

# Lead-Acid Battery AGM Series



## General Purpose Batteries

AGM series are general purpose batteries with 12 years design life in float service. They meet IEC, JIS and BS standards. With up-dated AGM valve regulated technology and high-purity raw materials, the AGM series batteries maintain high consistency for better performance and reliable standby service life.

## Product Features

- Capacity range: 7Ah–260Ah
- Voltage class: 12V
- Long design life (25°C): 12 years
- Low self-discharge rate:  $\leq 3\%$ /month
- Good high rate discharge performance
- High sealed reaction efficiency:  $\geq 99\%$
- Wide operation temperature range:  $-20^{\circ}\text{C} \sim 60^{\circ}\text{C}$
  
- Structure: compact design, low internal resistance
- Plate: pasted flat type, with AM patented formula
- Terminal: two or more types of terminals can be selected
- Separator: improved AGM separator, makes lower resistance, higher assembling pressure to increase deep cycle life
- Battery case: made of high-strength ABS (UL94-HB), and UL94-V0 is optional
- Terminal sealing: double sealing technology (mechanical + epoxy gule)

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# Technical Parameters

Model	Nominal Voltage	Capacity	Dimension				Weight	Terminal Type	Terminal Position
			Length	Width	Height	Total Height			
	(V)	(Ah)	mm	mm	mm	mm	kg		
AGM 7-12	12	7	151	65	94	100	1.95	F1/F2	F
AGM 9-12EP	12	9	151	65	94	100	2.55	F1/F2	F
AGM 9-12	12	9	151	65	94	100	2.30	F1/F2	F
AGM 9-12S	12	9	151	65	111	117	2.45	F1/F2	F
AGM 12-12	12	12	151	98	95	101	3.5	F1/F2	F
AGM 12-12A	12	12	151	98	95	101	3.15	F1/F2	F
AGM 18-12	12	18	181	77	167	167	4.85	F3(M5)/F13-BP(M5)	D
AGM 24-12	12	24	166	176	125	125	7	F3(M5)/F13-BP(M5)	D
AGM 24-12S	12	24	165	125	174	174	7.4	T28(M5)/F11(M6)	D
AGM 40-12	12	40	198	166	169	169	11.5	F4(M5)/F11(M6)	D
AGM 65-12	12	65	350	167	182	182	17.5	F5(M8)/F11(M6)	C
AGM 80-12S	12	80	260	169	211	216	22	F15(M6)/F11(M6)	C
AGM 80-12	12	80	350	167	182	182	21.5	F5(M8)/F11(M6)	C
AGM 100-12A	12	100	328	172	215	220	27	F5(M8)/F12(M8)/L7	C
AGM 100-12S	12	100	306.5	168.5	210	215	26.5	F15(M6)/F12(M8)	C
AGM 100-12	12	100	328	172	215	220	27.5	F5(M8)/F12(M8)	C
AGM 120-12	12	120	407	177	225	225	32.5	F5(M8)/F12(M8)	C
AGM 150-12	12	150	483	170	241	241	43	F5(M8)/F12(M8)	C
AGM 200-12	12	200	522	240	219	224	56.5	F16(M8)/F10(M8)	E
AGM 260-12	12	260	521	268	220	225	70	F14(M8)/L6	E

## Applications

- UPS/EPS
- Emergency Light
- Security System
- Medical Equipment

## Compliant Standards

- GB/T19638-2005
- YD/T799-2002
- JIS C8704-2006
- IEC 60896-21/22-2004
- ISO9001, ISO14001, OHSAS18001, UL, CE and TLC certified

