

# STARMAX

The world's leading battery brand



## HRL SERIES-LONG LIFE **BATTERIES**

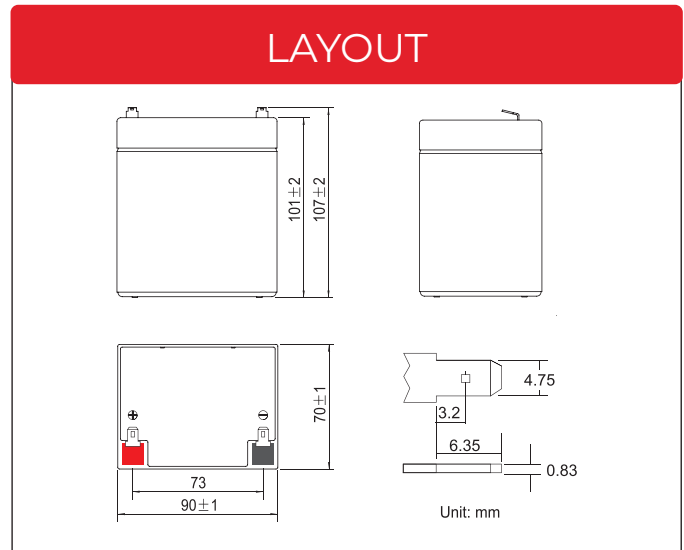
HRL 1224W



[www.starmaxbatteries.com](http://www.starmaxbatteries.com)

# HRL Series

## HRL 1224W



## General Features

- ✓ **High quality AGM separator:** Extend cycle life and prevent micro short circuit
- ✓ **PbCaSn alloy for plate grids:** Less gassing, less self-discharging
- ✓ **Unique vent valve design:** Reduce water losing and prevent air/spark going inside

## Applications

- ✓ UPS
- ✓ Hospitals & Testing Laboratories
- ✓ Emergency Power Supply
- ✓ Industrial Process Control Facilities
- ✓ Banks & Financial Markets
- ✓ Data & Network Operation Centers

## Standards

- ✓ Compliance with IEC 60896 standards
- ✓ Classified as "General Purpose" according to Eurobat
- ✓ CE, UL, IEC Cer tified
- ✓ Manufactured in Starmax, ISO 45001, ISO 9001 and ISO 14001 certified production facilities



# SPECIFICATIONS

Rated Voltage	12V		
Nominal Rate	(W <sub>15</sub> ,1.67V/cell)	24W	
Nominal Capacity	(C <sub>10</sub> ,1.80V/cell)	5.3Ah	
Dimensions	Length	90±1mm (3.54 inches)	
	Width	70±1mm (2.78 inches)	
	Container height	101±2mm (3.98 inches)	
	Total height	107±2mm (4.21 inches)	
Approx. weight	1.88 Kg (4.15 lbs)		
Terminal	T1		
Container material	ABS: UL 94 HB or V-0		
Rated capacity (25°C)	5.30 Ah	(10hr, 0.530A,1.80V/cell)	
	5.20 Ah	(8hr, 0.650A,1.80V/cell)	
	4.90 Ah	(5hr, 0.980A,1.75V/cell)	
	4.50 Ah	(3hr, 1.50A,1.75V/cell)	
	4.78 Ah	(1hr,4.78A,1.67V/cell)	
Max. discharge current	90A		
Internal resistance (25°C)	Approx. 31mΩ		
Operating temp. range	Discharge	-20~55°C (4~131°F)	
	Charge	-20~40°C (-4~104°F)	
	Storage	-15~50°C (5~122°F)	
Nominal operating temp. range	25±3°C (77±5°F)		
Max.Charging Current(25°C)	1.43A		
Charge voltage(25°C)	<b>Charge voltage</b>		<b>Temp. Coefficient</b>
	Float	2.25~2.30V/cell	-3mV/cell/°C
	Equalization	2.30~2.40V/cell	-4mV/cell/°C
Effect of temp. to Capacity	40°C (104°F)		106%
	25°C (77°F)		100%
	0°C (32°F)		86%
Self discharge	≤3%/month @ 25°C		

