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Premium Power From Premium Battery

newmax®

FLOODED BATTERY USER'S GUIDE BATTERY INSTALLATION & MAINTENANCE



KOREA BATTERY CO., LTD.
www.newmaxbattery.co.kr



POWER DEEP CYCLE BM BATTERY

■ Plates

Made from 99.99% or higher purity lead processed into an active sub-stances.

Use an antimony alloy metal with higher corrosion-resistance on the board.

The negative plate uses highly porous and deep cycle-resistant additives.

A special additive applied the positive plate for long service life.

■ Electrolyte & Cap

Electrolyte contain highly pure, refined sulfuric acid (KS M 1203 No.3 or higher) CAP has a structure that can filter acid haze and gas generated during the recharge step 3, discharge only the gas.

Uses a flame arrestor that can prevent an explosion from inflammation of the interior.

■ Separators

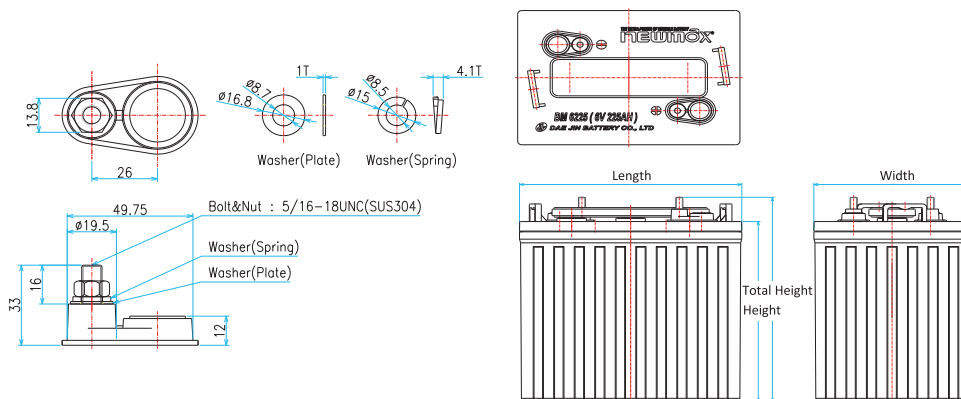
Use in highly porous and corrosion-resistant PE material.

A glass mat applied to the surface to prevent withdrawal objective sub -stances. Low electric resistance and excellent physical traits.

■ Case & Cover

Use of Polypropylene(PP) resin. A special saddle plate installed for prevention of a short on the bottom from withdrawal of active substances.

A design which keeps in electrolyte from being leaking



Battery Type	Nominal Voltage	Exterior Dimension								Terminal type	BCI Group
		Length		Width		Height		T.Height			
		(mm)	(inch)	(mm)	(inch)	(mm)	(inch)	(mm)	(inch)		
BM 6210	6	260	10.24	183	7.20	247	9.72	279	10.98	Standard	GC2
BM 6225	6	260	10.24	183	7.20	247	9.72	279	10.98	Standard	GC2
BM 6240	6	260	10.24	183	7.20	247	9.72	279	10.98	Standard	GC2
BM 8170	8	260	10.24	183	7.20	247	9.72	279	10.98	Standard	GC8
BM 8190	8	260	10.24	183	7.20	247	9.72	279	10.98	Standard	GC8
BM 12150	12	331	13.03	183	7.20	247	9.72	279	10.98	Standard	GC12
BM 12165	12	331	13.03	183	7.20	247	9.72	279	10.98	Standard	GC12

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MAINTENANCE AND INSTALLATION

■ SAFETY PRECAUTIONS & WARNINGS

- Always wear protective clothing, gloves and goggles.
- Do not smoke near batteries.
- Keep sparks, flames and metal objects away from batteries.
- Use insulated tools when making battery connections.
- Electrolyte is a solution of acid and water, so avoid skin contact.
If acid contacts skin or eyes, flush with water immediately and contact a medical professional.
- Ensure the cable connections to the terminals are properly tightened.
- Do not lay objects on top of battery.
- Always charge and handle batteries in a well-ventilated area.
- Never add acid to a battery.



■ BATTERY ORIENTATION

- Flooded batteries must be placed and installed upright at all times (Fluid will spill if the battery is placed on its side or at an angle).

■ TERMINAL PROTECTION

- Keep terminals clean and dry to avoid corrosion. Terminal protector spray is recommended.

■ BATTERY CONNECTION

- If using washers to connect the wire connections, ensure the connection is in direct contact with the lead surface of the terminal.
- Ensure the washer is placed on top of the wire connection (between the connection and the nut). Do not place the washer between the terminal and the connection as this creates high resistance and can cause terminal meltdown.

