SINCE 1995

About us

HONGKONG SONGLI GROUP LIMITED
XIAMEN SONGLI IMPORT AND EXPORT CO., LTD
JINJIANG SONGLI BATTERY CO., LTD
XIAMEN SONGLI NEW ENERGY TECHNOLOGY CO.,LTD

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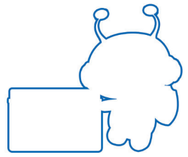
TCS®

VRLA BATTERY

ENERGY STORAGE BATTERY

SINCE 1995

PRODUCT CATALOG



CATALOGUE

CATALOGUE

PRODUCT CERTIFICATE

Songli has a professional quality management system and successfully acquired the recognition of various standards such as ISO9001, ISO/TS16949, CE, UL.201C.

Company
Profile /

Xiamen Songli New Energy Technology Limited ("Songli"), was founded in 1995, which specialized in advanced battery research, development, production and marketing. Songli has been one of the most specialized battery manufacturers in China.

Songli has always kept rapid growth. Our production base covers an area of more than 400,000 square meters, with 2000 employees and professional technical & quality engineering department. Songli has advanced battery production lines and has been continuously introducing the world's leading automated machines and manufacturing equipment.

Songli mainly produces lead acid batteries, AGM VRLA batteries, Deep cycle batteries, GEL batteries, 2V, OPzV, OPzS, the products are widely used in motorcycles, electric bicycles, cars, solar, wind, telecommunication, emergency, industries and other special purposes. The production can be reached up to 2,000,000 batteries per month. The total annual capacity is more than 4,000,000 KVAH.

Songli Group has grown into a major battery enterprise, and gradually develops into one of the largest domestic battery manufacturers. We have a quality assurance system with ISO9001, ISO/TS16949 quality management system certification.

With rich experience in the production of battery, a perfect innovation system, a good relationship with customers and reliable sales and after-sales service, we are managing stable dealerships as well as service agencies in the domestic and global markets, our products have been reached out to more than 100 countries and regions, including Southeast Asia, the Middle East, America and Africa.

With an aim to become one of the leading brands in the world, we make sure every battery is from our commitment to the best quality.

Dining Bar

Office

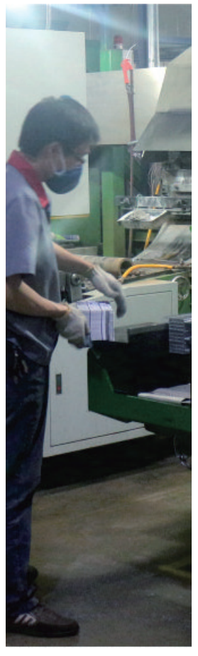
Exhibition Room

Production

Steps /

Songli has the international first-class battery production equipments and technologies, introducing and strictly following the international advanced standards and production process.

With strict quality control procedures, Songli is aim to produce high quality products and provide a powerful guarantee, to lay a solid foundation for our reputation.



1 /

Grid Making

2 /

Coating

3 /

Cast Welding

4 /

Put Plates
Into Case

5 /

Welding Machine

6 /

Capping Glue

7 /

Auto Acid Filler

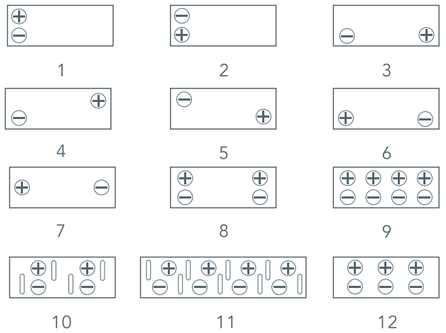
8 /

Circuit Test

STORAGE

APPLICATION SCENARIO:

TERMINAL DIRECTION:



PRODUCT DESCRIPTION:

Safety: no leakage on battery terminal, ensure using in safe and reliable conditions.

Maintenance free: due to all internal generated gas restore to water, do not need water replenishment

Exhaust air system: it can exhaust excess gas and make air pressure up to normal range when battery overcharges and internal pressure is over high, this time safe valve will close by itself, so there will be no additional gas accumulation.

No free acid: special separator adsorb electrolyte, so there is no free acid inside battery, then battery can be installed in various positions.

Outer Box

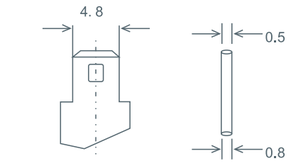
Battery

BATTERY

TERMINAL DIMENSIONS(mm):

Type	A	B	C	D	Material
F5	16.5	6	15	6.2	Lead
F6	18	3	19	7	Copper
F7	18	9.6	18	9.5	Lead
F8	26	8	24	8.6	Lead
F9	26.5	10	23	8.5	Lead
F10	26	8.3	23	8.5	Lead
F11	27	8.3	26	9	Lead
F12	12	2	14	5.5	Copper

Type	M	ϕ	Material
D1	4	10	Copper
F12	8	20	Copper
F13	8	16	Copper
F14	6	14	Copper
F16	8	18	Copper
F18	5	12	Copper
F19	6	16	Copper



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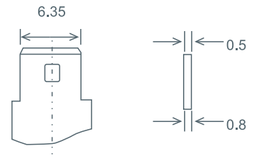

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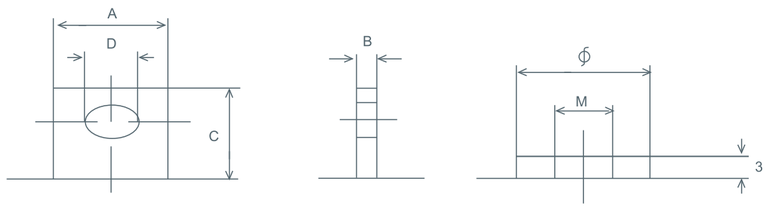
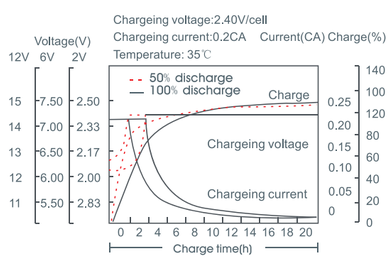
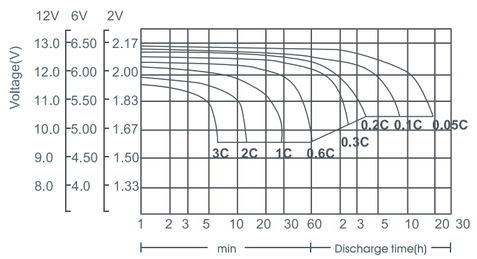


● **Charge characteristic curve**



● **Small size battery Discharge characteristic curve**



Small

SMALL SIZE BATTERY SERIES

Valve Regulated Lead Acid Battery

Product Features

+

- Capacity range: 0.8AH-24AH
- Design life(25℃): 5 years
- Operation temperature: -20℃-60℃
- Multi-voltage class: 2V, 4V, 6V, 12V
- Terminal type: F1, F2, F17, F18 etc.
- AGM technology reduces the resistance of the battery
- Low self-discharge
- High charge receptivity
- With an excellent resistance to high and low temperature and good sealing performance
- Battery container: ABS material, tough, hard and rigid

Electric toys

Small

SMALL SIZE BATTERY SERIES

Valve Regulated Lead Acid Battery

Summary

Small size batteries have different voltages such as 4V, 6V and 12V. With the small size and weight, it is most widely used in our daily life.