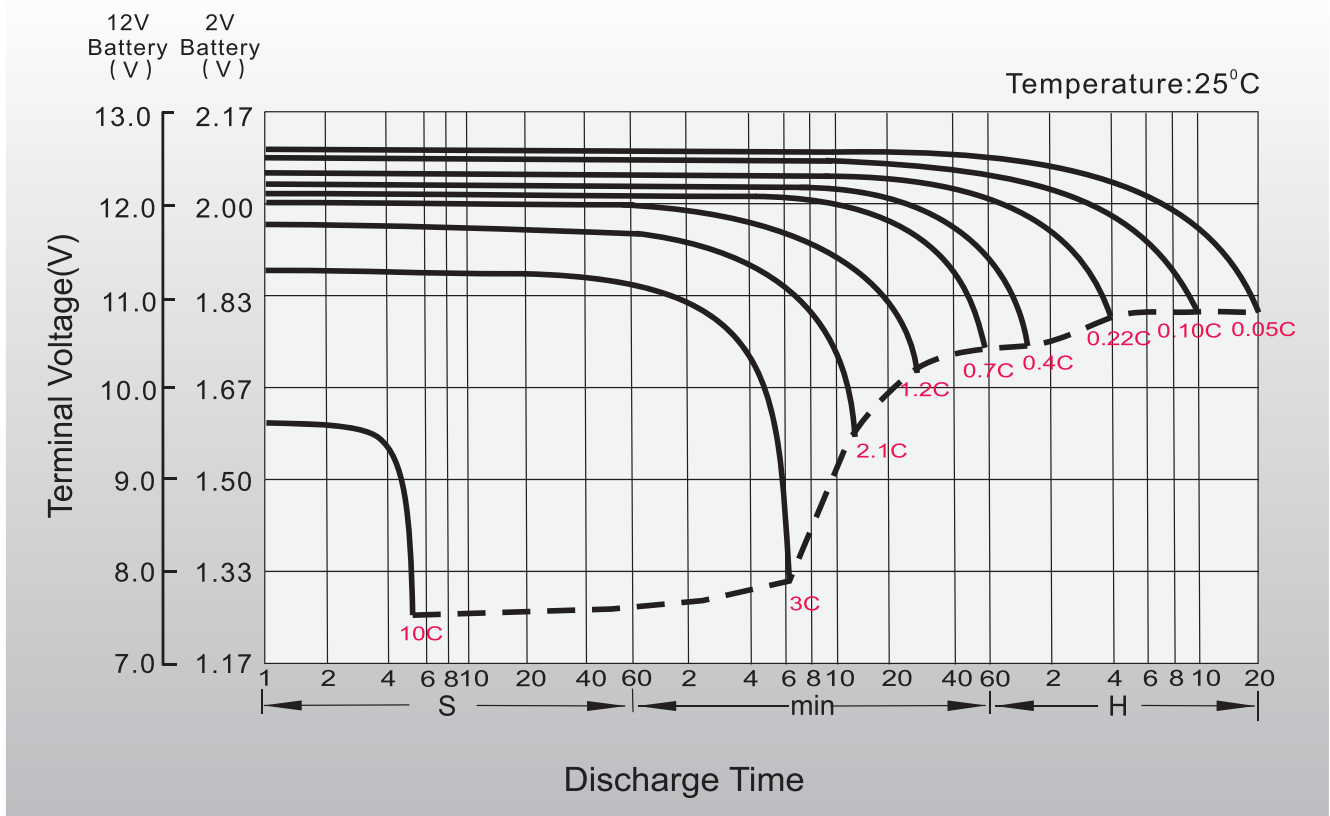
## Constant Current Discharge (Amperes) at 25°C (77°F)

