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# HR 1224W ▶ 12V 24W

HR 1224W is specially designed for high efficient discharge application. Its characteristics are high energy density, small footprint and high discharge efficiency. It can be used for more than 260 cycles at 100% discharge in cycle service, up to 5 years in standby service.



## ► Specification

|                                            |                                                                                                                                                                     |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cells Per Unit                             | 6                                                                                                                                                                   |
| Voltage Per Unit                           | 12                                                                                                                                                                  |
| Capacity                                   | 24W @ 15min-rate to 1.67V per cell @25 °C (77°F)                                                                                                                    |
| Weight                                     | Approx. 1.95 kg(4.3 lbs)                                                                                                                                            |
| Maximum Discharge Current                  | 100A/130A(5sec)                                                                                                                                                     |
| Internal Resistance                        | Approx. 21 mΩ                                                                                                                                                       |
| Operating Temperature Range                | Discharge: -15°C~50°C ( 5°F~122°F)<br>Charge: -15 °C~40°C ( 5°F~104°F)<br>Storage: -15°C~40°C ( 5°F~104°F)                                                          |
| Nominal Operating Temperature Range        | 25°C±3°C (77°F±5°F)                                                                                                                                                 |
| Float Charging Voltage                     | 13.5 to 13.8 VDC/unit Average at 25°C (77°F)                                                                                                                        |
| Recommended Maximum Charging Current Limit | 2.4A                                                                                                                                                                |
| Equalization and Cycle Service             | 14.4 to 15.0 VDC/unit Average at 25°C (77°F)                                                                                                                        |
| Self Discharge                             | 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. |
| Terminal                                   | F1/F2-Faston Tab187/250                                                                                                                                             |
| Container Material                         | ABS(UL 94-HB) & Flammability resistance of (UL 94-V0) can be available upon request.                                                                                |

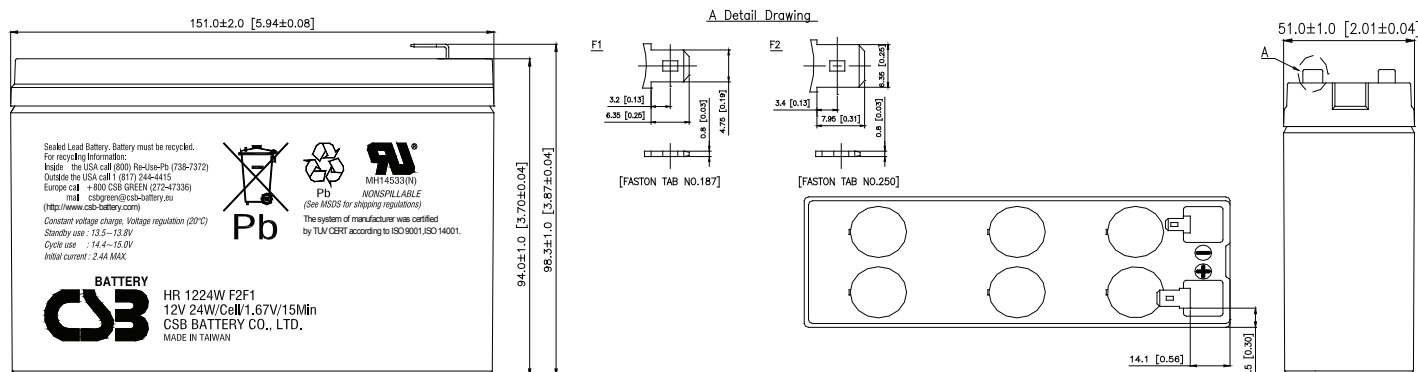


CSB-manufactured **VRLA** (Absorbent Glass Mat type) batteries are UL-recognized components under UL1989.

CSB is also certified by ISO 9001 and ISO 14001.

## ► Dimensions :

| Unit: mm (inch) | Overall Height (H)   | Container height (h) | Length (L)           | Width (W)            |
|-----------------|----------------------|----------------------|----------------------|----------------------|
|                 | 98.3±1.0 (3.87±0.04) | 94.0±1.0 (3.70±0.04) | 151.0±2.0(5.94±0.08) | 51.0±1.0 (2.01±0.04) |