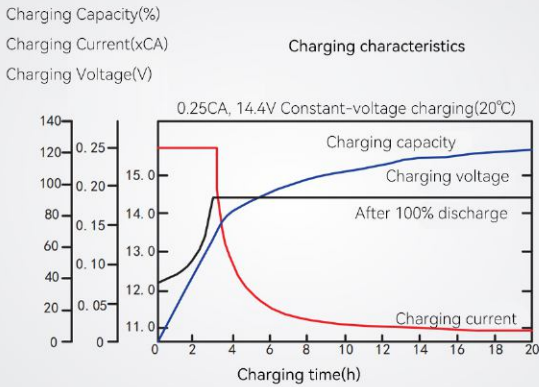
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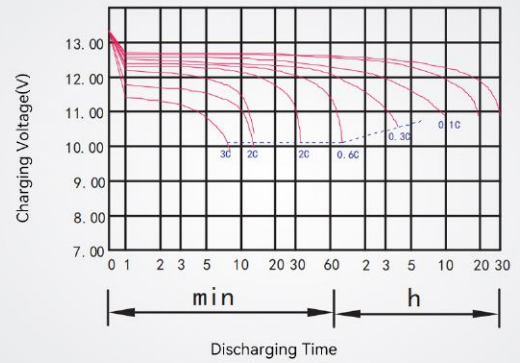
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# Characteristic Curve

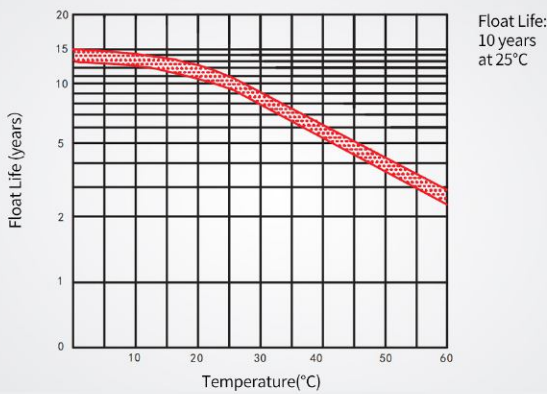
## Curves of Charging Characteristics(25°C)



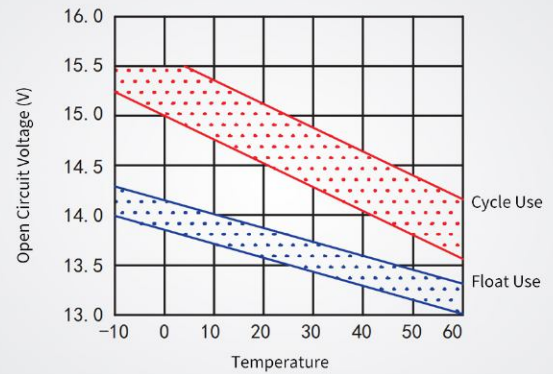
## Curves of Discharging Characteristics(25°C)



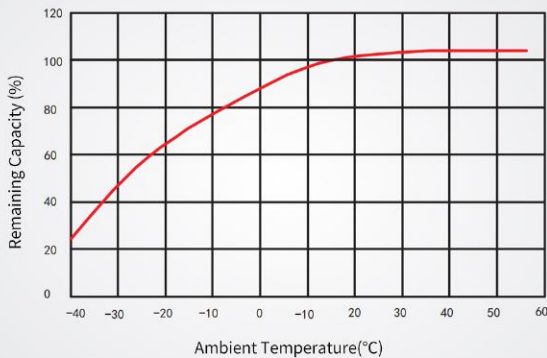
## Relationship Between Temperature and Float Life



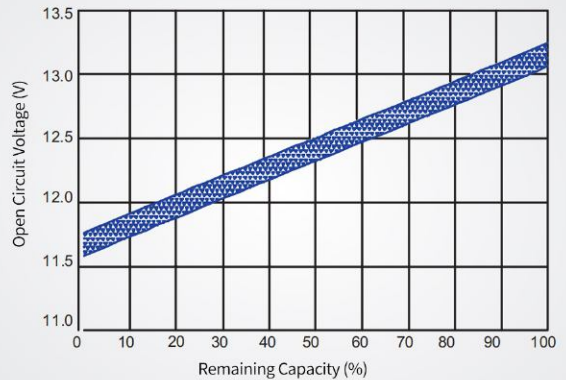
## Relationship Between Temperature and Charging Voltage



