Catalogue & Brochure 2011

of

Industrial Batteries

G & P BATTERY CO.,LIMITED

2011

◆ G & P BATTERIES BRIEF

G & P Batteries has been a leading force in the lead acid battery business for over 39 years. Our Company has thrived due to our commitment to provide high quality cost effective batteries, backed by a level of service that is second to none.

We pride ourselves on our flexibility and ability to act quickly in bringing new industry leading products to market. We are proud to hold ISO 9001, TS16949, UL, CE and Soncap certification covering all aspects of our organization.

G & P Batteries has four Main Business sectors: Automotive Batteries; Motorcycle Batteries, Industrial SLA batteries and Motive Batteries. we have been supplying more than 70 countries and regions all range of lead acid batteries which meet JIS, DIN, BCI or Australian specifications.

So come on in and see why we are known so highly throughout the world.

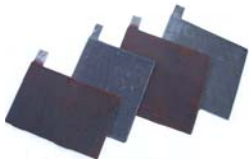
Main Products

Automotive Battery

Motorcycle Battery

Industrial Battery

Motive Battery



Battery Plates

Certificates & Approvals

◆ INDUSTRIAL BATTERIES

What's advantage of G & P industrial batteries?

Higher Reliability and Quality

Throughout the whole manufacturing process, PPM and ISO9001 are carried out to make sure that the product reliability and defect ratio meet with the PPM standard.

Reliable Construction

The extra strong construction ABS container reduces case bulging and plate warping, ensuring long life and high performance.

Higher Power Density

A special assembly technology is used to enhance power density to a considerable level.

Valve regulating

Perfect venting system, which operates under low pressure, is designed to release excess gas and keep the internal pressure within the optimum range of safe and efficient performance.

Excellent Recovery from Deep Discharge

Unique technical processes are used into the grid alloy and electrolyte additives, so that the battery can be recharged easily to a normal level even after being over-discharged.

Living Up to Prevailing Standards

The batteries live up to standards JIS, DIN, BS and IEC.

Applications

Cyclic applicaions

Lighting equipment

Power tools

Electronic bikes and scooter

Medical equipment;

Portable radio and tv

Toys & hobbies

Vacuum clearners

Standby applicaions

Emergency lighting

Security & burglar system

Tel & communictiaons equipment

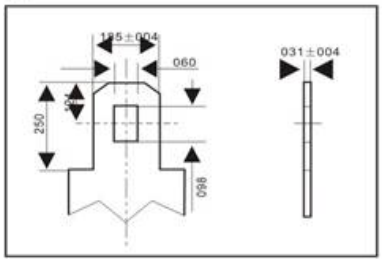
Fire alarm system

Computer terminal

Ups/CVCF

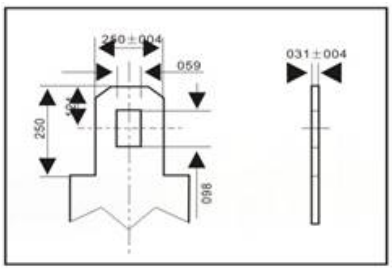
Electronic equipment

Battery Terminal



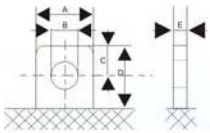
F1

INCH	MM
.250	6.35
.185	4.70
.124	3.15
.098	2.50
.060	1.52
.031	0.79
.004	0.10



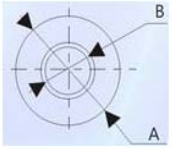
F2

INCH	MM
.250	6.35
.124	3.15
.098	2.50
.031	0.79



Measurement:MM

Type	A	B	C	D	E
L1	12.0	5.5	4.8	12.0	2
L2	17.0	5.5	6.5	13.5	7
L3	15.0	6.5	7	14.0	7
L4	18.0	6.5	6	15.0	6
L5	17.0	6.5	8	16.0	8
L6	19.0	6.5	7.5	19.0	7
L7	18.0	8.5	8.5	18.5	8
L8	22.0	8.5	11	18.0	8
L9	25.0	8.5	12	30.0	8
L10	27.0	9.5	11	28.0	8
L11	28.0	10.0	11	28.0	10
L12	27.0	10.0	12	33.0	10