Applications

Alarm system

Electrical tools

Electronic scale

- Medical equipment
- Alarm system
- Communication equipment
- Controlling device

- Engine start
- Emergency lighting system
- Fire and security system
- Electric toys/tools

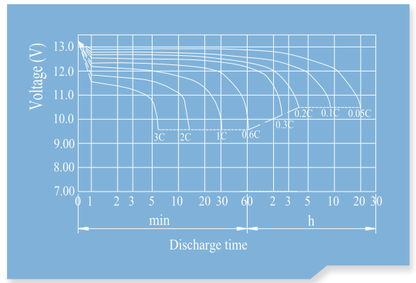
- Computer backup power
- Power systems
- ATM
- Control system

Small

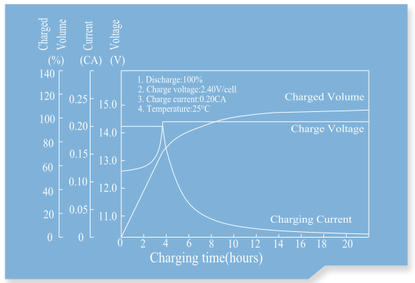
SMALL SIZE BATTERY SERIES

Valve Regulated Lead Acid Battery

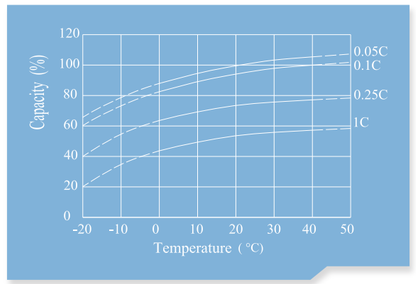
Experimental curve



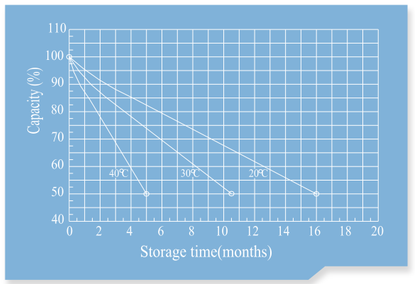
DISCHARGE CHARACTERISTICS(25℃)



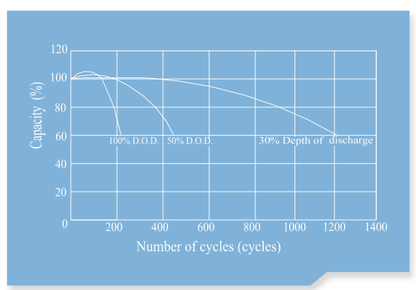
CHARGING CHARACTERISTICS(25℃)



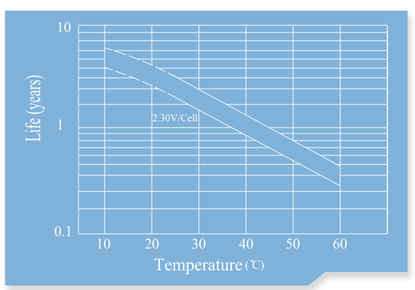
EFFECT OF TEMPERATURE ON CAPACITY



SELF DISCHARGE CHARACTERISTICS



CYCLE LIFE IN RELATION TO DEPTH OF DISCHARGE



EFFECT OF TEMPERATURE ON FLOAT LIFE

Model	Voltage	Capacity	Internal Resistance	Dimensions(mm)				Terminal Type	Terminal Position	Weight
	(V)	(Ah)	(mΩ)	(L)±1. 5	(W)±1.0	(H)±2.0	(TH)±2.0			(Kg)±5%
SL2-4	2	4.0	9	46	25	100	106	F1	7	0.25
SL4-3.5S	4	3.5	/	48	48	102	108	F2	3	0.41
SL4-4.5	4	4.5	16	48	48	102	108	F2/F1	3	0.48
SL4-10	4	10.0	9	102	44	95	101	F17	6	1.00
SL4-20	4	20.0	6	149	43	154	165	F1	3	2.20

Model	Voltage	Capacity	Internal Resistance	Dimensions(mm)				Terminal Type	Terminal Position	Weight
	(V)	(Ah)	(mΩ)	(L)±1. 5	(W)±1.0	(H)±2.0	(TH)±2.0			(Kg)±5%
SL6-1.2	6	1.2	55	97	24	52	58	F1	6	0.29
SL6-2.3	6	2.3	30	43	37	76	76	/	/	0.34
SL6-2.8	6	2.8	32	66	33	97	104	F1	4	0.50
SL6-3.2	6	3.2	35	134	35	61	67	F1	6	0.65
SL6-3.5S	6	3.5	35	70	47	101	107	F1	4	0.62
SL6-4E	6	4.0	30	70	47	101	107	F1	4	0.66
SL6-4	6	4.0	30	70	47	101	107	F1	4	0.68
SL6-4.5	6	4.5	25	70	47	101	107	F1	4	0.72
SL6-4.5H	6	4.5	25	70	47	101	107	F1	4	0.75
SL6-5	6	5.0	17	70	47	101	107	F1	4	0.80
SL6-6.5	6	6.5	21	151	35	94	100	F1/F2	6	1.05
SL6-7	6	7.0	18	151	35	94	100	F1/F2	6	1.10
SL6-7.2	6	7.2	16	151	35	94	100	F1/F2	6	1.15
SL6-7.5	6	7.5	14	151	35	94	100	F1/F2	6	1.18
SL6-9	6	9.0	12	151	35	94	100	F1/F2	6	1.30
SL6-8	6	8.0	13	99	58	109	113	F1	6	1.30
SL6-10	6	10.0	15	151	50	94	100	F1/F2	6	1.55
SL6-10H	6	10.0	15	151	50	94	100	F1/F2	6	1.65
SL6-12	6	12.0	12	151	50	94	100	F1/F2	6	1.75
SL6-12H	6	12.0	12	151	50	94	100	F1/F2	6	1.80
SL6-20	6	20	8	157	83	125	130	F17	6	3.00
SL12-0.8	12	0.8	200	96	25	62	62	AMP		0.34
SL12-1.2	12	1.2	95	97	43	52	58	F1	2	0.55
SL12-2	12	2.0	65	178	35	61	67	F1	6	0.80
SL12-2.3	12	2.3	60	178	35	61	67	F1	6	0.90
SL12-2A	12	2.0	72	70	48	98	104	F1	6	0.74
SL12-2.3A	12	2.3	60	70	48	98	104	F1	6	0.77
SL12-2.6A	12	2.6	40	70	48	98	104	F1	6	0.85
SL12-2.5	12	2.5	45	104	48	70	70	+F2-F2		0.90
SL12-2.8B	12	2.8	40	104	48	70	70	+F2-F2		0.98
SL12-2.8	12	2.8	50	67	67	97	103	F1	6	1.00
SL12-2.8A	12	2.8	50	132	33	98	104	F1	6	1.00
SL12-2.9	12	2.9	45	79	56	99	105	F1	3	1.05
SL12-3.2	12	3.2	55	134	67	61	67	F1	2	1.21
SL12-4	12	4.0	55	90	70	101	107	F1/F2	6	1.36
SL12-4.5	12	4.5	45	90	70	101	107	F1/F2	6	1.43
SL12-5	12	5.0	26	90	70	101	107	F1/F2	6	1.53
SL12-4A	12	4.0	45	195	47	70	76	F1	6	1.42
SL12-5A	12	5.0	30	140	48	102	103	+F2-F1	6	1.53
SL12-6	12	6.0	32	151	65	94	100	F1/F2	1	1.88
SL12-6.5	12	6.5	32	151	65	94	100	F1/F2	1	1.98
SL12-7	12	7.0	30	151	65	94	100	F1/F2	1	2. 10
SL12-7.2	12	7.2	28	151	65	94	100	F1/F2	1	2. 20
SL12-7.5	12	7.5	26	151	65	94	100	F1/F2	1	2. 30
SL12-8. 5	12	8.5	23	151	65	94	100	F1/F2	1	2. 40
SL12-9	12	9.0	20	151	65	94	100	F1/F2	1	2. 60
SL12-10L	12	10.0	32	181	77	117	117	F2/F17		3.00
SL12-10	12	10.0	32	151	98	95	101	F2/F1	1	2.80
SL12-10H	12	11.0	32	151	98	95	101	F2/F1	1	3.12
SL12-12	12	12.0	20	151	98	95	101	F2/F1	1	3.25
SL12-12H	12	13.0	20	151	98	95	101	F2/F1	1	3.45
SL12-15	12	15. 0	20	181	77	167	167	F17/F18	3	4.60
SL12-17	12	17. 0	18	181	77	167	167	F17/F18	3	5. 10
SL12-18	12	18. 0	16	181	77	167	167	F17/F18	3	5. 25
SL12-20	12	20. 0	14	181	77	167	167	F17/F18	3	5. 50
SL12-24E	12	24. 0	15	175	166	125	125	F17/F18	3	7. 30
SL12-24	12	24. 0	15	175	166	125	125	F17/F18	3	7. 60
SL12-26	12	26. 0	14	175	166	125	125	F17/F18	3	7. 80
SL12-28	12	28. 0	12	175	166	125	125	F17/F18	3	8. 20
SL12-24A	12	28. 0	15	165	125	175	175	F18	3	8.10
SL12-28A	12	32. 0	12	165	125	175	175	F18	3	9.30
SL24-5	24	5.0	60	140	90	103	109	F1/F2	3	3.20
SL24-3.5	24	3.5	60	180	73	70	70	/	/	3.20

