2.18	1.16
GFMJ-300	1.65	510	465	432	390	303	187.5	112.5	82.5	57	51	39.9	33.75	16.95	13.86	7.29	3.75	3.27	1.74
	1.70	480	442.5	390	340.5	285	184.5	110.55	81.6	55.65	48.3	38.7	31.95	16.65	13.86	7.29	3.75	3.27	1.74
	1.75	450	418.5	372	328.5	276	181.5	108.45	80.4	54.6	47.55	37.95	31.35	16.5	13.86	7.29	3.75	3.27	1.74
	1.80	420	397.5	343.5	303	255	168	104.1	76.8	52.5	45.75	36.45	30	16.2	13.86	7.29	3.75	3.27	1.74
	1.85	360	343.5	313.5	283.5	238.5	162	97.95	72	49.35	42.9	34.2	28.35	15.3	13.2	7.29	3.75	3.27	1.74
GFMJ-400	1.65	680	620	576	520	404	250	150	110	76	68	53.2	45	22.6	18.48	9.72	5	4.36	2.32
	1.70	640	590	520	454	380	246	147.4	108.8	74.2	64.4	51.6	42.6	22.2	18.48	9.72	5	4.36	2.32
	1.75	600	558	496	438	368	242	144.6	107.2	72.8	63.4	50.6	41.8	22	18.48	9.72	5	4.36	2.32
	1.80	560	530	458	404	340	224	138.8	102.4	70	61	48.6	40	21.6	18.48	9.72	5	4.36	2.32
	1.85	480	458	418	378	318	216	130.6	96	65.8	57.2	45.6	37.8	20.4	17.6	9.72	5	4.36	2.32
GFMJ-500	1.65	850	775	720	650	505	312.5	187.5	137.5	95	85	66.5	56.25	28.25	23.1	12.15	6.25	5.45	2.9
	1.70	800	737.5	650	567.5	475	307.5	184.25	136	92.75	80.5	64.5	53.25	27.75	23.1	12.15	6.25	5.45	2.9
	1.75	750	697.5	620	547.5	460	302.5	180.75	134	91	79.25	63.25	52.25	27.5	23.1	12.15	6.25	5.45	2.9
	1.80	700	662.5	572.5	505	425	280	173.5	128	87.5	76.25	60.75	50	27	23.1	12.15	6.25	5.45	2.9
	1.85	600	572.5	522.5	472.5	397.5	270	163.25	120	82.25	71.5	57	47.25	25.5	22	12.15	6.25	5.45	2.9
GFMJ-600	1.65	1020	930	864	780	606	375	225	165	114	102	79.8	67.5	33.9	27.72	14.58	7.5	6.54	3.48
	1.70	960	885	780	681	570	369	221.1	163.2	111.3	96.6	77.4	63.9	33.3	27.72	14.58	7.5	6.54	3.48
	1.75	900	837	744	657	552	363	216.9	160.8	109.2	95.1	75.9	62.7	33	27.72	14.58	7.5	6.54	3.48
	1.80	840	795	687	606	510	336	208.2	153.6	105	91.5	72.9	60	32.4	27.72	14.58	7.5	6.54	3.48
	1.85	720	687	627	567	477	324	195.9	144	98.7	85.8	68.4	56.7	30.6	26.4	14.58	7.5	6.54	3.48

Performance Data

Constant current performance data for GFMJ/GFMJ-E 2V (A, 20°C)

