Small-Size Valve Regulated Lead-Acid Batteries

Small-Size Valve Regulated Lead-Acid Batteries

m series FML series FLH series FPX series

ISO9001 Certified
JQA-1118
(THE FURUKAWA BATTERY CO., LTD.)

ISO14001 Certified
JQA-EM0380
(Iwaki and Imaichi Plants)

* Actual colors may differ slightly from those in the photos due to printing limitations.

●Contact Information

THE FURUKAWA BATTERY CO., LTD.

Head Office
2-4-1 Hoshikawa, Hodogaya-Ku, Yokohama City, Kanagawa Prefecture 240-0006 JAPAN
http://www.furukawadenchi.co.jp

Information contained in this catalogue is current as of July 2014
and may be subject to change without notice.

FURUKAWA BATTERY

Energy & Communication

Small-Size Valve Regulated Lead-Acid Batteries

Overview

The shift to an IT-based society has led to an even greater use of electronic equipment. Our small-sized valve regulated lead-acid batteries are ideally suited to use in electronic devices. These batteries do not use a flowing electrolyte, eliminating concerns regarding the possibility of electrolyte leakage unless they are tilted more than 90 degrees from the upright position. This means that our batteries can be mounted horizontally. In addition, oxygen and hydrogen gases produced electrolytically at the end of a charging cycle from the water content in the electrolyte are absorbed in the battery, resulting in very little gas being produced.

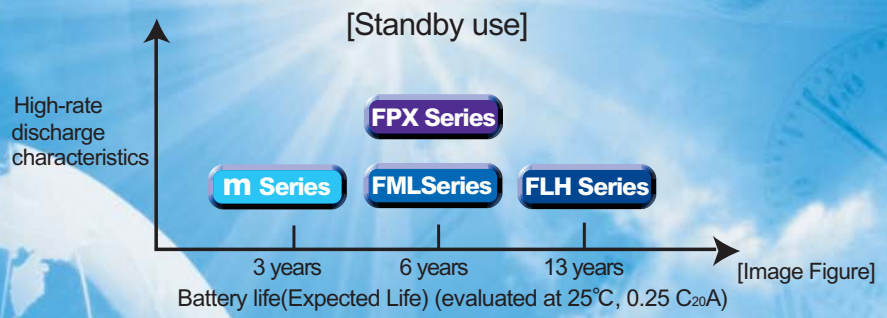
We began research and development into lead-acid batteries in the 1950s and started mass-production in 1970.

Since then, we have continued to improve their performance so as to keep up with the times and advances made in electronics. Many of the disadvantages of conventional lead-acid batteries have now been overcome, allowing us to offer a brand new line-up of lead-acid batteries.

In order to meet our customers' requests, we will continue our efforts to realize the development of higher-performance lead-acid batteries that will offer customers higher added value, and work to develop more sophisticated production technologies. Our Imaichi Plant, which produces small-sized valve regulated lead-acid batteries, was awarded ISO 9001 certification, an internationally recognized standard for quality management systems, in October 1996. The plant is equipped with an integrated production system that extends from development to final inspection, which continuously ensures high reliability. The Imaichi Plant was also awarded ISO 14001 certification, an internationally recognized standard for environment management systems, in June 1999. It produces environmentally friendly products using environmentally friendly production processes.

ISO9001 Certified
JQA-1118
(THE FURUKAWA BATTERY CO., LTD.)

ISO14001 Certified
JQA-EM0380
(Iwaki and Imaichi Plants)



Category	Series	Voltage	Capacity	Expected life	Loading time	Features	Applications
General-purpose batteries	m Series	6	10	Note 1 Approx. 3 years	0.5～20(h)	・Standard type with various capacity ranges ・Models with flame-retardant containers available	Standby use ・Communication devices ・Emergency lighting systems ・Robots, control devices, and other factory automation devices ・Firefighting equipment ・CATV, optical communication devices ・PHS base stations, microcell base stations ・Disaster and crime prevention systems, etc.
		12	2.0、7.2、15、17、24、38				
Long-life batteries	FML Series	12	0.8、2.0、4、7、17、	Note 1 Approx. 6 years	0.5～20(h)	・Offers approximately twice the service life of m Series batteries. ・Flame-retardant containers used for all models. ・Longer container life	
Ultra long-life batteries	FLH Series	12	2、7、15、24、40、65	Note 1 Approx. 13 years	0.5～20(h)	・Offers approximately five times the service life of m Series batteries. ・Flame-retardant containers used for all models. ・Longer container life	
High-rate discharge batteries	FPX Series	12	5.5、7.5、8.8	Note 2 Approx. 3 years	0.05～1(h)	・Significantly improved high-rate discharge characteristics enable a more compact design. ・Offers approximately twice the service life of m Series batteries at high-rate discharge. ・Flame-retardant containers used for all models. ・Longer container life	・UPS, etc
			10、17、24、38	Note 2 Approx. 5 years			

[Standby use]

Note 1: Trickle life at a constant temperature of 25℃, obtained from a high-temperature accelerated life test. The capacity test was carried out at 0.25 C_{20}A, and the battery is determined to have reached the end of its life when its capacity reaches half the rated capacity (20 HR).

Note 2: Trickle life at a constant temperature of 30℃, obtained from a high-temperature accelerated life test. The capacity test was carried out at 3 C_{20}A, and the battery is determined to have reached the end of its life when its discharge duration time reaches 3 minutes.