F.V/Time	5min	10min	15min	20min	30min	45min	1h	1.5h	2h	3h	4h	5h	8h	10h
1.85V/cell	17.7	11.8	9.69	7.73	5.43	3.87	3.01	2.25	1.80	1.35	1.07	0.890	0.607	0.497
1.80V/cell	20.7	13.9	11.3	8.90	6.14	4.33	3.33	2.46	1.96	1.46	1.15	0.959	0.650	0.530
1.75V/cell	22.6	14.9	11.9	9.34	6.42	4.51	3.46	2.55	2.02	1.50	1.18	0.980	0.662	0.538
1.70V/cell	24.4	15.9	12.6	9.83	6.70	4.68	3.58	2.63	2.09	1.54	1.21	1.00	0.673	0.547
1.67V/cell	25.5	16.5	13.0	10.1	6.87	4.78	3.66	2.68	2.12	1.57	1.23	1.02	0.680	0.552
1.60V/cell	28.1	17.9	13.9	10.7	7.25	5.03	3.84	2.80	2.21	1.62	1.27	1.05	0.696	0.563

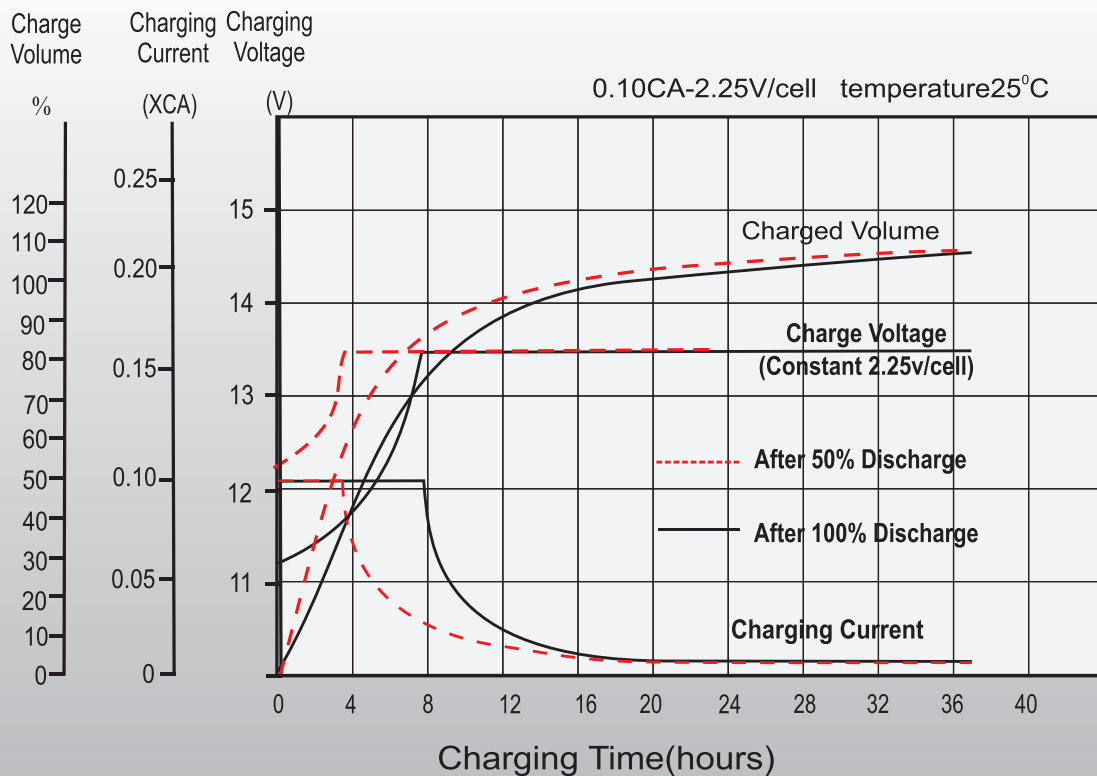
## Constant Power Discharge (Watts/cell) at 25°C (77°F)