Battery Type	End Voltage (V/cell)	Discharge time																	
		5min	10min	15min	20min	30min	1h	2h	3h	5h	6h	8h	10h	20h	24h	48h	100h	120h	240h
GFMJ-800	1.65	1360	1240	1152	1040	808	500	300	220	152	136	106.4	90	45.2	36.96	19.44	10	8.72	4.64
	1.70	1280	1180	1040	908	760	492	294.8	217.6	148.4	128.8	103.2	85.2	44.4	36.96	19.44	10	8.72	4.64
	1.75	1200	1116	992	876	736	484	289.2	214.4	145.6	126.8	101.2	83.6	44	36.96	19.44	10	8.72	4.64
	1.80	1120	1060	916	808	680	448	277.6	204.8	140	122	97.2	80	43.2	36.96	19.44	10	8.72	4.64
	1.85	960	916	836	756	636	432	261.2	192	131.6	114.4	91.2	75.6	40.8	35.2	19.44	10	8.72	4.64
GFMJ-1000	1.65	1700	1550	1440	1300	1010	625	375	275	190	170	133	112.5	56.5	46.2	24.3	12.5	10.9	5.8
	1.70	1600	1475	1300	1135	950	615	368.5	272	185.5	161	129	106.5	55.5	46.2	24.3	12.5	10.9	5.8
	1.75	1500	1395	1240	1095	920	605	361.5	268	182	158.5	126.5	104.5	55	46.2	24.3	12.5	10.9	5.8
	1.80	1400	1325	1145	1010	850	560	347	256	175	152.5	121.5	100	54	46.2	24.3	12.5	10.9	5.8
	1.85	1200	1145	1045	945	795	540	326.5	240	164.5	143	114	94.5	51	44	24.3	12.5	10.9	5.8
GFMJ-1200	1.65	2040	1860	1728	1560	1212	750	450	330	228	204	159.6	135	67.8	55.44	29.16	15	13.08	6.96
	1.70	1920	1770	1560	1362	1140	738	442.2	326.4	222.6	193.2	154.8	127.8	66.6	55.44	29.16	15	13.08	6.96
	1.75	1800	1674	1488	1314	1104	726	433.8	321.6	218.4	190.2	151.8	125.4	66	55.44	29.16	15	13.08	6.96
	1.80	1680	1590	1374	1212	1020	672	416.4	307.2	210	183	145.8	120	64.8	55.44	29.16	15	13.08	6.96
	1.85	1440	1374	1254	1134	954	648	391.8	288	197.4	171.6	136.8	113.4	61.2	52.8	29.16	15	13.08	6.96
GFMJ-1500	1.65	2550	2325	2160	1950	1515	937.5	562.5	412.5	285	255	199.5	168.75	84.75	69.3	36.45	18.75	16.35	8.7
	1.70	2400	2212.5	1950	1702.5	1425	922.5	552.75	408	278.25	241.5	193.5	159.75	83.25	69.3	36.45	18.75	16.35	8.7
	1.75	2250	2092.5	1860	1642.5	1380	907.5	542.25	402	273	237.75	189.75	156.75	82.5	69.3	36.45	18.75	16.35	8.7
	1.80	2100	1987.5	1717.5	1515	1275	840	520.5	384	262.5	228.75	182.25	150	81	69.3	36.45	18.75	16.35	8.7
	1.85	1800	1717.5	1567.5	1417.5	1192.5	810	489.75	360	246.75	214.5	171	141.75	76.5	66	36.45	18.75	16.35	8.7
GFMJ-2000	1.65	3400	3100	2880	2600	2020	1250	750	550	380	340	266	225	113	92.4	48.6	25	21.8	11.6
	1.70	3200	2950	2600	2270	1900	1230	737	544	371	322	258	213	111	92.4	48.6	25	21.8	11.6
	1.75	3000	2790	2480	2190	1840	1210	723	536	364	317	253	209	110	92.4	48.6	25	21.8	11.6
	1.80	2800	2650	2290	2020	1700	1120	694	512	350	305	243	200	108	92.4	48.6	25	21.8	11.6
	1.85	2400	2290	2090	1890	1590	1080	653	480	329	286	228	189	102	88	48.6	25	21.8	11.6

Performance Data

Performance Data

Constant power discharge performance data for GFMJ/GFMJ-E 12V (W/CELL, 20°C)

