ISO14001 ISO9001 ISO45001

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Publication No: LB-GEL-EN-V4.2-202601

Stock Code:00842.HK

LEOCH BATTERIES

VRLA-GEL BATTERY

VRLA-GEL BATTERIES

- LPG SERIES– GENERAL PURPOSE GEL
- LPFG SERIES– FRONT TERMINAL GEL
- LPCG SERIES– DEEP CYCLE GEL

LEOCH®
LEOCH BATTERY

About LEOCH BATTERY

Established in 1999, LEOCH BATTERY (stock code: 00842.HK) is a globally recognized leader in power solutions.

Our headquarter is located in the dynamic business hub of Singapore, where we actively contribute to the development of various international industrial standards.

With an extensive global presence, LEOCH BATTERY operates 21 state-of-the-art manufacturing facilities spanning a total area of 2 million square meters. Our global footprint includes over 80 local service companies, and we are proud to be a home to a dedicated workforce of 15,000 employees, including more than 1,500 highly skilled R&D and technical experts.

LEOCH BATTERY is your trusted partner for industrial and commercial energy storage solutions. Our expertise covers every aspect of the industry, from cutting-edge research and development to top-notch manufacturing, robust sales, and comprehensive services. We proudly serve clients in over 150 countries and regions worldwide.

At LEOCH BATTERY, we specialize in delivering tailored power solutions for a wide spectrum of industrial and commercial applications across the globe. Our product and service portfolio is strategically designed to meet the diverse needs of our clients, including:

--Energy Storage Systems
--Telecom & Data Centre Power Solutions
--Starting Power Solutions
--Motive Power Solutions
--Battery Recycling

With a commitment to excellence, innovation, and sustainability, LEOCH BATTERY is dedicated to empowering businesses around the world with reliable, cutting-edge power solutions.

PRODUCTION BASES


Jiangsu


Zhaoqing


Anhui UPLUS


Anhui


Malaysia


India Ⅰ,Ⅱ


Anhui Dahua


Jiangsu Ⅱ


Vietnam Ⅰ,Ⅱ,Ⅲ


Anhui Lithium


Malaysia Ⅱ,Ⅲ


Mexico Ⅰ,Ⅱ

Global Leader in Battery Manufacturing

21
Production Bases

3000+
Products Categories

150+
Countries and Regions

15000+
Employees Worldwide

LEOCH VRLA-GEL BATTERY FEATURES

INTRODUCTION

LEOCH VRLA Gel batteries are based on true gel technology which has more than a half century experience. This type of battery contains gel electrolyte primarily produced by the homogeneous distributed SiO_2 in a diluted sulfuric acid named gel SOL with thixotropic properties. The special designed vent valves are also used to control the gassing and water losing rate. Since no maintenance is required and valve regulated, they are classified as one type of VRLA batteries (The other type is VRLA-AGM batteries). After 5 years of development, LEOCH now has built up two series and 40 gel battery models, from 2V to 12V in the voltage range, and from 24Ah to 3500 Ah in the capacity range, which can be used for general purpose application (named as LPG Series) and Telecom/UPS application with front terminal (named as LPFG Series). LEOCH can produce batteries from scratch and is capable of engineering tools and molds upon customer's special requests.

FUNDAMENTAL BASICS OF VRLA GEL BATTERIES:

What is gel?

Gel is usually produced by homogeneous dispersion of pyrogenic silica in diluted sulfuric acid. Pyrogenic silica is a kind of powder of very well dispersed SiO_2,which absorbs more than 10 times its weight in liquid, producing gel. Because of the thixotropic properties of gel (liquid by stirring and solid by resting), after a certain gelling time, the agglomerates are connecting themselves together to form a network which keeps the liquid inside and gives the gel structure. This form can be broken by stirring to single agglomerates giving again a liquid form.

Main difference from AGM batteries

- Using gel SOL as electrolyte
- Using the extra microporous separator which can reduce the depolarization of the negative electrode and avoid the PCL 3 effect (premature capacity loss due to negative plate sulphation); significantly decreasing thermal runaway; during deep discharge or pole reversal, helps to prevent short circuits by dendrite growth between the plates
- Plate thickness tolerance is not critical since the high compression of plate group assembly is not required
- More electrolytes for better contact with plates and active materials and container walls, good for releasing internal heat and cooling battery temperature
- Better vent valve design to lower gassing rate and water losing rate to extend battery lifetime