Middle

MIDDLE SIZE BATTERY SERIES

Valve Regulated Lead Acid Battery

Product Features

+

- Capacity range: 24AH-250AH
- Design life(25℃): 10 years
- Operation temperature: -20℃-60℃
- Multi-voltage class: 6V, 8V, 12V
- Terminal type: F2, F13, F14 etc.
- AGM technology reduces the resistance of the battery
- Low self-discharge
- High charge receptivity
- With an excellent resistance to high and low temperature and good sealing performance
- Battery container: ABS material, tough, hard and rigid

Tour car

Middle

MIDDLE SIZE BATTERY SERIES

Valve Regulated Lead Acid Battery

Summary

Middle size batteries with a 12V voltage, and larger capacity makes the batteries widely used in energy storage facilities and system.

Applications

Electric wheelchair

Ship equipment

Forklift power

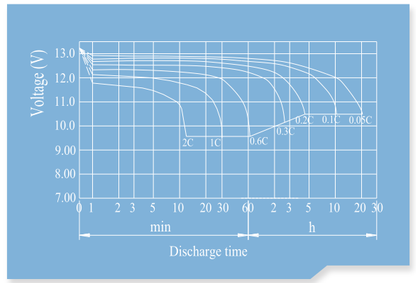
- Marine equipment
- Military equipment
- Golf cart
- Power systems
- Railway systems
- Electric forklift
- Medical equipment
- Power station
- Large UPS
- Telecommunications equipment
- Solar / Wind energy systems
- Cable television

Middle

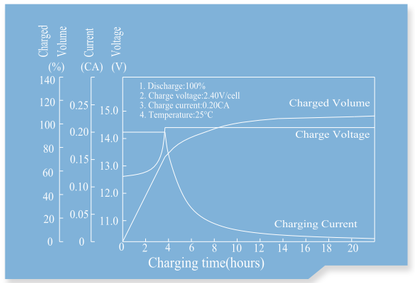
MIDDLE SIZE BATTERY SERIES

Valve Regulated Lead Acid Battery

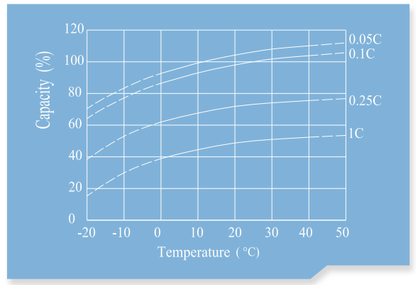
Experimental curve



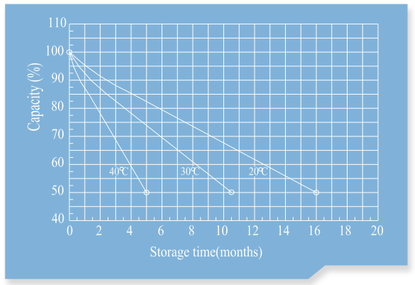
DISCHARGE CHARACTERISTICS(25℃)



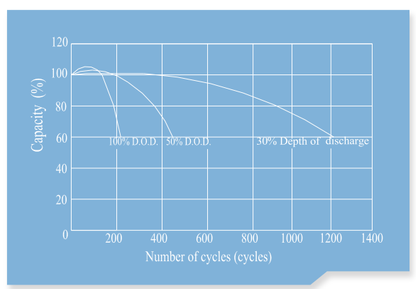
CHARGING CHARACTERISTICS(25℃)