Note 3: An "expected life" is a life on condition of a fixed operating condition and maintenance management.
Since the life of an actual storage battery changes for operating conditions (service temperature, discharge frequency, discharge rate, charge conditions, etc.) or a use history, an "expected life" does not guarantee real tenure of use.

✱ " C_{20} " indicates theValue of rated capacity at a 20-hour rate .

General-purpose Batteries

m series

Features

- **Standard type**
  Voltages of 6 or 12 V and capacities of 2 Ah to 38 Ah are available, allowing our customers to select the capacity best suited to their needs.
- **Standby use**
  The expected life in standby use is approximately 3 years (25℃, 0.25 C_{20} discharge).
- **Models made using flame-retardant resin available**
  Models with "B" at the end of the model number have flame-retardant (UL94V-0) containers.
- **UL certified (Batteries, Standby-Component): No. MH16658.** Note: Not all models are UL-certified.

Applications

- **Standby use**
  Communication devices, emergency lighting systems, factory automation devices (robots, control devices, etc.), firefighting equipment, CATV/optical communication devices, PHS base stations, microcell base stations, disaster and crime prevention systems, etc.

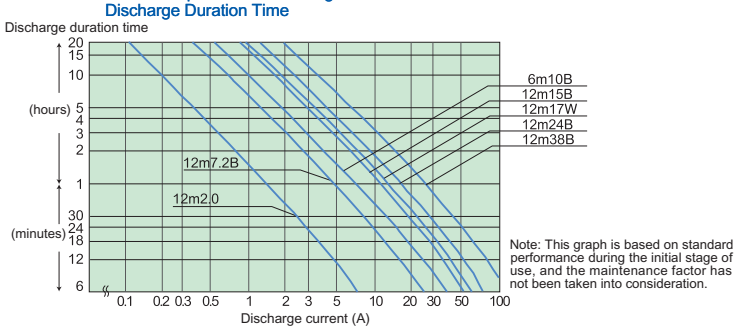
m Series Specifications

Items / Type	Nominal voltage (V)	Rated capacity (Ah/20HR)	Dimensions (mm) Total Height (Max.)	Container Height	Width	Length	Approx. mass(g)	Terminal shape	Terminal position	Flame-retardant container	Maximum discharge current (5 seconds)	Battery system type certification	UL certification
6m10B	6	10.0	102	94±2	50±1	151±1	1800	F2	1	○	150	○	– –
12m2.0		2.0	65.5	64.5±1	27±1	152±1	700	W	6	– –	12	○	○
12m7.2B		7.2	102	94±2	65±1	151±1	2700	F1	3	○	108	○	– –
12m15B	12	15.0	169	167±2	76±1	181±1	5800	B1	5	○	225	○	– –
12m17W		17.0	169	167±2	76±1	181±1	5900	B1	5	– –	255	○	– –
12m24B		24.0	127	125±2	166±1	175±1	7800	B1	5	○	360	○	– –
12m38B		38.0	172.5	171±1.5	165±1.5	197±1.5	14300	B2	5	○	570	○	– –

Bolt fastening terminal B1: M5 (t = 2); B2: M5 (t = 5) (t: terminal thickness)
✱ A producing district changes with Types. Lead wires W／ Faston terminal F1: 187 series; F2: 250 series

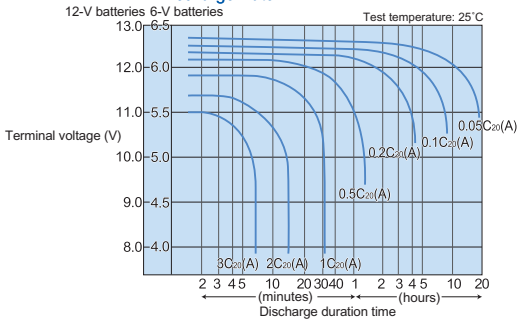
Characteristics

●Relationship between Discharge Current and Discharge Duration Time

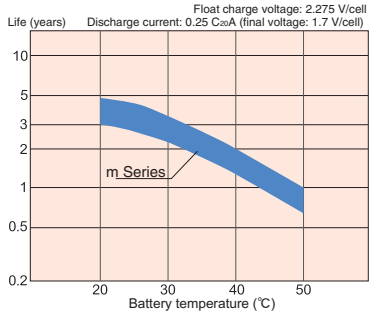


Note: This graph is based on standard performance during the initial stage of use, and the maintenance factor has not been taken into consideration.

●Discharge Characteristics with Varying Discharge Rate



●Temperature-Life Characteristics



✱ Life years are the expected life presumed based on the accelerated life test result of our company, and are not a guaranteed performance.An expected life changes also according to discharge conditions or charge conditions.

m SERIES ELECTRICAL CHARACTERISTICS (Ampere)