Type	A	B
C1	ø12	M6
C2	ø14	M8
C3	ø16	M8
C4	ø20	M8

『INDUSTRIAL BATTERIES---GENERAL APPLICATIONS』

TYPE	Rated Voltage (V)	Rated Capacity (AH)	Approx.dimensions(mm)								Approx Weight (kg)	Battery Terminal
			Leight		Width		Height		Total Height			
			mm	in	mm	in	mm	in	mm	in		
FM1.3-6	6	1.3	97	3.82	24	0.94	52	2.05	58	2.28	0.30	F1
FM2.8-6	6	2.8	67	2.64	34	1.34	100	3.94	105	4.13	0.61	F1
FM3-6	6	3	125	4.92	33	1.30	60	2.36	65	2.56	0.68	F1
FM3.2-6	6	3.2	66	2.60	33	1.30	115	4.53	120	4.72	0.70	F1
FM3.4-6	6	3.4	134	5.28	34.5	1.36	60	2.36	65	2.56	0.71	F1
FM4A-6	6	4	70	2.76	47	1.85	100	3.94	105	4.13	0.68	F1
FM4B-6	6	4	70	2.76	47	1.85	105	4.13	105	4.13	0.68	F1
FM4.2-6	6	4.2	70	2.76	47	1.85	100	3.94	105	4.13	0.73	F1,F2
FM4.5-6	6	4.5	70	2.76	47	1.85	100	3.94	105	4.13	0.80	F1,F2
FM5-6	6	5	70	2.76	47	1.85	100	3.94	105	4.13	0.86	F1,F2
FM7-6	6	7	151	5.94	34	1.34	95	3.74	100	3.94	1.35	F1,F2
FM10-6	6	10	151	5.94	51	2.01	95	3.74	100	3.94	2.00	F1,F2
FM12-6	6	12	151	5.94	51	2.01	95	3.74	100	3.94	2.20	F1,F2
FM200A-6	6	200	323	12.72	178	7.01	224	8.82	250	9.84	36.00	L12
FM200B-6	6	200	398	15.67	178	7.01	215	8.46	250	9.84	36.00	L12
FM1.3-12	12	1.3	97	3.82	43	1.69	51	2.01	56	2.20	0.58	F1
FM2.0-12	12	2	178	7.01	35	1.38	61	2.40	65	2.56	0.90	F1
FM2.3-12	12	2.3	70	2.76	47	1.85	101	3.98	105	4.13	0.92	F1
FM2.6-12	12	2.6	178	7.01	35	1.38	61	2.40	65	2.56	1.20	F1
FM2.8-12	12	2.8	66	2.60	66	2.60	98	3.86	103	4.06	1.20	F1
FM3.2-12	12	3.2	134	5.28	67	2.64	60	2.36	65	2.56	1.40	F1
FM4-12	12	4	90	3.54	70	2.76	101	3.98	107	4.21	1.60	F1,F2
FM5-12	12	5	90	3.54	70	2.76	101	3.98	107	4.21	1.80	F1,F2
FM6-12	12	6	151	5.94	65	2.56	95	3.74	100	3.94	2.00	F1,F2
FM7-12	12	7	151	5.94	65	2.56	95	3.74	100	3.94	2.20	F1,F2
FM7.2-12	12	7.2	151	5.94	65	2.56	95	3.74	100	3.94	2.30	F1,F2
FM7.5-12	12	8	151	5.94	65	2.56	95	3.74	100	3.94	2.40	F1,F2
FM9-12	12	9	151	5.94	65	2.56	113	4.45	118	4.65	3.80	F1,F2
FM10-12	12	10	151	5.94	98	3.86	95	3.74	100	3.94	3.60	F1,F2
FM12-12	12	12	151	5.94	98	3.86	95	3.74	100	3.94	4.20	F1,F2
FM18-12	12	18	181	7.13	76	2.99	167	6.57	167	6.57	6.10	L1,M6
FM26-12	12	26	175	6.89	165	6.50	125	4.92	125	4.92	9.00	L1,M6
FM33-12	12	33	196	7.72	131	5.16	171	6.73	175	6.89	11.70	L2,M6
FM40-12	12	40	197	7.76	165	6.50	170	6.69	170	6.69	14.00	L4,M6
FM55-12	12	55	229	9.02	138	5.43	208	8.19	227	8.94	18.00	L6,M6
FM65-12	12	65	350	13.78	166	6.54	175	6.89	175	6.89	22.50	L8,M8
FM70-12	12	70	260	10.24	169	6.65	208	8.19	227	8.94	25.00	L8,M8
FM90-12	12	90	306	12.05	169	6.65	208	8.19	236	9.29	29.00	L8,M8
FM100-12	12	100	331	13.03	173	6.81	214	8.43	242	9.53	31.00	L9,M8
FM120A-12	12	120	408	16.06	174	6.85	211	8.31	241	9.49	32.50	L11
FM120B-12	12	120	331	13.03	173	6.81	214	8.43	242	9.53	32.50	L9,M8
FM150-12	12	150	484	19.06	171	6.73	241	9.49	241	9.49	52.00	L11
FM200-12	12	200	522	20.55	240	9.45	218	8.58	244	9.61	65.00	L11
FM230-12	12	230	520	20.47	269	10.59	203	7.99	230	9.06	74.00	L11
FM7-24	24	7	200	7.87	97	3.82	95	3.74	99	3.90	5.00	F1,F2
FM10-24	24	10	200	7.87	97	3.82	133	5.24	137	5.39	7.50	F1,F2
FM12-24	24	12	301	11.85	98	3.86	95	3.74	100	3.94	8.80	F1,F2