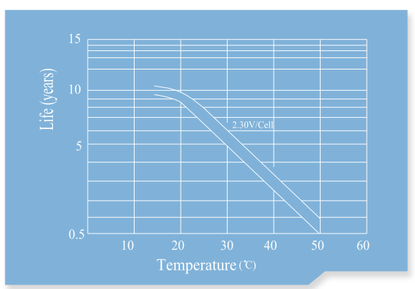
EFFECT OF TEMPERATURE ON CAPACITY



SELF DISCHARGE CHARACTERISTICS



CYCLE LIFE IN RELATION TO DEPTH OF DISCHARGE



EFFECT OF TEMPERATURE ON FLOAT LIFE

Middle

MIDDLE SIZE BATTERY SERIES

Valve Regulated Lead Acid Battery

Model	Voltage (V)	Capacity (Ah)	Internal Resistance (mΩ)	Dimensions(mm) (L)±1.5	(W)±1.0	(H)±2.0	(TH)±2.0	Terminal Type	Terminal Position	Weight (Kg)±5%
SL6-36	6	36	4.5	162	88	164	170	F2	5	5.6
SL6-42	6	42	4.2	162	88	164	170	F2	5	6.1
SL6-100	6	100	3.0	194	170	205	210	F14	4	15.5
SL6-150	6	150	2.5	260	180	245	250	F13	5	23.0
SL6-180	6	180	2.2	307	169	220	225	F13	5	27.0
SL6-200A	6	200	2.0	307	169	220	225	F13	5	29.0
SL6-200	6	200	2.0	321	176	226	229	F13	4	29.5
SL6-300	6	300	1.5	295	178	345	348	F13	5	47.0
SL12-31	12	31	11.0	195	130	155	166	F14	6	9.6
SL12-33	12	33	10.0	195	130	155	166	F14	6	10.0
SL12-35	12	35	9.0	195	130	155	166	F14	6	10.5
SL12-38	12	38	9.0	197	165	170	170	F14	3	12
SL12-40	12	40	8.5	197	165	170	170	F14	3	12.5
SL12-42	12	42	8.0	197	165	170	170	F14	3	13.5
SL12-45	12	45	8.0	197	165	170	170	F14	3	14.0
SL12-50	12	50	7.5	229	138	211	214	F14	6	15.5
SL12-55	12	55	7.0	229	138	211	214	F14	6	16.5
SL12-50A	12	50	7.5	229	138	205	210	F19	6	15.5
SL12-60	12	60	7.0	260	168	211	214	F14	6	20.0
SL12-70	12	70	6.5	260	168	211	214	F14	6	21.5
SL12-75	12	75	6.0	260	168	211	214	F14	6	22.5
SL12-80	12	80	5.5	260	168	211	214	F14	6	23
SL12-65	12	65	6.0	350	167	179	179	F14	3	20.0
SL12-80A	12	80	6.0	350	167	179	179	F14	3	23.5
SL12-90	12	90	5.0	306	169	211	214	F14	6	26.5
SL12-90E	12	90	5.0	306	169	211	214	F14	6	26.0
SL12-90AE	12	90	5.0	330	171	214	220	F12	6	27.0
SL12-90A	12	90	5.0	330	171	214	220	F12	6	27.5
SL12-100E	12	100	5.0	330	171	214	220	F12	6	29.0
SL12-100	12	100	4.5	330	171	214	220	F12	6	29.5
SL12-110	12	110	4.5	330	171	214	220	F12	6	32.0
SL12-120A	12	120	4.0	409	176	225	225	F12	6	34.0
SL12-90S	12	90	5.0	406	173	208	238	F12	6	29.5
SL12-100S	12	100	4.5	406	173	208	238	F12	6	31.0
SL12-110S	12	110	4.5	406	173	208	238	F12	6	32.0
SL12-120	12	120	4.0	406	173	208	238	F12	6	34.0
SL12-135	12	135	3.5	340	172	282	284	F12	6	42.5
SL12-135S	12	135	3.5	485	172	240	240	F12	6	40.5
SL12-150	12	150	3.5	485	172	240	240	F12	6	43.0
SL12-160	12	160	4.0	530	207	210	213	F12	2	49.5
SL12-180	12	180	3.5	530	207	210	213	F12	2	52.5
SL12-180S	12	180	3.0	522	238	218	221	F12	2	55.5
SL12-190S	12	190	3.0	522	238	218	221	F12	2	57.0
SL12-200	12	200	3.0	522	238	218	221	F12	2	59.5
SL12-220	12	220	3.0	522	238	218	221	F12	2	62.0
SL12-225	12	225	3.0	522	238	218	221	F12	2	63.0
SL12-250	12	250	2.6	521	269	220	223	F12	2	71.0

Deep Cycle

DEEP CYCLE BATTERY SERIES

Valve Regulated Lead Acid Battery

Product Features

+

- Capacity range: 33AH-3000AH
- Design life(25℃): 12 years
- Operation temperature: -20℃-60℃
- Multi-voltage class: 2V, 6V, 8V, 12V
- Terminal type: F12, F13, F14 etc.
- AGM technology reduces the resistance of the battery
- Strong grids and special materials are used
- Low self-discharge
- High charge receptivity
- With an excellent resistance to high and low temperature and good sealing performance
- Battery container: ABS material, tough, hard and rigid

Motorhome

Deep Cycle

DEEP CYCLE BATTERY SERIES

Valve Regulated Lead Acid Battery

Summary

Special deep cycle technology offers battery widely used in wherever needs higher requirements of cycle times and service life.

Applications

- Solar energy systems
- Power systems
- Large UPS
- Wind power systems
- Motorhome
- Ship starting systems

Model	Voltage	Capacity	Internal Resistance	Dimensions(mm)				Terminal Type	Terminal Position	Weight
	(V)	(Ah)	(mΩ)	(L)±1. 5	(W)±1.0	(H)±2.0	(TH)±2.0			(Kg)±5%
SLD6-100	6	100	3.0	194	170	205	210	F14	4	15.5
SLD6-150	6	150	2.5	260	180	245	250	F13	5	23.0
SLD6-180	6	180	2.2	307	169	220	225	F13	5	27.0
SLD6-200	6	200	2.0	321	176	226	229	F13	4	29.5
SLD12-33	12	33.0	10	195	130	155	166	F14	6	10.0
SLD12-40	12	40.0	8.5	197	165	170	170	F14	3	12.5
SLD12-50	12	50.0	7.5	229	138	211	214	F14	6	15.5
SLD12-70	12	70.0	6.5	260	168	211	214	F14	6	21.5
SLD12-65	12	65.0	6.0	350	167	175	175	F14	3	20.0
SLD12-90	12	90.0	5.0	306	169	211	214	F14	6	27.0
SLD12-100	12	100	4.5	330	171	214	220	F14	6	29.5
SLD12-120A	12	120	4.0	409	176	225	225	F13	6	34.0
SLD12-120	12	120	4.0	406	173	208	238	F13	6	34.0
SLD12-150	12	150	3.5	485	172	240	240	F13	6	43.0
SLD12-160	12	160	4.0	530	207	210	213	F13	2	47.5
SLD12-180	12	180	3.5	530	207	210	213	F13	2	52.5
SLD12-200	12	200	3.0	522	238	218	221	F13	2	59.5
SLD12-250	12	250	2.6	521	269	220	223	F13	2	71.0
SLD2-100	2	100	0.8	171	72	205	210	F13	7	5.60
SLD2-150	2	150	0.6	171	102	206	221	F13	4	8.00
SLD2-200	2	200	0.9	171	111	330	364	F12	7	12.8
SLD2-300	2	300	0.8	171	151	330	364	F12	7	18.0
SLD2-400	2	400	0..6	210	175	330	367	F12	8	25.0
SLD2-500	2	500	0.5	241	175	330	365	F12	8	30.0
SLD2-600	2	600	0.45	302	175	330	367	F12	8	36.0
SLD2-800	2	800	0.4	410	175	330	367	F12	9	50.0
SLD2-1000	2	1000	0.3	475	175	330	367	F12	9	60.0
SLD2-1500	2	1500	0.22	400	350	345	382	F12	10	93.0
SLD2-2000	2	2000	0.2	490	350	345	382	F12	11	120
SLD2-3000	2	3000	0.12	710	350	345	382	F12	11	180

GEL

GEL BATTERY SERIES

Valve Regulated Lead Acid Battery

Product Features

- Capacity range: 100AH-3000AH
- Design life(25℃): 12 years
- Operation temperature: -20℃-60℃
- Voltage class: 2V, 6V, 8V, 12V
- Terminal type: F12, F13, F14
- Environmentally friendly
- High power density
- AGM separator
- High reliability and quality
- Longer service life
- International leading technology
- Excellent recovery from deep discharge

Solar energy

GEL

GEL BATTERY SERIES

Valve Regulated Lead Acid Battery

Summary

The gel technology provides battery to be widely used even in extreme temperature and ventilated environment with less gas.