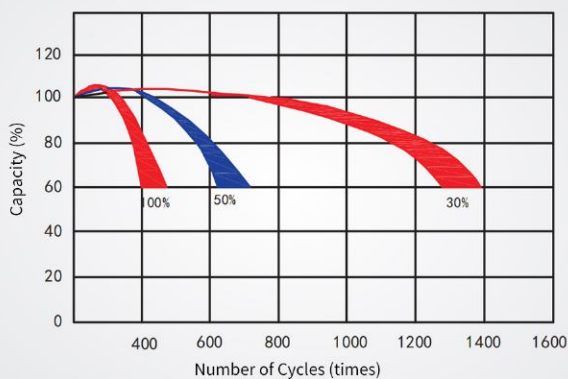
## Relationship Between Capacity and Temperature



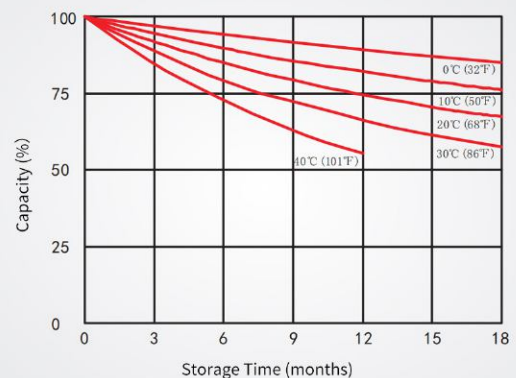
## Relationship Between OCV and Remaining Capacity



## Curve of Discharge Depth and Cycle Life



## Self-Discharge Curve



# Lead-Acid Battery Gel Series



## Deep Cycle Gel Batteries

Gel series is designed for frequent cyclic charge and discharge applications in extreme environments. By using strong grids, high-purity lead and patented Gel electrolyte, Gel series has excellent recovery from deep discharge under frequent cyclic discharge, and can provide 400 cycles at 100% DOD.

## Product Features

- Capacity range: 26Ah-260Ah
- Voltage class: 12V
- Long design life(25°C): 15 years
- Low self-discharge rate: <3 % per month
- High sealed reaction efficiency:  $\geq 98\%$
- High specific energy density
- Excellent charge acceptance
- Wide operation temperature:  $-40^{\circ}\text{C} \sim 60^{\circ}\text{C}$
  
- Grid: patented primary and secondary grid structure design;
- Positive plate: pasted flat type, high temperature and humidity formation technology;
- Separator: high-porosity PE separator with glass fibre has good cyclic characteristics and low resistance;
- Battery container: High-strength ABS (UL94-HB), and UL94-V0 is optional;
- Post sealing: patent double layer post sealing;
- Safety valve: narrow operating pressure range, equipped with explosion-proof arrester and acid filter.

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# Technical Parameters

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			Length	Width	Height	Total Height			
	(V)	(Ah)	mm	mm	mm	mm	kg		
GEL 26-12	12	26	166	176	125	125	8.1	F3(M5)/F13-BP(M5)/T24(M5)	D
GEL 33-12	12	33	195	130	155	168	9.6	F7(M8)/F11(M6)	C
GEL 40-12	12	40	198	166	169	169	12.4	F4(M5)/F11(M6)	D
GEL 55-12	12	55	229	138	211	216	16.5	F15(M6)/F11(M6)	C
GEL 65-12	12	65	350	167	182	182	19.5	F5(M8)/F11(M6)	C
GEL 75-12	12	75	260	169	211	216	22.5	F15(M6)/F11(M6)	C
GEL 90-12	12	90	306.5	168.5	210	215	27	F15(M6)/F12(M8)	C
GEL 100-12	12	100	328	172	215	220	29	F5(M8)/F12(M8)	C
GEL 120-12	12	120	407	177	225	225	33.5	F5(M8)/F12(M8)	C
GEL 134-12	12	134	340	173	280	287	39	F5(M8)/F12(M8)	C
GEL 145-12	12	145	340	173	280	287	41.5	F5(M8)/F12(M8)	C
GEL 150-12	12	150	483	170	241	241	43	F5(M8)/F12(M8)	C
GEL 160-12	12	160	532	207	214	219	48	F16(M8)/F12(M8)	E
GEL 180-12	12	180	532	207	214	219	51	F16(M8)/F12(M8)	E
GEL 200-12	12	200	522	240	219	224	59	F16(M8)/F10(M8)	E
GEL 225-12	12	225	522	240	219	224	61	F16(M8)/F10(M8)	E
GEL 230-12	12	230	521	269	204	209	67	F10(M8)	E
GEL 260-12	12	260	521	268	220	225	72	F14(M8)	E