『INDUSTRIAL BATTERIES---DEEP CYCLE APPLICATIONS』

TYPE	Rated Voltage (V)	Rated Capacity (AH)	Approx.Dimensions(mm)								Approx Weight (kg)	Battery Terminal
			Leight		Width		Height		Total Height			
			mm	in	mm	in	mm	in	mm	in		
DC7-12	12	7	151	5.94	65	2.56	95	3.74	100	3.94	2.2	F2
DC12-12	12	12	151	5.94	98	3.86	95	3.74	105	4.13	4.1	F2
DC14-12	12	14	151	5.94	98	3.86	105	4.13	105	4.13	4.4	F2
DC22-12	12	22	180	7.09	76	2.99	167	6.57	167	6.57	6.7	M6
DC24-12	12	24	180	7.09	79	3.11	171	6.73	171	6.73	7.0	M6
DC35-12	12	35	196	7.72	131	5.16	171	6.73	175	6.89	12.5	M6
DC40-12	12	40	197	7.76	165	6.50	170	6.69	170	6.69	14.0	M6
DC50-12	12	55	229	9.02	138	5.43	208	8.19	227	8.94	17.0	M6
DC70-12	12	70	260	10.24	169	6.65	208	8.19	227	8.94	22.2	M8
DC90-12	12	90	306	12.05	169	6.65	208	8.19	236	9.29	27.0	M8
DC100-12	12	100	331	13.03	173	6.81	214	8.43	242	9.53		M8
DC120-12	12	120	408	16.06	174	6.85	211	8.31	241	9.49		M8
DC150-12	12	150	484	19.06	171	6.73	241	9.49	241	9.49		M8
DC200-12	12	200	522	20.55	240	9.45	218	8.58	244	9.61		M8

