



# HC 1228W

## 12V 28W

HC 1228W is specially designed for high efficient discharge application. Its invisible terminal can be inserted PC board directly. HC series battery can serve more than 260 cycles at 100% discharge in cycle service, or three to five years in standby service.



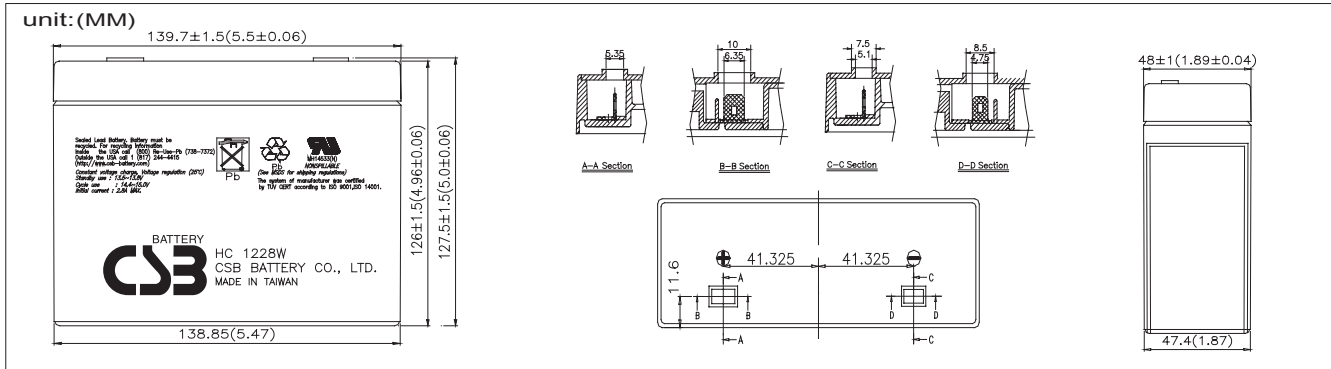
### Specification

|   |  |
|---|--|
| <b>Cells Per Unit</b>                             | 6  |
| <b>Voltage Per Unit</b>                           | 12   |
| <b>Capacity</b>                                   | 28W @ 15minute-rate to 1.67V per cell @25 °C(77°F)   |
| <b>Weight</b>                                     | Approx. 2.60kg(5.73 lbs)   |
| <b>Maximum Discharge Current</b>                  | 60A(5sec)  |
| <b>Internal Resistance</b>                        | Approx. 22mΩ   |
| <b>Operating Temperature Range</b>                | Discharge: -20°C~50°C(-4°F~122°F)<br>Charge: 0°C~40°C(32°F~104°F)<br>Storage: -20°C~40°C(-4°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> | 2.8A   |
| <b>Equalization and Cycle Service</b>             | 14.4 to 15.0 VDC/unit Average at 25°C(77°F)  |
| <b>Self Discharge</b>                             | CSB 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>                                   | Faston Tab 187/250   |
| <b>Container Material</b>                         | -ABS (UL94-HB)*Flammability resistance of UL94-V2 can be available upon request.   |



CSB-manufactured batteries are UL-recognized components under UL924 as well as certified by ISO 9001 and ISO 14001.

