

ES series

Pasted High Technology
Electrolyte Suspension lead-acid Battery



ES series



Applications

Cycle use

Various Portable Equipment / Medical Instruments /
Cameras & Photographic / Equipment /
Portable Digital Instruments / Personal Computers /
Powered Toys /
Renewable Energy System(Solar & Wind Power)/
Lighting Equipment

Standby use

Security Alarm Systems / Fire Alarm Systems /
Computer Back-up / Emergency Lighting /
UPS Systems / Communication Equipment /
OA/FA/HA Equipment

Product Characteristics

- No-Spill Sealed Construction
- Absorptive Glass Mat System(AGM System)
- Container & Cover : Acid-resistant ABS resin
Option : UL94-V0 = ABS
- Gas Recombination
- Maintenance-Free Operation
- Low Pressure Venting System
- Heavy-Duty Grids
- Low Self-Discharge / Long Shelf Life
- Wide Operating Temperature Range
- High Recovery Capacity
- Design life 8~10 years at 25°C

Certificate

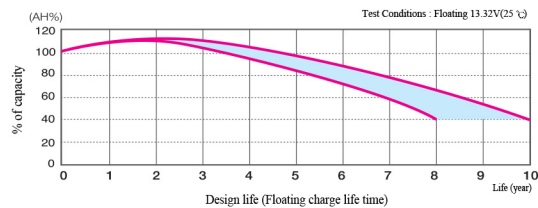


- ISO 9001
- ISO 14001
- TSE(TURKEY STANDARD)

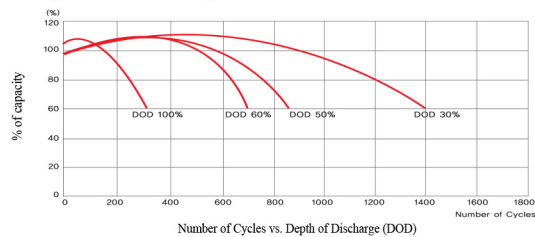
ESH



Design Life



Cycle Lifetime by DOD

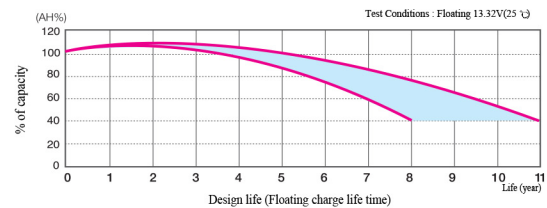


ESL

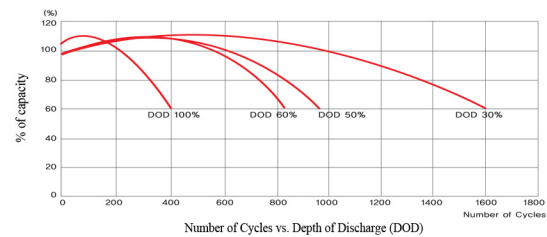
ES Long - Life



Design Life



Cycle Lifetime by DOD



ESH Specification

Model	Nominal Voltage (V)	Capacity (AH)					Dimension (mm)				Weight (kg)	Terminal type
		10HR 1.80 (V/Cell)	5HR 1.70 (V/Cell)	3HR 1.67 (V/Cell)	1HR 1.60 (V/Cell)	0.5HR 1.60 (V/Cell)	Length (L)	Width (W)	Height (H)	Total Height (TH)		
ESH 30-12	12	30	25.5	23.1	18.0	15.0	192	132	170	170	9.3	BOLT TERMINAL
ESH 40-12	12	40	34.0	30.8	24.0	20.0	197	165	170	170	12.8	
ESH 65-12	12	65	55.3	50.1	39.0	32.5	325	166	174	174	20.9	
ES80H-12	12	80	68.0	61.5	48.0	37.5	332	174	229	229	24.7	
ES100H-12	12	100	87.5	81.1	61.8	47.5	332	174	229	229	28.7	
ESH 100-12	12	100	92.0	83.0	65.0	50.0	443	167	204	237	32.0	
ESH 130-12	12	130	119.0	108.0	85.0	65.0	550	167	204	237	40.0	
ESH 150-12	12	150	137.0	124.0	98.0	75.0	520	269	203	237	50.0	
ESH 200-12	12	200	183.0	166.0	130.0	100.0	520	269	203	237	60.0	

