



# HR 1224W F2

## 12V 24W

HR 1224W F2 is specially designed for high efficient discharge application. Its characteristics are small volume, light weight and high discharge efficiency. It can be used for more than 260 cycles at 100% discharge in cycle service, or three to five years in standby service.

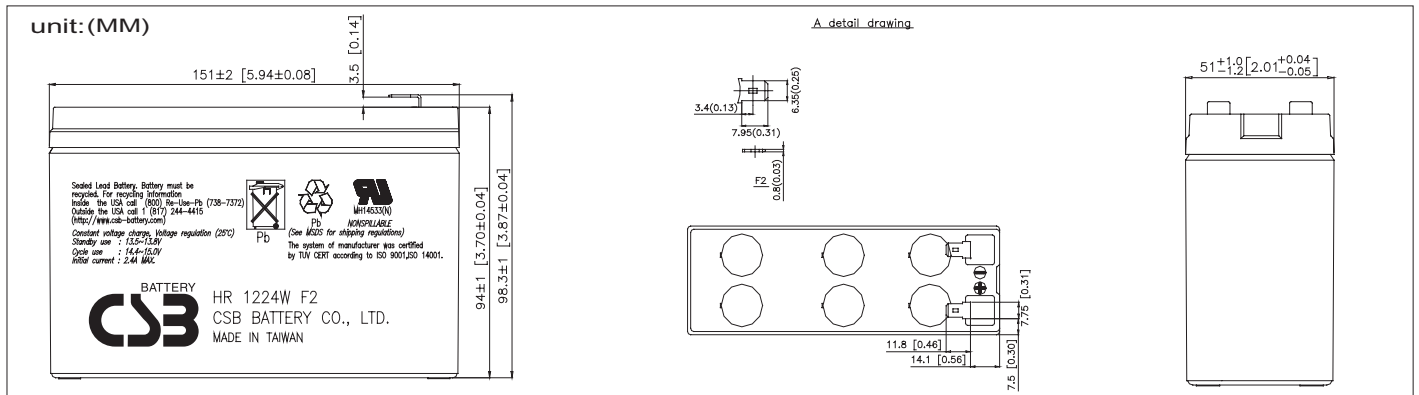
### Specification

<b>Cells Per Unit</b>	6
<b>Voltage Per Unit</b>	12
<b>Capacity</b>	24W @ 15minute-rate to 1.67V per cell @25 °C (77°F)
<b>Weight</b>	Approx. 2.06kg(4.5 lbs)
<b>Maximum Discharge Current</b>	90A(5sec)
<b>Internal Resistance</b>	Approx. 21mΩ
<b>Operating Temperature Range</b>	Discharge: -20°C~50°C (-4°F~122°F) Charge: 0°C~40°C (32°F~104°F) 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>	2.4A
<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 250
<b>Container Material</b>	-ABS (UL94-HB)*Flammability resistance of UL94-V0 can be available upon request.



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

### Dimensions



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

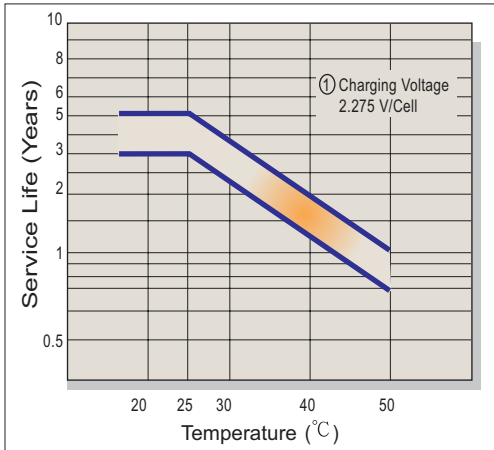
F.V/Time	2MIN	4MIN	6MIN	8MIN	10MIN	15MIN	20MIN	30MIN	60MIN	90MIN
1.60V	47.50	33.00	25.75	22.00	18.92	14.00	11.00	7.95	4.29	3.43
1.67V	44.00	31.08	24.47	20.95	18.05	13.48	10.42	7.64	4.16	3.29
1.70V	42.50	30.25	23.92	20.50	17.67	13.25	10.17	7.51	4.10	3.23
1.75V	40.46	28.84	23.05	19.84	16.88	12.84	10.09	7.49	4.08	3.23
1.80V	38.42	27.42	22.17	19.17	16.08	12.42	10.00	7.46	4.06	3.23
1.85V	36.38	26.01	21.30	18.51	15.29	12.01	9.92	7.44	4.04	3.23