Battery Type	End Voltage (V/cell)	Discharge time																		
		5min	10min	15min	20min	30min	45min	1h	1.5h	2h	3h	5h	8h	10h	20h	24h	48h	100h	120h	240h
6GFMJ-33	1.60	162.7	121.9	95.7	80.3	60.2	45.2	35.2	27.4	21.5	15.5	10.6	8.0	6.3	3.4	3.02	1.60	0.83	0.73	0.39
	1.65	151.3	117.4	93.6	79.3	59.6	44.8	34.6	27.2	21.5	15.5	10.6	8.0	6.2	3.4	3.02	1.60	0.83	0.73	0.39
	1.70	138.4	110.9	90.4	77.7	58.8	44.2	34.6	26.9	21.5	15.5	10.6	8.0	6.2	3.4	3.02	1.60	0.83	0.73	0.39
	1.75	127.5	102.8	87.6	74.8	57.3	43.2	34.0	26.7	21.5	15.5	10.6	7.9	6.1	3.4	3.02	1.60	0.83	0.73	0.39
	1.80	118.7	93.7	83.7	70.1	54.6	41.6	33.5	26.0	20.9	15.1	10.1	7.6	6.0	3.3	2.90	1.60	0.83	0.73	0.39
6GFMJ-50	1.60	246.5	184.7	145.0	121.7	91.2	68.6	53.4	41.5	32.5	23.6	16.1	12.1	9.5	5.1	4.58	2.43	1.25	1.10	0.59
	1.65	229.3	177.9	141.8	120.2	90.4	68.0	52.5	41.2	32.5	23.6	16.1	12.1	9.4	5.1	4.58	2.43	1.25	1.10	0.59
	1.70	209.7	168.1	137.0	117.8	89.1	67.0	52.5	40.8	32.5	23.6	16.1	12.1	9.4	5.1	4.58	2.43	1.25	1.10	0.59
	1.75	193.3	155.8	132.8	113.3	86.8	65.5	51.5	40.4	32.5	23.6	16.1	12.0	9.3	5.1	4.58	2.43	1.25	1.10	0.59
	1.80	179.8	142.0	126.8	106.2	82.7	63.1	50.8	39.5	31.7	23.0	15.3	11.6	9.1	5.0	4.40	2.43	1.25	1.10	0.59
6GFMJ-65	1.60	320.5	240.0	188.4	158.1	118.5	89.1	69.4	54.0	42.3	30.6	20.9	15.8	12.4	6.6	5.95	3.16	1.63	1.43	0.76
	1.65	298.1	231.2	184.3	156.3	117.5	88.3	68.2	53.6	42.3	30.6	20.9	15.7	12.2	6.6	5.95	3.16	1.63	1.43	0.76
	1.70	272.5	218.5	178.1	153.1	115.8	87.1	68.2	53.0	42.3	30.6	20.9	15.7	12.2	6.6	5.95	3.16	1.63	1.43	0.76
	1.75	251.2	202.5	172.6	147.3	112.8	85.1	67.0	52.5	42.3	30.6	20.9	15.6	12.1	6.6	5.95	3.16	1.63	1.43	0.76
	1.80	233.7	184.6	164.8	138.0	107.5	82.0	66.0	51.3	41.2	29.8	19.8	15.0	11.8	6.4	5.72	3.16	1.63	1.43	0.76
6GFMJ-85	1.60	419.1	313.9	246.4	206.8	155.0	116.5	90.8	70.6	55.3	40.0	27.4	20.7	16.2	8.7	7.78	4.13	2.13	1.87	0.99
	1.65	389.8	302.3	241.0	204.3	153.6	115.5	89.2	70.0	55.3	40.0	27.4	20.6	16.0	8.7	7.78	4.13	2.13	1.87	0.99
	1.70	356.4	285.7	232.9	200.2	151.5	113.9	89.2	69.4	55.3	40.0	27.4	20.6	16.0	8.7	7.78	4.13	2.13	1.87	0.99
	1.75	328.5	264.8	225.7	192.6	147.6	111.3	87.6	68.7	55.3	40.0	27.4	20.4	15.8	8.7	7.78	4.13	2.13	1.87	0.99
	1.80	305.7	241.4	215.5	180.5	140.6	107.3	86.4	67.1	53.9	39.0	25.9	19.6	15.4	8.4	7.48	4.13	2.13	1.87	0.99
6GFMJ-100	1.60	493.0	369.3	289.9	243.3	182.3	137.1	106.8	83.0	65.0	47.1	32.2	24.3	19.0	10.2	9.15	4.86	2.50	2.20	1.17
	1.65	458.6	355.7	283.5	240.4	180.7	135.9	104.9	82.4	65.0	47.1	32.2	24.2	18.8	10.2	9.15	4.86	2.50	2.20	1.17
	1.70	419.3	336.1	274.0	235.5	178.2	134.0	104.9	81.6	65.0	47.1	32.2	24.2	18.8	10.2	9.15	4.86	2.50	2.20	1.17
	1.75	386.5	311.5	265.5	226.6	173.6	130.9	103.0	80.8	65.0	47.1	32.2	24.0	18.6	10.2	9.15	4.86	2.50	2.20	1.17
	1.80	359.6	284.0	253.5	212.3	165.4	126.2	101.6	78.9	63.4	45.9	30.5	23.1	18.1	9.92	8.80	4.86	2.50	2.20	1.17

Performance Data

Constant power discharge performance data for GFMJ/GFMJ-E 12V (W/CELL, 20°C)