Temperature:25°C

Battery type	Final Voltage V(V/cell)	Discharge Time (min) 15	30	60	120	180	240	300	360	480	600
6m10B	10.8 (1.8)	14.1	9.09	5.56	3.28	2.38	1.90	1.59	1.35	1.05	0.91
	10.2 (1.7)	15.6	9.80	6.06	3.57	2.56	2.08	1.72	1.47	1.15	0.95
	9.6 (1.6)	16.7	10.4	6.45	3.77	2.70	2.17	1.79	1.54	1.19	1.00
12m2.0	10.8 (1.8)	2.82	1.82	1.11	0.66	0.48	0.38	0.32	0.27	0.21	0.18
	10.2 (1.7)	3.13	1.96	1.21	0.71	0.51	0.42	0.34	0.29	0.23	0.19
	9.6 (1.6)	3.33	2.08	1.29	0.75	0.54	0.43	0.36	0.31	0.24	0.20
12m7.2B	10.8 (1.8)	10.1	6.55	4.00	2.36	1.71	1.37	1.14	0.97	0.76	0.65
	10.2 (1.7)	11.3	7.06	4.36	2.57	1.85	1.50	1.24	1.06	0.83	0.69
	9.6 (1.6)	12.0	7.50	4.65	2.72	1.95	1.57	1.29	1.11	0.86	0.72
12m15B	10.8 (1.8)	21.1	13.6	8.33	4.92	3.57	2.86	2.38	2.03	1.58	1.36
	10.2 (1.7)	23.4	14.7	9.09	5.36	3.85	3.13	2.59	2.21	1.72	1.43
	9.6 (1.6)	25.0	15.6	9.68	5.66	4.05	3.26	2.68	2.31	1.79	1.50
12m17w	10.8 (1.8)	23.9	15.5	9.44	5.57	4.05	3.24	2.70	2.30	1.79	1.55
	10.2 (1.7)	26.6	16.7	10.3	6.07	4.36	3.54	2.93	2.50	1.95	1.62
	9.6 (1.6)	28.3	17.7	11.0	6.42	4.59	3.70	3.04	2.62	2.02	1.70
12m24B	10.8 (1.8)	33.8	21.8	13.3	7.87	5.71	4.57	3.81	3.24	2.53	2.18
	10.2 (1.7)	37.5	23.5	14.5	8.57	6.15	5.00	4.14	3.53	2.76	2.29
	9.6 (1.6)	40.0	25.0	15.5	9.06	6.49	5.22	4.29	3.69	2.86	2.40
12m38B	10.8 (1.8)	53.5	34.5	21.1	12.5	9.05	7.24	6.03	5.14	4.00	3.45
	10.2 (1.7)	59.4	37.3	23.0	13.6	9.74	7.92	6.55	5.59	4.37	3.62
	9.6 (1.6)	63.3	39.6	24.5	14.3	10.3	8.26	6.79	5.85	4.52	3.80

Long-life Batteries

FML series

Features

Long life of approximately 6 years in standby use

The use of an improved grid alloy and active material provides an expected life of approximately 6 years, which is considerably longer than the 3-year expected life of standard-type batteries. This reduces the frequency of battery replacement, resulting in significantly reduced running costs.

High Reliability

The use of cutting-edge production equipment has reduced variations in capacity by minimizing process variations, thereby providing higher reliability.

Improved Safety

- UL-certified (Batteries, Standby-Component): No. MH16658
- Flame-retardant resin (UL94V-0) is used as the container material.
- The space inside the container is designed with plate elongation in mind, ensuring a longer container life.

Applications

Communication devices, emergency lighting systems, factory automation devices (robots, control devices, etc.), firefighting equipment, CATV/optical communication devices, PHS base stations, microcell base stations, disaster and crime prevention systems, etc.

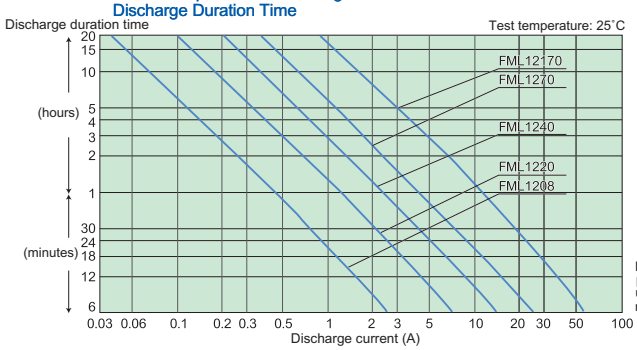
FML Series Specifications

Item / Type	Nominal voltage (V)	Rated capacity (Ah/20HR)	Dimensions (mm) Total Height (Max.)	Container Height	Width	Length	Approx. mass(g)	Terminal shape	Terminal position	Flame-retardant container	Maximum discharge current (5 seconds)	Battery system type certification	UL certification
FML1208	12	0.8	62.5	61.5±1	25±1	96±1	350	W	6	○	9	○	○
FML1220		2.0	65.5	64.5±1	27±1	152±1	700	W	6	○	12	○	○
FML1240		4.0	78	70±2	47±1	195±1	1600	F1	1	○	60	○	○
FML1270		7.0	102	94±2	65±1	151±1	2700	F1	3	○	105	○	○
FML12170		17.0	169	167±2	76±1	181±1	5900	B1	5	○	255	○	○

✱ Lead wires W／ Faston terminal F1: 187 series／ Bolt fastening terminal B1: M5 (t = 2) (t: terminal thickness)

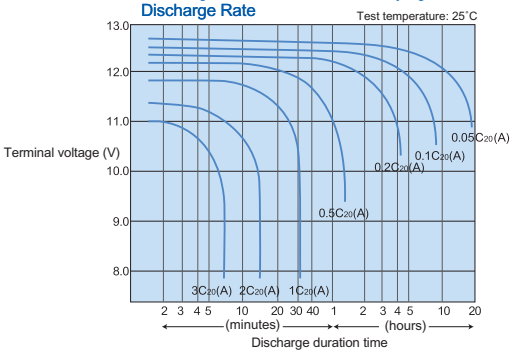
Characteristics

●Relationship between Discharge Current and Discharge Duration Time

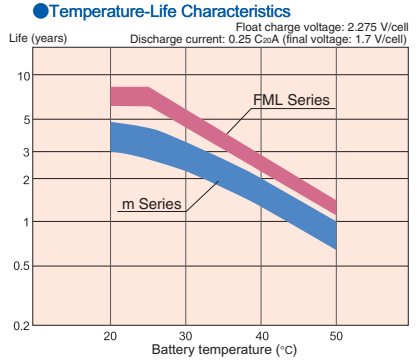


Note: This graph is based on standard performance during the initial stage of use, and the maintenance factor has not been taken into consideration.