## Applications

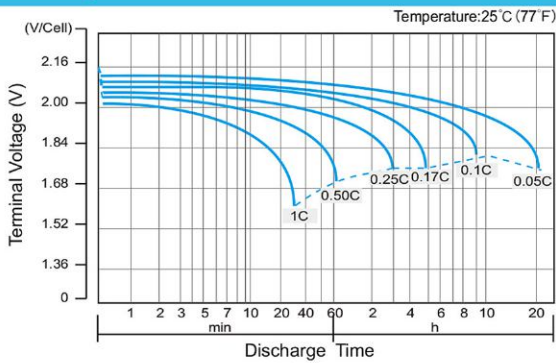
- Telecommunication
- Photovoltaic/Wind Energy
- UPS
- Cable TV

## Compliant Standards

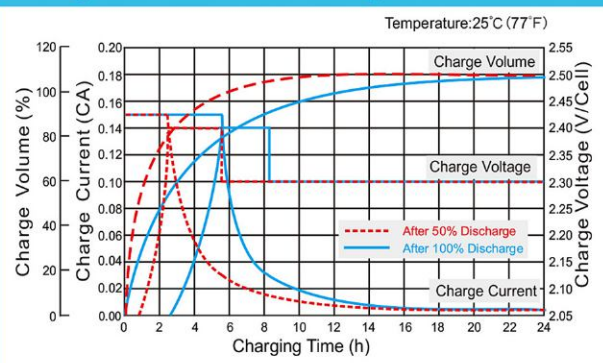
- IEC60896-21/22-2004
  - DIN43539-T5
  - IEC61427-2005
  - YD/T1360-2005
  - GB/T 22473-2008
- ISO9001, ISO14001, OHSAS18001, UL, CE certified

# Characteristic Curve

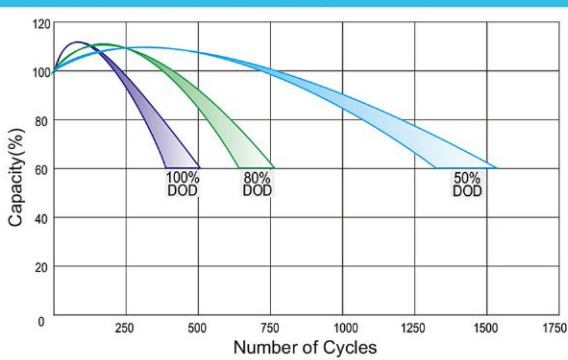
Discharge Characteristic Curve



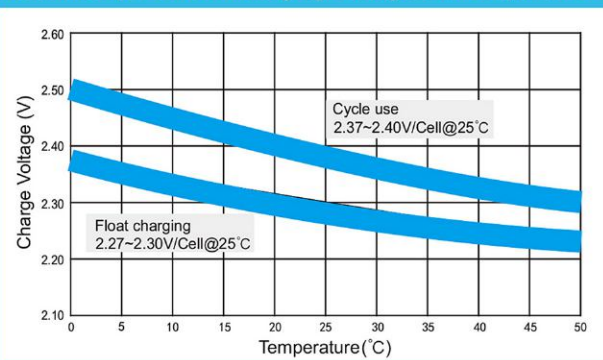
Charge Characteristic Curve for Cycle Use(IUU)