『INDUSTRIAL BATTERIES---FRONT ACESS APPLICATIONS』

TYPE	Rated Voltage (V)	Rated Capacity (AH)	Approx.Dimensions(mm)								Approx Weight (kg)	Battery Terminal
			Leight		Width		Height		Total Height			
			mm	in	mm	in	mm	in	mm	in		
FA55-12	12	55	278	10.94	106	4.17	223	8.78	223	8.78	17.3	M6
FA80-12	12	80	562	22.13	114	4.49	188	7.40	188	7.40	26.7	M6
FA95-12	12	95	395	15.55	106	4.17	266	10.47	266	10.47	29.2	M6
FA100-12	12	100	508	20.00	111	4.37	227	8.94	238	9.37	32.9	M8
FA110-12	12	110	395	15.55	110	4.33	286	11.26	286	11.26	33.6	M8
FA125-12	12	125	550	21.65	110	4.33	240	9.45	240	9.45	36.4	M8
FA160-12	12	160	550	21.65	110	4.33	287	11.30	287	11.30	46.1	M8
FA175-12	12	175	560	22.05	125	4.92	317	12.48	317	12.48	54.4	M8

『INDUSTRIAL BATTERIES---GFM STATIONARY APPLICATIONS』

TYPE	Rated Voltage (V)	Rated Capacity (AH)	Approx.Dimensions(mm)								Approx Weight (kg)	Battery Terminal
			Leight		Width		Height		Total Height			
			mm	in	mm	in	mm	in	mm	in		
GFM100-2	2	100	171	6.73	72	2.83	205	8.07	230	9.06	6.0	L11
GFM200-2	2	200	173	6.81	111	4.37	329	12.95	365	14.37	16.0	L12
GFM300-2	2	300	171	6.73	151	5.94	330	12.99	362	14.25	24.0	L12
GFM400-2	2	400	211	8.31	176	6.93	329	12.95	367	14.45	32.0	L12
GFM500-2	2	500	241	9.49	172	6.77	331	13.03	366	14.41	36.0	L12
GFM1000-2	2	1000	475	18.70	175	6.89	328	12.91	365	14.37	72.5	L12
GFM1500-2	2	1500	401	15.79	351	13.82	342	13.46	378	14.88	115.0	L12
GFM2000-2	2	2000	491	19.33	351	13.82	344	13.54	383	15.08	152.0	L12

『SERVICE CENTER --- INDUSTRIAL BATTERIES』

Battery Charging

Correct battery charging ensures the maximum possible working life for the battery. There are four major methods of charging:

Constant Voltage Charging.

Constant Current Charging.

Two Stage Constant Voltage Charging.

Taper Current Charging.

Constant Voltage Charging

This is the recommended method of charging for VRLA batteries. It is necessary to closely control the actual voltage to ensure that it is within the limits advised.

Float Service: 2.25-2.30 Vpc at 25℃ .

Cycle Service: 2.40-2.45 Vpc at 25℃ .

We suggest that the initial current be set within 0.4C20 A. The attached Figure indicates the time taken to be fully recharged. It should be noted that the graph illustrated is for a fully discharged battery, i.e; a battery that has reached the minimum cell voltage recommended for its discharge time. As shown on the graph,it is necessary to charge a greater amount of energy into the battery than was taken out of the battery on discharge. The actual current indicating that the battery is fully charged is approx 5mA/Ah under charging voltage is 2.30Vpc.

Constant Current Charging

This method of charging is generally not recommended for SLA batteries. It is necessary to understand that if the batteries are not removed from the charger after full charged, considerable damage will occur due to overcharging.

Two Stage Constant Voltage Charging

This method should not be used when the battery and load are connected in parallel. If this method is to be used, it is suggested that technical department is contacted

Taper Current Charging

This method is not recommended for VRLA batteries. However, if this method is to be used, it is suggested that the technical department is contacted

Effect of Temperature on Charging Voltage

As temperature rises, electrochemical activity in a battery increases; otherwise, as temperature falls, electrochemical activity decreases. Therefore, as temperature rises, charging voltage should be reduced to prevent overcharge,and increased if temperature falls to avoid undercharge. In general, to assure optimum service life, a temperature compensated charger is recommended. The recommended compensation factor for batteries is -3mV/oC/Cell (stand by) and -5mV/oC/Cell (cyclic use). The standard center point for temperature compensation is 25℃. Figure 1 shows the relationship between temperatures and charging voltages in both cyclic and standby applications.

