



# MS12-60H (12V 60Ah)

MS12-60H is a general purpose battery with 10 years design life time in float charging use. As with all MASTERSAFE batteries, all MS models are rechargeable, highly efficient, leak proof and maintenance free.

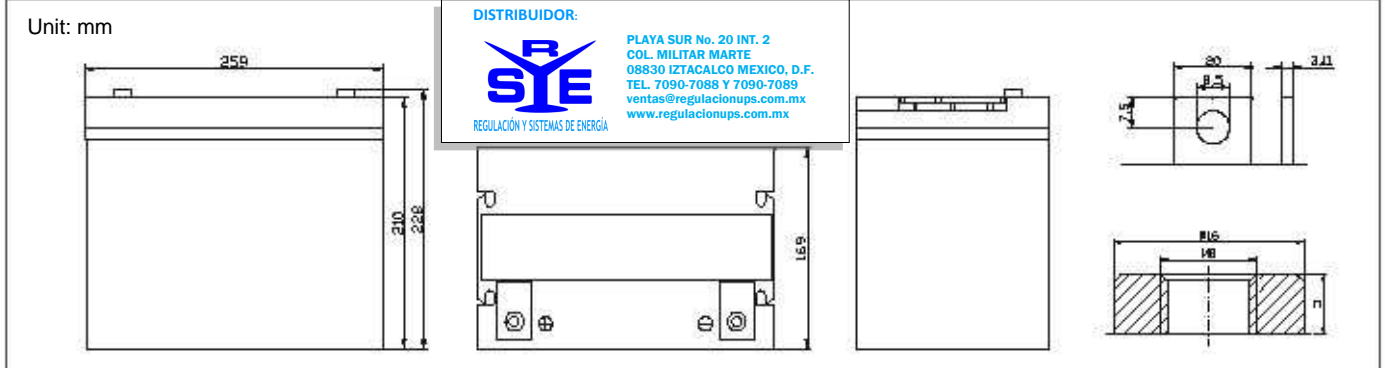


## Specification

Cells Per Unit	6
Voltage Per Unit	12
Capacity	60Ah@10hr-rate to 1.75V per cell @25°C
Weight	Approx. 20.5 Kg
Max. Discharge Current	300 A (5 sec)
Internal Resistance	Approx. 6 mΩ
Operating Temperature Range	Discharge: -20°C -60°C Charge: 0°C-50°C Storage: -20°C-60°C
Normal Operating Temperature Range	25°C ± 5°C
Float charging Voltage	13.6 to 13.8 V DC/unit Average at 25°C
Recommended Maximum Charging Current Limit	18 A
Equalization and Cycle Service	14.4 to 15.0 V DC/unit Average at 25°C
Self Discharge	RITAR batteries can be stored for more than 6 months at 25°C. Please charge batteries before using. For higher temperature, the time interval will be shorter.
Terminal	Terminal F11/F15
Container Material	A.B.S. (UL94-HB) Flammability resistance of UL94-V1 can be available upon request.



## Dimensions



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

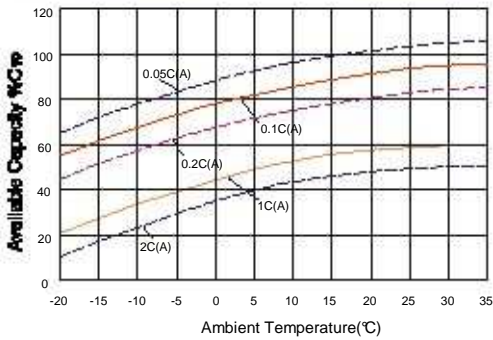
F.V /Time	5MIN	10M IN	15MIN	30M IN	1HR	2HR	3HR	4HR	5HR	8HR	10HR	20HR
1.60 V	224	161	117	69	39.0	23.9	15.7	13.0	10.2	7.4	6.2	3.3
1.67 V	218	153	115	68	38.8	23.8	15.6	12.9	10.1	7.3	6.2	3.2
1.70 V	206	148	113	67	38.5	23.6	15.5	12.8	10.1	7.3	6.1	3.2
1.75 V	185	136	107	66	38.1	23.4	15.4	12.7	10.0	7.2	6.1	3.1
1.80 V	167	124	99	63	37.2	23.0	15.0	12.4	9.8	7.1	6.0	3.1
1.85 V	145	111	89	59	35.3	22.0	14.3	11.8	9.4	6.8	5.8	2.9

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

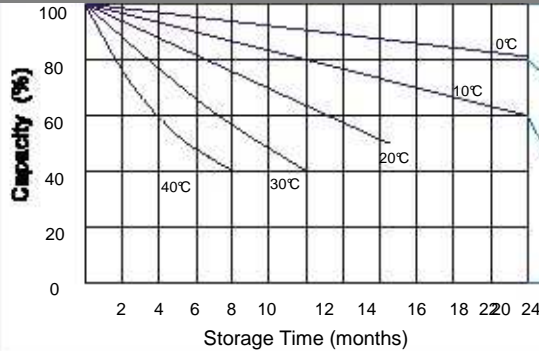
F.V /Time	5MIN	10M IN	15MIN	30M IN	1HR	2HR	3HR	4HR	5HR	8HR	10HR	20HR
1.60 V	402	294	217	130	74.3	45.9	30.1	25.0	19.7	14.3	11.7	6.2
1.67 V	394	281	212	128	74.0	45.7	30.1	24.9	19.6	14.2	11.6	6.1
1.70 V	372	272	209	127	73.4	45.3	29.9	24.8	19.5	14.1	11.5	6.1
1.75 V	335	251	200	124	72.7	44.9	29.7	24.6	19.3	14.0	11.4	6.0
1.80 V	301	228	183	118	70.9	44.2	29.0	23.9	19.0	13.7	11.3	5.9
1.85 V	260	202	164	111	67.2	42.2	27.5	22.8	18.1	13.2	10.9	5.7

All mentioned values are average values.