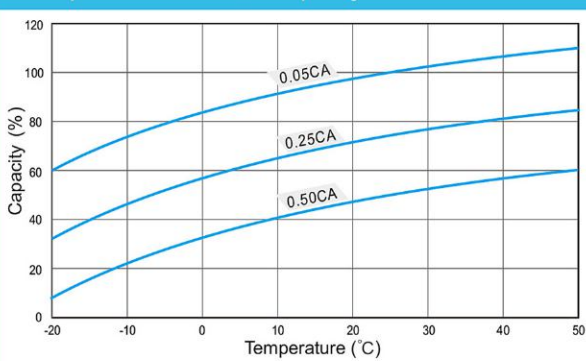
Cycle Life vs Depth of Discharge



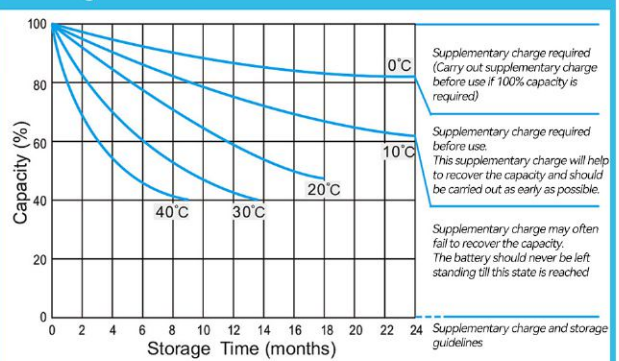
Relationship Between Charging Voltage and Temperature



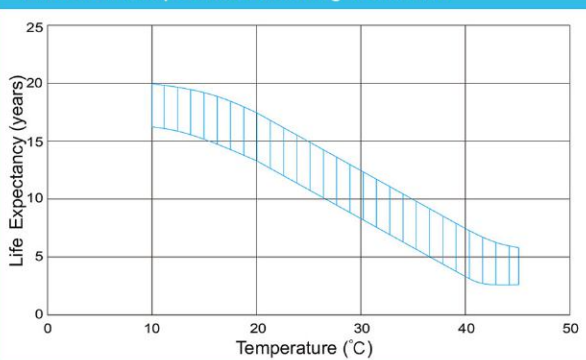
Temperature Effects on Capacity



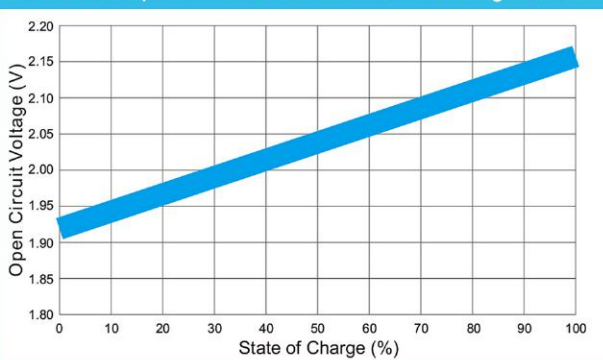
Storage Characteristics



Effect of Temperature on Long Term Life



Relationship Between OCV and State of Charge(20°C)



# Lead Acid Battery FT Series



FT (Front Terminal) series is specially designed for use in telecommunications and has 12 years design life in float service. By adopting a new AGM separator and centralized ventilation system, the battery can be installed in any position while maintaining high reliability. The dimension of the FT series is designed for installation in 19" and 23" cabinets.

## Product Features

- Capacity range: 55Ah-200Ah
- Voltage: 12V
- Long design life(25°C): 12 years
- Low self-discharge rate:  $\leq 3\%$ /month
- Good high rate discharge performance
- High sealed reaction efficiency:  $\geq 99\%$
- Wide operation temperature range:  $-20^{\circ}\text{C} \sim 60^{\circ}\text{C}$
- Narrow structure: each cell has the same heat dissipation efficiency, which effectively prevents thermal runaway;
- Plate: pasted flat type with AM patented formula to ensure good service life;
- Front terminal is convenient for connection and maintenance;
- Centralized ventilation system: allows battery internal gas to be vented out of the system, and is equipped with flame arrester;
- Terminal cover: to avoid short circuit and dust, with inspection holes for easy maintenance;
- Separator: use an improved AGM separator for lower resistance and higher assembling pressure to increase deep cycle;
- Terminal sealing: double sealing technology (mechanical + epoxy glue).