### Dimensions



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

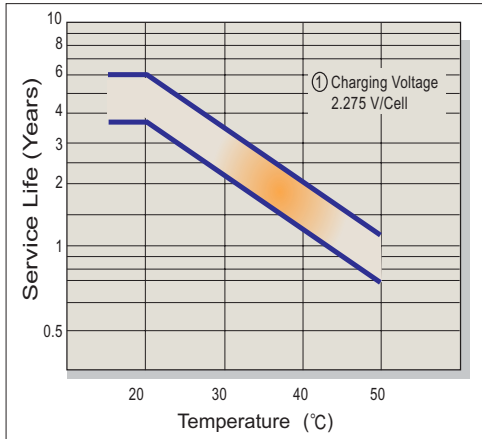
| F.V/Time | 2MIN | 4MIN | 6MIN | 8MIN | 10MIN | 15MIN | 20MIN | 30MIN | 60MIN | 90MIN |
|----------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| 1.60V    | 48.6 | 38.2 | 31.3 | 27.2 | 23.3  | 17.3  | 15.4  | 11.6  | 7.71  | 4.75  |
| 1.67V    | 46.9 | 36.6 | 29.9 | 26.1 | 22.6  | 16.7  | 14.9  | 11.4  | 7.58  | 4.53  |
| 1.70V    | 46.3 | 35.9 | 29.3 | 25.7 | 22.3  | 16.5  | 14.7  | 11.3  | 7.53  | 4.43  |
| 1.75V    | 44.0 | 34.3 | 28.2 | 24.5 | 21.5  | 16.1  | 14.5  | 11.3  | 7.51  | 4.29  |
| 1.80V    | 41.7 | 32.6 | 27.1 | 23.4 | 20.7  | 15.8  | 14.3  | 11.2  | 7.49  | 4.14  |
| 1.85V    | 39.4 | 30.9 | 26.0 | 22.3 | 19.9  | 15.4  | 14.0  | 11.1  | 7.47  | 4.00  |

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

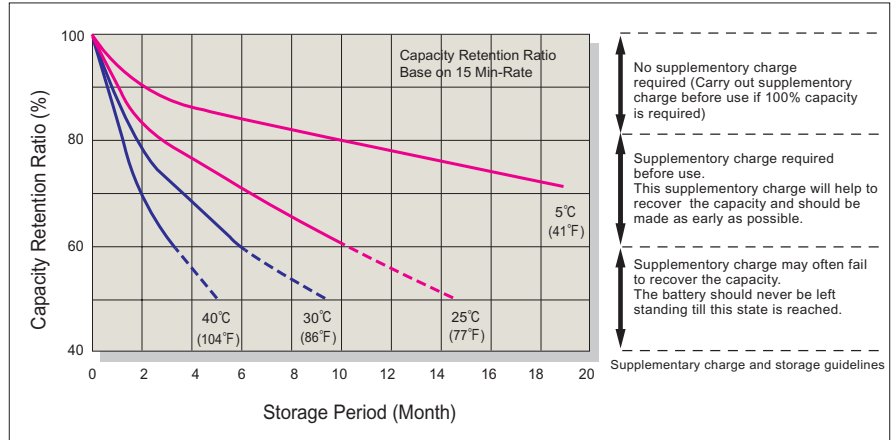
| F.V/Time | 2MIN | 4MIN | 6MIN | 8MIN | 10MIN | 15MIN | 20MIN | 30MIN | 60MIN | 90MIN |
|----------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| 1.60V    | 583  | 458  | 375  | 326  | 280   | 208   | 185   | 139   | 92.5  | 57.0  |
| 1.67V    | 563  | 439  | 359  | 313  | 271   | 201   | 179   | 137   | 91.0  | 54.3  |
| 1.70V    | 555  | 431  | 352  | 308  | 267   | 198   | 176   | 136   | 90.4  | 53.2  |
| 1.75V    | 528  | 411  | 339  | 295  | 258   | 194   | 174   | 135   | 90.2  | 51.5  |
| 1.80V    | 500  | 391  | 325  | 281  | 248   | 189   | 171   | 134   | 89.9  | 49.7  |
| 1.85V    | 473  | 371  | 312  | 268  | 239   | 185   | 169   | 133   | 89.7  | 48.0  |

- All mentioned values are average values.
- Low rate discharge mode (over 90 min.) is not recommended.