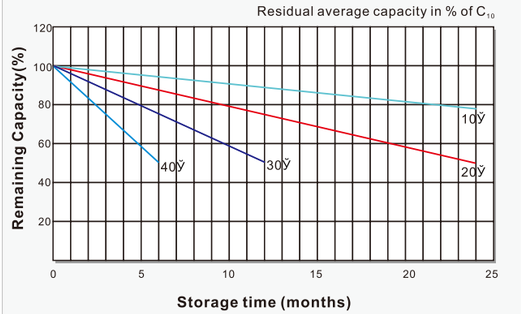
ADVANTAGE OF GEL BATTERIES

- No electrolyte adjustment needed
- Do not need quick recharging after discharging
- Insensitive to occasional deep discharge. Deep discharging resistance is high and much higher than in case of AGM since
- AGM has less electrolyte (only about 66% in comparison to gel)
- Extremely low gas extrication during charging
- Low self-discharge: 50% of the nominal capacity after a 12 months' storage in room temperature
- High charge acceptance
- High energy at low temperature
- Higher operating reliability and longer lifetime, as mistakes due to wrong maintenance will not occur
- The tendency to thermo-runaway-effect is strongly reduced for gel batteries since the higher electrolyte content than AGM (b/c the contact between plates and container walls for heat dispersion through the surrounding gel)
- Can be stored and used in upright or on side position (side position may give less capacity)
- No pollution problems if container is damaged
- Approved for air transport (IATA)
- Almost no acid stratification which can occur in AGM and conventional wet cells, especially on the tall batteries
- Self-resealing valves with adapter to reduce severe water losing and extend battery life
- Low cost rate (cost vs. life time and cost vs. Cycles)

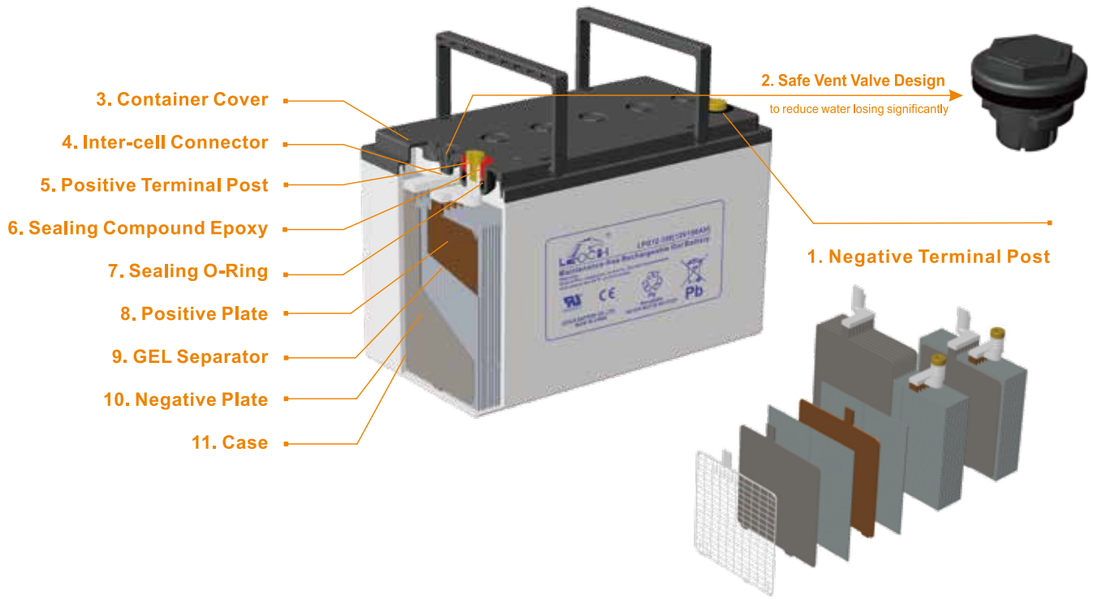
Charge Voltages and Temperature Ranges

Temp (°F)	Boost Charge(V/cell)		Float Charge(V/cell)		Temp (°C)
	Optimum	Maximum	Optimum	Maximum	
≥120	2.23	2.28	2.15	2.18	≥49
110-120	2.27	2.32	2.17	2.22	43-49
100-110	2.28	2.33	2.18	2.23	38-43
90-100	2.30	2.35	2.20	2.25	32-38
80-90	2.32	2.37	2.22	2.27	27-32
70-80	2.35	2.40	2.25	2.30	21-27
60-70	2.38	2.43	2.28	2.33	16-21
50-60	2.40	2.45	2.30	2.35	10-16
40-50	2.43	2.48	2.33	2.38	4-10
30-40	2.46	2.51	2.34	2.39	(-1)-4
20-30	2.49	2.54	2.36	2.41	(-6)-(-1)
10-20	2.53	2.58	2.38	2.43	(-12)-(-6)
≤10	2.58	2.63	2.39	2.44	≤-12

General relation of Capacity vs. Storage time



VRLA GEL BATTERY CONSTRUCTION

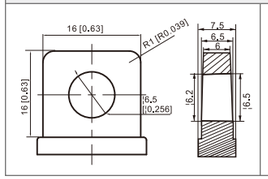


LEOCH VRLA-GEL BATTERY TERMINAL OPTIONS

Unit:mm[inch]