●Discharge Characteristics with Varying Discharge Rate



●Temperature-Life Characteristics



✱ Life years are the expected life presumed based on the accelerated life test result of our company, and are not a guaranteed performance.An expected life changes also according to discharge conditions or charge conditions.

FML SERIES ELECTRICAL CHARACTERISTICS (Ampere)

Temperature:25°C

Battery type	Final Voltage V(V/cell)	Discharge Time (min) 15	30	60	120	180	240	300	360	480	600
FML 1208	10.8 (1.8)	1.13	0.73	0.44	0.26	0.19	0.15	0.13	0.11	0.08	0.07
	10.2 (1.7)	1.25	0.78	0.48	0.29	0.21	0.17	0.14	0.12	0.09	0.08
	9.6 (1.6)	1.33	0.83	0.52	0.30	0.22	0.17	0.14	0.12	0.10	0.08
FML 1220	10.8 (1.8)	2.82	1.82	1.11	0.66	0.48	0.38	0.32	0.27	0.21	0.18
	10.2 (1.7)	3.13	1.96	1.21	0.71	0.51	0.42	0.34	0.29	0.23	0.19
	9.6 (1.6)	3.33	2.08	1.29	0.75	0.54	0.43	0.36	0.31	0.24	0.20
FML 1240	10.8 (1.8)	5.63	3.64	2.22	1.31	0.95	0.76	0.63	0.54	0.42	0.36
	10.2 (1.7)	6.25	3.92	2.42	1.43	1.03	0.83	0.69	0.59	0.46	0.38
	9.6 (1.6)	6.67	4.17	2.58	1.51	1.08	0.87	0.71	0.62	0.48	0.40
FML 1270	10.8 (1.8)	9.86	6.36	3.89	2.30	1.67	1.33	1.11	0.95	0.74	0.64
	10.2 (1.7)	10.9	6.86	4.24	2.50	1.79	1.46	1.21	1.03	0.80	0.67
	9.6 (1.6)	11.7	7.29	4.52	2.64	1.89	1.52	1.25	1.08	0.83	0.70
FML 12170	10.8 (1.8)	23.9	15.5	9.44	5.57	4.05	3.24	2.70	2.30	1.79	1.55
	10.2 (1.7)	26.6	16.7	10.3	6.07	4.36	3.54	2.93	2.50	1.95	1.62
	9.6 (1.6)	28.3	17.7	11.0	6.42	4.59	3.70	3.04	2.62	2.02	1.70

Ultra Long-Life Batteries

FLH series

Features

Long life of approximately 13 to 15 years in standby use

The use of an improved grid alloy and active material provides an expected life of approximately 13 to 15 years, which is considerably longer than the 3-year expected life of standard-type batteries. This reduces the frequency of battery replacement, resulting in significantly reduced running costs.

High Reliability

The use of cutting-edge production equipment has reduced variations in capacity by minimizing process variations, thereby providing high reliability.

Improved Safety

- UL-certified (Batteries, Standby-Component): No. MH16658. Note: Not all models are UL-certified.
- Flame-retardant resin (UL94V-0) is used as the container material.
- The space inside the container is designed with plate elongation in mind, ensuring a longer container life.

Applicatios

Communication devices, emergency lighting systems, factory automation devices (robots, control devices, etc.), firefighting equipment, CATV/optical communication devices, PHS base stations, microcell base stations, disaster and crime prevention systems, etc.

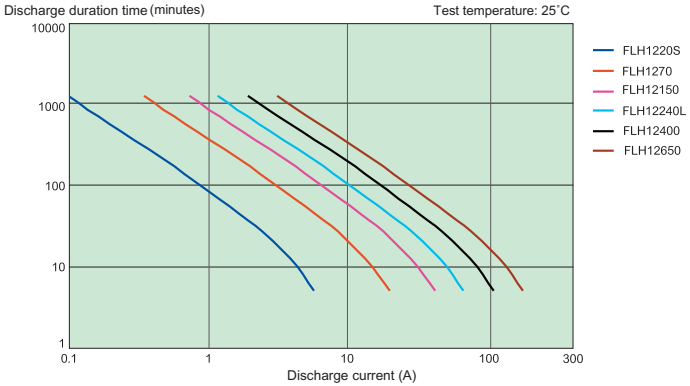
FLH Series Specifications

Items / Type	Nominal voltage (V)	Rated capacity (Ah/20HR)	Dimensions (mm) Total Height (Max.)	Container Height	Width	Length	Approx. mass(g)	Terminal shape	Terminal position	Flame-retardant container	Maximum discharge current (5 seconds)	Battery system type certification	UL certification
FLH1220S	12	2	91	89±2	25±1	150±1	950	W	6	○	12	○	○
FLH1270		7	102	94±2	65±1	151±1	2800	F1	3	○	105	○	○
FLH12150		15	169	167±2	76±2	181±2	5900	F2	5	○	225	○	○
FLH12240L		24	127	125±2	166±2	175±2	9300	B1,(F2)	5	○	360	○	○
FLH12400		40	172	170±2	165±2	197±2	16000	B2,(T1)	5	○	600	○	– –
FLH12650		65	177	175±2	166±2	350±2	24500	T2	5	○	975	○	– –

