

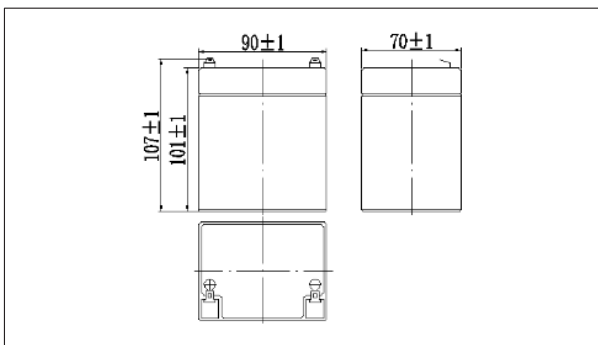
## HA12-4 (12V-4 Ah)

### Specifications

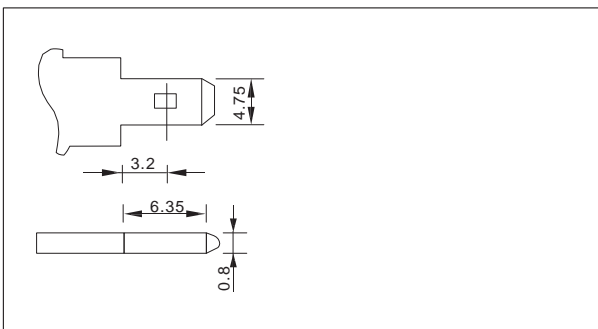
|                               |              |                    |
|-------------------------------|--------------|--------------------|
| Nominal Voltage               |              | 12V                |
| Rated capacity (20 hour rate) |              | 4Ah                |
| Dimensions                    | Length       | 90±1mm(3.54inch)   |
|                               | Width        | 70±1mm(2.76inch)   |
|                               | Height       | 101±1mm(3.98inch)  |
|                               | Total Height | 107±1mm(4.21inch)  |
| Approx. Weight                |              | 1.35kg(2.98lbs)±4% |



### Outer dimensions (mm)



### Terminal Type (mm)



### Characteristics

|   |             |   |
|---|-------------|---|
| Capacity (25°C)                           | 20HR(10.5V) | 4Ah   |
|   | 10HR(10.5V) | 3.7Ah   |
|   | 1HR(9.60V)  | 2.4Ah   |
| Terminal type                             |             | T1/F1   |
| Internal resistance (Fully charged, 25°C) |             | Approx. 55m Ω   |
| Capacity affected by temperature (20HR)   | 40°C        | 102%  |
|   | 25°C        | 100%  |
|   | 0°C         | 85%   |
|   | -15°C       | 65%   |
| Self-discharge (25°C)                     | 3month      | Remaining Capacity: 91%                               |
|   | 6month      | Remaining Capacity: 82%                               |
|   | 12month     | Remaining Capacity: 65%                               |
| Nominal operating temperature             |             | 25°C ±3°C (77°F ±5°F)                                 |
| Operating temperature range               | Discharge   | -15°C~50°C (5°F~122°F)                                |
|   | Charge      | -10°C~50°C (14°F~122°F)                               |
|   | Storage     | -20°C~50°C (-4°F~122°F)                               |
| Float charging voltage(25°C)              |             | 13.50 to 13.80V<br>Temperature compensation: -18mV/°C |
| Cyclic charging voltage(25°C)             |             | 14.50 to 15.00V<br>Temperature compensation: -30mV/°C |
| Maximum charging current                  |             | 1.2A  |
| Maximum discharge current                 |             | 60A(5 sec.)   |
| Designed floating life(20°C)              |             | 5 years   |

### Construction

| Component    | Positive plate | Negative plate | Container | Cover | Separator | Electrolyte   | Safety valve | Terminal |
|--------------|----------------|----------------|-----------|-------|-----------|---------------|--------------|----------|
| Raw material | Lead dioxide   | Lead           | ABS       | ABS   | AGM       | Sulfuric acid | Rubber       | Copper   |

