PHOENIX BATTERIES

Precautions for Safe Use

•To use the battery safely and properly, be sure to read the instruction manual before use.

⚠ Danger

A

- For stationary batteries, ensure that the room is well ventilated so that the hydrogen concentration is 0.8% or less. Failure to do so may cause fire or explosion.
- Do not install the battery in a poorly-ventilated area where the hydrogen concentration becomes 0.8% or more, or near open flame. Doing so may cause fire or explosion.

/^Caution

- The service temperature range of the battery is from -15 to 45° C. Using the battery outside this range may accelerate deterioration or cause the battery to freeze or overheat, resulting in damage or deformation.
- Do not use this battery where it is exposed to direct sunlight. Doing so may cause the parts of the battery to deteriorate.
- Do not expose the battery to water or seawater. Doing so may cause damage to the battery or fire, or cause the terminals or connecting plates to corrode.
- Do not use the battery near a heat source. Doing so may cause damage to the battery or cause the battery life to shorten.
- Do not use the battery in dusty areas. Doing so may cause a short-circuit.
- Charge the battery under the charging conditions recommended by Furukawa Battery. Failure to do so may result in insufficient charging, electrolyte leakage, temperature rise, explosion, deterioration in performance, or reduced service life.
- Install the battery horizontally with the terminals facing up and ensure that the battery is not tilted more than 90°. Failure to do so may cause electrolyte leakage.
- Ensure that the maximum discharge current is not exceeded for more than 1 minute for $6C_{10}$ (A) or for more than 5 seconds for $12C_{10}$ (A). Failure to do so may cause damage to the battery.
- Periodically inspect the battery. If the results deviate from the standards specified in the instruction manual, follow the steps in the instruction manual. Using the battery with such deviations may cause damage to the battery, or burnout.

CERTIFIED MANAGEMENT SYSTEM JQA QUALITY SYSTEM

IS09001 Certifed
JQA-1118
(THE FURUKAWA BATTERY CO, LTD.)

CERTIFIED MANAGEMENT SYSTEM JQA ENVIRONMENTAL SYSTEM

IS014001 Certifed
JQA-EM0380
(Iwaki and Imaichi Plants)

'Actual colors may differ slightly from those in the photo due to printing limitations.

• Contact Information

THE FURUKAWA BATTERY* CO., *LTD.

BLE15a

TP-1408-2B-05

FB FURUKAWA BATTERY

High-rate Discharge Type Valve-regulated Stationary Lead-acid Batteries

FVH Series

FURUKAWA BATTERY

FVH SERIES

FVH series are the optimum lead-acid batteries for large-capacity UPS.

IT(Information Technology) revolution based on computers is supported by UPS (Uninterruptible Power Supply), which generates stable alternating current. UPS must be equipped with highly reliable, safe and cost-effective batteries. These batteries must have high discharge capacity (generates large current discharge for short period) since the back-up time of UPS is usually 5 to 10 minutes. The FVH series, having much superior discharge capacity to the MSE type, are optimum for UPS. The compact and light-weight FVH series need smaller installation space.

SKThe MSE-type batteries are standard valve-regulated stationary lead-acid batteries in Japan.

521002^030

Features

•High-performance discharge capacity (large-current discharge) for short period

The increased plate surface area and optimized grid shape used for the FVH Series have improved the current-collection efficiency and reduced the resistance of the separators, thereby providing significantly improved high-rate discharge characteristics. (The amount of current that can be discharged over 10 minutes is about 1.75 times greater than that of the MSE Series.)

•Space saving

The improved high-rate discharge characteristics of the FVH Series enables lower capacity batteries to be used in UPSs, enabling space savings to be made. The required installation area is 42 to 80% smaller than that required when MSE Series batteries are used.
(In comparison with other Furukawa products when housed in a cubicle.)

•Monoblock Structure (Heat sealing and resistance welding)

Featuring a monoblock structure and offering excellent high-rate discharge characteristics, the FVH-100-12 and FVH-150-8 enable reductions to be made to the installation footprint and the weight of the assembled batteries.

•Easier installation

The use of a terminal structure with nut-insert type poles has reduced the time required to tighten the terminals. (Excludiug FVH-50-12)

•Compatible with the MSE Series

The FVH-50-12, FVH-200 and FVH-300 are manufactured with the same dimensions as MSE Series batteries so as to achieve compatibility with the MSE Series.