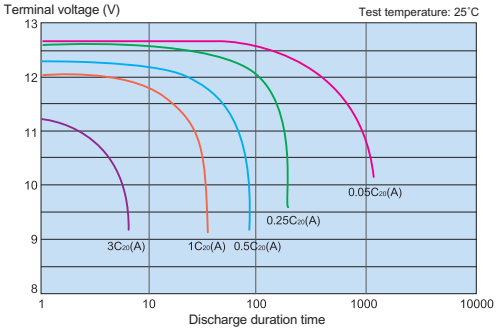
✱Terminal shapes shown in parentheses indicate optional specifications. Lead wires W／ Faston terminal F1: 187 series; F2: 250 series
Bolt fastening terminal B1: M5 (t = 2); B2: M5 (t = 5) (t: terminal thickness)／ Bolt terminal T1: M5; T2: M6

Characteristics

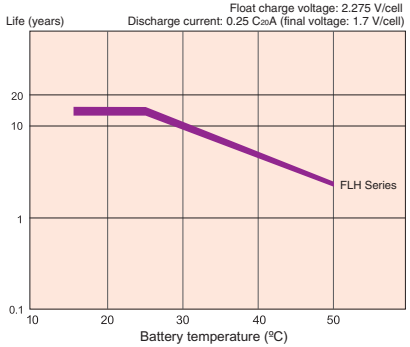
●Relationship between Discharge Current and Discharge Duration Time



● Discharge Characteristics with Varying Discharge Rate



●Temperature-Life Characteristics



✱ Life years are the expected life presumed based on the accelerated life test result of our company, and are not a guaranteed performance.An expected life changes also according to discharge conditions or charge conditions.

FLH SERIES ELECTRICAL CHARACTERISTICS (Ampere)

Temperature:25°C

Battery type	Final Voltage V(V/cell)	Discharge Time (min) 15	30	60	120	180	240	300	360	480	600
FLH 1220S	10.8 (1.8)	2.78	1.82	1.11	0.66	0.48	0.38	0.32	0.27	0.21	0.17
	10.2 (1.7)	3.03	1.96	1.21	0.71	0.51	0.42	0.34	0.29	0.23	0.19
	9.6 (1.6)	3.33	2.11	1.27	0.75	0.54	0.43	0.36	0.31	0.24	0.20
FLH 1270	10.8 (1.8)	9.72	6.36	3.89	2.30	1.67	1.35	1.11	0.95	0.73	0.61
	10.2 (1.7)	10.61	6.86	4.24	2.50	1.79	1.46	1.21	1.01	0.80	0.67
	9.6 (1.6)	11.7	7.37	4.43	2.64	1.89	1.52	1.25	1.09	0.84	0.69
FLH 12150	10.8 (1.8)	20.8	13.6	8.33	4.92	3.57	2.83	2.38	2.03	1.56	1.30
	10.2 (1.7)	22.7	14.7	9.10	5.36	3.85	3.13	2.59	2.17	1.70	1.43
	9.6 (1.6)	25.0	15.8	9.49	5.66	4.05	3.26	2.68	2.33	1.81	1.49
FLH 12240L	10.8 (1.8)	33.3	21.8	13.3	7.87	5.71	4.62	3.81	3.24	2.50	2.09
	10.2 (1.7)	36.4	23.5	14.6	8.57	6.15	5.00	4.14	3.48	2.73	2.29
	9.6 (1.6)	40.0	25.3	15.2	9.06	6.49	5.22	4.29	3.72	2.89	2.38
FLH 12400	10.8 (1.8)	55.6	36.4	22.2	13.1	9.50	7.69	6.35	5.41	4.17	3.48
	10.2 (1.7)	60.6	39.2	24.2	14.3	10.3	8.33	6.90	5.80	4.55	3.81
	9.6 (1.6)	66.7	42.1	25.3	15.1	10.8	8.70	7.14	6.20	4.82	3.96
FLH 12650	10.8 (1.8)	90.3	59.0	36.1	21.3	15.5	12.5	10.3	8.78	6.77	5.65
	10.2 (1.7)	98.5	63.7	39.4	23.2	16.7	13.5	11.2	9.42	7.39	6.19
	9.6 (1.6)	108.3	68.4	41.1	24.5	17.6	14.1	11.6	10.1	7.83	6.44

High-rate Discharge Batteries

FPX series

Features

Significantly improved high-rate discharge characteristics

- The optimized plate thickness and area of this battery provide improved high-rate discharge characteristics.
- A 10-minute discharge is possible with a current that is 1.5 to 1.7 times greater than that of standard-type Furukawa battery.

Long life in standby use

The results of a high-rate discharge evaluation indicate that the service life of this battery is approximately twice as long as that of standard-type batteries.

- A new alloy is used in the positive grid, providing improved corrosion resistance.
- The increased positive grid volume provides high durability.
- The optimized grid shape prevents plate elongation.
- The improved container and cover thickness reduces moisture transmission.
- The improved control valve material provides improved durability.

High Reliability

Minimizing variations in the amounts of the active material and electrolyte and in the electrolyte specific gravity has reduced variations in capacity, thereby providing high reliability.

Improved Safety

- UL-certified (Batteries, Standby-Component): No. MH16658
- Flame-retardant resin (UL94V-0) is used as the container material.
- The space inside the container is designed with plate elongation in mind, ensuring a longer container life.

Applications

UPS, disaster and crime prevention systems, etc.