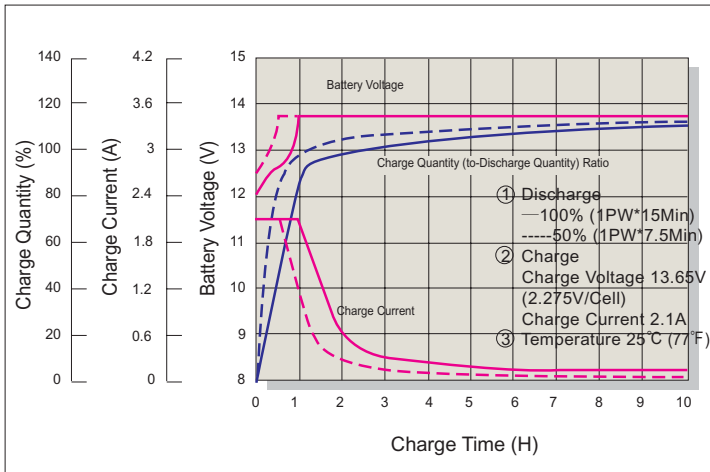
## Trickle (or Float) Service Life



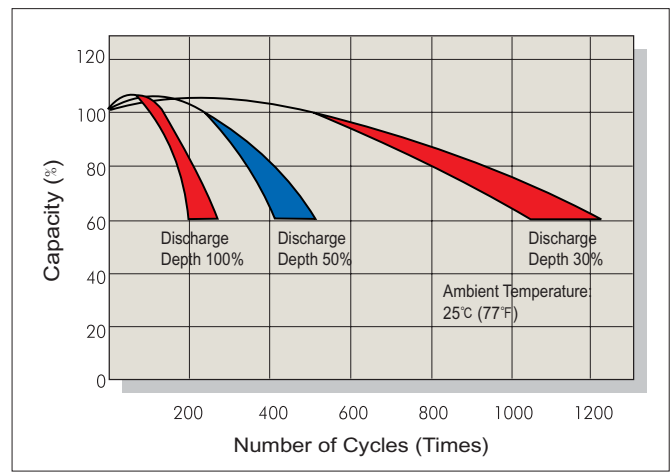
## Capacity Retention Characteristic



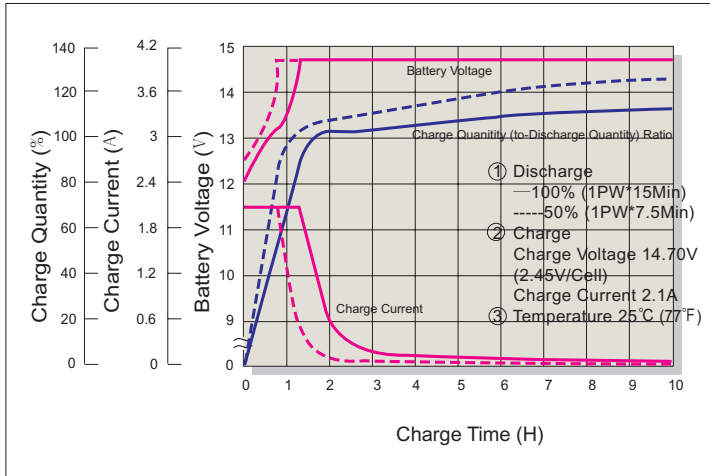
## Battery Voltage and Charge Time for Standby Use



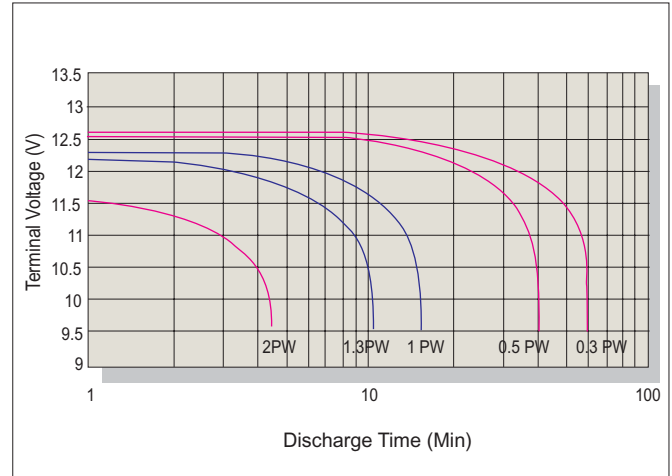
## Cycle Service Life



## Battery Voltage and Charge Time for Cycle Use



## Terminal Voltage (V) and Discharge Time (25°C 77°F)



## 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          | 1.55          | 1.30     |
| Discharge Current (A)          | 0.2C>(A) | 0.2C<(A)<0.5C | 0.5C<(A)<1.0C | (A)>1.0C |