Applications

- Solar / Wind Energy Systems
- Telecommunications
- Wheelchair
- Marine Equipment
- Military Equipment
- Emergency Lighting
- Power Plants
- Medical Devices
- Golf Cart

Model	Voltage	Capacity	Internal Resis tance	Dimensions(mm)				Terminal Type	Terminal Position	Weight
	(V)	(Ah)	(mΩ)	(L)±1. 5	(W)±1.0	(H)±2.0	(TH)±2.0			(Kg)±5%
SLG6-100	6	100	3.3	194	170	205	210	F14	4	15.5
SLG6-150	6	150	2.8	260	180	245	250	F13	5	23.0
SLG6-180	6	180	2.5	307	169	220	225	F13	5	27.0
SLG6-200	6	200	2.2	321	176	226	229	F13	4	29.5
SLG12-33	12	33.0	11	195	130	155	166	F14	6	10.0
SLG12-40	12	40.0	9.5	197	165	170	170	F14	3	12.5
SLG12-50	12	50.0	8.5	229	138	211	214	F14	6	15.5
SLG12-70	12	70.0	7.0	260	168	211	214	F14	6	21.5
SLG12-65	12	65.0	6.5	350	167	175	175	F14	3	20.0
SLG12-90	12	90.0	5.5	306	169	211	214	F14	6	27.0
SLG12-100	12	100	5	330	171	214	220	F14	6	29.5
SLG12-120A	12	120	4.5	409	176	225	225	F13	6	34.0
SLG12-120	12	120	4.5	406	173	208	238	F13	6	34.0
SLG12-150	12	150	4.0	485	172	240	240	F13	6	43.0
SLG12-160	12	160	4.5	530	207	210	213	F13	2	47.5
SLG12-180	12	180	4.0	530	207	210	213	F13	2	52.5
SLG12-200	12	200	3.3	522	238	218	221	F13	2	59.5
SLG12-250	12	250	3.0	521	269	220	223	F13	2	71.0
SLG2-100	2	100	0.9	171	72	205	210	F13	7	5.60
SLG2-150	2	150	0.7	171	102	206	221	F13	4	8.00
SLG2-200	2	200	1.0	171	111	330	364	F12	7	12.8
SLG2-300	2	300	0.9	171	151	330	364	F12	7	18.0
SLG2-400	2	400	0.7	210	175	330	367	F12	8	25.0
SLG2-500	2	500	0.55	241	175	330	365	F12	8	30.0
SLG2-600	2	600	0.5	302	175	330	367	F12	8	36.0
SLG2-800	2	800	0.45	410	175	330	367	F12	9	50.0
SLG2-1000	2	1000	0.33	475	175	330	367	F12	9	60.0
SLG2-1500	2	1500	0.25	400	350	345	382	F12	10	93.0
SLG2-2000	2	2000	0.22	490	350	345	382	F12	11	120
SLG2-3000	2	3000	0.14	710	350	345	382	F12	11	180

OPzV/OPzS

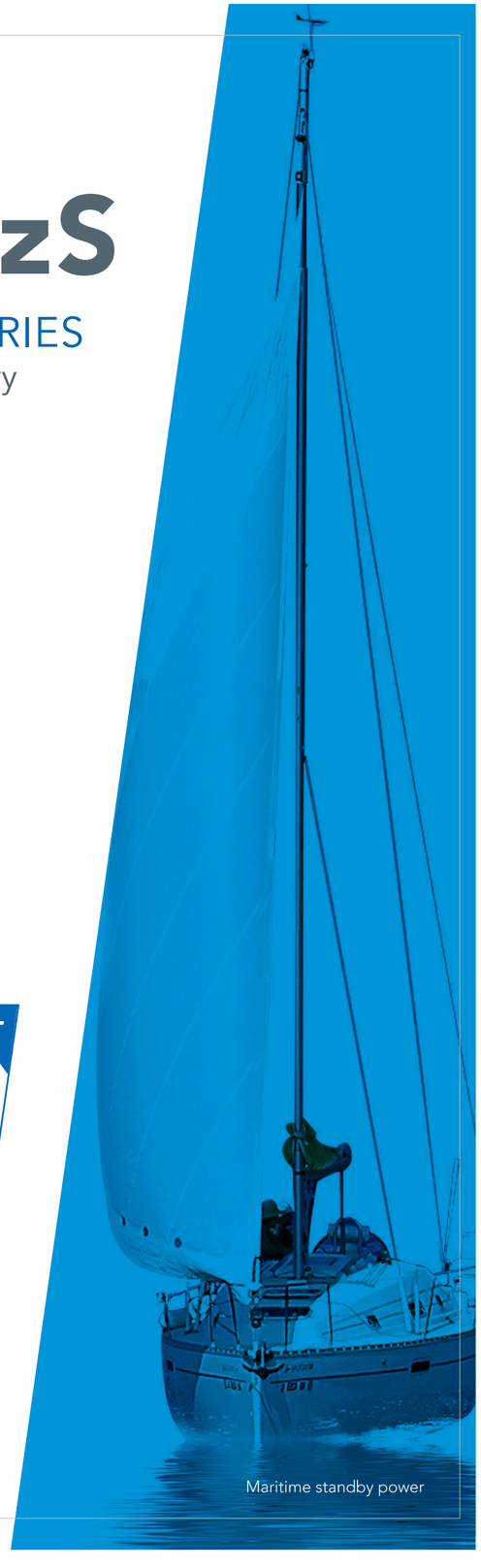
OPzV / OPzS BATTERY SERIES

Valve Regulated Lead Acid Battery

Product Features

+

- Capacity range: 200AH-3000AH
- Design life(25℃): 20 years
- Operation temperature: -40℃-60℃
- Voltage class: 2V
- Terminal type: F12
- Completely sealing throughout the batteries life.
- Minimum space required
- Easy to move and handle.
- Low self discharge rate, High charge receptive
- Excellent cycle life



Maritime standby power

OPzV/OPzS

OPzV / OPzS BATTERY SERIES

Valve Regulated Lead Acid Battery

Summary

OPzV & OPzS are tubular structure batteries, Specially used in harsh environment and large scale project. It can provide the longest service life of battery.

Applications

- Telecommunications
- Radio stations
- Emergency lighting systems
- Power stations
- Standby power
- Railway signalling
- Maritime standby power
- Process and control engineering
- Large UPS and computer back-up

Model	Voltage (V)	Capacity (Ah)	Internal Resistance (mΩ)	Dimensions(mm) (L)±1.5	(W)±1.0	(H)±2.0	(TH)±2.0	Terminal Type	Terminal Position	Weight (Kg)±5%
OPzV 200	2	200	0.9	103	206	355	390	F12	7	20.0
OPzV 250	2	250	0.85	124	206	355	390	F12	7	24.0
OPzV300	2	300	0.8	145	206	355	390	F12	7	28.0
OPzV350	2	350	0.75	124	206	471	506	F12	7	31.0
OPzV 420	2	420	0.65	145	206	471	506	F12	7	35.0
OPzV 500	2	500	0.55	166	206	471	506	F12	7	41.0
OPzV 600	2	600	0.45	145	206	646	681	F12	7	49.0
OPzV 800	2	800	0.35	191	210	646	681	F12	8	65.0
OPzV 1000	2	1000	0.3	233	210	646	681	F12	8	80.0
OPzV 1200	2	1200	0.25	275	210	646	681	F12	8	93.0
OPzV 1500	2	1500	0.22	275	210	796	831	F12	8	117
OPzV 2000	2	2000	0.18	397	212	772	807	F12	12	155
OPzV 2500	2	2500	0.15	487	212	772	807	F12	9	192
OPzV 3000	2	3000	0.13	576	212	772	807	F12	9	228
OPzS 200	2	200	0.9	103	206	355	410	F12	7	17.5
OPzS 250	2	250	0.8	124	206	355	410	F12	7	20.5
OPzS 300	2	300	0.7	145	206	355	410	F12	7	24.0
OPzS 350	2	350	0.65	124	206	471	526	F12	7	28.0
OPzS 420	2	420	0.55	145	206	471	526	F12	7	32.0
OPzS 490	2	490	0.5	166	206	471	526	F12	7	37.5
OPzS 600	2	600	0.45	145	206	646	701	F12	7	47.0
OPzS 800	2	800	0.3	191	210	646	701	F12	8	64.0
OPzS 1000	2	1000	0.26	233	210	646	701	F12	8	78.0
OPzS 1200	2	1200	0.22	275	210	646	701	F12	8	92.0
OPzS 1500	2	1500	0.2	275	210	796	851	F12	8	111
OPzS 2000	2	2000	0.16	397	212	772	827	F12	12	152
OPzS 2500	2	2500	0.13	487	212	772	827	F12	9	185
OPzS 3000	2	3000	0.12	576	212	772	827	F12	9	222