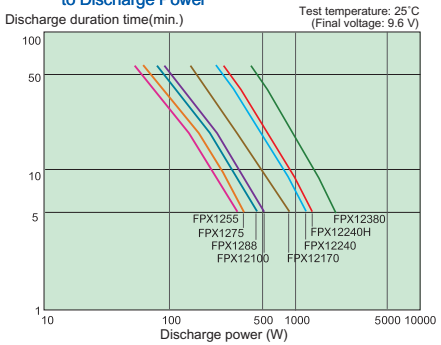
FPX Series Specifications

Items / Type	Nominal voltage (V)	Rated capacity (Ah/20HR)	Dimensions (mm) Total Height (Max.)	Container Height	Width	Length	Approx. mass(g)	Terminal shape	Terminal position	Flame-retardant container	Maximum discharge current (1 seconds)	Battery system type certification	UL certification
FPX1255	12	5.5	109	102±1	70±1	90±1	2000	F2	3	○	110	○	○
FPX1275		7.5	102	94±2	65±1	151±1	2800	F1	3	○	150	○	○
FPX1288		8.8	102	94±2	65±1	151±1	2850	F2	3	○	176	○	○
FPX12100		10	102	94±2	98±1	151±1	3700	F2	3	○	200	○	○
FPX12170		17	169	167±2	76±1	181±1	6000	B1	5	○	340	○	○
FPX12240		24	127	125±2	166±1	175±1	9500	B1	5	○	480	○	○
FPX12240H		24	177	175±2	125±1	166±1	9400	B1	5	○	480	○	○
FPX12380		38	172	170±2	165±1	197±1	15000	T2	5	○	760	○	○

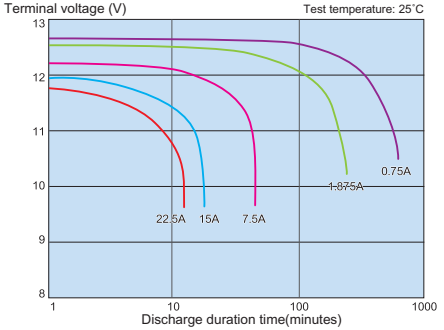
Faston terminal F1: 187 series; F2: 250 series ／ Bolt-nut terminal B1: M5 (t = 2) (t: terminal thickness) ／ Bolt terminal T2: M6

Characteristics

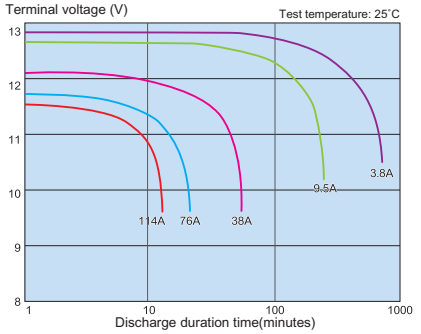
Discharge Duration Time in Relation to Discharge Power



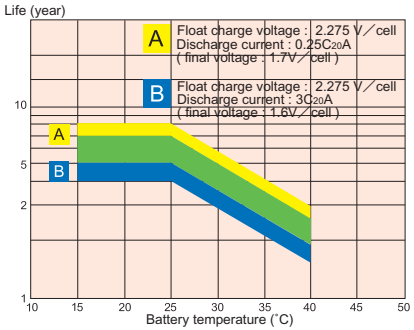
FPX1275 Model: Discharge Characteristics with Varying Discharge Rate



FPX12380 Model: Discharge Characteristics with Varying Discharge Rate



Temperature - Life Characteristics



★Life years are the expected life presumed based on the accelerated life test result of our company, and are not a guaranteed performance. An expected life changes also according to discharge conditions or charge conditions. In addition, expected lives differ in battery type.

FPX SERIES ELECTRICAL CHARACTERISTICS (Ampere)

Temperature:25°C

Battery type	Final Voltage V(V/cell)	Discharge Time (min) 3	5	10	15	20	30	40	50	60
FPX 1255	10.8（1.8）	22.9	19.0	12.8	10.0	8.33	6.11	5.00	4.17	3.62
	10.2（1.7）	30.6	23.9	14.9	11.2	9.17	6.88	5.50	4.62	3.99
	9.6（1.6）	34.4	26.2	16.7	12.5	10.2	7.43	5.91	4.91	4.20
FPX 1275	10.8（1.8）	31.3	25.9	17.4	13.6	11.4	8.33	6.82	5.68	4.93
	10.2（1.7）	41.7	32.6	20.3	15.3	12.5	9.38	7.50	6.30	5.43
	9.6（1.6）	46.9	35.7	22.7	17.0	13.9	10.1	8.06	6.70	5.73
FPX 1288	10.8（1.8）	36.7	30.3	20.5	16.0	13.3	9.78	8.00	6.67	5.79
	10.2（1.7）	48.9	38.3	23.8	18.0	14.7	11.0	8.80	7.39	6.38
	9.6（1.6）	55.0	41.9	26.7	20.0	16.3	11.9	9.46	7.86	6.72
FPX 12100	10.8（1.8）	41.7	34.5	23.3	18.2	15.2	11.1	9.09	7.58	6.58
	10.2（1.7）	55.6	43.5	27.0	20.4	16.7	12.5	10.0	8.40	7.25
	9.6（1.6）	62.5	47.6	30.3	22.7	18.5	13.5	10.8	8.93	7.63
FPX 12170	10.8（1.8）	70.8	58.6	39.5	30.9	25.8	18.9	15.5	12.9	11.2
	10.2（1.7）	94.4	73.9	45.9	34.7	28.3	21.3	17.0	14.3	12.3
	9.6（1.6）	106.3	81.0	51.5	38.6	31.5	23.0	18.3	15.2	13.0
FPX 12240	10.8（1.8）	100.0	82.8	55.8	43.6	36.4	26.7	21.8	18.2	15.8
	10.2（1.7）	133.3	104.3	64.9	49.0	40.0	30.0	24.0	20.2	17.4
	9.6（1.6）	150.0	114.3	72.7	54.5	44.4	32.4	25.8	21.4	18.3
FPX 12240H	10.8（1.8）	104.3	85.7	61.5	49.0	41.4	30.8	25.3	21.2	18.2
	10.2（1.7）	141.2	114.3	77.4	58.5	47.1	34.3	30.4	22.9	19.7
	9.6（1.6）	150.0	126.3	82.8	63.2	50.0	36.9	29.3	24.2	21.2
FPX 12380	10.8（1.8）	165.2	135.7	97.4	77.6	65.5	48.7	40.0	33.6	28.8
	10.2（1.7）	223.5	181.0	122.6	92.7	74.5	54.3	48.1	36.2	31.1
	9.6（1.6）	237.5	200.0	131.0	100.0	79.2	58.5	46.3	38.4	33.6