F.V/Time	5min	10min	15min	20min	30min	45min	1h	1.5h	2h	3h	4h	5h	8h	10h
1.85V/cell	33.8	22.6	18.6	14.9	10.5	7.51	5.86	4.39	3.52	2.65	2.10	1.75	1.20	0.983
1.80V/cell	38.9	26.3	21.4	17.0	11.8	8.33	6.44	4.78	3.81	2.85	2.25	1.88	1.28	1.05
1.75V/cell	41.9	27.9	22.4	17.7	12.2	8.61	6.63	4.91	3.91	2.91	2.30	1.92	1.30	1.06
1.70V/cell	44.8	29.4	23.5	18.4	12.6	8.86	6.82	5.04	4.01	2.99	2.35	1.96	1.32	1.08
1.67V/cell	46.4	30.3	24.0	18.8	12.9	9.02	6.93	5.12	4.07	3.02	2.38	1.98	1.33	1.09
1.60V/cell	50.5	32.4	25.4	19.7	13.4	9.38	7.20	5.30	4.20	3.12	2.45	2.03	1.36	1.11

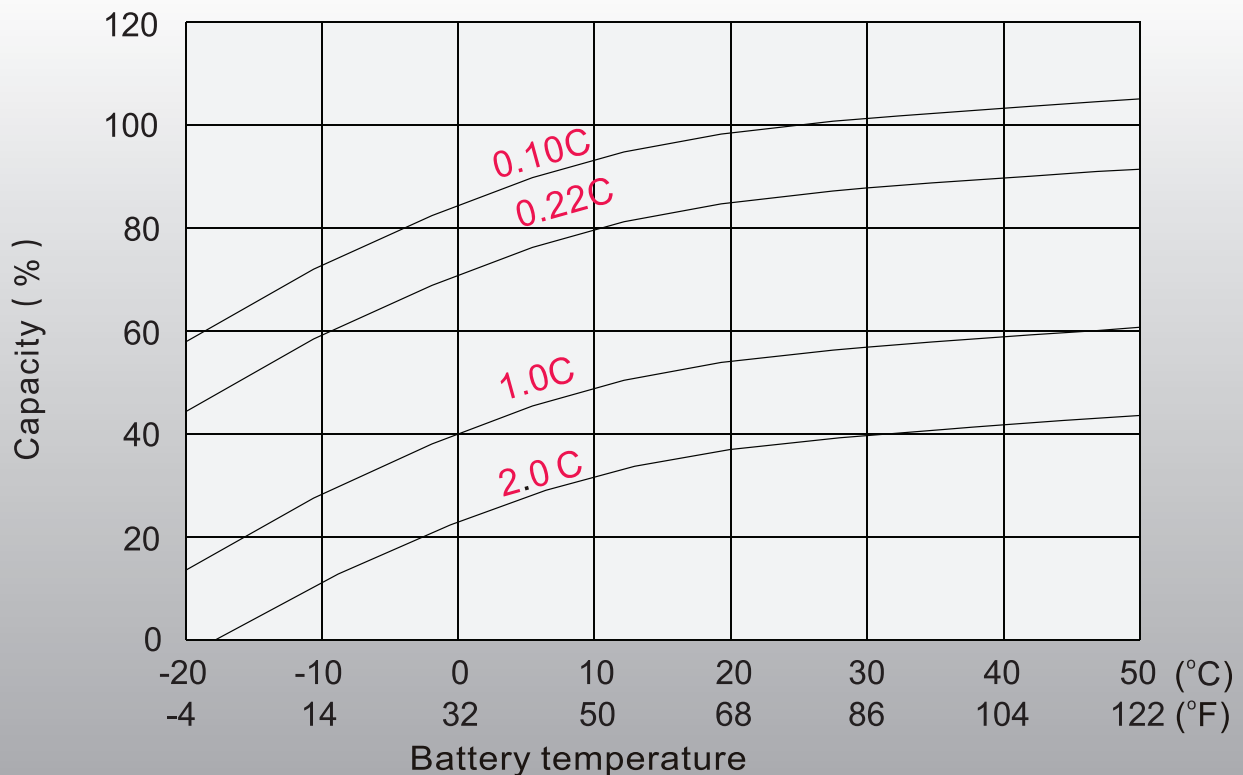
## Discharge Characteristics



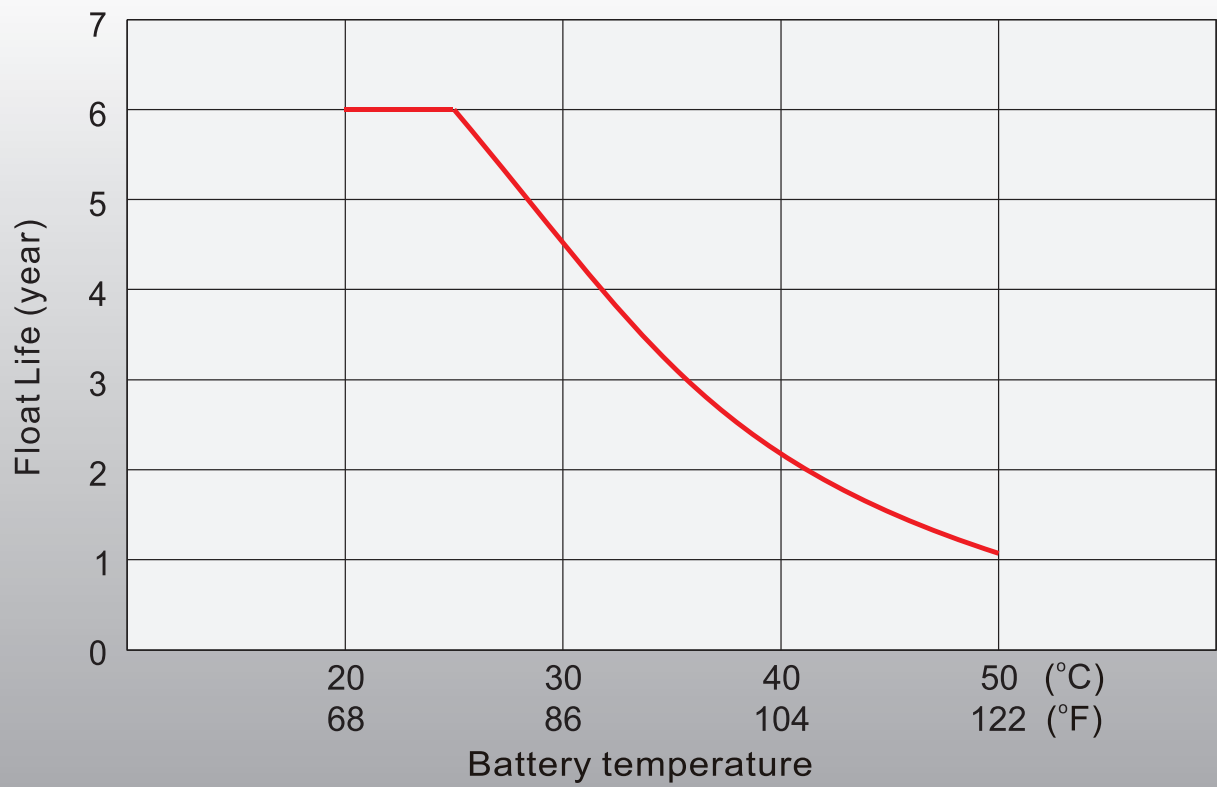
# Float Charging Characteristics



# Temperature Effects in Relation to Battery Capacity



# Effect of Temperature on Long Time Float Life







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