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# Technical Parameters



Model	Nominal Voltage	Capacity	Dimension				Weight	Terminal Type	Terminal Position
			Length	Width	Height	Total Height			
	(V)	(Ah)	mm	mm	mm	mm	kg		
FT 55-12	12	55	291	106	230	230	17.2	F11(M6 )	E
FT 55-12A	12	55	291	106	230	230	16.2	F11(M6)	E
FT 90-12	12	90	562	114	188	188	24	F6(M8)	E
FT 90-12A	12	90	562	114	188	188	28.5	F6(M8)	E
FT 100-12	12	100	508	110	236	236	27	F14(M8)	E
FT 100-12A	12	100	508	110	236	236	31	F14(M8)	E
FT 100-12S	12	100	410	109	285	293	28.5	F9(M8)	E
FT 100-12SA	12	100	410	109	285	293	32.5	F9(M8)	E
FT 105-12	12	105	508	110	236	236	29	F14(M8)/F8(M6)	E
FT 105-12A	12	105	508	110	236	236	31.2	F14(M8)/F8(M6)	E
FT 110-12	12	110	410	109	285	293	29.5	F9(M8)	E
FT 110-12A	12	110	410	109	285	293	43.5	F9(M8)	E
FT 150-12	12	150	565	110	288	288	39.5	F9(M8)	E
FT 150-12A	12	150	565	110	288	288	47	F9(M8)	E
FT 160-12	12	160	565	110	288	288	47	F14(M8)	E
FT 170-12	12	170	560	125	316	316	52	F14(M8)	E
FT 180-12	12	180	560	125	316	316	48	F14(M8)	E
FT 180-12A	12	180	560	125	316	316	54	F9(M8)	E
FT 185-12	12	185	560	125	316	316	57.5	F14(M8)	E
FT 200-12	12	200	560	125	316	316	54	F14(M8)	E
FT 200-12A	12	200	560	125	316	316	57.5	F14(M8)	E

## Applications

- Telecommunication
- Emergency Light
- Photovoltaic/Wind Energy

## Compliant Standards

- IEC60896-21/22-2004
- BS 6290-4-1997
- YD/T799-2002
- GB/T19638-2005
- JIS8704-2006
- ISO9001, ISO14001, OHSAS18001, UL, CE certified
- NEBS certified

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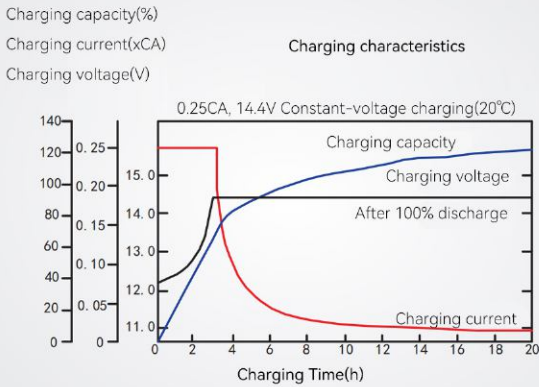
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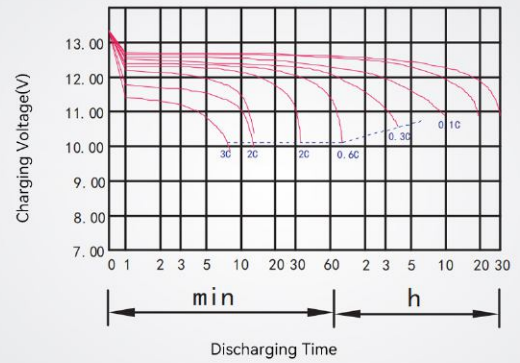
# Characteristic Curve



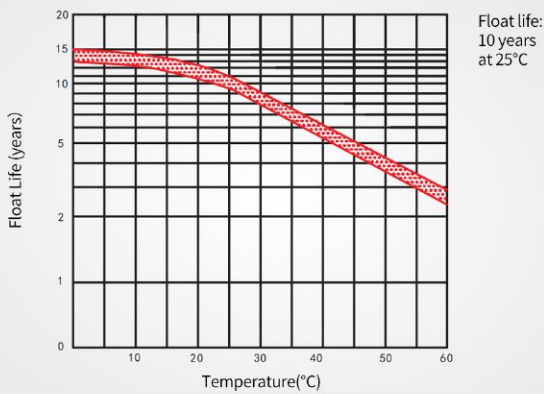
## Curves of Charging Characteristics(25°C)