Effect of Voltage on Battery Gassing

Though the batteries are of the recombination type and the amount of gassing at normal operation is negligible, if the charging voltage increased, gassing will occur despite the recombination design of the product. Gassing does not normally occur while the battery operating under float conditions and normal constant voltage recharge of 2.25-2.30 Vpc at 25℃. Very little gassing occurs when the battery recharged under normal cycling recharge procedures. However, it can be seen on the accompanying graph the higher voltages that this especially under conditions of constant current charging will substantially increase gassing.

Discharge characteristic

The discharge capacity of a lead acid battery varies and is dependant on the discharge current. G & P batteries use a rate at the 20 hour rate. i.e.the capacity of the battery at 20 hours discharges to an end voltage of 1.75 Vpc at a temperature of 25℃.

General Comments

The discharge curves show the minimum design parameters for each fully charged battery after installation. Full capacity is reached after some initial service.

Float Service.

One month after installation and recharging.

Cycle Service.

Within three to five cycles after initial charge and service entry.

Technical Terms

1. Battery capacity for small batteries by accepted convention worldwide is described in "AMPERE HOUR" at the 20-hr when discharged at 25℃. i.e. a FM4.5-12 is 4.5 Ah at C20 that means the battery will deliver 0.225 amps current for 20 hours to a final voltage of 1.75 volts per cell (10.5 volts per battery).

2. Final voltage is the volts per cell to which a battery may be discharged safely to maximize battery life. This data is specified according to the actual discharge load and run time. As a rule of thumb, high amp loads and short run times will tolerate a lower final voltages (eg. 3C at 1.3V/C), whereas a low amps long run time discharge will require a higher final voltages (eg. 0.05C at 1.75V/C).

Battery Selection

The battery discharge graph(Figure 2) may be utilized in battery selection. However, it is suggested that a review be made of the data sheet for each battery type or the chart showing the actual capacity of each battery type at various discharge times.

Effect of Temperature on Battery

The nominal battery capacity is based on the temperature of 25℃. Above this temperature, the capacity increases marginally but it must be noted that the working battery should be kept within the temperature design limitations of the product.

Below 25℃, the capacity decreases. This decrease in capacity becomes more prominent at temperatures below zero and in heavy discharge rates(Chart 1). illustrates the situation and the decrease in capacity with the decrease in operating temperature. Temperature must be taken into capacity design calculations in applications where the operating temperature of the system is below 20℃ .

	Battery Temperature											
Discharging Time												
	-15℃	-10℃	-5℃	0℃	5℃	10℃	15℃	20℃	25℃	30℃	35℃	40℃
10min	0.46	0.52	0.58	0.65	0.71	0.78	0.85	0.93	1	1.07	1.15	1.22
1hr	0.59	0.64	0.69	0.74	0.8	0.85	0.9	0.95	1	1.05	1.09	1.14
20hr	0.71	0.75	0.79	0.82	0.86	0.9	0.93	0.97	1	1.03	1.06	1.08

Charge characteristics

The cells in the product range must be charged at a constant voltage at an ambient temperature of 25℃, the batteries should be charged at 2.27-2.30 volts per cell. It is not necessary to limit the current, as this will be governed by the maximum output available from the charger until the voltage limit is reached. The charging voltage of 2.27-2.30 volts should also be used for float charging. To achieve nominal performance characteristics, it is recommended to adjust this value to suit the ambient temperature, as indicated in the following table:

Under these

Fast recharge:

Increasing the charge voltage to 2.40 Volts per cell can reduce recharge time and it is possible, depending on the depth of discharge, to halve the recharge time. Under these conditions, however, the charge must be monitored and must be terminated when the charge current remains steady for 3 hours after the voltage limit has been reached. At the beginning of charge the current must be limited to 0.4C20 (A).