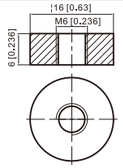
T5 Terminal

Lead
Torque: 3.9 ~ 5.4 N*m (34.39 ~ 47.75 in*lbs)



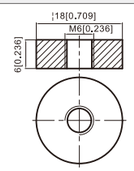
T6 Terminal

Brass Coated With Tin; Threaded Insert 6mm STUD
Torque: 3.9 ~ 5.4 N*m (34.39 ~ 47.75 in*lbs)



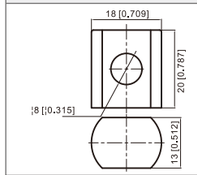
T7 Terminal

Brass Coated With Tin; Threaded Insert 6mm STUD
Torque: 3.9 ~ 5.4 N*m (34.39 ~ 47.75 in*lbs)



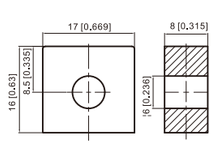
T9 Terminal

Lead
Torque: 11 ~ 14.7 N*m (97.28 ~ 130.0 in*lbs)



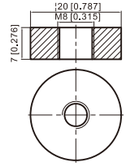
T10 Terminal

Lead
Torque: 3.9 ~ 5.4 N*m (34.39 ~ 47.75 in*lbs)



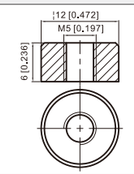
T11 Terminal

Brass Coated With Tin; Threaded Insert 8mm STUD
Torque: 11~14.7 N*m (97.28 ~ 130.0 in*lbs)



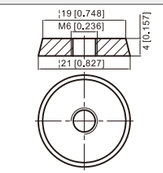
T12 Terminal

Brass Coated With Tin; Threaded Insert 5mm STUD
Torque: 2.0 ~ 3.0 N*m (17.69 ~ 26.53 in*lbs)



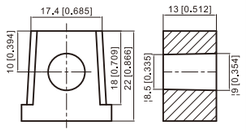
T13 Terminal

Brass Coated With Tin; Threaded Insert 6mm STUD
Torque: 3.9 ~ 5.4 N*m (34.39 ~ 47.75 in*lbs)



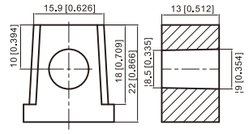
T14-1 Positive

Lead
Torque: 11 ~ 14.7 N*m (97.28 ~ 130.0 in*lbs)



T14-2 Negative

Lead
Torque: 11 ~ 14.7 N*m (97.28 ~ 130.0 in*lbs)



Note: the figures below just show the appearance and dimension. For the positioning on each battery model, please check the specification on www.leoch.com.

VALVE REGULATED LEAD-ACID GEL BATTERY, RECHARGABLE

LPG SERIES
GENERAL PURPOSE GEL

General Features

- The maximum design life up to 16 years
- Long time discharge
- Suitable for space and storage electric power use
- Special plate design, long cycle lifetime
- Using special lead-calcium alloy to boost up the grid anti-corrosive performance and extend the battery using lifetime
- Using special separator to boost up the battery performance inside
- High thermal capacity, reduce the risk of thermal out of control and drying hard, can be used in bad environment
- High gas recombined reaction efficiency
- Little water losing, no electrolyte stratification phenomenon
- Long storage time
- Good deep discharge resilience performance
- Using gas silicon dioxide, small granule degree, bigger than surface area

Typical Applications

Cycle applications

- Golf trolleys
- Garden equipments
- Portable equipments
- Wheel chairs
- Solar and wind mill units
- Boats or buoys
- Medical equipments
- Portable video/radio
- Military
- Railway crossing
- Traffic lights
- Street signs
- Cottage camping
- SOS pillars
- Pump system
- Toys and hobby applications
- Flash units also for mining (head flash)
- Portable equipments for communication, testing, distance measuring etc.

Standby applications

- power supplies
- Power plants
- Transmitter systems
- Burglar alarms
- Telecommunication backup
- Uninterrupted
- Cash register systems
- Telephone systems
- Clocks systems
- Emergency lights signal systems
- Solar applications
- Fire alarm systems
- Communication systems
- Mobile stations
- Radar and satellite stations
- Computer back-up (high power)
- Emergency power supply for hospitals
- Airport / runway emergency illumination
- Elevators emergency power supply (skyscrapers)
- Medical equipments (stationary and portable i.e. X- ray)

LPG Models and Parameters(Small, Middle Size)