Battery Type	End Voltage (V/cell)	Discharge time																		
		5min	10min	15min	20min	30min	45min	1h	1.5h	2h	3h	5h	8h	10h	20h	24h	48h	100h	120h	240h
6GFMJ-120	1.60	591.6	443.2	347.9	292.0	218.8	164.5	128.2	99.6	78.0	56.5	38.6	29.1	22.8	12.2	10.98	5.83	3.00	2.64	1.40
	1.65	550.3	426.8	340.2	288.5	216.8	163.1	125.9	98.9	78.0	56.5	38.6	29.0	22.6	12.2	10.98	5.83	3.00	2.64	1.40
	1.70	503.2	403.3	328.8	282.6	213.8	160.8	125.9	97.9	78	56.5	38.6	29.0	22.6	12.2	10.98	5.83	3.00	2.64	1.40
	1.75	503.2	403.3	328.8	282.6	213.8	160.8	125.9	97.9	78.0	56.5	38.6	29.0	22.6	12.2	10.98	5.83	3.00	2.64	1.40
	1.80	463.8	373.8	318.6	271.9	208.3	157.1	123.6	97.0	78.0	56.5	38.6	28.8	22.3	12.2	10.56	5.83	3.00	2.64	1.40
6GFMJ-150	1.60	739.5	554.0	434.9	365.0	273.5	205.7	160.2	124.5	97.5	70.7	48.3	36.4	28.5	15.3	13.73	7.29	3.75	3.30	1.76
	1.65	687.9	533.6	425.3	360.6	271.1	203.9	157.4	123.6	97.5	70.65	48.3	36.2	28.2	15.3	13.73	7.29	3.75	3.3	1.76
	1.70	629.0	504.2	411.0	353.3	267.3	201.0	157.4	122.4	97.5	70.65	48.3	36.2	28.2	15.3	13.73	7.29	3.75	3.3	1.76
	1.75	579.8	467.3	398.3	339.9	260.4	196.4	154.5	121.2	97.5	70.65	48.3	36.1	27.9	15.3	13.73	7.29	3.75	3.3	1.76
	1.80	539.4	426.0	380.3	318.5	248.1	189.3	152.4	118.4	95.1	68.85	45.75	34.6	27.15	14.88	13.2	7.29	3.75	3.3	1.76
6GFMJ-200	1.60	986	738.6	579.8	486.6	364.6	274.2	213.6	166	130	94.2	64.4	48.6	38	20.4	18.30	9.72	5.00	4.40	2.34
	1.65	917.2	711.4	567	480.8	361.4	271.8	209.8	164.8	130	94.2	64.4	48.3	37.6	20.4	18.30	9.72	5.00	4.40	2.34
	1.70	838.6	672.2	548	471	356.4	268	209.8	163.2	130	94.2	64.4	48.3	37.6	20.4	18.30	9.72	5.00	4.40	2.34
	1.75	773	623	531	453.2	347.2	261.8	206	161.6	130	94.2	64.4	48.1	37.2	20.4	18.30	9.72	5.00	4.40	2.34
	1.80	719.2	568	507	424.6	330.8	252.4	203.2	157.8	126.8	91.8	61	46.1	36.2	19.84	17.60	9.72	5.00	4.40	2.34
6GFMJ-65E	1.60	320.5	240.0	188.4	158.1	118.5	89.1	69.4	54.0	42.3	30.6	20.9	15.8	12.4	6.6	5.95	3.16	1.63	1.43	0.76
	1.65	298.1	231.2	184.3	156.3	117.5	88.3	68.2	53.6	42.3	30.6	20.9	15.7	12.2	6.6	5.95	3.16	1.63	1.43	0.76
	1.70	272.5	218.5	178.1	153.1	115.8	87.1	68.2	53.0	42.3	30.6	20.9	15.7	12.2	6.6	5.95	3.16	1.63	1.43	0.76
	1.75	251.2	202.5	172.6	147.3	112.8	85.1	67.0	52.5	42.3	30.6	20.9	15.6	12.1	6.6	5.95	3.16	1.63	1.43	0.76
	1.80	233.7	184.6	164.8	138.0	107.5	82.0	66.0	51.3	41.2	29.8	19.8	15.0	11.8	6.4	5.72	3.16	1.63	1.43	0.76
6GFMJ-85E	1.60	419.1	313.9	246.4	206.8	155.0	116.5	90.8	70.6	55.3	40.0	27.4	20.7	16.2	8.7	7.78	4.13	2.13	1.87	0.99
	1.65	389.8	302.3	241.0	204.3	153.6	115.5	89.2	70.0	55.3	40.0	27.4	20.6	16.0	8.7	7.78	4.13	2.13	1.87	0.99
	1.70	356.4	285.7	232.9	200.2	151.5	113.9	89.2	69.4	55.3	40.0	27.4	20.6	16.0	8.7	7.78	4.13	2.13	1.87	0.99
	1.75	328.5	264.8	225.7	192.6	147.6	111.3	87.6	68.7	55.3	40.0	27.4	20.4	15.8	8.7	7.78	4.13	2.13	1.87	0.99
	1.80	305.7	241.4	215.5	180.5	140.6	107.3	86.4	67.1	53.9	39.0	25.9	19.6	15.4	8.4	7.48	4.13	2.13	1.87	0.99

Performance Data

Performance Data

Constant power discharge performance data for GFMJ/GFMJ-E 12V (W/CELL, 20°C)