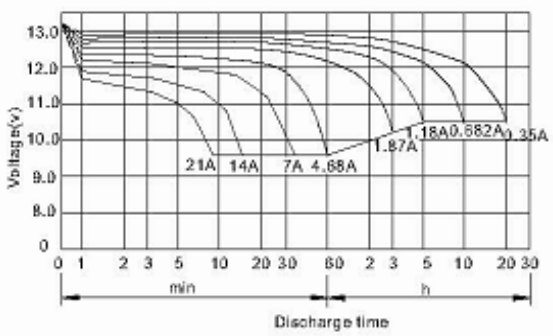
Ripple current:

The rippl charging current affects battery life. We recommend to limit the continuous ripple current to 0.05C20A(never exceed 0.10C20). Transient and other ripple type voltage excursions can be accommodated provided that, with the battery disconnected, the system peak to peak voltage including regulation limits falls within 2.5% of the recommended float voltage.

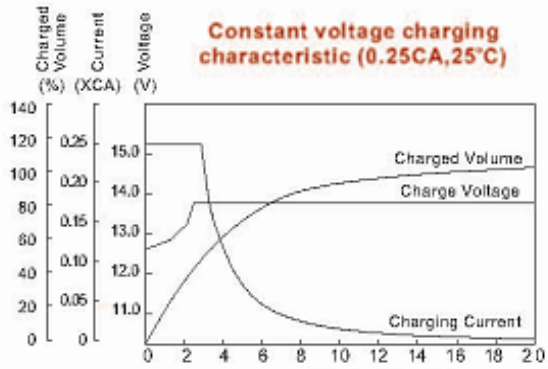
「SERVICE CENTER --- INDUSTRIAL BATTERIES」

Technical Curves & Characteristics

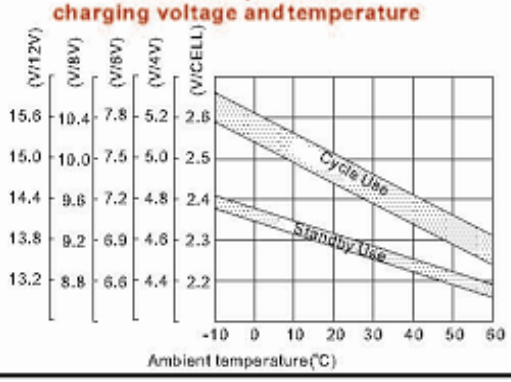
Discharge characteristic (25°C)



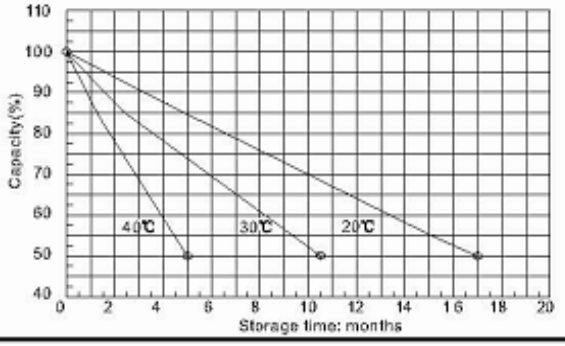
Constant voltage charging characteristic (0.25CA,25°C)



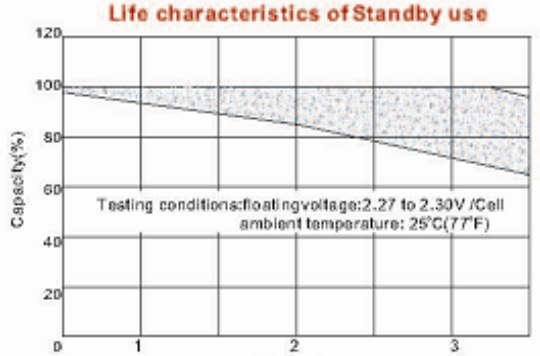
Relationship between charging voltage and temperature