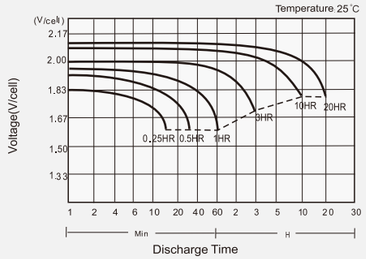
Model	Rated Voltage (V)	Rated Capacity(Ah)	Approx Dimension								Gross Weight		Type
			Length		Width		Height		Total Height				
		20HR											
		1.80V/cell	mm	in.	mm	in.	mm	in.	mm	in.	Kg	Lbs.	
LPG12-17	12	17	181.5	7.15	76.5	3.01	167.5	6.59	167.5	6.59	5.80	12.79	T12-I(M5)
LPG12-24	12	24	166	6.54	175	6.89	125	4.92	125	4.92	8.50	18.74	T12-I(M5)
LPG12-31	12	30	195	7.68	130	5.12	164	6.46	178	7.01	10.2	22.49	T5
LPG12-38	12	38	197	7.76	165	6.50	170	6.69	170	6.69	12.8	28.22	T6(M6)
LPG12-45	12	45	257	10.12	132	5.20	200	7.87	200	7.87	15.5	34.17	T6(M6)
LPG12-50	12	50	229	9.02	138	5.43	205	8.07	211	8.31	16.1	35.49	T6(M6)
LPG12-60	12	60	255	10.04	170	6.69	174.5	6.87	177.5	6.99	18.5	40.79	T6(M6)
LPG12-65	12	65	325	12.80	167	6.57	174	6.85	174	6.85	20.5	45.19	T6(M6)
LPG12-70H	12	70	260	10.24	168	6.61	208	8.19	214	8.43	22.9	50.49	T6(M6)
LPG12-85	12	85	306	12.05	168	6.61	208	8.19	214	8.43	27.5	60.63	T6(M6)

LPG Models and Parameters(Small, Middle Size)

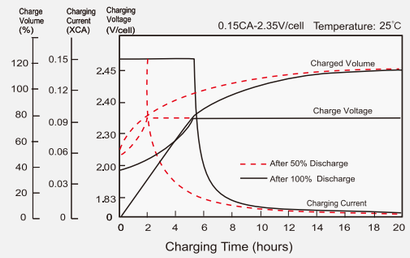
Model	Rated Voltage (V)	Rated Capacity(Ah)	Approx Dimension								Gross Weight		Type
			Length		Width		Height		Total Height				
		20HR											
		1.80V/cell	mm	in.	mm	in.	mm	in.	mm	in.	Kg	Lbs.	
LPG12-100	12	100	330	12.99	173	6.81	212	8.35	218	8.58	31.2	68.78	T11(M8)
LPG12-110	12	110	408	16.06	177	6.97	225	8.86	225	8.86	34.5	76.06	T11(M8)
LPG12-125	12	130	345	13.58	172	6.77	274	10.79	280	11.02	40.0	88.18	T11(M8)
LPG12-140	12	140	483	19.02	170	6.69	238.5	9.39	238.5	9.39	43.8	96.56	T11(M8)
LPG12-160	12	160	522	20.55	240	9.45	218	8.58	224	8.82	57.5	126.76	T11(M8)
LPG12-200	12	200	522	20.55	240	9.45	218	8.58	224	8.82	62.3	137.35	T11(M8)
LPG12-240	12	240	522	20.55	268	10.55	220	8.66	226	8.90	73.3	161.60	T11(M8)

Characteristics curves

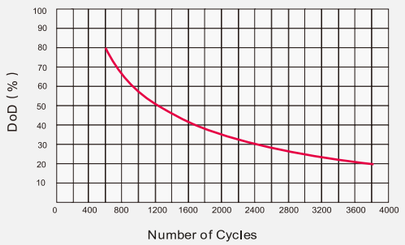
DISCHARGE CHARACTERISTICS



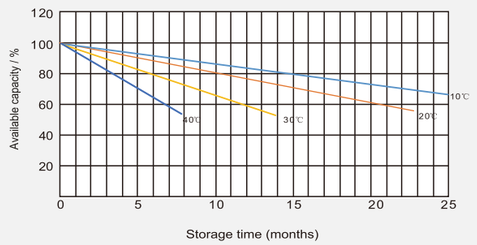
CHARGING CHARACTERISTICS



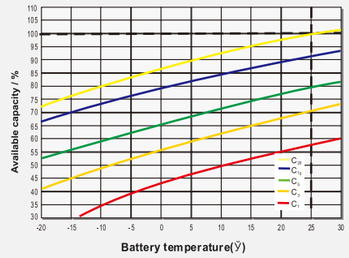
CYCLE LIFE IN RELATION TO DOD



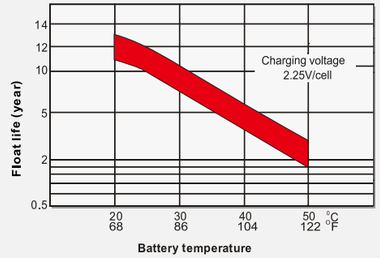
SELF DISCHARGE CHARACTERISTICS



TEMPERATURE EFFECTS IN RELATI ON TO BATTER CA PACITY



EFFECT OF TEMPERATURE ON LONG TERM FLOAT LIFE

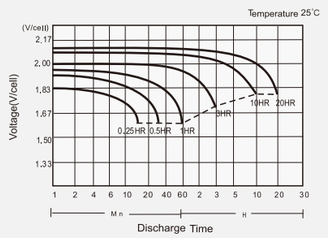


LPG Models and Parameters(2V Series)