■ TORQUE LOADINGS

- Tighten all cable connections to the specified values, ensuring proper contact with the terminals. Over-tightening can result in terminal breakage and loose connections, which may result in meltdown or fire.

*Refer to the User's Guide on www.newmaxbattery.com



USER'S MAINTENANCE

■ INSPECTION

Inspect battery at regular intervals. The tops of the batteries and terminal connections should be clean, dry, and free of dirt or corrosion.

Fluid on top of a flooded battery may indicate overwatering or overcharging.

■ WATERING

- Fully charge the batteries prior to adding water.

Only add water to discharged or partially charged batteries before charging if the plates are exposed. In this case, add just enough water to cover the plates and then charge the batteries.

Once fully charged continue with the watering procedure.

- If electrolyte is above the plates, it's not necessary to add water.
- If electrolyte is needed, add distilled or deionized water to a level 3mm below the vent well (plastic shield inside the vent hole).
- After adding water, secure vent caps back on batteries.

■ CLEANING

- Inspect battery for cleanliness at regular intervals and keep terminals and connectors free of corrosion.
- Prior to cleaning check that all vent caps are secured properly on the battery.
- Clean the top of the battery, terminals and connections with a cloth or brush and a sodium bicarbonate solution (1/3 cup of baking soda to 1L of water (150g/1L)).
- Do not allow the cleaning solution to get inside the battery.
- Rinse with water and dry with a clean cloth.
- Keep the area around batteries clean and dry.

■ CHARGING

- Proper charging will maximize battery performance.
- Both under and over-charging can reduce the life of the battery.
- Do not discharge your battery more than 80% to prevent overdischarging and damaging the battery's internal components.
- Avoid charging at temperatures above 50°C.

■ EQUALIZING

- NEWMAX BM Battery recommends equalizing flooded batteries every 30 days or when batteries have low specific gravity, below 1.235 or wide ranging specific gravity, > 0.030 points between cells, after fully charging.

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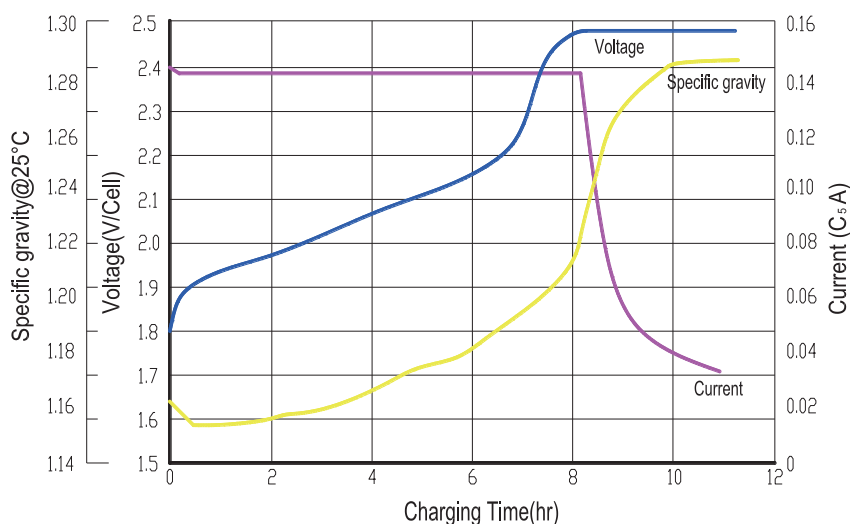
■ STORAGE

- Fully charge batteries before placing in storage.
- Store in a cool, dry location, protected from the elements.
- Batteries self-discharge during storage. Monitor the specific gravity or voltage every 4-8 weeks.
- In high temperatures (greater than 32°C) monitor the specific gravity or voltage every 2-4 weeks as batteries will self-discharge faster.
- Stored batteries should be given a boost charge when they are at or less than 70% State of Charge (SOC).
- After storage, recharge before use.