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

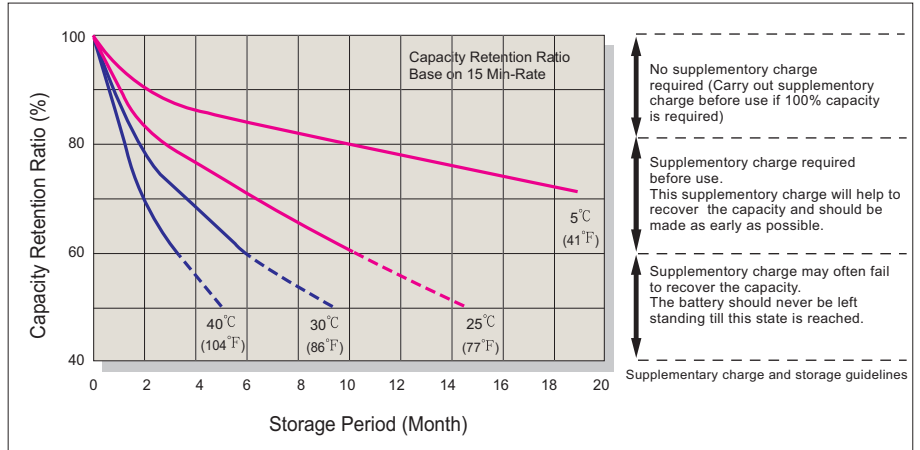
F.V/Time	2MIN	4MIN	6MIN	8MIN	10MIN	15MIN	20MIN	30MIN	60MIN	90MIN
1.60V	570.00	396.00	309.00	264.00	227.00	168.00	132.00	95.40	51.50	41.20
1.67V	528.00	372.90	293.60	251.40	216.50	161.70	125.00	91.69	49.89	39.52
1.70V	510.00	363.00	287.00	246.00	212.00	159.00	122.00	90.10	49.20	38.80
1.75V	485.50	346.00	276.50	238.00	202.50	154.00	121.00	89.80	48.95	38.75
1.80V	461.00	329.00	266.00	230.00	193.00	149.00	120.00	89.50	48.70	38.70
1.85V	436.50	312.00	255.50	222.00	183.50	144.00	119.00	89.20	48.45	38.65

• All mentioned values are average values.

### Trickle (or Float) Service Life



### Capacity Retention Characteristic



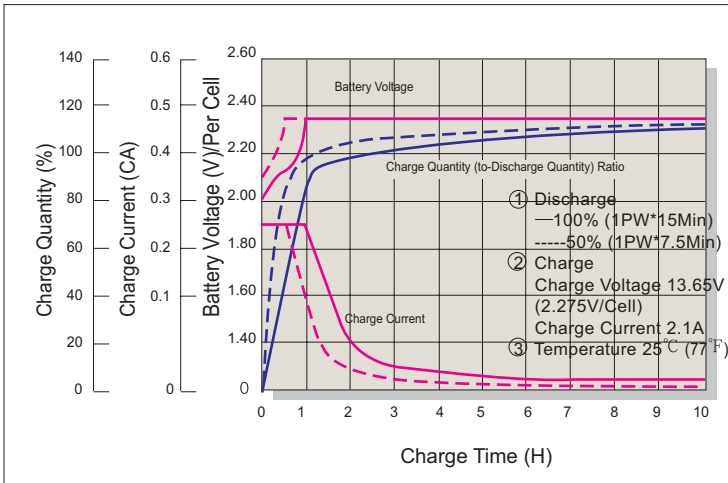
No supplementary charge required (Carry out supplementary charge before use if 100% capacity is required)

Supplementary charge required before use. This supplementary charge will help to recover the capacity and should be made as early as possible.