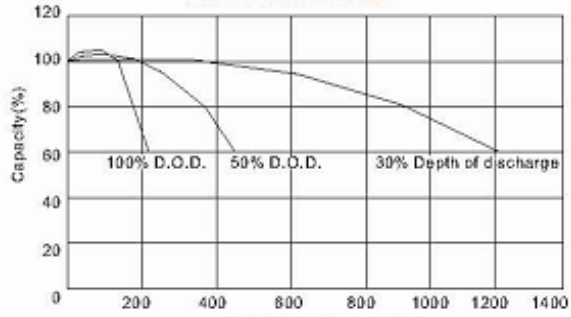
Self-discharge characteristic



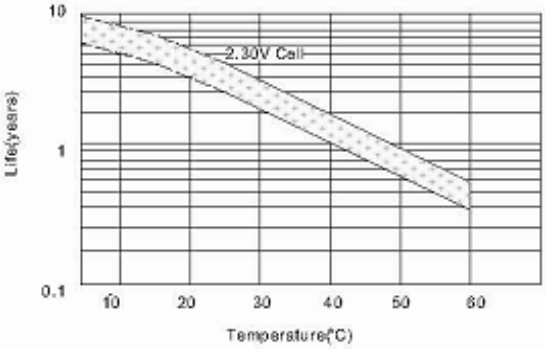
Life characteristics of Standby use



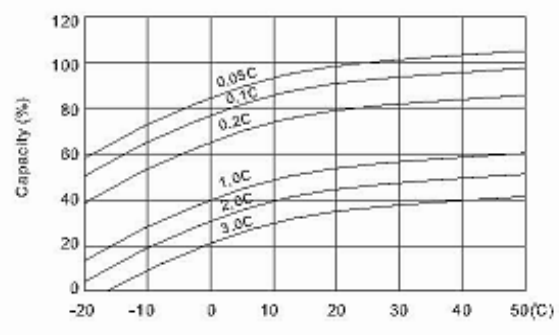
Cycle service life in relation to depth of discharge



Temperature effects on float life



Temperature effects on capacity



『SERVICE CENTER --- INDUSTRIAL BATTERIES』

Product Standards & Storage

Our batteries meet with DIN, IEC & BS6290-4 standards. We have ISO9001 certification and CE & UL approval (MH19451) for all types of batteries. All these render our batteries to be compatible with requirements of world-level equipments.

Shipment and Storage

When Moving batteries, suitable mechanical handing aids should be used, Never drag or roll the battery since damage would be caused;
Do not touch the battery terminals or the safety value during handling;
The batteries are fully charged before shipment; and prevent any shortout

Storage Conditions:

The batteries should be stored away from any moisture or souce of heat.

Storage times:

The self-discharge of batteries as a function of temperature is as follows:

3% per month at 20℃;

6% per month at 30℃;

10% per month at 40℃;

To ensure that the battery be charged easily and kept in good performance after a long period of storage, it is recommended that batteries should not be stored for more than the following period without recharging;
06 months at 20℃;

04 months at 30℃;

02 months at 40℃;

Fairure to comply with these suggestions may compromise the batterylife.

Determining the state of charge of the battery

The state of charge of the battery could be determined by measuring the off-load voltage after the battery has been allowed to rest for 24hrs. And to keep storage area clear, dry and ventilated

% capacity at 20℃	0℃	10℃	20℃	30℃	40℃
100%	2.16	2.15	2.14	2.13	2.13
80%	2.09	2.09	2.09	2.09	2.09
60%	2.06	2.06	2.06	2.06	2.06
40%	2.02	2.02	2.02	2.02	2.02
20%	1.97	1.97	1.97	1.97	1.97

Recharging stored batteries

The batteries should be recharged at the float voltage of 2.27-2.30 volts at 25℃ per cell for a minium period of 24hrs; The batteries be full charged if the charging current remianed constant for 3 hrs.