* Above specifications subject to change without prior notice

ESL Specification

Model	Nominal Voltage (V)	Capacity (AH)					Dimension (mm)				Weight (kg)	Terminal type
		10HR 1.80 (V/Cell)	5HR 1.70 (V/Cell)	3HR 1.67 (V/Cell)	1HR 1.60 (V/Cell)	0.5HR 1.60 (V/Cell)	Length (L)	Width (W)	Height (H)	Total Height (TH)		
ESL 40-12	12	40	34.0	30.8	24	20.0	197	165	170	170	13.4	BOLT TERMINAL
ESL 65-12	12	65	55.3	50.1	39	32.5	325	166	174	174	21.2	
ESL 100-12	12	100	92.0	83.0	65	50.0	443	167	204	237	34.5	
ESL 130-12	12	130	119.0	108.0	85	65.0	550	167	204	237	43.0	
ESL 150-12	12	150	137.0	124.0	98	75.0	520	269	203	237	52.9	
ESL 200-12	12	200	183.0	166.0	130	100.0	520	269	203	237	64.5	

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PERFORMANCE DATA

Battery Capacity Selection

Figure 1 below may be used to determine the minimum battery capacity requirement in Ampere Hour(AH). To determine the capacity required, specify the discharge current and the length of time required for discharge. Select the specified current and time on the chart. The point where the current and time lines intersect on the chart with the diagonal AH line is the minimum capacity required for the application.

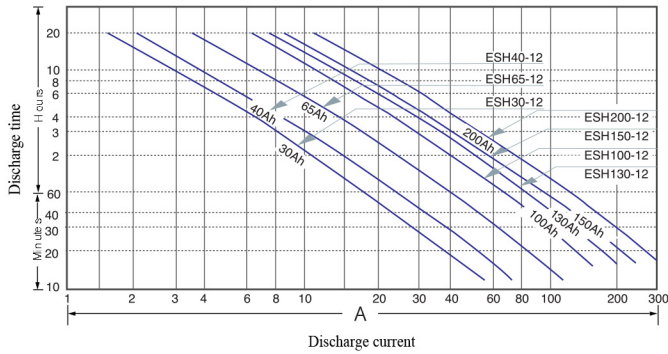


Figure 1. 10-Hour Rate Capacity Selection Chart

Charge Characteristics

1. New batteries can be used without charging, however batteries put into service long after the manufacturing date may need to be charged.
2. During charging, the ambient temperature should be in the 0-40 °C range. If the surface temperature exceeds 50 °C, charging should stop and resume when the temperature drops below 40 °C.
3. Observe polarity when connecting.
4. There are two charge methods depending on usage conditions.

Using Type	Charging Voltage(V)	Compensation Voltage(mV/°C)	Max. initial Charging (C)	Charge Time (H)		Recommended Temp. °C
				After 100% Discharge	After 50% Discharge	
Floating Use	12V Battery 13.32	-18	0.25	24	20	15-35 °C
Cycle Use	12V Battery 14.40	-24	0.25	16	10	

Temperature Characteristics

The diffusion rate of electrolytes, reaction rate of active materials in the plates and the discharge capacity are affected in direct proportion to the ambient temperature.