•Same battery life as the MSE Series even when discharged at a high rate

A high corrosion-resistant alloy is used as the positive grid material for the FVH Series, providing the same expected life as the MSE Series (7 to 9 years) even when discharged at a high rate [25°C, 3.3 C_{10}A discharge].

※ An "expected life" is a life on condition of a fixed operating condition and maintenance management.
In addition, real tenure of use is not guaranteed from the life which can be expected in the ambient air temperature of 25°C, and floating charging voltage 2.23V / cell when the number of times of electric discharge is a years time grade.

Applications

• UPS (Uninterruptible Power Systems)

FVH Specifications

Type	Nominal voltage (V)	Capacity (Ah)			Dimensions (Approx, mm)				Weight (Approx, kg)
		10-hour rated capacity (Ah/10HR)	10-minute rated capacity (Ah/10 MR)	10-minute rated current (A)	Total height	Container height	Length	Width	
FVH-50-12	12	50	28.3	170	220	190	363	128	25
FVH-200	2	200	113	680	347.5	322.5	106	170	18
FVH-300	2	300	170	1020	347.5	322.5	150	170	25
FVH-100-12	12	100	55.3	332	353	340	322	165	50
FVH—150-8	8	150	83	498	353	340	311	165	49

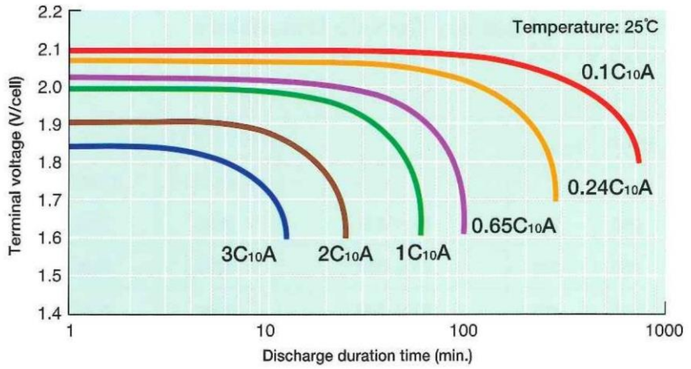
Superiority of FVH to MSE

Type / Item	FVH Series			MSE Series		
	FVH-50-12	FVH-200	FVH-300	MSE-50-12	MSE-200	MSE-300
Amount of current that can be discharged for 5 minutes (A)Note	215	865	1300	113.8	455	682
Amount of current that can be discharged for 10 minutes (A) Note	170	680	1020	94.3	377	566
Terminal material (shape)	Lead alloy (L-shape)	Brass Nut-insert		Lead alloy (L-shape)		
Terminal connection method	Tightened from the side with a bolt and nut	Tightened from the top with a bolt		Tightened from the side with a bolt and nut		
Float voltage (V/cell)	2.23			2.23		