Charge / Discharge

For effective use of small-sized valve regulated lead-acid batteries that meet expected performance levels, the batteries need to be charged by using an appropriate method under appropriate conditions suited to their service conditions.For standby use

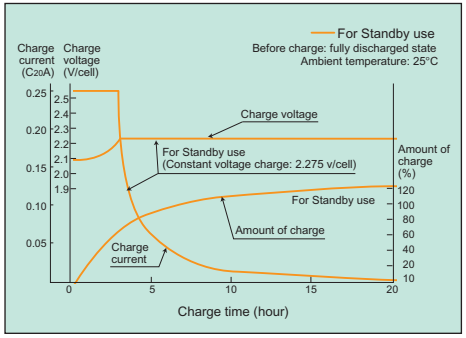
Charge

For standby use

1. Charge the battery at a constant voltage of 2.275 V/cell (6-V battery: 6.825 V/battery; 12-V battery: 13.65 V/battery). If the battery is frequently used outside the temperature range of 5 to 35℃, temperature-compensate the charge voltage by -3.3 mV/℃ per cell, with 25℃ as the starting point.

2. Ensure that the initial charge current is 0.3 $C_{20}A$ or less.

●Charge Characteristics: Typical Constant Voltage Charge



Discharge

1. The final voltage is as shown in the table below. Ensure that the terminal voltage does not fall to or below these values.

Discharge current	Final voltage
< 0.01 $C_{20}A$	1.90V/cell
≧ 0.01 $C_{20}A$ and < 0.2 $C_{20}A$	1.75V/cell
≧ 0.2 $C_{20}A$ and < 0.5 $C_{20}A$	1.70V/cell
≧ 0.5 $C_{20}A$ and < 1.0 $C_{20}A$	1.65V/cell
≧ 1.0 $C_{20}A$ and < 2.0 $C_{20}A$	1.60V/cell
> 2.0 $C_{20}A$	1.50V/cell

2. Ensure that the discharge current does not exceed the maximum discharge current specified in the table below.

Series	Discharge time	Discharge current
m, FML, FLH	≦ 5 minutes	2$C_{20}A$
	≦ 5 seconds	15$C_{20}A$ (Note 1)
FPX	≦ 10 minutes	3.5$C_{20}A$
	≦ 1 second	20$C_{20}A$

Note 1: Except for lead-wire type batteries

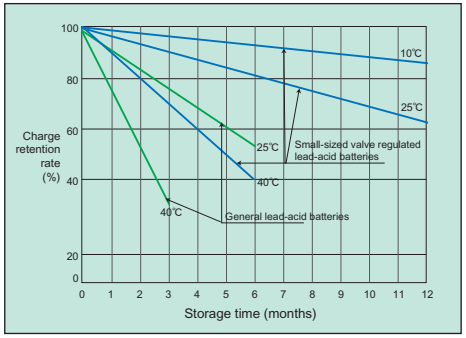
Storage

1. During storage, the battery loses capacity due to self-discharge. If the battery will not be in use for a prolonged period of time, periodically perform an auxiliary charge in accordance with the standby-use charge method.

2. When storing the battery for a prolonged period time, perform an auxiliary charge, disconnect the battery from the recharger and loads, and store it in a dry, cold area not exposed to direct sunlight.

Note: Even when not in use, the battery produces hydrogen gas, which may result in an explosion, so make sure that the storage area is well-ventilated. In addition, do not bring an open flame near to the battery

●Capacity Retention Characteristics

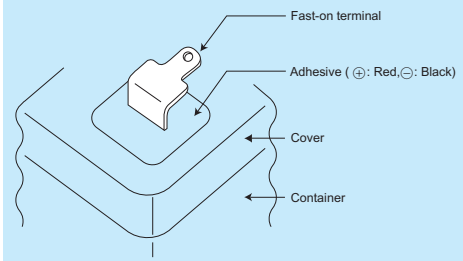


Service Temperature Range

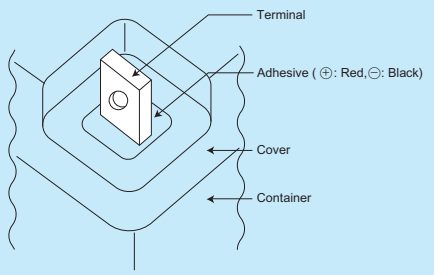
The service temperature range is as follows:
・Discharge: -15 to 50℃ ・ Charge: 0 to 40℃ ・ Storage: -15 to 40℃