Battery Type	End Voltage (V/cell)	Discharge time																		
		5min	10min	15min	20min	30min	45min	1h	1.5h	2h	3h	5h	8h	10h	20h	24h	48h	100h	120h	240h
6GFMJ-100E	1.60	493.0	369.3	289.9	243.3	182.3	137.1	106.8	83.0	65.0	47.1	32.2	24.3	19.0	10.2	9.15	4.86	2.50	2.20	1.17
	1.65	458.6	355.7	283.5	240.4	180.7	135.9	104.9	82.4	65.0	47.1	32.2	24.2	18.8	10.2	9.15	4.86	2.50	2.20	1.17
	1.70	419.3	336.1	274.0	235.5	178.2	134.0	104.9	81.6	65.0	47.1	32.2	24.2	18.8	10.2	9.15	4.86	2.50	2.20	1.17
	1.75	386.5	311.5	265.5	226.6	173.6	130.9	103.0	80.8	65.0	47.1	32.2	24.0	18.6	10.2	9.15	4.86	2.50	2.20	1.17
	1.80	359.6	284.0	253.5	212.3	165.4	126.2	101.6	78.9	63.4	45.9	30.5	23.1	18.1	9.92	8.80	4.86	2.50	2.20	1.17
6GFMJ-120E	1.60	591.6	443.2	347.9	292.0	218.8	164.5	128.2	99.6	78.0	56.5	38.6	29.1	22.8	12.2	10.98	5.83	3.00	2.64	1.40
	1.65	550.3	426.8	340.2	288.5	216.8	163.1	125.9	98.9	78.0	56.5	38.6	29.0	22.6	12.2	10.98	5.83	3.00	2.64	1.40
	1.70	503.2	403.3	328.8	282.6	213.8	160.8	125.9	97.9	78	56.5	38.6	29.0	22.6	12.2	10.98	5.83	3.00	2.64	1.40
	1.75	503.2	403.3	328.8	282.6	213.8	160.8	125.9	97.9	78.0	56.5	38.6	29.0	22.6	12.2	10.98	5.83	3.00	2.64	1.40
	1.80	463.8	373.8	318.6	271.9	208.3	157.1	123.6	97.0	78.0	56.5	38.6	28.8	22.3	12.2	10.56	5.83	3.00	2.64	1.40
6GFMJ-150E	1.60	739.5	554.0	434.9	365.0	273.5	205.7	160.2	124.5	97.5	70.7	48.3	36.4	28.5	15.3	13.73	7.29	3.75	3.30	1.76
	1.65	687.9	533.6	425.3	360.6	271.1	203.9	157.4	123.6	97.5	70.65	48.3	36.2	28.2	15.3	13.73	7.29	3.75	3.3	1.76
	1.70	629.0	504.2	411.0	353.3	267.3	201.0	157.4	122.4	97.5	70.65	48.3	36.2	28.2	15.3	13.73	7.29	3.75	3.3	1.76
	1.75	579.8	467.3	398.3	339.9	260.4	196.4	154.5	121.2	97.5	70.65	48.3	36.1	27.9	15.3	13.73	7.29	3.75	3.3	1.76
	1.80	539.4	426.0	380.3	318.5	248.1	189.3	152.4	118.4	95.1	68.85	45.75	34.6	27.15	14.88	13.2	7.29	3.75	3.3	1.76
6GFMJ-200E	1.60	986	738.6	579.8	486.6	364.6	274.2	213.6	166	130	94.2	64.4	48.6	38	20.4	18.30	9.72	5.00	4.40	2.34
	1.65	917.2	711.4	567	480.8	361.4	271.8	209.8	164.8	130	94.2	64.4	48.3	37.6	20.4	18.30	9.72	5.00	4.40	2.34
	1.70	838.6	672.2	548	471	356.4	268	209.8	163.2	130	94.2	64.4	48.3	37.6	20.4	18.30	9.72	5.00	4.40	2.34
	1.75	773	623	531	453.2	347.2	261.8	206	161.6	130	94.2	64.4	48.1	37.2	20.4	18.30	9.72	5.00	4.40	2.34
	1.80	719.2	568	507	424.6	330.8	252.4	203.2	157.8	126.8	91.8	61	46.1	36.2	19.84	17.60	9.72	5.00	4.40	2.34

Performance Data

Constant power performance data for GFMJ/GFMJ-E 2V (W/CELL, 20°C)

Battery Type	End Voltage (V/cell)	Discharge time																	
		5min	10min	15min	20min	30min	1h	2h	3h	5h	6h	8h	10h	20h	24h	48h	100h	120h	240h
GFMJ-200	1.65	594	551	518	471	369	232	140	104	72	50.1	40.0	33.0	18.30	16.9	9.72	5.00	4.40	2.34
	1.70	569	534	475	418	351	230	139	104	71	48.6	38.5	31.9	18.30	16.7	9.72	5.00	4.40	2.34
	1.75	547	515	462	410	346	229	138	103	70	46.9	37.2	30.7	18.30	16.5	9.72	5.00	4.40	2.34
	1.80	523	498	434	383	325	214	135	99	68	45.2	35.8	30.0	18.30	16.1	9.72	5.00	4.40	2.34
	1.85	458	439	402	366	309	211	128	94	65	42.9	34.1	28.3	17.60	15.3	9.72	5.00	4.40	2.34
GFMJ-300	1.65	891	826.5	777	706.5	553.5	348	210	156	108	75.15	60	49.5	27.45	25.35	14.58	7.5	6.6	3.51
	1.70	853.5	801	712.5	627	526.5	345	208.5	156	106.5	72.9	57.75	47.85	27.45	25.05	14.58	7.5	6.6	3.51
	1.75	820.5	772.5	693	615	519	343.5	207	154.5	105	70.35	55.8	46.05	27.45	24.75	14.58	7.5	6.6	3.51
	1.80	784.5	747	651	574.5	487.5	321	202.5	148.5	102	67.8	53.7	45	27.45	24.15	14.58	7.5	6.6	3.51
	1.85	687	658.5	603	549	463.5	316.5	192	141	97.5	64.35	51.15	42.45	26.4	22.95	14.58	7.5	6.6	3.51
GFMJ-400	1.65	1188	1102	1036	942	738	464	280	208	144	100.2	80	66	36.6	33.8	19.44	10	8.8	4.68
	1.70	1138	1068	950	836	702	460	278	208	142	97.2	77	63.8	36.6	33.4	19.44	10	8.8	4.68
	1.75	1094	1030	924	820	692	458	276	206	140	93.8	74.4	61.4	36.6	33	19.44	10	8.8	4.68
	1.80	1046	996	868	766	650	428	270	198	136	90.4	71.6	60	36.6	32.2	19.44	10	8.8	4.68
	1.85	916	878	804	732	618	422	256	188	130	85.8	68.2	56.6	35.2	30.6	19.44	10	8.8	4.68
GFMJ-500	1.65	1485	1377.5	1295	1177.5	922.5	580	350	260	180	125.25	100	82.5	45.75	42.25	24.3	12.5	11	5.85
	1.70	1422.5	1335	1187.5	1045	877.5	575	347.5	260	177.5	121.5	96.25	79.75	45.75	41.75	24.3	12.5	11	5.85
	1.75	1367.5	1287.5	1155	1025	865	572.5	345	257.5	175	117.25	93	76.75	45.75	41.25	24.3	12.5	11	5.85
	1.80	1307.5	1245	1085	957.5	812.5	535	337.5	247.5	170	113	89.5	75	45.75	40.25	24.3	12.5	11	5.85
	1.85	1145	1097.5	1005	915	772.5	527.5	320	235	162.5	107.25	85.25	70.75	44	38.25	24.3	12.5	11	5.85
GFMJ-600	1.65	1782	1653	1554	1413	1107	696	420	312	216	150	120	99	54.9	50.7	29.16	15	13.2	7.02
	1.70	1707	1602	1425	1254	1053	690	417	312	213	146	116	95.7	54.9	50.1	29.16	15	13.2	7.02
	1.75	1641	1545	1386	1230	1038	687	414	309	210	141	112	92.1	54.9	49.5	29.16	15	13.2	7.02
	1.80	1569	1494	1302	1149	975	642	405	297	204	136	107	90	54.9	48.3	29.16	15	13.2	7.02
	1.85	1374	1317	1206	1098	927	633	384	282	195	129	102	84.9	52.8	45.9	29.16	15	13.2	7.02

