

# LEAD ACID (DEEP CYCLE) BATTERY

## MD80-12

Marvel MD series is specially designed for frequent discharge deep cycle applications. By using the specially designed active material, strong grids and thick plate construction, the series battery offers reliable performance in high load situations and could provide competitive cycle performance. Suitable for electric vehicles and golf carts; industrial equipment, floor machines, forklifts, aerial lifts, and robotics; marine, RV, and no-idle solutions; mobility and medical equipment; and most outdoor application.

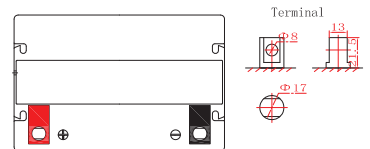
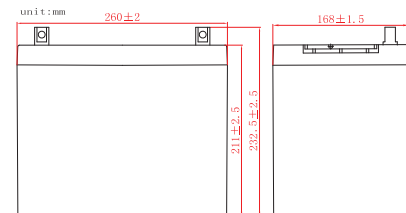


### ► Specification

<b>Cells Per Unit</b>	6
<b>Voltage Per Unit</b>	12
<b>Capacity</b>	80Ah @ 20hr-rate to 1.75V per cell @25°C (77°F)
<b>Weight</b>	Approx. 22.8 kg (50.26lbs)
<b>Maximum Discharge Current</b>	750A(5sec)
<b>Internal Resistance</b>	Approx. 4.5 mΩ
<b>Operating Temperature Range</b>	Discharge: -15°C~50°C ( 5°F~122°F) Charge: -15 °C~40°C ( 5°F~104°F) Storage: -15°C~40°C ( 5°F~104°F)
<b>Nominal Operating Temperature Range</b>	25°C±3°C(77°F±5°F)
<b>Float Charging Voltage</b>	13.5 to 13.8 VDC/unit Average at 25°C(77°F)
<b>Recommended Maximum Charging Current Limit</b>	18.75 A
<b>Equalization and Cycle Service</b>	14.4 to 14.8 VDC/unit Average at 25°C(77°F)
<b>Self Discharge</b>	Marvel Batteries can be stored for more than 6 months at 25°C (77°F ). Please charge batteries before using. For higher temperatures the time interval will be shorter.
<b>Terminal</b>	L terminal to accept M8 nut & bolt
<b>Container Material</b>	ABS(UL 94-HB) & Flammability resistance of (UL 94-V0) can be available upon request.

► **Dimensions :**

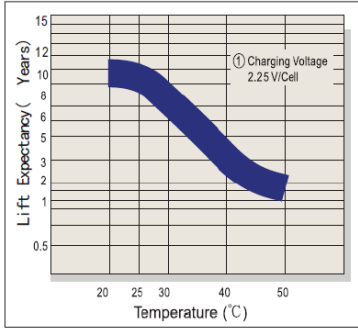
Unit: mm	Overall Height (H)	Container height (h)	Length (L)	Width (W)
	232.5±2.5	211±2.5	260±2	168±1.5



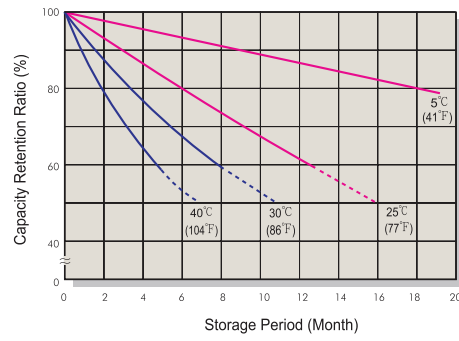
Constant Current Discharge Characteristics Unit:A (25°C, 77°F)								
F.V/Time	5min	15min	30min	1h	3h	5h	10h	20h
1.60V	264	129	81.4	48.9	22.4	14.82	7.81	4.19
1.67V	250	127	79.8	48.3	22.1	14.60	7.77	4.17
1.7V	235	123	77.8	47.4	21.6	14.28	7.72	4.15
1.75V	217	118	75.3	46.0	20.9	13.82	7.64	4.11
1.8V	196	110	72.0	44.0	19.8	13.17	7.50	4.04
1.85V	170	96	67.5	40.8	18.1	12.20	7.27	3.91