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

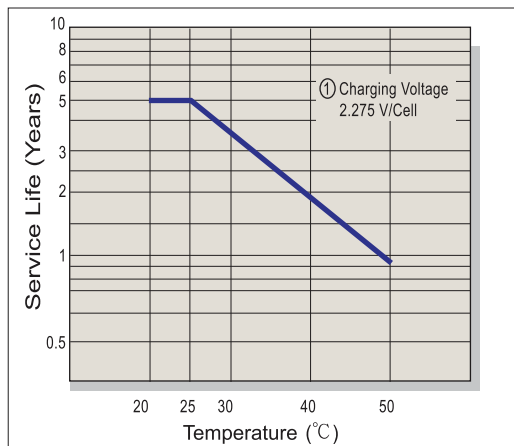
| F.V/Time | 2MIN | 4MIN | 6MIN | 8MIN | 10MIN | 15MIN | 20MIN | 30MIN | 60MIN | 90MIN |
|----------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| 1.60V    | 47.5 | 33.0 | 26.1 | 22.0 | 18.9  | 14.0  | 11.0  | 7.95  | 4.29  | 3.43  |
| 1.67V    | 44.1 | 31.1 | 24.7 | 21.0 | 18.0  | 13.5  | 10.6  | 7.76  | 4.20  | 3.34  |
| 1.70V    | 42.7 | 30.3 | 24.0 | 20.5 | 17.6  | 13.2  | 10.5  | 7.67  | 4.15  | 3.30  |
| 1.75V    | 40.5 | 28.8 | 23.0 | 19.8 | 17.0  | 12.8  | 10.2  | 7.56  | 4.10  | 3.26  |
| 1.80V    | 38.4 | 27.4 | 22.2 | 19.1 | 16.4  | 12.5  | 10.0  | 7.49  | 4.06  | 3.22  |
| 1.85V    | 36.4 | 26.0 | 21.3 | 18.5 | 16.0  | 12.1  | 9.84  | 7.44  | 4.04  | 3.19  |

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

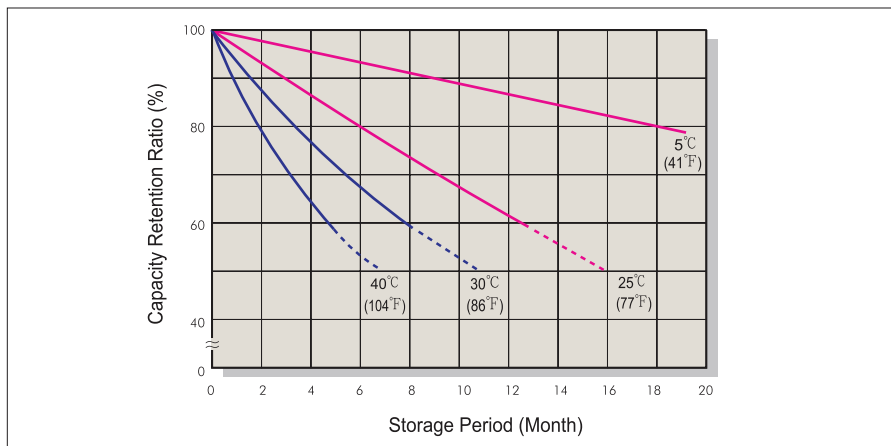
| F.V/Time | 2MIN | 4MIN | 6MIN | 8MIN | 10MIN | 15MIN | 20MIN | 30MIN | 60MIN | 90MIN |
|----------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| 1.60V    | 570  | 396  | 313  | 264  | 228   | 168   | 132   | 95.4  | 51.5  | 41.2  |
| 1.67V    | 529  | 373  | 297  | 251  | 217   | 162   | 128   | 92.9  | 50.3  | 40.2  |
| 1.70V    | 512  | 363  | 289  | 246  | 212   | 159   | 126   | 92.1  | 49.9  | 39.7  |
| 1.75V    | 486  | 346  | 277  | 238  | 204   | 154   | 123   | 90.8  | 49.3  | 39.2  |
| 1.80V    | 461  | 329  | 266  | 229  | 197   | 149   | 121   | 89.9  | 48.8  | 38.8  |
| 1.85V    | 437  | 314  | 256  | 219  | 187   | 144   | 119   | 89.2  | 48.5  | 38.6  |

Ratings presented herein are subject to revision without notice. Please refer to [www.csb-battery.com](http://www.csb-battery.com) to confirm the latest version.