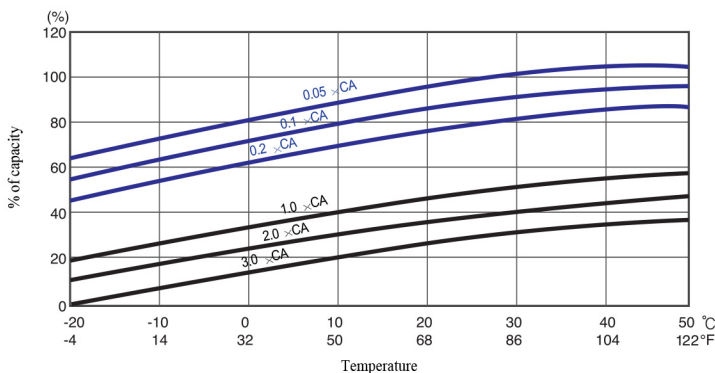


Figure 2. Relation between temperature and discharge capacity

Discharge Characteristics Diagram

The curves shown in Figure 3 illustrate the typical ESH battery discharge features at an ambient temperature of 25 °C (77 °F). The symbol 'C' expresses the nominal capacity of the battery measured at a 10-hour discharge rate.

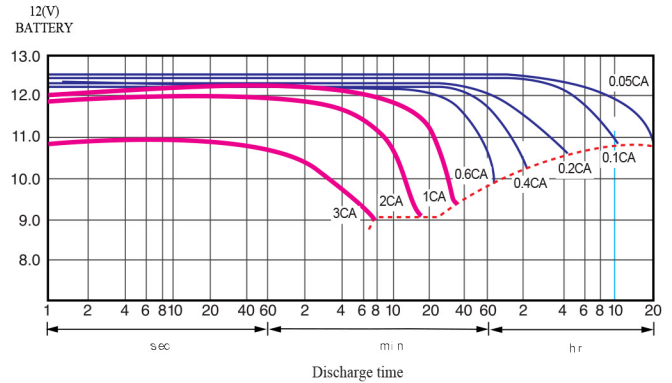


Figure 3. Discharge characteristics diagram at 25 °C (77 °F)

Temperature and Floating Charge Characteristics

Floating charge voltage set-up depending on temperature

※ Floating charge voltage: 13.32V(25 °C)

※ If the ambient temperature is too high, this may cause deterioration in battery performance, damage or deformation.

The charge voltage should therefore be lowered in order to prevent over charging.

Floating charge voltage (V) = Optimal floating charge voltage(V) × No. of blocks

Temperature	-10 °C	0 °C	10 °C	20 °C	25 °C	30 °C	35 °C	40 °C
Floating use (V)	13.95V	13.77V	13.59V	13.41V	13.32V	13.23V	13.14V	13.05V
Cycle use (V)	14.51V	14.48V	14.45V	14.42V	14.40V	14.39V	14.37V	14.36V

When the ambient temperature is higher than 25 °C (77 °F), the float charge voltage would be adjusted according to the temperature compensation formula listed above.

Self-discharge Characteristics Diagram

The self-discharge rate of ES batteries is approximately 2.5% per month when batteries are stored at an ambient temperature of 25 °C (77 °F). The self-discharge rate varies with ambient temperature. Figure 4 shows the relation between the storage time at various temperatures and the remaining capacity.

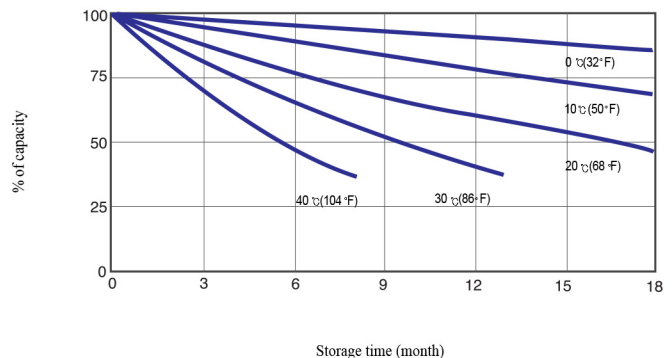


Figure 4. Self-discharge characteristics diagram