Constant Power Discharge Characteristics Unit:W (25°C, 77°F)								
F.V/Time	5min	15min	30min	1h	3h	5h	10h	20h
1.60V	430	274	157.2	93.0	44.1	28.9	15.37	8.31
1.67V	410	260	154.3	91.9	43.5	28.6	15.30	8.29
1.7V	383	243	151.1	90.4	42.6	28.1	15.17	8.25
1.75V	346	222	146.5	88.5	41.2	27.2	14.97	8.15
1.8V	297	197	140.3	86.1	39.0	25.9	14.70	8.02
1.85V	231	165	131.5	81.0	36.0	24.3	14.38	7.80

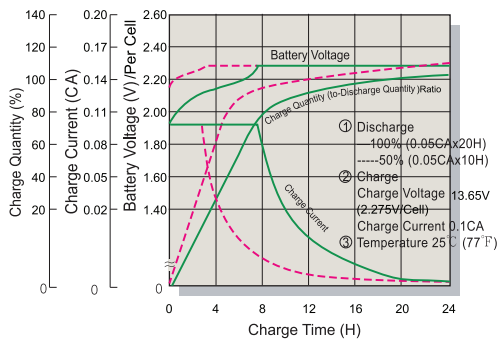
**Trickle(or Float)Design Life**



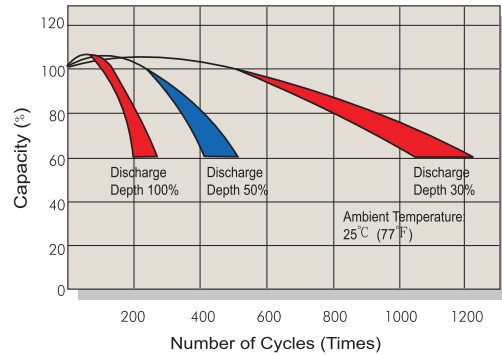
**Capacity Retention Characteristic**



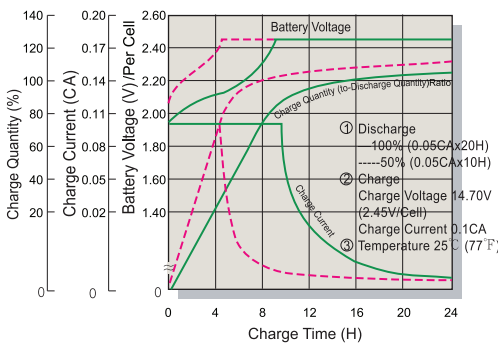
**Battery Voltage and Charge Time for Standby Use**



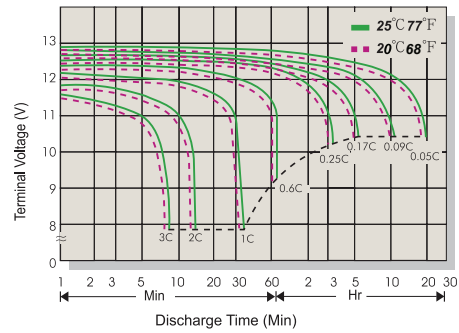
**Cycle Service Life**



**Battery Voltage and Charge Time for Cycle Use**



**Terminal Voltage (V) and Discharge Time**



**Charging Procedures**

Application	Charge Voltage(V/Cell)			Max.Charge Current
	Temperature	Set Point	Allowable Range	
Cycle Use	25°C (77°F)	2.45	2.40~2.50	0.3C
Standby	25°C (77°F)	2.275	2.25~2.30	

**Discharge Current VS. Discharge Voltage**

Final Discharge Voltage V/Cell	1.75	1.70	1.65	1.60
Discharge Current(A)	0.2C > (A)	0.2C < (A) < 0.5C	0.5C < (A) < 1.0C	(A) > 1.0C

**Effect of temperature on capacity (20HR)**

Temperature	Dependency of Capacity (20HR)
40 °C	102%
25 °C	100%
0 °C	85%
-15 °C	65%

**Self-discharge Characteristics**

Charge Voltage(V/Cell)	Charge Voltage(V/Cell)
3 Months	91%
6 Months	82%
12 Months	64%

