

Stationary Valve-Regulated Lead Acid Battery

HSE, MSE, MSJ, MU, UP-R series



A wide variety of battery uses

We provide you trust and assurance with our storage

Telecommunications, electricity, water supply and sewerage systems, roads, and other forms of social infrastructure cannot remain functional without electricity.

While Japan has suffered human and economic damages almost every year from typhoons, torrential rains, earthquakes, and other disasters, our batteries have been contributing to keep the infrastructure functioning during times of such disasters.

We as a manufacturer of storage batteries, have been supplying the batteries for various applications.

With a wealth of experience and superior technical development capabilities, we have been developing products and technologies to meet the customers' requests.

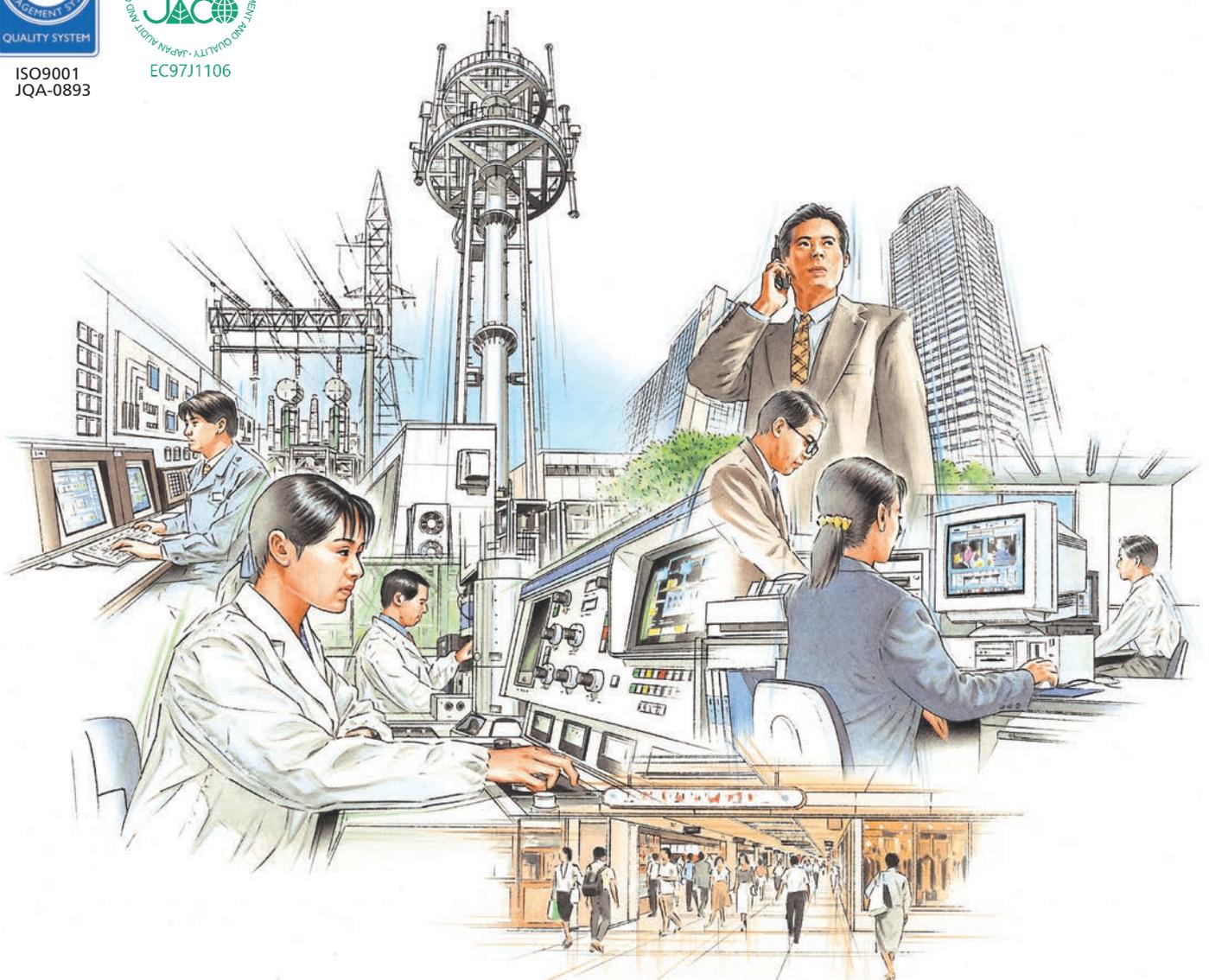
Furthermore, we are actively committed to technological development, recycling of raw materials, and other measures to protect the global environment, which is a worldwide issue.