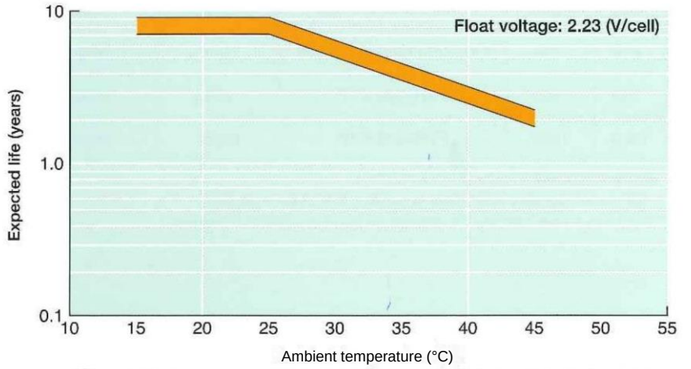
Note: 25℃; Cut-off voltage: 1.6 V/cell

Characteristics

Discharge Characteristics with Varying Discharge Rate

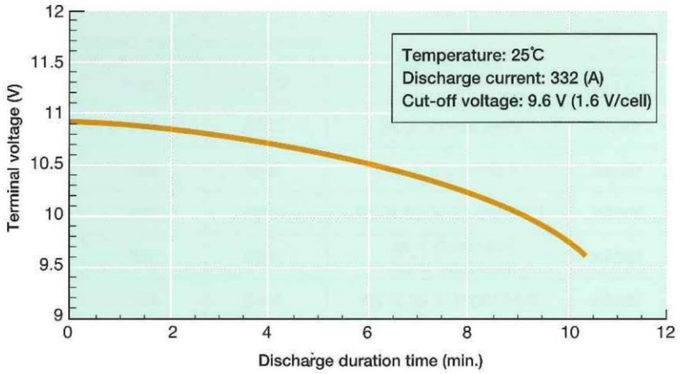


Relationship between Temperature and Battery Life

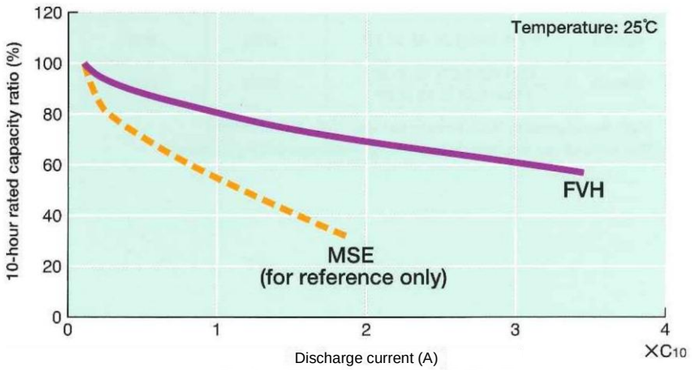


※These values are estimated based on accelerated life testing results, and are not guaranteed values.

10-minute rate discharge characteristics FVH-100-12 (example)



Relationship between Discharge Current and Capacity



^Cw is a value of 10-hour rated capacity.

Battery Cubicle Dimensions

^Example of Battery Cubicle Dimensions

Example of Battery Cubicle Dimensions (360 V/180 cells assembly)

UPS power (kVA)	FVH Series				
	Capacity (Ah/10HR)	Type	Dimensions for Battery Cubicle (Approx, mm)		
			Width	Depth	Height
200	200	FVH-200	2000	1000	1950
250	300	FVH-300	2800	1000	1950
300	300	FVH-300	2800	1000	1950
400	400	FVH-200 X2P	4000	1000	1950
500	500	FVH-200+FVH-300	5000	1000	1950
600	700	FVH-200X2P+FVH-300	7000	1000	1950
750	900	FVH-300 X3P	7600	1000	1950
1000	1200	FVH-300 X4P	10800	1000	1950

* When the backup time is 10 minutes (25°C)
* X2P: two in parallel; X3P: three in parallel; X4P: four in parallel
* This table shows example dimensions for Furukawa Battery Cubicles.

^Dimensions of Battery Cubicle for FVH-1 00-12/FVH-l 50-8 Example)

Example Dimensions of Battery Cubicle for FVH-100-12/FVH-150-8 (360 V/180 cells assembly)

Assembled battery capacity (10 HR)	Battery Type	Dimensions for Battery Cubicle (Approx, mm)			Total mass / Approx, kg \ yper assembly)	Installation area (Approx, m^2)	Floor load (Approx, t/m^2)
		Width	Depth	Height			
100Ah	FVH-100-12 X 30	1300	850	1950	1,900	1.11	1.7
150Ah	FVH-150-8 X 45	1900	850	1950	2,805	1.62	1.7
200Ah	FVH-100-12 X 30 X 2P	2200	850	1950	3,660	1.87	2.0
250Ah	FVH-100-12 X 30 FVH-100-8 X 45	3000	850	1950	4,635	2.55	1.8
300Ah	FVH-150-8 X 45 X 2P	3300	850	1950	5,400	2.81	1.9
350Ah	FVH-100-12 X 30 X 2P FVH-150-8 X 45	4100	850	1950	6,465	3.49	1.9
400Ah	FVH-100-12 X 30 X 4P	4400	850	1950	7,320	3.74	2.0
450Ah	FVH-150-8 X 45 X 3P	4750	850	1950	8,115	4.04	2.0
500Ah	FVH-100-12 X 30 X 2P FVH-150-8 X 45 X 2P	5500	850	1950	9,060	4.68	1.9

* X2P: two in parallel; X3P: three in parallel; X4P: four in parallel
* This table shows example dimensions for Furukawa Battery Cubicles.

MEMO

PHOENIX
BATTERIES

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