Performance Data

Performance Data

Constant power performance data for GFMJ/GFMJ-E 2V(W/CELL, 20°C)

Battery Type	End Voltage (V/cell)	Discharge time																	
		5min	10min	15min	20min	30min	1h	2h	3h	5h	6h	8h	10h	20h	24h	48h	100h	120h	240h
GFMJ-800	1.65	2376	2204	2072	1884	1476	928	560	416	288	200	160	132	73.2	67.6	38.88	20	17.6	9.36
	1.70	2276	2136	1900	1672	1404	920	556	416	284	194	154	128	73.2	66.8	38.88	20	17.6	9.36
	1.75	2188	2060	1848	1640	1384	916	552	412	280	188	149	123	73.2	66	38.88	20	17.6	9.36
	1.80	2092	1992	1736	1532	1300	856	540	396	272	181	143	120	73.2	64.4	38.88	20	17.6	9.36
	1.85	1832	1756	1608	1464	1236	844	512	376	260	172	136	113	70.4	61.2	38.88	20	17.6	9.36
GFMJ-1000	1.65	2970	2755	2590	2355	1845	1160	700	520	360	251	200	165	91.5	84.5	48.6	25	22	11.7
	1.70	2845	2670	2375	2090	1755	1150	695	520	355	243	193	160	91.5	83.5	48.6	25	22	11.7
	1.75	2735	2575	2310	2050	1730	1145	690	515	350	235	186	154	91.5	82.5	48.6	25	22	11.7
	1.80	2615	2490	2170	1915	1625	1070	675	495	340	226	179	150	91.5	80.5	48.6	25	22	11.7
	1.85	2290	2195	2010	1830	1545	1055	640	470	325	215	171	142	88	76.5	48.6	25	22	11.7
GFMJ-1200	1.65	3564	3306	3108	2826	2214	1392	840	624	432	300.6	240	198	109.8	101.4	58.32	30	26.4	14.04
	1.70	3414	3204	2850	2508	2106	1380	834	624	426	291.6	231	191.4	109.8	100.2	58.32	30	26.4	14.04
	1.75	3282	3090	2772	2460	2076	1374	828	618	420	281.4	223.2	184.2	109.8	99	58.32	30	26.4	14.04
	1.80	3138	2988	2604	2298	1950	1284	810	594	408	271.2	214.8	180	109.8	96.6	58.32	30	26.4	14.04
	1.85	2748	2634	2412	2196	1854	1266	768	564	390	257.4	204.6	169.8	105.6	91.8	58.32	30	26.4	14.04
GFMJ-1500	1.65	4455	4132.5	3885	3532.5	2767.5	1740	1050	780	540	375.75	300	247.5	137.25	126.75	72.9	37.5	33	17.55
	1.70	4267.5	4005	3562.5	3135	2632.5	1725	1042.5	780	532.5	364.5	288.75	239.25	137.25	125.25	72.9	37.5	33	17.55
	1.75	4102.5	3862.5	3465	3075	2595	1717.5	1035	772.5	525	351.75	279	230.25	137.25	123.75	72.9	37.5	33	17.55
	1.80	3922.5	3735	3255	2872.5	2437.5	1605	1012.5	742.5	510	339	268.5	225	137.25	120.75	72.9	37.5	33	17.55
	1.85	3435	3292.5	3015	2745	2317.5	1582.5	960	705	487.5	321.75	255.75	212.25	132	114.75	72.9	37.5	33	17.55
GFMJ-2000	1.65	5940	5510	5180	4710	3690	2320	1400	1040	720	501	400	330	183	169	97.2	50	44	23.4
	1.70	5690	5340	4750	4180	3510	2300	1390	1040	710	486	385	319	183	167	97.2	50	44	23.4
	1.75	5470	5150	4620	4100	3460	2290	1380	1030	700	469	372	307	183	165	97.2	50	44	23.4
	1.80	5230	4980	4340	3830	3250	2140	1350	990	680	452	358	300	183	161	97.2	50	44	23.4
	1.85	4580	4390	4020	3660	3090	2110	1280	940	650	429	341	283	176	153	97.2	50	44	23.4