We will keep working on the challenge of creating new value required in the future.

Our Nabari Works, which manufactures industrial-use storage batteries, acquired certification of ISO 14001 environmental management system, and have since been engaged in production in harmony with the environment. In addition, we have acquired certification of ISO 9001 quality management system, and have since been designing, developing, and manufacturing under the quality management system based on the certification standards.



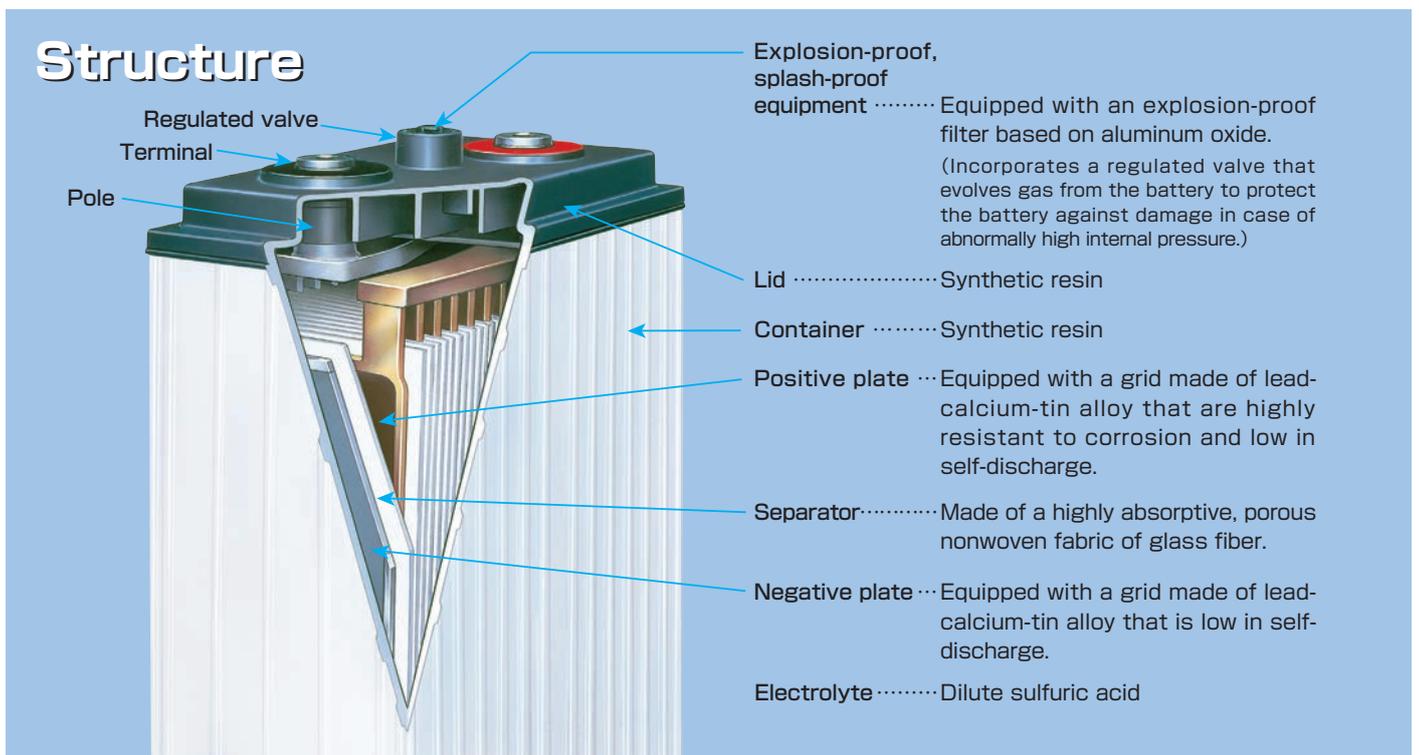
ISO9001
JQA-0893



batteries.

Series	Service Expected life ^{note1} (years)	Standard load time (recommended value)
Standard MSE series	7~9	<p>0.2min (12sec) 0.2h (12min) 0.5h (30min) 1h 2h 5h 20h</p>
Long-life MSJ series (long life type of MSE)	13~15	<p>0.2min (12sec) 0.2h (12min) 0.5h (30min) 1h 2h 5h 20h</p>
Large-current discharge UP-R series	7~9	<p>0.2min (12sec) 0.2h (12min) 0.5h (30min) 1h 2h 5h 20h</p>
Space-saving and long-life MU series	13~15	<p>0.1h (6min) 0.2h (12min) 0.5h (30min) 1h 2h 5h 20h</p>
Standard HSE series	5~7	<p>0.2min (12sec) 0.2h (12min) 0.5h (30min) 1h 2h 3h 5h 20h</p>

Note1: "Expected life" is the number of years achieved in the high temperature accelerated life test converted into the period of use at constant condition at 25°C.
This number of years is estimated based on the constant use conditions. It does not guarantee the battery life under all operating conditions.