2V

2V BATTERY SERIES

Valve Regulated Lead Acid Battery

Product Features

+

- Capacity range: 100AH-3000AH
- Design life(25℃): 15-18 years
- Operation temperature: -15℃-50℃
- Voltage class: 2V
- Terminal type: F12, F13
- Stable quality & high reliability
- Long service life
- Excellent high rate discharge performance
- Maintenance-free operation
- Heavy duty grids
- Low self-discharge
- High specific energy density

Data center

2V

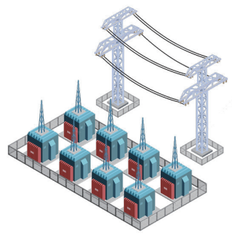
2V BATTERY SERIES

Valve Regulated Lead Acid Battery

Summary

Capacity range of this series is 200Ah-3000Ah, and the long service life also makes the battery widely used in large scale projects.

Applications



Power station

Traffic light system

Railway system

- Control systems
- Electric toys
- Emergency lamp
- Power tools
- Alarm systems
- Emergency light systems
- Large UPS
- Telecommunication system
- Firefighting equipment
- Railway system
- Power station
- Navigation aid signaling system

Model	Voltage	Capacity	Internal Resistance	Dimensions(mm)				Terminal Type	Terminal Position	Weight
	(V)	(Ah)	(mΩ)	(L)±1.5	(W)±1.0	(H)±2.0	(TH)±2.0			(Kg)±5%
SL2-100	2	100	0.8	171	72	205	210	F13	7	5.6
SL2-150	2	150	0.6	171	102	206	221	F13	4	8.0
SL2-200	2	200	0.9	171	111	330	364	F12	7	12.8
SL2-300	2	300	0.8	171	151	330	364	F12	7	18
SL2-400	2	400	0.6	210	175	330	367	F12	8	25
SL2-500	2	500	0.5	241	175	330	365	F12	8	30
SL2-600	2	600	0.45	302	175	330	367	F12	8	36
SL2-800	2	800	0.4	410	175	330	367	F12	9	50
SL2-1000	2	1000	0.3	475	175	330	367	F12	9	60
SL2-1500	2	1500	0.22	400	350	345	382	F12	10	93
SL2-2000	2	2000	0.2	490	350	345	382	F12	11	120
SL2-3000	2	3000	0.12	710	350	345	382	F12	11	180

FRONT TERMINAL

FRONT TERMINAL BATTERY SERIES

Valve Regulated Lead Acid Battery

Medical equipments

Product Features

+

- Capacity range: 50AH-180AH
- Design life(25℃): 12 years
- Operation temperature: -20℃-60℃
- Voltage class: 12V
- Terminal type: F13, F14
- Low self-discharge rate
- Excellent deep discharge recovery capability
- Sealed structure, no free liquid electrolyte
- Special lead paste formula and gel liquid electrolyte improve the charging acceptance ability

FRONT TERMINAL

FRONT TERMINAL BATTERY SERIES

Valve Regulated Lead Acid Battery

Summary

Special shapes of battery shells (long and narrow) and front terminal make battery with easier way for installation and maintenance in telecommunications system.

Applications

Control equipments

Medical equipments

ATM

- Telecom
- Control equipments
- UPS systems
- Emergency power systems
- Medical equipments
- Communication equipments

Model	Voltage (V)	Capacity (Ah)	Internal Resistance (mΩ)	Dimensions(mm) (L)±1.5	(W)±1.0	(H)±2.0	(TH)±2.0	Terminal Type	Terminal Position	Weight (Kg)±5%
SL12-50FT	12	50	7.5	277	106	221	221	F14	2	15.5
SL12-75FT	12	75	6.5	562	114	189	189	F14	2	24.5
SL12-100FT	12	100	5.5	506	110	224	239	F14	2	31.0
SL12-100AFT	12	100	5.5	395	110	286	286	F14	2	31.0
SL12-120FT	12	120	5.0	551	110	239	239	F13	2	36.0
SL12-125FT	12	125	4.5	436	108	317	317	F13	2	37.0
SL12-150FT	12	150	4.2	551	110	287	287	F13	2	48.5
SL12-180FT	12	180	4.0	546	125	317	323	F13	2	56.0

CHEMICAL REACTION IN VRLA BATTERY AS FOLLOWS

PbO_2 (Lead dioxide / Positive active Material) + $2H_2SO_4$ (Sulfuric acid / Electrolyte) + Pb (Spongy lead / Negative active Material) ⇄ (Discharge / Charge) $PbSO_4$ (Lead Sulfate / Positive active Material) + $2H_2O$ (Water / Electrolyte) + $PbSO_4$ (Lead sulfate / Negative active Material)

While battery is discharged, the concentration of sulfuric acid is gradually decreased and lead sulfate is formed under the reaction between lead dioxide of positive electrode, spongy lead of negative electrode and the sulfuric acid in the electrolyte. While charging,lead sulfate in the positive and negative electrode is transformed to lead dioxide and spongy lead, and with the separation of sulfuric ions, the concentration of sulfuric acid will increase.

During the last charging period of traditional lead acid battery, water is consumed by the reaction of hydrogen evolution. So it requires compensation of water. With the application of moist spongy lead, it promptly reacts with oxygen, which effectively controls the decrease of water.

It is same as the traditional batteries from the beginning of charge to before the final stage, but when it is over-charged and in the last period of charge, the electric power will start to decompose water, negative electrode will be in discharge condition because oxygen from the positive plate reacts with spongy lead of negative plate and sulfuric acid of electrolyte. That restrains the hydrogen evolution on the negative plates.

The part of negative electrode in discharge condition will transform to spongy lead while charging. The quantity of spongy lead formed from charging equals to the quantity of sulfate lead as the result of absorbing the oxygen from positive electrode, which keeps the balance of negative electrode, and also make it possible to seal battery.

Reaction after the final stage of charge and chemical equation as below:

Fig.3:Reaction From Beginning Of Charge To Before the Final Stage

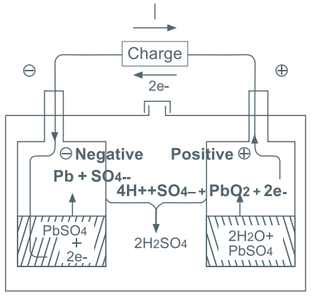
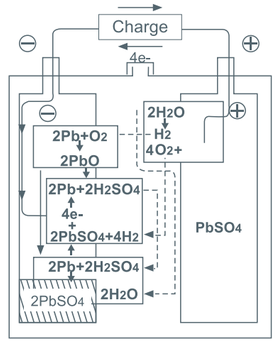


Fig.4:Reaction after final stage of charge:



As show, the positive electrode and the charge state of oxygen produced the negative electrode active material, rapid response to regenerate water, so the water little loss, so that the battery reaches the seal.