Terminal Shapes

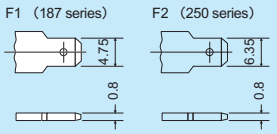
Faston Terminal



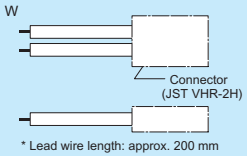
Bolt Fastening Terminal



Faston Terminal Type

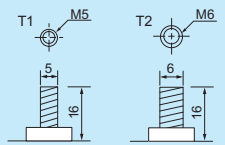


Lead Wire type

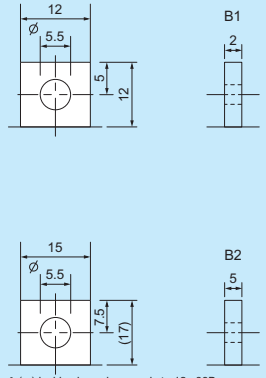


* Lead wire length: approx. 200 mm

Bolt terminal type



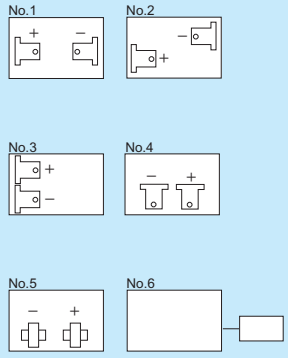
Bolt Fastening Terminal



★( ) inside size value : apply to 12m38B.

Terminal position

Terminal symbol			
Terminal shape	Faston	Bolt fastening	Lead wire



Precautions for Safe Use

Before using a Furukawa small-sized valve-regulated lead-acid battery (hereinafter, "the battery"), be sure to read the instruction manual and the instructions printed on the battery. If you do not understand any of these instructions, please contact us. A battery is a source of energy, so failure to follow these instructions may cause electrolyte leakage, heat generation, or an explosion, resulting in personal injury.

⚠ Danger

- The battery generates hydrogen gas, so ensure that the room is well ventilated when using it so that the hydrogen concentration is 0.8% or less. Failure to do so may cause a fire or explosion.
- When installing the battery on equipment, do not seal the equipment. Doing so may cause the equipment to explode, resulting in personal injury.
- When using a metallic tool such as a torque wrench or a spanner, ensure that it is electrically insulated with vinyl tape or the like. Failure to do so may cause a short-circuit, resulting in burn injuries, damage to the battery, a fire, or an explosion.
- Do not install the battery in a sealed area or near a fire. Doing so may cause a fire or explosion.
- Do not connect the positive and negative terminals of the battery using a metallic object such as a wire, or allow a metallic tool such as a wrench or spanner to come into contact with two areas that have different voltages. Doing so may cause burn injuries, electrolyte leakage, heat generation, or an explosion.
- Do not use the battery together with other types of batteries such as alkaline and nickel-cadmium batteries.

⚠ Warning

- When charging the battery, use the dedicated recharger or charge the battery under the conditions specified by Furukawa Battery. Charging the battery under conditions other than those specified by Furukawa Battery may cause electrolyte leakage, heat generation, or an explosion.
- Do not install the battery in areas where it is likely to be exposed to water. Doing so may cause an electrical shock or fire.
- When handling the battery, which can generate high voltage, wear rubber gloves or take other safety measures. Failure to do so may result in an electrical shock.
- Ensure that the polarities (+/-) are correct. Incorrect terminal connections may cause a fire or result in damage to the recharger.
- Do not place the battery in a fire. Doing so may cause electrolyte leakage, heat generation, or an explosion.
- Do not disassemble or alter the battery. Doing so may cause electrolyte leakage, heat generation, or an explosion.
- Install insulation covers on the terminals and connected conductors as specified. Failure to do so may cause a short-circuit, resulting in burn injuries, damage to the battery, or an explosion.
- When cleaning the battery, do not use a dry cloth or duster. Doing so may generate static electricity, resulting in an explosion. Clean the battery with a wet cloth or the like.
- Replace the battery before the expiry of the replacement period specified in the instruction manual or printed on the equipment. Failure to do so may cause damage to the battery container or electrolyte leakage.
- The battery contains dilute sulfuric acid, which is a deleterious material. If the electrolyte leaks from the battery and comes into contact with your skin or clothing, rinse it with clean water. If the electrolyte gets in your eyes, rinse them with clean water and seek medical attention. Eye or skin contact with dilute sulfuric acid may cause blindness or burn injuries.

⚠ Caution

- The service temperature range for the battery is as follow:
  Discharge: -15 to 50℃
  Charge: 0 to 40℃
  Storage: -15 to 40℃

Using the battery outside these ranges may result in reduced battery performance or service life, as well as damage or deformation to the battery.

- Do not use or store the battery in a location where the ambient temperature exceeds 50℃, such as in a car under the hot sun, areas exposed to direct sunlight, in front of a stove, or near a fire. Doing so may cause electrolyte leakage, heat generation, or an explosion.
- Handle the battery in the same way as you would handle a heavy object. Failure to do so may cause backache or injury.
- Use the battery with the terminal side facing upward and do not tilt the battery over 90°.
- Before cleaning or inspecting the battery, touch a metal object that is separate from the battery to discharge any static electricity from your body. Failure to do so may cause a spark, resulting in a fire or explosion.

General-purpose batteries **m series**

Long-life batteries **FML series**

Ultra long-life batteries **FLH series**

High-rate discharge batteries **FPXseries**