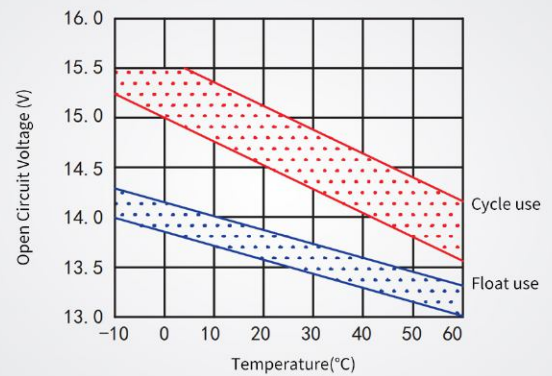
## Curves of Discharging Characteristics(25°C)



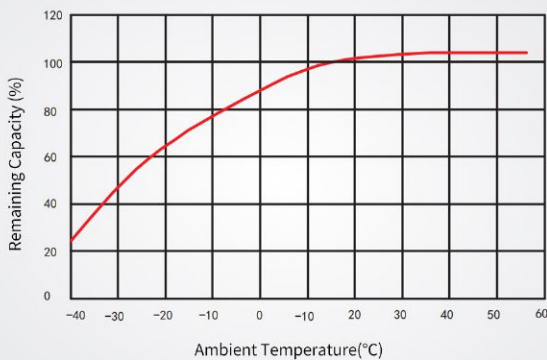
## Relationship Between Temperature and Float Life



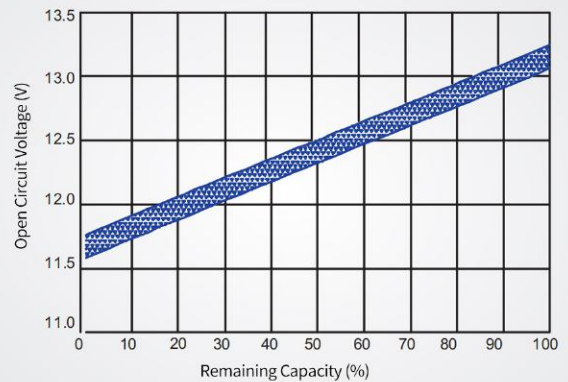
## Relationship Between Temperature and Charging Voltage



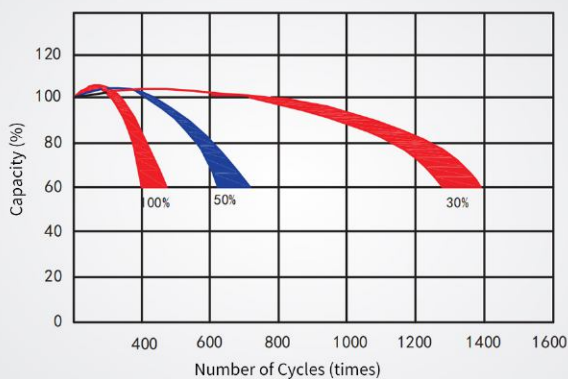
## Relationship Between Capacity and Temperature



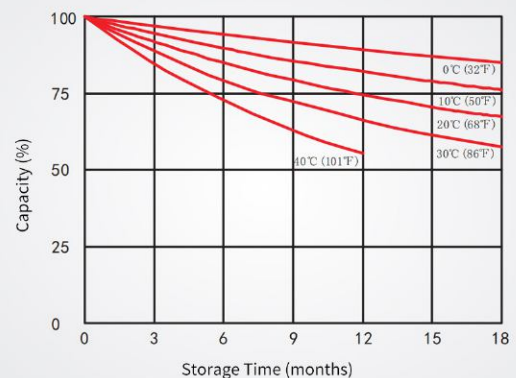
## Relationship Between OCV and Remaining Capacity



## Curve of Discharge Depth and Cycle Life




## Self-discharge Curve



# Lead Acid Battery OPzV Series

OPzV Solid-State Lead Battery (VRLA Tubular Gel Battery) is a new battery technology based on traditional lead-acid battery, which has been improved through technology research and development and countless practice. OPzV adopts gas-phase nano silica as electrolyte to replace the sulfuric acid electrolyte of traditional lead-acid battery, forms colloidal medium, and then solidifies. It not only ensures excellent conductivity, but also completely eliminates the leakage and volatilization of electrolyte, so as to prolong the service life of the battery and reduce the maintenance cost. The battery is designed and manufactured according to DIN standards, adopting die-casting positive grid and patented formula of active materials. OPzV series exceeds DIN standard values that it has 20~25 years floating design life at 25°C and is even more suitable for cyclic use under extreme operating conditions.