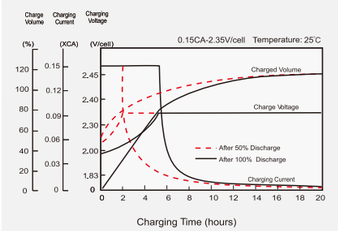
Model	Rated Voltage (V)	Rated Capacity(Ah)	Approx Dimension								Gross Weight		Type
			Length		Width		Height		Total Height				
		10HR											
		1.80V/cell	mm	in.	mm	in.	mm	in.	mm	in.	Kg	Lbs.	
LPG2-100	2	100	170	6.70	72	2.84	205	8.08	214	8.43	6	13.20	T6(M6)
LPG2-120	2	120	170	6.70	98	3.86	205	8.08	214	8.43	7.3	16.06	T7(M6)
LPG2-200	2	200	170	6.70	110	4.33	328	12.92	337	13.28	14.1	31.02	T11(M8)
LPG2-300	2	300	170	6.70	150	5.91	330	13.00	339	13.36	19.5	42.90	T11(M8)
LPG2-400	2	400	210	8.27	175	6.90	330	13.00	339	13.36	27	59.40	T11(M8)
LPG2-500	2	500	240	9.46	175	6.90	327.5	12.90	338	13.32	31.8	69.96	T11(M8)
LPG2-600	2	600	300	11.82	175	6.90	330	13.00	340	13.40	40	88.00	T11(M8)
LPG2-800	2	800	410	16.15	175	6.90	330	13.00	340	13.40	54	118.80	T11(M8)
LPG2-1000	2	1000	475	18.72	175	6.90	328	12.92	338	13.32	64.1	141.02	T11(M8)
LPG2-1500	2	1500	403	15.88	354	13.95	339	13.36	349	13.75	102	224.40	T11(M8)
LPG2-2000	2	2000	490	19.31	350	13.79	339	13.36	349	13.75	130	286.00	T11(M8)
LPG2-3000	2	3000	709	27.93	350	13.79	337	13.28	347	13.67	190	418.00	T11(M8)

Characteristics curves

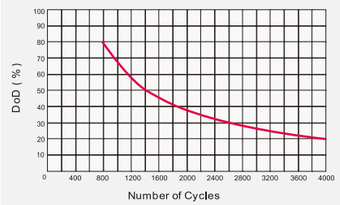
DISCHARGE CHARACTERISTICS



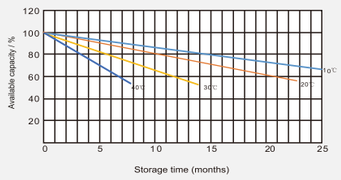
CHARGING CHARACTERISTICS



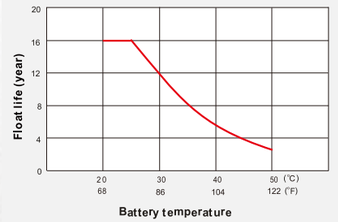
CYCLE LIFE IN RELATION TO DOD



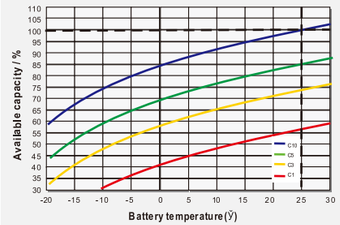
SELF DISCHARGE CHARACTERISTICS



EFFECT OF TEMPERATUR E ON LONG TERM FLOAT LIFE



TEMP ERATURE EFFECTS IN RELATION TO BATTER CAPACITY



LPFG SERIES
FRONT TERMINAL GEL

General Features

- Specifically ideal for 19 inches or 23 inches power cabinets
- Front terminals make the installation, maintenance and supervision easy
- Shield designs protect terminals from short circuit and show good appearance
- Unique vent valve design: reduce water losing and prevent air/spark going inside
- Thick plates, special formula of paste and plate manufacturing process for a long service life
- ABS material: increase the strength of battery container (Flame-retardant ABS is optional)
- Long discharge time
- Suitable for standby power and energy storage power use
- Special plate design, long cycle life
- Using special lead-calcium alloy to boost up the grid anti-corrosive performance and extend the battery using life
- Special separators boost up the battery internal performance
- High thermal capacity, reduce the risk of thermal runaway and drying up, can be used in poor environment
- High gas recombination efficiency
- Little water losing, no electrolyte stratification phenomenon
- Long storage time
- Good deep discharge resilience performance
- Use nano-fumed silica,with small particle size,and big specific surface area