① $2H_2O \longrightarrow O_2 + 4H_2+ + 4e-$ (Reaction at positive plate) — Reaction at positive plate (oxygen generation)

② $2Pb + O_2 \longrightarrow 2PbO$ — Migrates to negative plate surface

③ PbO $2PbO + 2H_2SO_4 \longrightarrow 2PbSO_4 + 2H_2O$ (To reaction ①) — Chemical reaction of spongy lead with oxygen

④ **Reduction of $PbSO_4$** $PbSO_4 + 4H+ + 4e- \longrightarrow 2Pb+2H_2SO_4$ (To reaction② / To reaction ③) — Chemical reaction of pbo with electrolytes

$O_2 + 4H + 4e- \longrightarrow 2H_2O$ — Chemical reaction of pbo with electrolytes

MAINTENANCE

In order to prevent battery troubles, inspect the battery regularly in the following manner and keep records.

Monthly check			
What to inspect	Method	Stand spec	Measures in case of irregularity
Total battery voltage during float charge	Measure total voltage by voltmeter	Float charge voltage* number of batteries	Adjusted to the float charge voltage number of batteries
Half year check			
Total battery voltage during float charge	Measure total battery voltage by voltmeter of class 0.5 or better	Total battery voltage shall be product of float charge voltage with battery quanting	Adjust if the voltage value is outside standard
Individual battery voltage during float charge	Measure total battery voltage by voltmeter of lass 0.5 or better	Within 2.25±0.1V/cell	Contact us for remedy; Any battery showing errors greater than permissible value shall be repaired or replaced
Appearance	Check for damage or leakage at container and cover	Replaced by electric tank or roof without damage or leakage acid	If leakage is found verify the cause, for container and cover having cracks, the battery shall be replaced
	Check for contamination by dust, etc	Battery no dust pollution	If contaminated, clean with wet cloth.
	Check for rust in the cubicle, battery stand, connecting plates, connecting wires and terminals	Battery holder Plate Connecting cable Termination rust	Perform cleaning, rust preventive treatment, painting of touch up.
One-year inspection (following inspection shall be added to six-months inspection)			
Connecting parts	Tighten bolts and nuts	Checking (connecting screw stud books and torque)	

BATTERY CONSTRUCTION

Safety valve

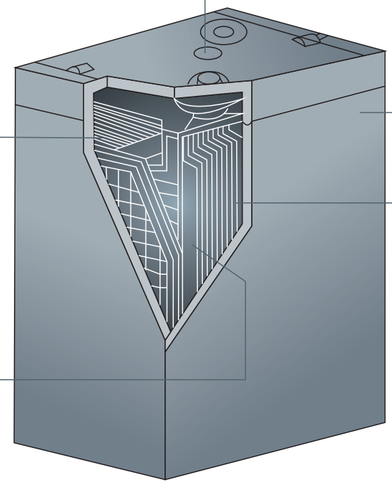
Synthesized with EPDM rubber and Teflon, the function of safety valve is to release gas when the internal pressure rises abnormally which can prevent water losses and protect battery from explosion by over-pressure and over-heat.

Electrolyte

Electrolyte is compounded with sulfuric acid, deionized water or distilled water. It takes part in the electrochemical reaction and plays as the medium of positive and negative ions in liquid and temperature between plates.

Grid

To collect and transfer current, grid-shape alloy (PB-CA-SN) plays a part of supporting active materials and distributing current in active materials equally.



Container&cover

Battery case includes container and cover. Container is used to hold positive and negative plates and electrolyte. Preventing impurities entering cells, cover also can avoid acid leakage and venting. Containing all materials relating charge and discharge, ABS and PP material are chosen as battery case because of their well performance in insulativity, mechanical strength, anticorrosion and heat resistance.

Separator

Separator in VRLA battery should consist of porous mass and adsorb massive electrolyte to make sure the free movement of electrolyte, positive and negative ions. As the carrier of electrolyte, separator also should prevent the short circuit between positive and negative plates. Providing the shortest distance for negative and positive electrode,separator prevents lead paste to be damaged and dropped, and prevents the contact between the cast and electrode even when the active materials is off the plates, It also can stop the spread and shift of hazardous substance. Glass fiber, as the normal and frequent choice, is characterized with strong adsorbability, tiny aperture, high porosity, large pore area, high mechanical strength, strong resistance to acid corrosion and chemical oxidizing.

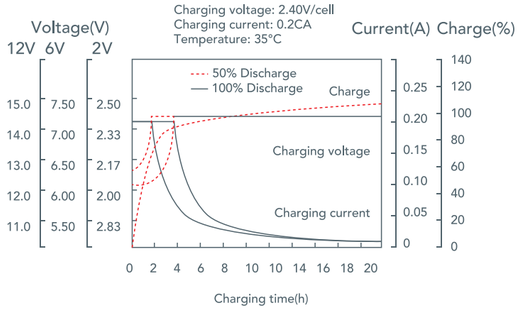
Charging
Characteristics /

- Floating charge voltage must be kept at a appropriate level to compensate self-discharge in batteries, which can keep the battery in a fully charged condition at all times. The optimum floating charge voltage for the battery is 2.25-2.30V per cell under normal temperature(25℃). When the electric power supply is not stable, the equalizing charge voltage for the battery is 2.40-2.50V per cell under normal temperature(25℃). But long time equalised charge should be avoided and less than 24 hours.
- The chart as below shows the charging characteristics at a constant current (0.1CA) and a constant voltage(2.23V/-cell) after discharge of 50% and 100% of the 10HR rated capacity. The time of fully charge varies by the discharge level, initial charge current and temperature. It will be recover 100% discharge capacity in 24 hours, if charging a fully discharging battery with constant current and constant voltage of 0.1CA and 2.23V respectively at 25℃. The initial charge current of battery is 0.1VA-0.3CA.
- For the VRLA storage battery, charging should be in constant voltage and constant current method.

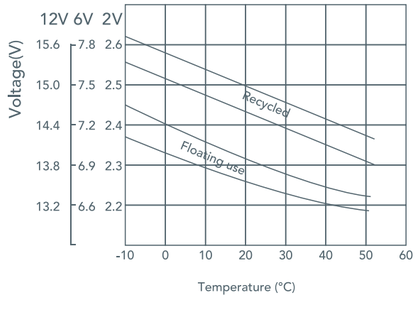
A: Charge of float battery
Charging voltage: 2.23-2.30V/cell (25°C) (suggest to set it at 2.25V/cell)
Max. Charging current: 0.3CA
Temperature compensation: -3mV/C.cell (25°C)

B: Charge of cycle battery
Charging voltage: 2.40~ 2.50V/cell (25°C) (suggest to set it at 2.25V/cell)
Max. Charging current: 0.3CA
Temperature compensation: -5mV/C.cell (25°C)

Charging characteristics curve as below:



The relationship between charging voltage and temperature:



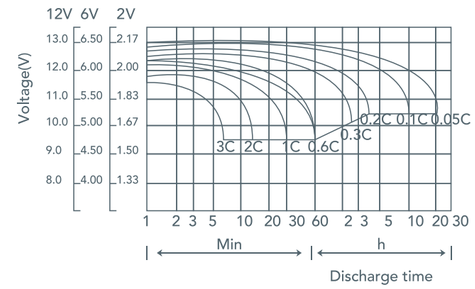
Discharge
Characteristics /

Discharge capacity

Right picture shows the curve:

Discharge capacity varies along with the change of discharge current(discharge rate), the smaller discharge current, the more the capacity increases; conversely, the larger the discharge current, the less the capacity.