### Constant Current Discharge Characteristics Unit:A(25°C,77°F)

| F.V/Time | 5min | 10min | 15min | 30min | 60min | 2h   | 3h   | 4h   | 5h   | 10h  | 20h  |
|----------|------|-------|-------|-------|-------|------|------|------|------|------|------|
| 9.60V    | 15.3 | 9.68  | 7.56  | 4.26  | 2.62  | 1.43 | 0.99 | 0.82 | 0.70 | 0.38 | 0.20 |
| 9.90V    | 14.8 | 9.39  | 7.38  | 4.17  | 2.58  | 1.42 | 0.99 | 0.82 | 0.69 | 0.38 | 0.20 |
| 10.2V    | 14.2 | 9.00  | 7.11  | 4.05  | 2.52  | 1.41 | 0.98 | 0.81 | 0.69 | 0.38 | 0.20 |
| 10.5V    | 13.6 | 8.62  | 6.86  | 3.95  | 2.47  | 1.39 | 0.97 | 0.80 | 0.68 | 0.37 | 0.20 |
| 10.8V    | 12.8 | 8.13  | 6.50  | 3.80  | 2.39  | 1.36 | 0.94 | 0.78 | 0.66 | 0.37 | 0.20 |

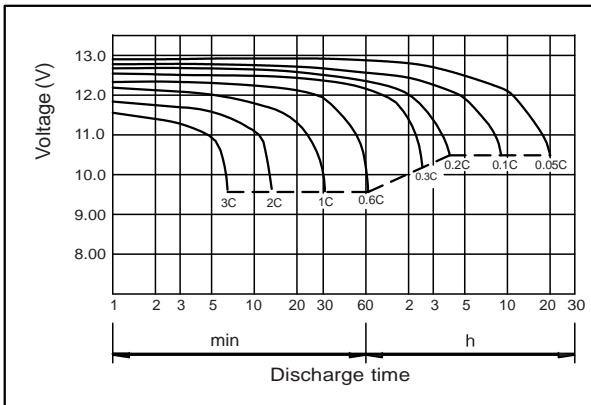
### Constant Power Discharge Characteristics Unit:W(25°C,77°F)

| F.V/Time | 5min | 10min | 15min | 30min | 60min | 2h   | 3h   | 4h   | 5h   | 10h  | 20h  |
|----------|------|-------|-------|-------|-------|------|------|------|------|------|------|
| 9.60V    | 171  | 109   | 86.2  | 48.8  | 30.3  | 16.8 | 11.8 | 9.77 | 8.33 | 4.55 | 2.44 |
| 9.90V    | 165  | 106   | 84.1  | 47.8  | 29.9  | 16.7 | 11.7 | 9.71 | 8.28 | 4.53 | 2.43 |
| 10.2V    | 159  | 102   | 81.0  | 46.4  | 29.1  | 16.5 | 11.6 | 9.64 | 8.22 | 4.51 | 2.41 |
| 10.5V    | 152  | 97.2  | 78.3  | 45.3  | 28.5  | 16.3 | 11.5 | 9.58 | 8.17 | 4.48 | 2.40 |
| 10.8V    | 143  | 91.7  | 74.1  | 43.6  | 27.7  | 15.9 | 11.2 | 9.29 | 7.92 | 4.39 | 2.35 |

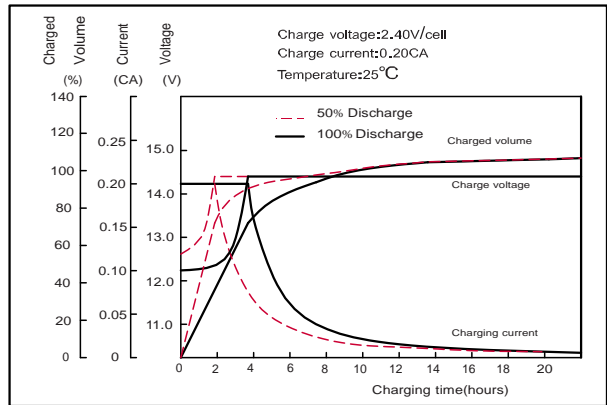
Note: The above characteristics data can be obtained within three charge or discharge cycles.