Typical Applications

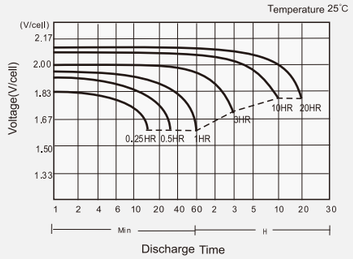
- Communication system
- Power system of special network or local area network
- UPS, standby power supply
- Power station systems
- Marine systems

LPFG Models and Parameters

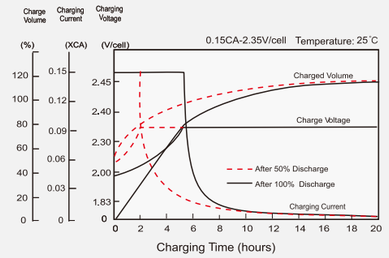
Model	Rated Voltage (V)	Rated Capacity(Ah)		Approx Dimension								Approx Weight		Type
		10HR	20HR	Length		Width		Height		Total Height				
		1.80V/cell	1.80V/cell	mm	in.	mm	in.	mm	in.	mm	in.	Kg	Lbs.	
LPFG12-70	12	65	70	564	22.20	114	4.49	187	7.36	187	7.36	26.7	58.86	T6(M6)
LPFG12-100H	12	90	95	394	15.51	110	4.33	285	11.22	285	11.22	35.0	77.16	T6(M6)
LPFG12-150	12	130	138	551	21.69	110	4.33	288	11.34	288	11.34	47.4	104.50	T6(M6)
LPFG12-180	12	150	160	550	21.65	125	4.92	281.5	11.08	281.5	11.08	51.8	114.20	T8(M6)

Characteristics curves

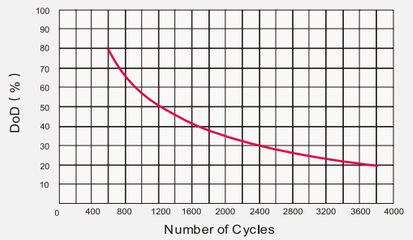
DISCHARGE CHARACTERISTICS



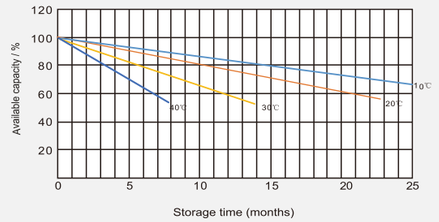
CHARGING CHARACTERISTICS



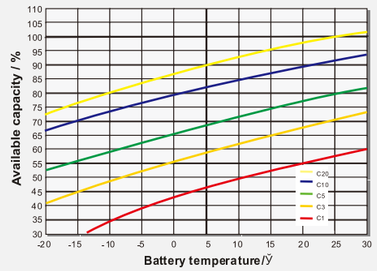
CYCLE LIFE IN RELATION TO DOD



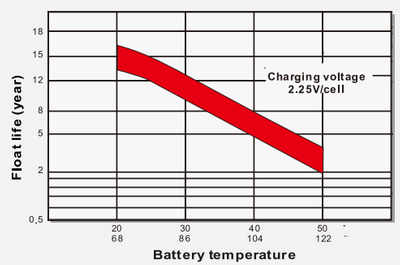
SELF DISCHARGE CHARACTERISTICS



TEMP ERATURE EFFECTS IN RELATION TO BATTER CAPACITY



EFFECT OF TEMPERATUR E ON LONG TERM FLOAT LIFE



GEL

VRLA-GEL BATTERY

LPCG SERIES
DEEP CYCLE GEL

General Features

- For longer cycle life: special paste formula, over dimensioned negative plate, optimised manufacturing process , additives for deep discharge
- Special anti-vibration design (optional)
- Thick plates, special formula of paste and plate manufacturing process for a long service life
- ABS material: increase the strength of battery container (Flame-retardant ABS is optional)
- Long discharge time
- Suitable for standby power and energy storage power use
- Special plate design, long cycle life
- Using special lead-calcium alloy to boost up the grid anti-corrosive performance and extend the battery using life
- Special separators boost up the battery internal performance
- High thermal capacity, reduce the risk of thermal runaway and drying up, can be used in poor environment
- High gas recombination efficiency
- Little water losing, no electrolyte stratification phenomenon
- Long storage time
- Good deep discharge resilience performanc

Typical Applications

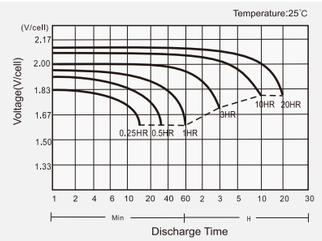
- Electrically powered wheelchair
- Vehicle in place of walking
- Lawn-mower
- Railway and marine systems
- Golf trolleys and golf cart