Small size battery discharge curve:

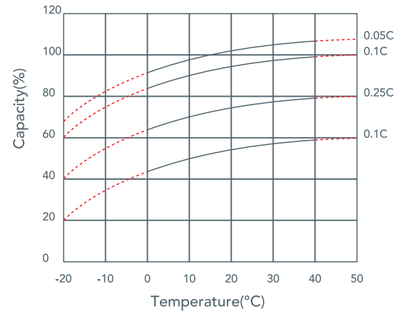


Temperature influences on capacity

Right picture shows the curve:

Discharge capacity increases as the temperature goes higher;

a lower temperature decreases the discharge capacity.



The relationship between the discharge current and the final voltage

In general, the final voltage is low in high current discharge, while in long time low current discharge, lead sulfate is formed on the electrode plates, which may cause distortion and shedding of active materials and bending of plates. So the final discharge voltage of small size battery should be sent higher to protect the battery.

Discharging a lead acid battery beyond the final discharge voltage (which is called over-discharged) must be avoided in practical applications. As above, over-discharged can only obtain very less additional capacity, but may damage the battery.

Recommended Discharge
Final Voltage Table As Below:

Discharge current	Discharge final voltage
< 0.1Ca	≥1.75V/cell
0.11~0.25Ca	≥1.70V/cell
0.26~1.0Ca	≥1.60V/cell
> 1.1Ca	≥1.40V/cell

Battery
Life /

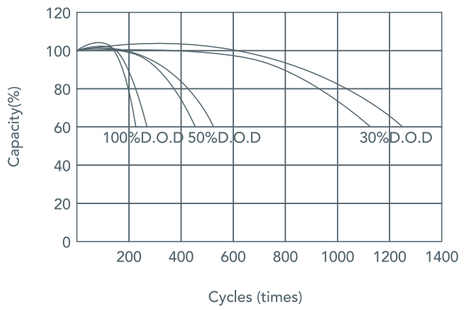
- The battery life of floating charge is influenced by discharge frequency, discharge depth, float charge voltage and service environment. The gas absorption mechanism described preciously can explain that the negative plates absorb the gas the generate in the battery and compound water at normal float charge voltage.Therefore, capacity will not decrease due to electrolyte depletion.

- Proper float charge voltage is necessary, because corrosion speed will be accelerated as the temperature rises that may shorter battery's life. Also the higher the charge current, the faster the corrosion. Therefore, the float charge voltage should always be set at 2.25V/cell, using a battery charger with voltage accuracy of 2% or better.

A Cycle life:

The cycle life of a battery depends on the depth of discharge(DOD), and the smaller the DOD, the longer the cycle life.

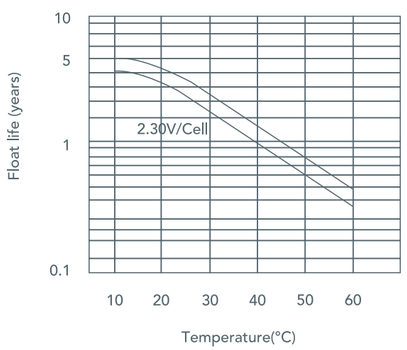
Cycle life curve as below:



B Standby life:

The float charge life is affected by temperature, and the higher the temperature , the shorter the float charge life. The design cycle life is based on 20°C.

Small size battery standby life curve as below:



Inspection&
Maintenance /

Storage:

The battery is delivered in a fully charged condition. Please note the points before installation as below:

A. Ignitable gases may be generated from the storage battery. Provide sufficient ventilation and keep the battery away from the sparks and naked flame.

B. Please check for any damage to the packages after arrival, then unpack carefully to avoid damage to the battery.

C. Unpacking at the installation location, please take out the battery by supporting the bottom instead of lifting the terminals. Attention that sealant may be disrupted if the battery is moved with force on the terminals.

D. After unpacking, check the quantity of the accessories and the exterior.

Inspection:

A. After verifying no abnormality in the battery, install it on the prescribed location (e.g. cubicle of battery stand)

B. If the battery is to be accommodated in a cubicle, place it at the lowest place of the cubicle whenever it is practicable. Keep at least 15mm distance between the batteries.

C. Always avoid installing the battery close to a heat source (such as a transformer)

D. Since s storage battery may generate ignitable gases, avoid installing close to an item that produces sparks (such as switch fuses).

E. Before making connections, polish the battery terminal to bright metal.

F. When a multiple number of the batteries are used, first connect the inner-battery in a correct manner, and then connect the battery to the charger or the load.

In these cases, the positive(+) of the storage battery should be securely connected to the positive(+) terminal of the charger or the load, and negative(-) to negative(-).

Damage to the charger may be caused by the incorrect connection between battery and charger. Make sure all connections are correct. The tightening torque for each connecting bolt and nut shall be in accordance with the below chart.

Applicable Bolts	Torque requirement
M5	2.0~4.0N*m(20~40kgf*cm)
M6	4.5~8.0N*m(45~80kgf*cm)
M8	11~13N*m(110~130kgf*cm)

Maintenance&
Operation /

▶ Cycle life

(1) The battery shouldn't be lower than the final discharge voltage.

(2) Please recharge the battery immediately if the battery is over discharging.

(3) The battery may be damaged if the discharge current is over 6C amps and the discharge time is more than 5 seconds.

▶ Charge

A.Float charge

Float charge voltage shall be maintained constant as the voltage.

The effect of too high or too low a floating charge voltage is as follows:

Too high for exceeded period(overcharge):it may shorten battery life.

Too low for exceeded period(undercharge): it may not meet load or cause variances in battery that will decrease the capacity of battery pack and shorten their life.

B.Recovery discharge

Recovery charge is achieve with the same voltage as floating charge , while initial charge current is 0.1C~0.3CA.

C.Temperature compensation

When the temperature deviates from 25℃, please modify the voltage as 3mv/cell for every 1℃ deviation.

D.The equalizing charge

The equalizing charge voltage is 2.3~2.35V/cell.

E.Caution during charge

(a) If the charge current exceeds 0.05CAat the final stage of charge, the battery may be permanently damaged in appearance and life. Pay special attention to charging voltage.

(b) The battery charger should be the one that can provide automatic constant voltage with drooping characteristics, if other types will be used, please contact us before applied.

▶ Storage

A.When you wish to store the battery, battery should be store without charger and load at dry location with low temperature.

B.If batteries are store for a long period, give a supplementary charge before use.

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▶ Cautions

A. Do not use vacuum cleaner and dry cloth(especially chemical fiber) but damp cloth to clean the battery, in order not to cause any static electricity and danger. Keep the battery away from organic solvents, such as gasoline.

B. A storage battery may generate ignitable gases, avoid placing near a naked flame or short-circuiting the battery.

C. Do not attempt to dismantle the storage battery. If sulfuric acid splashes on skin or clothes due to mechanical damage, rinse immediately with water, If splashed into the eyes wash with a large amount of fresh water and get treatment immediate.

D. It is very dangerous to throw battery into fire, avoid such conduct at all times.

E. A ventilation opening is required when the storage battery is operated in a cubicle or case containing the battery should be provided with sufficient ventilation.

F. One may get electric shock if touch an electrical conductor, Be sure to wear rubber gloves before inspection or maintenance work.

G. Please take rust proof conduction on the battery connectors.

H. Theoretically operating temperature is -15 - 45℃, but operating under 15 - 25℃ is recommended for longer service life.

I. Please contact us before using 4 or more batteries in parallel.

J. Mixed use of batteries with different capacities, different histories and of different manufacturer is liable to cause damage to the battery or the equipment,consult with us if such necessity is present.