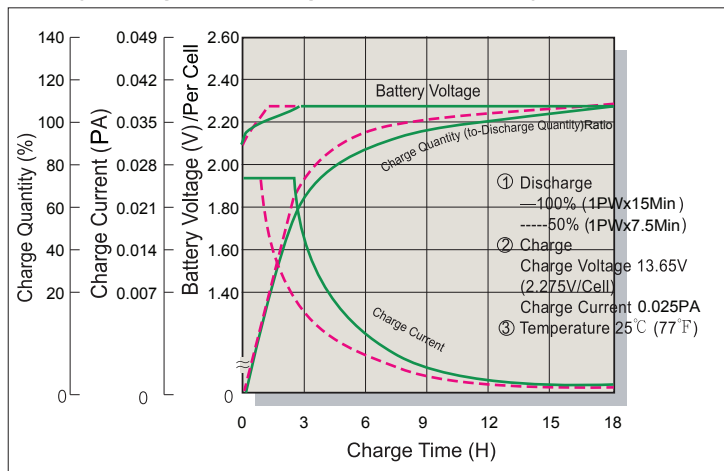
## Trickle (or Float) Service Life



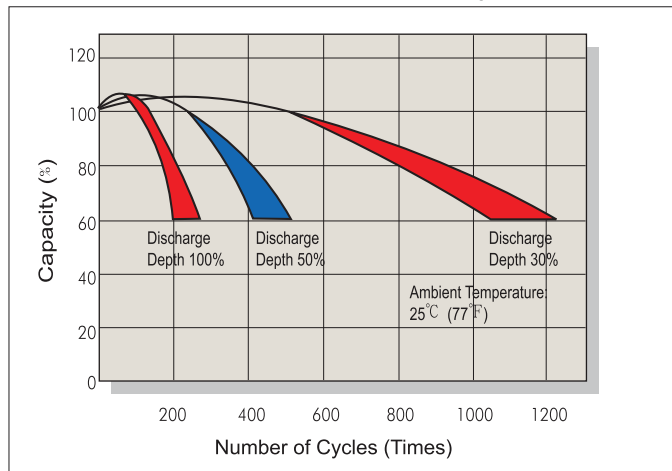
## Capacity Retention Characteristic



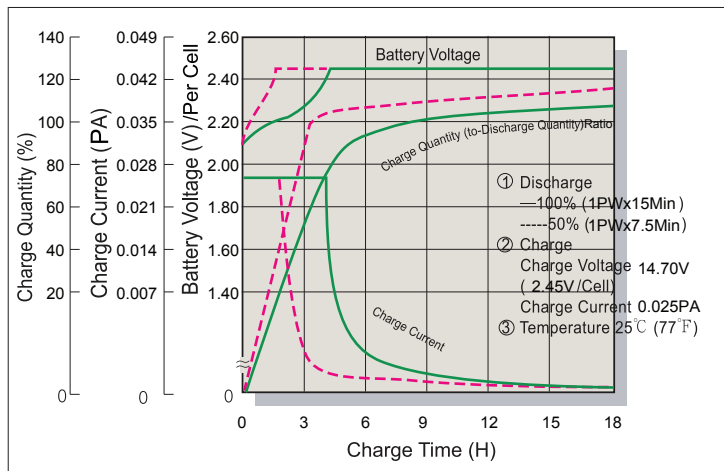
## Battery Voltage and Charge Time for Standby Use



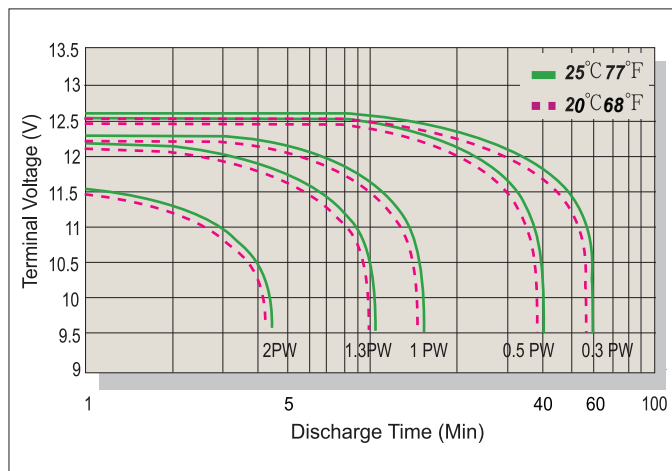
## Cycle Service Life



## Battery Voltage and Charge Time for Cycle Use



## Terminal Voltage (V) and Discharge Time



## 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       | 0.1PA              |
| 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           | 1.60           | 1.30     |
|--------------------------------|----------|----------------|----------------|----------|
| Discharge Power(W)             | 0.1P>(W) | 0.1P≤(W)<0.25P | 0.25P≤(W)<1.0P | (W)≥1.0P |

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