LPCG Models and Parameters

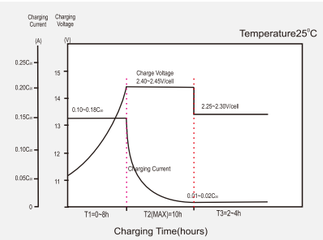
Model	Rated Voltage (V)	Rated Capacity(Ah)		Approx Dimension								Approx Weight		Type
		10HR	20HR	Length		Width		Height		Total Height				
		1.80V/cell	1.80V/cell	mm	in.	mm	in.	mm	in.	mm	in.	Kg	Lbs.	
LPCG12-24	12	22.6	24	166	6.54	175	6.89	125	4.92	125	4.92	8.5	18.74	T12(M5)
LPCG12-30	12	27.6	30	195	7.68	130	5.12	164	6.46	178	7.01	10.2	22.49	T5
LPCG12-40	12	35	38	197	7.76	165	6.50	170	6.69	170	6.69	12.8	28.22	T6(M6)
LPCG12-55	12	50	55	229	9.02	138	5.43	205	8.07	211	8.31	16.1	35.49	T6(M6)
LPCG12-60	12	55	60	255	10.04	170	6.69	174.5	6.87	177.5	6.99	18.5	40.79	T6(M6)
LPCG12-65	12	60	65	325	12.80	167	6.57	174	6.85	174	6.85	20.5	45.19	T6(M6)
LPCG12-70	12	70	75	260	10.24	168	6.61	208	8.19	214	8.43	22.9	50.49	T6(M6)
LPCG12-90	12	85	90	306	12.05	168	6.61	208	8.19	214	8.43	27.5	60.63	T6(M6)
LPCG12-100	12	90	100	330	12.99	173	6.81	212	8.35	218	8.58	31.2	68.78	T11(M8)

Characteristics curves

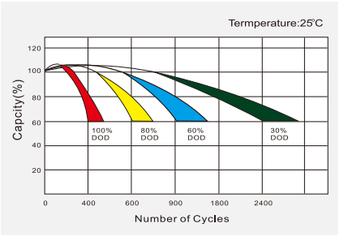
DISCHARGE CHARACTERISTICS



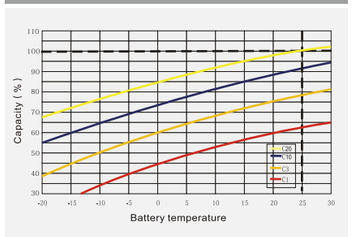
CHARGING CHARACTERISTICS



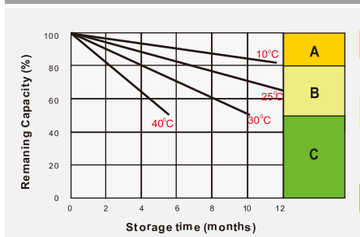
CYCLE LIFE IN RELATION TO DEPTH OF DISCHARGE



TEMPERATURE EFFECTS IN RELATION TO CAPACITY



SELF DICHARGE CHARACTER ISTICS



A No supplementary charge required
(Carry out supplementary charge before use if 100% capacity is required.)

B Supplementary charge required before use.Optional charging way as below:
1.Charged for above 3 days at limted current 0.25CA and constant volatge 2.25V/cell.
2.Charged for above 20hours at limted current 0.25CA and constant volatge 2.4V/cell.
3.Charged for 8~10hours at limted current 0.05CA .

C Supplementary charge may often fail to recover the capacity. The battery should never be left standing till this is reached.

BATTERY CARE AND MAINTENANCE

Influence of Temperature

These Gel batteries are designed to operate within a temperature range between -30°C and +50°C. Below -15°C, there is a risk of freezing the equipment. On the other hand it is possible to use the batteries at lower temperatures, under specific conditions (contact your representative). The use of VRLA batteries at high temperatures affects their service life. The service life is divided by factor 2 for an increasing of temperature of 10°C. The optimum operating temperature is 20°C.

The battery temperature affects the available capacity (please refer to the chart on this subject in each series). Above 35°C, the increasing of capacity is negligible.