CHARGER SETTINGS

System Voltage	6 VOLT	8 VOLT	12 VOLT
Absorption Voltage (2.45 VPC)	7.35V	9.80V	14.7V
Equalization Voltage (2.70 VPC)	8.10V	10.8V	16.2V
Float Voltage (2.25 VPC)	6.75V	9.00V	13.5V

CHARGING CHARACTERISTICS





SOC, Specific Gravity & Temperature

Temp soc °C	-15	-10	-5	0	+5	+10	+15	+20	+25	+30	+35	+40
0%	1.108	1.105	1.101	1.098	1.094	1.090	1.087	1.084	1.080	1.076	1.073	1.069
10%	1.128	1.125	1.121	1.118	1.114	1.110	1.107	1.104	1.100	1.096	1.093	1.089
20%	1.148	1.145	1.141	1.138	1.134	1.130	1.127	1.124	1.120	1.116	1.113	1.109
30%	1.168	1.165	1.161	1.158	1.154	1.150	1.147	1.144	1.140	1.136	1.133	1.129
40%	1.188	1.185	1.181	1.178	1.174	1.170	1.167	1.164	1.160	1.156	1.153	1.149
50%	1.208	1.205	1.201	1.198	1.194	1.190	1.187	1.184	1.180	1.176	1.173	1.169
60%	1.228	1.225	1.221	1.218	1.214	1.210	1.207	1.204	1.200	1.196	1.193	1.189
70%	1.248	1.245	1.241	1.238	1.234	1.230	1.227	1.224	1.220	1.216	1.213	1.209
80%	1.268	1.265	1.261	1.258	1.254	1.250	1.247	1.244	1.240	1.236	1.233	1.229
90%	1.288	1.285	1.281	1.278	1.274	1.270	1.267	1.264	1.260	1.256	1.253	1.249
100%	1.308	1.305	1.301	1.298	1.294	1.290	1.287	1.284	1.280	1.276	1.273	1.269

$$S_{25} = S_t + 0.0007(t-25)$$

S_t = Specific Gravity at $t^{\circ}\text{C}$

t = Temperature at the time

S_{25} = Specific Gravity at 25°C

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COMMON BATTERY FAILURE MODES AND THEIR CAUSES

ITEM	Symptoms of the battery	Causes	Counter measures	Responsibility
Early elimination of the active materials	⊖ Capacity loss ⊖ A sudden drop of voltage during the discharge	⊖ Over charge/over discharge ⊖ High charging current ⊖ High temperature	⊖ Charging current, temperature improvement	User's fault
Incurvation and/or Expansion of the plates	⊖ Short-circuit ⊖ Capacity loss	⊖ Over charge ⊖ High charging current ⊖ High charging voltage	⊖ Replacement of the Battery	User's fault
Corrosion of Grid	⊖ Capacity loss	⊖ Over charging	⊖ May appear at the end of life	User's fault
Sulfation	⊖ Capacity loss ⊖ Low voltage during the discharge	⊖ Long-period negligence without any charging ⊖ A repetition of insufficient charge ⊖ A repetition of over-discharge	⊖ Can be recovered if it is subjected to charging at a current of 20-hour rate.	User's fault
Internal short-circuit	⊖ Voltage drop ⊖ Capacity loss	⊖ Short-circuit by the damage of separators ⊖ Introduction of metallic impurities ⊖ Abnormal insertion of separators	⊖ Replacement of the Battery	Manufacturer's fault
Leakage	⊖ Corrosion of Terminal ⊖ Oxidation of the negative electrode caused by the problem of sealing ⊖ Reduction of the electrode ⊖ Increase in internal resistance	⊖ A breakdown and/or Geta crack in the case ⊖ Poorly sealed Terminal ⊖ Imperfect adhesion between the Case and Cover	⊖ Replacement of the battery	Manufacturer's fault
A breakdown of Terminal	⊖ Spark shoot up in the Terminal ⊖ Melt-down of the Terminal	⊖ A faulty connection between the Terminal and connector ⊖ Unused spring washer	⊖ Replacement of the battery	User's fault
Reverse polarity	⊖ Lowest Voltage ⊖ High temperature & a Gas leak during the discharge	⊖ Over discharge	⊖ Ascertain of recoverableness by along period of Constant-voltage charge ⊖ Replacement of the battery	User's fault
An expansion of the case	⊖ An expansion on the side of the case	⊖ Internal short-circuit ⊖ High charging voltage - Overcharging - Especially, During the floating charging	⊖ Replacement of the battery	It requires a detailed analysis
Corrosion of the Negative plate	⊖ A loss in capacity	⊖ Used an Impure Lead alloy ⊖ Became incorporated into the Electrolyte impurities	⊖ Replacement of the battery	Manufacturer's fault
Explosion (Flooded battery) 100%	⊖ breakage of Terminal ⊖ Terminal melted down ⊖ Breakage of container, cover	⊖ A faulty connection between the Terminal and connector ⊖ Unused spring washer ⊖ When the electrolyte level is lowered to the plate	⊖ Replacement of the battery	User's fault
		⊖ When spot welding is not good	⊖ Replacement of the battery	Manufacturer's fault



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