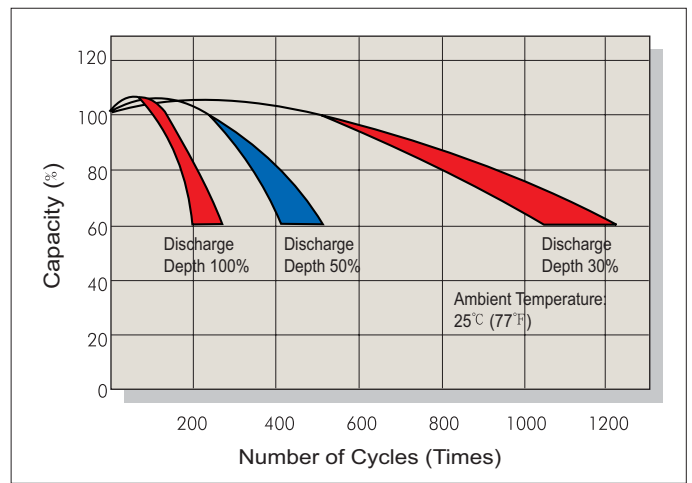
Supplementary charge may often fail to recover the capacity. The battery should never be left standing till this state is reached.

Supplementary charge and storage guidelines

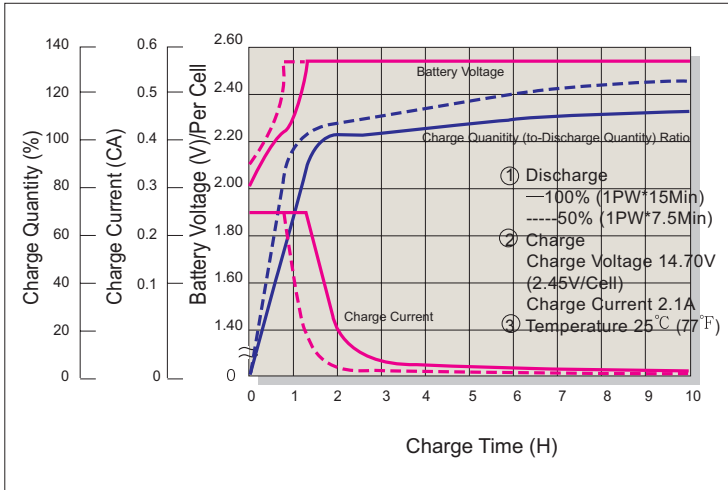
### Battery Voltage and Charge Time for Standby Use



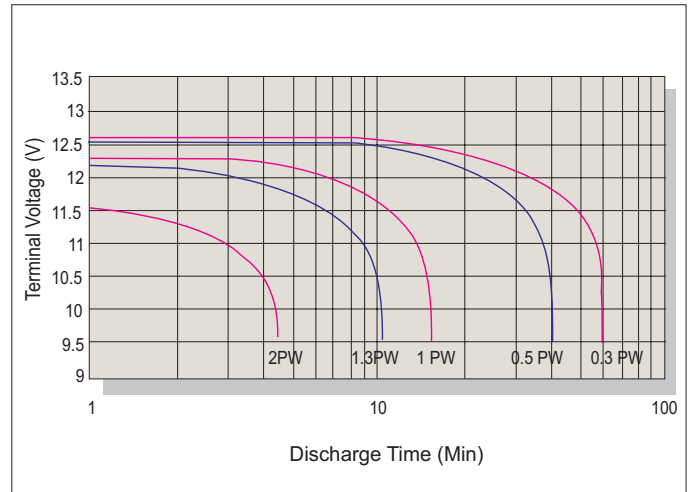
### Cycle Service Life



### 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

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