Top-charge and precautions

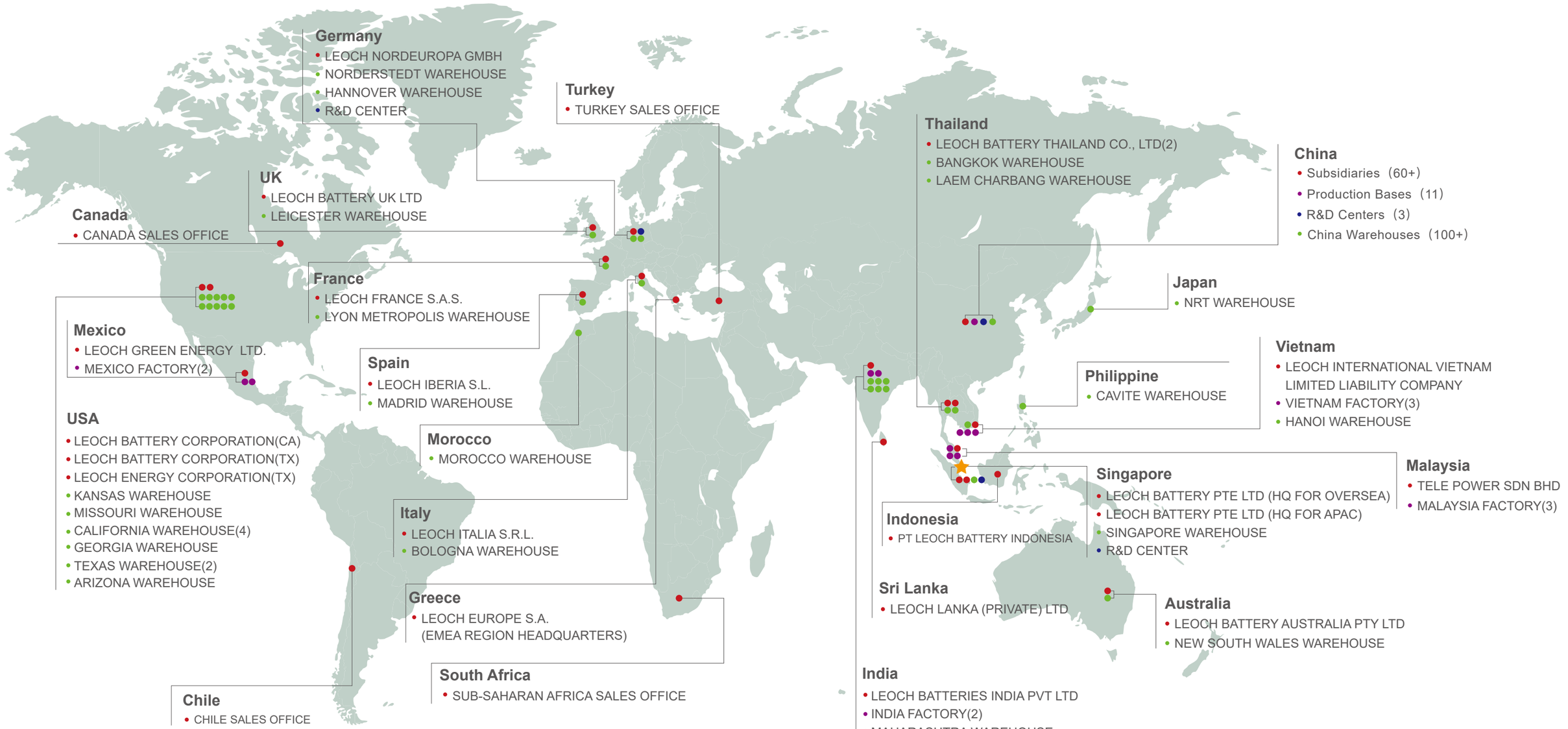
Any VRLA-GEL battery will be damaged by continualiy undercharging or overcharging (Capacity is reduced and life is shortened), although LEOCH batteries accept a charge very well due to their low internal resistance. Overcharging is extremely harmful to any VRLA battery because of the sealed design. Overcharging dries out the electrolyte by driving the oxygen and hydrogen out of the battery through the pressure relief valves which will lead to less capacity and shorter lifetime. If a battery is continually undercharged, a barrier layer of sulfate will build up on the negative plate which will impact recharging acceptability. Premature plate shedding can also happen. Performance is reduced and life is shortened.

It is critical that a charger be used that limit voltage. The charger must be temperature-compensated to prevent under or overcharging due to ambient temperature changes (Please refer to the table titled asỸ Charge Voltage and Temperature Ranges Ỹon Page 3). The warranty is void if improperly charged. Use a good constant potential, temperature-compensated, voltage-regulated charger. Constant current chargers should never be used on VRLA-GEL batteries.

Maintenance for Battery Storage

- The location in which the batteries are being stored must be clean and well maintained.
- Appropriate inventory turnover, will ensure the highest operating quality of the products.
- Prior to installation the battery casings must be cleaned, never use solvents or abrasives.
- For longer storage periods, checking the open circuit voltage (OCV) at the following intervals is recommended:
  Storage at 20°C: after a storage period of 12 months, then charge batteries every 3 months afterwards.
  Storage at 30°C: after a storage period of 6 months, then charge batteries every 2 months afterwards.

GLOBAL DEPLOYMENT



Global Subsidiaries, Production Bases, Warehouses, R&D Centers/Distribution in Worldwide Regions (as of March 2025)

● Subsidiaries (80+) ● Production Bases (21) ● Warehouses (Overseas 30, China 100+) ● R&D Centers (5)