Maintenance

The performance and service life of battery be optimized by keeping the following guidelines: Do not use battery in totally sealed space. Keep batteryroom ventilated; To recharge the battery promptly after discharging, Never be stored in a discharged state. Recommend Ambient operation temp.from 20℃ to 25℃ to extend lifespan. Fasten the battery connections firmly and use shock absorber to protect it from unusual vibrations & shocks during service. Supply minimum free air space, the distance between batteries is 5mm to 10mm in connecting. Avoid mixed use of batteries with different capacities, ages and makers, because the uneven characteristics could damage the battery or equipment. To achieve long service life, insulator, plastics or rubber necessary between battery and rack where the D.C input exceed 60 volts. Also, maintain the greater resistance than one Megaohm between battery and rock in addition to incorporating some alarm circuit to detect any electric leak. Replace the battery that has the abnormal performance, the crack and deformation of case, electrolyte leakage. Recharge the battery that has been over -discharged in very low current for many times as soon as possible.

Installation

1. Initial preparation before installation: Verify no abnormalities on battery case (like crack of leakage).

2. Free air space must be provided between each battery. Minimum space 5¡ª10mm (0.02¡ª0.03 inch) is necessary.

3. Choose a proper mounting placer:

------Away from heat source (such as a transformer). Otherwise, battery temperature will be raised and shorten battery life. Optimal temperature is 20℃/68oF.
------Located in the lowest part of the equipment.

------Away from device that may cause sparks (such as switch or fuse), because battery may generate inflammable gases during overcharge.

------Do not place near open flame.

------our battery designed to be used in any position, but charging in upside-down position should be avoided. Otherwise, leakage of electrolyte from safety vents may occur during excessive charge.
------Do not put batteries into airtight containers to release gas generated from excessive charge and avoid explosion.

Provide enough insulation on lead wires and connectors.

Set the batteries firmly in the equipment. Otherwise, batteries may be damaged, or connection conductively may be decreased due to shock.
When batteries are used in ibration conditions, they shall be mounted in upright position and with proper cushion for protecting vibration.
For applications require more than one battery, first make the inter-battery connections properly, then connect the batteries to the charger or the load. Before connection, switch off the circuit of the charger/ load. Be careful to connect the positive (+) battery terminal to the (+) pole of the load/charger. Wrong connection will result in explosion, fire and / or damage of the charger/ loading equipment and the battery. Pay attention to the high voltage when a large number of batteries are connected in series. Be sure to wear rubber gloves before installation of maintenance. If 4 or more battery groups are to be used in parallel connection, consult us first.
Avoid mixed usage of batteries differing in capacity, manufacturer, storage or charge/ discharge conditions. Batteries may be damaged after cycles due to difference in electrical characteristics.

Cautions

The performance and service life of battery can be optimized by keeping the following guidelines:

Do not use in totally sealed space. The adequate ventilation equipment should be constructed in that space.

To obtain maximum life, take attention to recharge the battery promptly after discharging. Never be stored in a discharged state.

Ambient operation temperature permits in the range of --15℃ to 50℃, but 20℃ to 25℃ would extend life span.

Fasten the battery connections firmly and use shock absorber to protect it from unusual vibrations and shocks during service.

Supply minimum free air space, the distance between batteries is 5mm to 10mm (0.02inch to 0.04inch) in connecting.

Avoid mixed use of batteries with different capacities, ages and makers, because the uneven characteristics could cause damage to the battery or the equipment.
For long service life, insulator, plastics or rubber necessary between battery and rack where the D.C input exceed 60 volts. Also, maintain the greater resistance than one Megaohm between battery and rock in addition to incorporating some alarm circuit to detect any electric leak.

Replace the battery that has the abnormal performance, the crack and deformation of case, electrolyte leakage.

Recharge the battery that has been over-discharged in very low current for many times as soon as it is over-discharged.