Standard stationary valve-regulated lead acid battery

MSE series

Features

- A rich lineup and compatibility with parallel connections
A rich lineup, along with possible parallel connections, that corresponds various capacity requirements.
- Low maintenance
These series eliminate the need for water additions, specific gravity measurements, and equalizing charge, resulting in reduced maintenance and lower cost.
- Expected life ranges from 7 to 9 years. ^{note)}

Note : "Expected life" is the number of years achieved in the high temperature accelerated life test converted into the period of use at constant condition at 25°C .

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Main uses

- Telecommunication system
- Operation of receiving and substation equipment
- Emergency lighting
- UPS
- Backup for instrumentation equipment
- Startup of generation equipment



Specifications

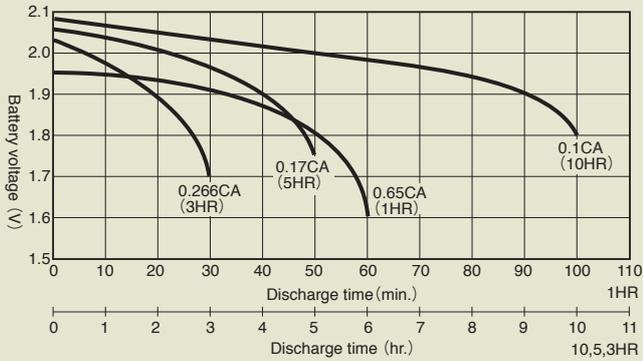
Battery type		MSE-50-12	MSE-100-6	* MSE-150	* MSE-200	* MSE-300	* MSE-500	
Nominal voltage	V	12	6	2	2	2	2	
Capacity (25°C)	10HR (1.80V/cell)	Ah	50	100	150	200	300	500
	5HR (1.75V/cell)	Ah	43	85	128	170	255	425
	3HR (1.70V/cell)	Ah	40	80	120	160	240	400
	1HR (1.60V/cell)	Ah	33	65	97.5	130	195	325
Dimensions	Overall height(max)	mm	220	220	365	365	365	365
	Casing height(±3)	mm	190	190	330	330	330	330
	Length(±3)	mm	363	345	106	106	150	241
	Width(±3)	mm	128	128	170	170	170	171
	Outside dimensional diagram	—	A	B	C	C	C	D
Weight (Approx.)	kg	22	21	13	15	21	35	
Charge voltage (25°C)	V/cell	2.23						
Service temperature range	Charge	°C	-15~45					
	Discharge	°C	-15~45					
	Storage	°C	-15~45					

*Nut-inserted terminal types are optionally available.

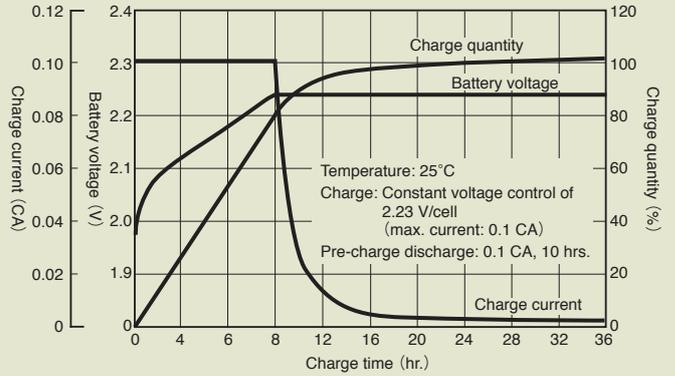
Standard type MSE series

Characteristics

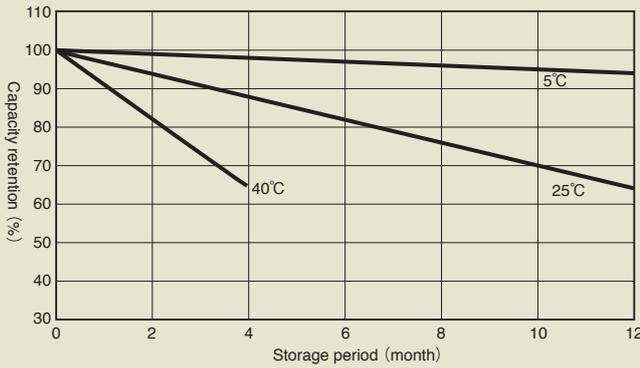
Examples of discharge characteristics at various rates (25°C)