# HA12-4 (12V-4 Ah)

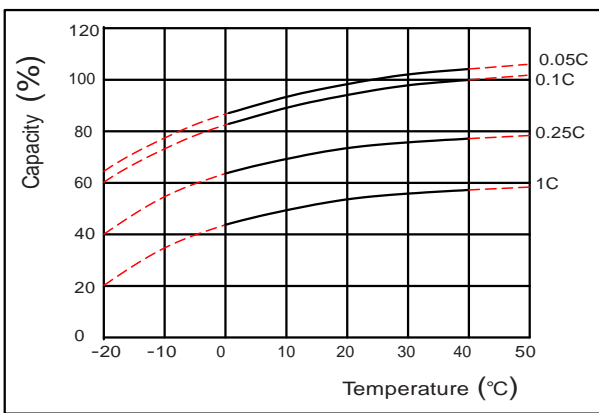
## ● Discharge characteristics (25°C)



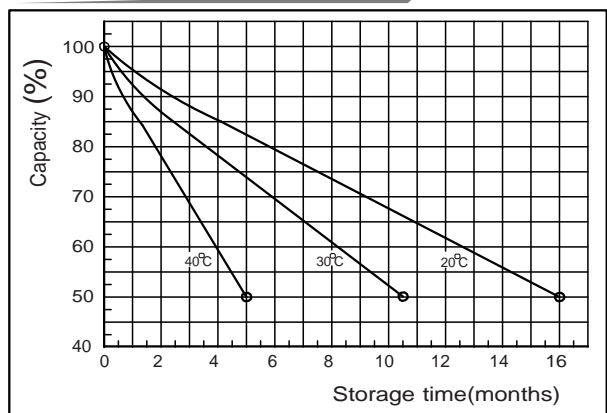
## ● Charging characteristics (25°C)



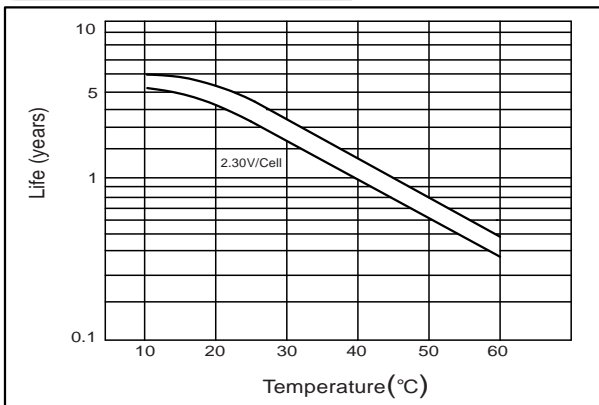
## ● Effect of temperature on capacity



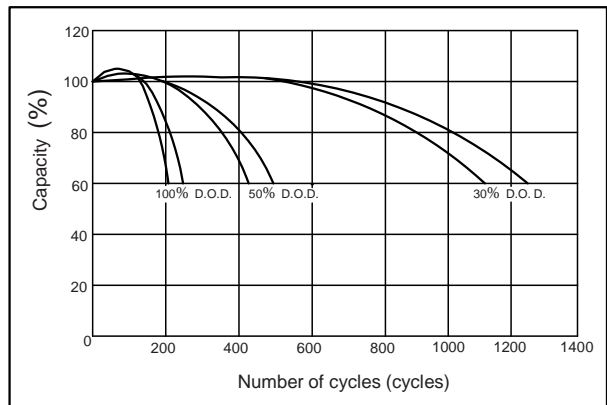
## ● Self-discharge characteristic



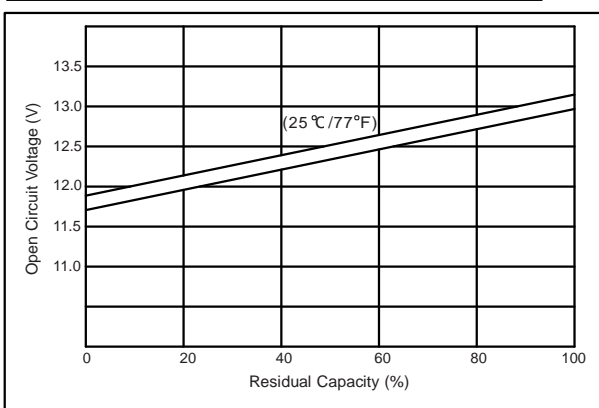
## ● Floating life on temperature



## ● Cycle life on D.O.D (25°C)



## ● The relationship for OCV and Capacity (25°C)



## ● The relationship for Charging voltage and Temperature