### Temperature effects curve



### Storage characteristic



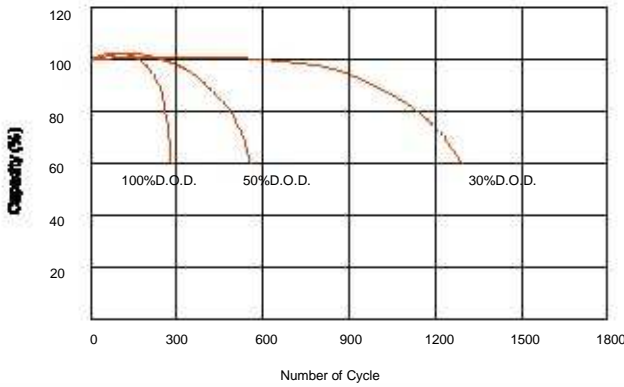
Supplementary charge required (Carry out supplementary charge before use if 100 % capacity is required)

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

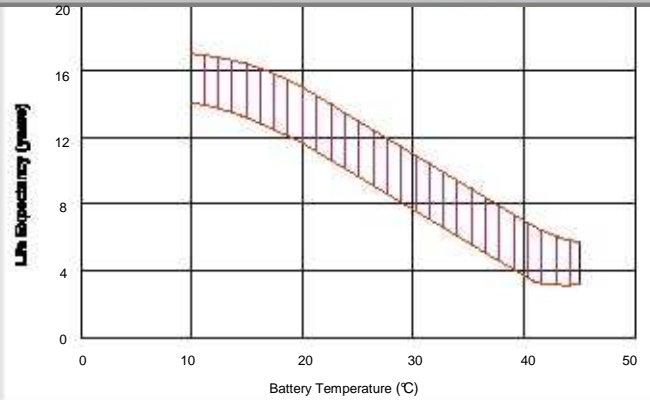
Supplementary charge may often fail to recover the capacity. The battery should never be left standing till this state is reached

Supplementary charge and storage guide lines

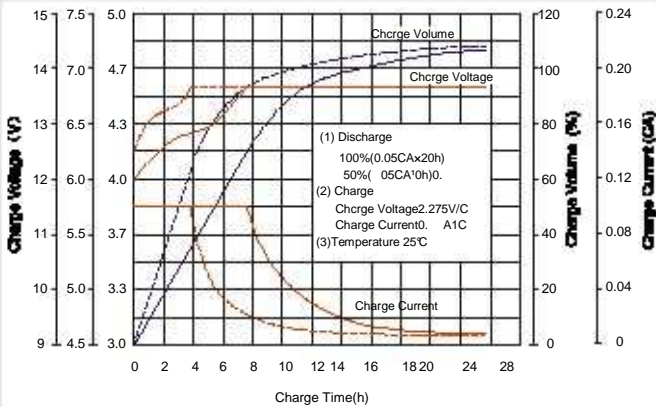
### Life characteristics of cyclic use



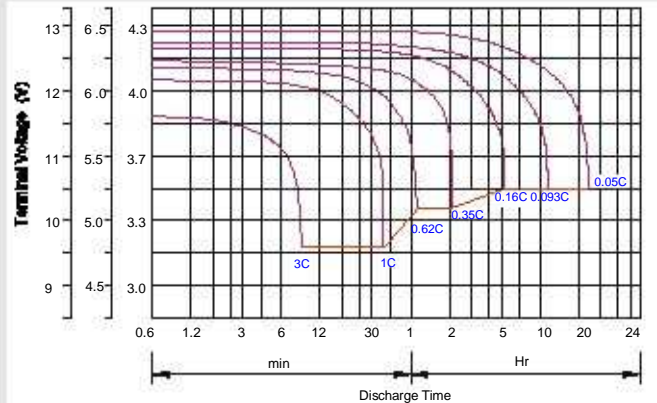
### Effect of temperature on long term float life



### Charge characteristic Curve for standby use



### Discharge characteristic Curve



### Charging Procedures(12V series)

Application	Charge Voltage (V)			Max. Charge Current
	Temperature	Set point	Allowable range	
Cycle Use	25°C	14.7	14.4-15.0	0.3C
Standby	25°C	13.7	13.6-13.8	0.3C

Charge the batteries at least once every six months, if they are stored at t 25°C.

### Charging Method:

Constant Voltage	- 0.2 C x 2 h + 1 4.4-15.0V,24h,Max. Current 0.3CA
Constant Current	-0.2Cx2h +0.1CAx12h
Fast	-0.2Cx2h +0.3CAx4h

### Discharge Current VS. Discharge Voltage

Final Discharge Voltage V/cel l	1.75V	1.7 0V	1.60V
Discharge Current (A)	( A )" 0.2C	0.2C< (A) <1.0C	(A) •1.0C

### Charging Procedures(6V series)

Application	Charge Voltage (V)			Max. Charge Current
	Temperature	Se t point	Allowable range	
Cycle Use	25°C	7.35	7.25-7.45	0.3C
Standby	25°C	6.85	6.8-6.9	0.3C

### DISTRIBUIDOR:



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