Operating Instructions and Guidelines

1 Discharge

End voltage with different discharge rate must be less than the specified value. Charge the battery as soon as possible after discharge. In order to extend the service life, the depth of discharge should be less than 60% of the rated capacity. The discharge over 60% DOD is deep discharge and would shorten the service life.

2 Temperature

The operation temperature range is -20°C--55°C. All the performance data is measured at ambient temperature of 20°C. The optimal temperature is 20°C 5°C, extreme high temperature would shorten the service life and very low temperature would lower the capacity available. The highest acceptable temperature is 55°C.

3 Floating charge and Equalization Charge

3.1 Floating charging operation is optimal for gel battery, battery has been in full charge ensuring battery maximum service life. The recommended battery floating charge voltage is 2.23~2.27 volts/cell at 20°C. The recharge time is about 24 to 36 hour.

Floating charge voltage shall be adjusted according to the ambient temperature, and temperature compensate coefficient for battery is -3.5mV/ °C / cell, the specifications is expressed by the following table.

Table Floating charge at different temperature

Ambient temperature(°C)	Floating charge(V/cell)
0	2.33
10	2.29
20	2.25
25	2.23
30	2.22
35	2.20

3.2 The batteries need an equalization charge or supplemental charge in the following conditions:

- Supplemental charge battery after the installation of battery system and before the operation.
- The batteries are on shelf for six months.
- Floating operation for a long time or not discharge 40% C₁₀ plus, the batteries need an equalization charge regularly and the equalizing charge cycle are 6 months to one year.

We recommend the below method for equalizing charge or supplemental charge:

Charge with 2.35 Vpc and limited current 0.15C₁₀(A)

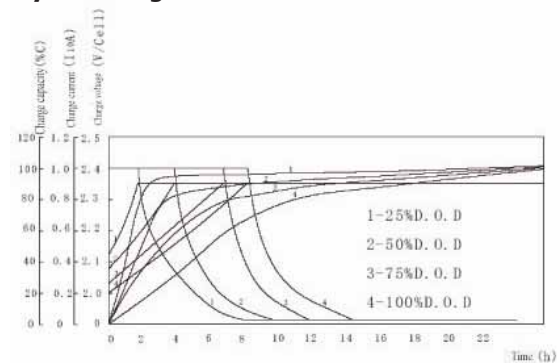
for 8 to 12 hours (non continuous charging is allowed).

Charge voltage shall be adjusted according to the ambient temperature, and temperature compensate coefficient for battery is -3.5mV/ °C / cell, the specifications is expressed by the following table.

Table Equalizing voltage at different temperature

Ambient temperature(°C)	Equalizing charge(V/cell)
0	2.45
10	2.39
20	2.35
25	2.33
30	2.31
35	2.30
40	2.29

4 Cycle charge characteristic



Cycle charge characteristic curve (at 20°C/68°F)

GFMJ (2V)	30%DOD	50%DOD	60%DOD	70%DOD	80%DOD	100%DOD
C ₁₀	2800	1000	850	750	650	600
C ₂₀	2500	890	770	680	580	470
C ₅₀	2150	800	700	600	500	400
C ₁₀₀	1800	730	640	530	430	330
C ₁₂₀	1600	680	575	475	370	270

GFMJ (12V)	30%DOD	50%DOD	60%DOD	70%DOD	80%DOD	100%DOD
C ₁₀	2600	900	750	680	600	500
C ₂₀	2410	800	710	630	520	420
C ₅₀	2050	740	650	570	460	360
C ₁₀₀	1700	680	590	500	400	300
C ₁₂₀	1480	590	510	415	320	240

GFMJ -E (12V)	30%DOD	50%DOD	60%DOD	70%DOD	80%DOD	100%DOD
C ₁₀	2450	800	650	580	500	400
C ₂₀	2280	680	590	510	420	320
C ₅₀	1950	630	530	470	360	260
C ₁₀₀	1550	560	480	400	300	200
C ₁₂₀	1280	470	410	325	220	160

Cycle times at different DOD and different discharge rate

Operating Instructions and Guidelines

5 Recharge

Battery should be recharged in time after discharge, the recommended charge methods are:

Charge the battery with constant current of less than $0.2C_{10}$ (A) until the battery boost voltage reach 2.33~2.37Vpc, then charge battery with the constant voltage 2.33~2.37Vpc until the end of charge. Charge voltage shall be adjusted along with ambient temperature, the temperature compensate coefficient for battery is $-3.5mV/^\circ C$ / cell.