## Product Features

- Capacity range: 60Ah-3000Ah, Voltage: 2V/12V
  - Floating design life(25°C): 20~25 years
  - Cycle life: 3500 at 80%DOD(2V), 2200 at 80%DOD(12V)
  - Self discharge rate:  $\leq 2\%$ /month;
  - High charge acceptance performance;
  - Wide operation temperature:  $-40^{\circ}\text{C} \sim 60^{\circ}\text{C}$
  - Good deep discharge recovery performance.
- 
- Electrolyte: solid-state electrolyte is made of imported silica, and the special technology make it in a gel immobilized state, which makes it safer than AGM type battery; special additives make it very stable, with lower internal resistance and no stratification;
  - Positive plate: tubular, with die-casting thick Pb-Ca grid, has very good corrosion resistance and very long service life;
  - Negative plate: pasted flat type, radial grid design, good high rate discharge performance;
  - Separator: PVC-SiO<sub>2</sub> separator is imported from Europe, with low internal resistance, high porosity and long life;
  - Flooded electrolyte design: contain much electrolyte like a flooded battery, gap between plates and separators is full of electrolyte, thus providing good heating capacity and avoiding “thermal runaway”;
  - Safety valve: good sensitivity, safe and reliable, equipped with double flame arresters/acid filters;
  - Battery case: made of high-strength ABC, designed for durability.

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			Length	Width	Height	Total Height			
	(V)	(Ah)	mm	mm	mm	mm	kg		
OPzV 60-12	12	60	260	169	211	216	23	F11(M6)	C
OPzV 80-12	12	80	328	172	215	220	30	F12(M8)	C
OPzV 100-12	12	100	407	177	225	225	34.5	F12(M8)	C
OPzV 120-12	12	120	483	170	241	241	44.6	F12(M8)	C
OPzV 140-12	12	140	532	207	214	219	52.8	F12(M8)	C
OPzV 160-12	12	160	532	207	214	219	57	F12(M8)	C
OPzV 180-12	12	180	522	240	219	224	65	F10(M8)	C
OPzV 200-12	12	200	521	268	220	225	69.5	F14(M8)	C
OPzV 200-2	2	200	103	206	355	390	16	F10(M8)	G
OPzV 250-2	2	250	124	206	355	390	19.5	F10(M8)	G
OPzV 300-2	2	300	145	206	355	390	23.5	F10(M8)	G
OPzV 350-2	2	350	124	206	470	505	27	F10(M8)	G
OPzV 420-2	2	420	145	206	470	505	32	F10(M8)	G
OPzV 500-2	2	490	166	206	470	505	38	F10(M8)	G
OPzV 770-2	2	770	210	254	470	505	55	F10(M8)	G
OPzV 600-2	2	600	145	206	645	680	42	F10(M8)	G
OPzV 800-2	2	800	191	210	645	680	57.5	F10(M8)	H
OPzV 1000-2	2	1000	233	210	645	680	70	F10(M8)	H
OPzV 1200-2	2	1200	276	210	645	680	83	F10(M8)	H
OPzV 1500-2	2	1500	275	210	795	830	102	F10(M8)	H
OPzV 2000-2	2	2000	399	214	770	805	140	F10(M8)	I
OPzV 2500-2	2	2500	487	212	770	805	176	F10(M8)	J
OPzV 3000-2	2	3000	576	212	770	805	208	F10(M8)	J

## Applications

- Telecommunication
- Photovoltaic/Wind Energy
- UPS
- Power Storage Plant
- Military

## Compliant Standards

- IEC60896-21/22-2004
- DIN43539-T5
- IEC61427-2005
- YD/T1360-2005
- GB/T 22473-2008
- ISO9001, ISO14001, OHSAS18001, UL, CE certified

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# Characteristic Curve