Whether the batteries are fully charged can be decided according to any one of two standards as follows:

- Different discharge depth. Sufficient charging time varies according to the different discharge depth. Please note from the table below.
- Under constant voltage charge condition, the charge current value maintains the same during the last three hour when the battery reaches the final stage of charging.

Table charge time with different DOD

Discharge depth (%)	Constant current (A)	Time for constant current converting to constant voltage (h)	Constant voltage (V/cell)	Charging time (h)
20	$0.1C_{10}$	1.6	2.35	8
	$0.15C_{10}$	1.2	2.35	6
50	$0.1C_{10}$	4.3	2.35	14
	$0.15C_{10}$	3.3	2.35	12
80	$0.1C_{10}$	6.8	2.35	16
	$0.15C_{10}$	5.5	2.35	14
100	$0.1C_{10}$	8.7	2.35	18
	$0.15C_{10}$	6.8	2.35	16

6 Storage

GEL batteries should be stored in a dry, clean, and ventilated location. Since the batteries are fully charged, the recommended storage time is as follows:

- 6 months at ambient temperature no warmer than 68°F (20°C)
- 3 months at 86°F (30°C)
- 6 weeks at 104°F (40°C)

The state of charge can be decided by the testing result of open circuit voltage after storage for 24 hours at $20\pm 5^\circ C$.

Table open circuit voltage

State of charge	Voltage(V/cell)
100%	≥ 2.18
80%	≥ 2.16
60%	≥ 2.12
40%	≥ 2.10
20%	≥ 2.06

The battery supplemental charge method during the storage is: charge battery with 2.37V/cell for 8 to 12 hours.

It is necessary to limit the current, and the optimum limiting value is $0.2C_{10}$ (A) .

Testing of the open circuit with the storage battery can decide whether it shall be supplemental charged. If the voltage drops to 2.10Vpc, the battery shall be supplemental charged in time.

Improper maintenance will shorten the battery service life or decrease the service performance.

Installation, Commissioning and Maintenance

Installation

The ground shall be strong enough to back up load.

Batteries integrated in equipment should be compliance with the installation instructions, separately installed on rack and cabinets should be connected by bolts to the foundation.

Battery racks or cabinets should be properly installed according to instructions.

Connecting

Before connecting, make a overall check of all the batteries and connectors to see whether there is hardware damage or manufacturing defects in order to guarantee the polarity are correct.

The charge equipments are in cut-off state and without loads, then connect the positive and negative terminals to chargers.

During the installation and transit of the battery, use insulated tools, gloves, aprons and safety glasses; do not touch connecting terminals and safety valve in transit.

Placing tools and conductive articles on the battery is strictly prohibited.

Maintain the connecting terminals clean and tighten the connectors as per required torque value.

Commissioning

Assure battery operation in the clean environment.

At 20°C, charge the battery with 2.23~2.27Vpc for 16 to 24 hours, or with 2.33~2.37Vpc for 8 to 12 hours; charge voltage should be adjusted according to the ambient temperature.

Maintenance

Monthly maintenance:

- Measure and record the ambient temperature of the battery room, battery container and terminals.
- Check container, lid and terminal surface defects and temperature of each battery.
- Measure and record the total voltage and floating current of the battery system.
- Correct problems once found.

Quarterly Maintenance:

- Repeat every item of monthly inspection.
- Measure and record floating voltage of every on-line battery.

Annually Maintenance:

- Repeat quarterly maintenance and inspection.
- Check whether the connectors are loose or not.
- Check whether the safety valve is tight or not.
- Perform a discharge test to check the exact load every year and discharge 30~40% of the rated capacity.

Three-year Maintenance:

- Carry out a capacity test(C_{10}) every three years and every year after six years' of operation. If the capacity of the battery is lower than 60% of the rated capacity, the battery should be replaced.

Security Instruction

- Only professionals shall be allowed to open and maintain the battery with insulated tools; Any metal objects to be put on top of the battery shall be strictly prohibited.
- The battery should be stored and installed upright; upright down or on one side is prohibited.
- Please do not use any organic solvent to clean batteries.
- Please do not smoke or set out fire near batteries.
- Please do not remove the relief valve or put anything into the battery.
- Please charge the battery within 24 hour after the discharge.
- Long storage time would result the degeneration of battery performance, and suggest use the battery early.



ABT VRLA Battery:

PowerLine/Thunder/Enduro/Sunwind/e-Trek/Gel

ABT World Wide

Our sales growth is due to a complete Global Network with Master distributors and Country managers who apply ABT commercial strategy and through Global Key Account.



Shandong Sacred Sun Power Sources Co.,Ltd.

Add: 1, Shengyang Road, Qufu 273100 China

Tel: 86-537-4438 666 extn 6028 Fax:86-537-4411 936

Website: www.abtbatt.com www.sacredsun.com

Email: sales@abtbatt.com