Examples of charge characteristics

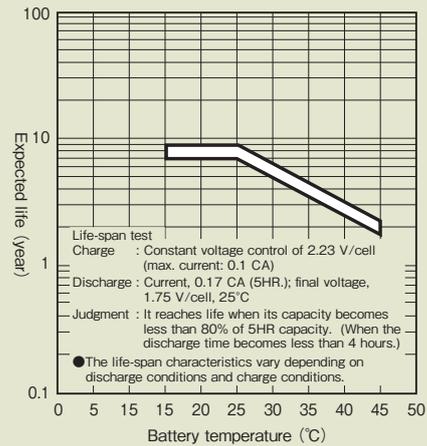


Examples of capacity retention characteristics



- The capacity retention ratio is a ratio to a 10-hour rated capacity.
- Make a supplemental charge until the capacity retention ratio becomes 80% or less.

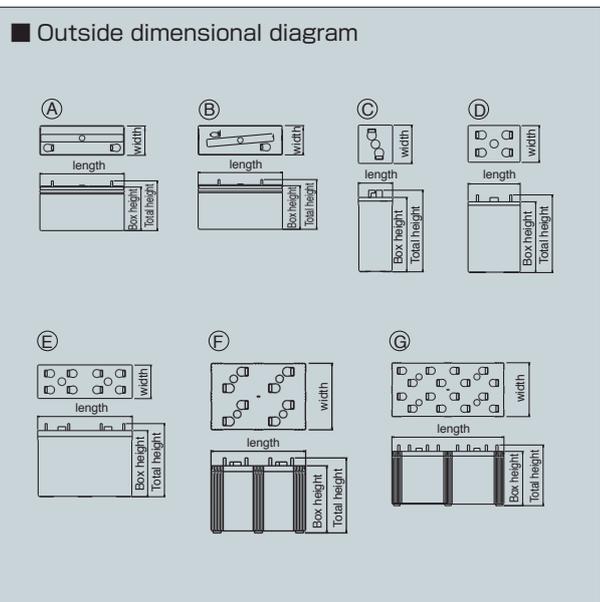
Examples of the life-span characteristics



"Expected life" is the number of years achieved in the high temperature accelerated life test converted into the period of use at constant condition at 25°C. This number of years is estimated based on the constant use conditions. It does not guarantee the battery life under all operating conditions.

Life-span test
 Charge : Constant voltage control of 2.23 V/cell (max. current: 0.1 CA)
 Discharge : Current, 0.17 CA (5HR); final voltage, 1.75 V/cell, 25°C
 Judgment : It reaches life when its capacity becomes less than 80% of 5HR capacity. (When the discharge time becomes less than 4 hours.)
 ● The life-span characteristics vary depending on discharge conditions and charge conditions.

	MSE-1000	MSE-1500	MSE-1500×2	MSE-2000	MSE-3000
	2	2	4	2	2
	1,000	1,500	1,500	2,000	3,000
	850	1,275	1,275	1,700	2,550
	800	1,200	1,200	1,600	2,400
	650	975	975	1,300	1,950
	365	375	375	375	375
	330	340	340	340	340
	471	476	696	476	696
	171	337	340	337	340
	E	F	G	F	G
	70	105	212	140	210
	2.23				
	-15~45				
	-15~45				
	-15~45				



For longer service life-span, low maintenance, labor

MSJ series (long life type of MSE)

Features

- Far longer-life than the conventional MSE series
A newly developed lead-calcium-tin alloy has made the positive plate grid more resistant to corrosion.
- Low maintenance
These series eliminate the need for water additions, specific gravity measurements, and equalizing charge, resulting in reduced maintenance and lower cost.
- Compatible with the MSE series
Compatible with cubicles and racks.
The use of the same charging method eliminates the need to modify the charger.
- Expected life ranges from 13 to 15 years. ^{note)}

Note : "Expected life" is the number of years achieved in the high temperature accelerated life test converted into the period of use at constant condition at 25°C .
This number of years is estimated based on the constant use conditions. It does not guarantee the battery life under all operating conditions.

Main uses

- Telecommunication system
- Operation of receiving and substation equipment
- UPS
- Emergency lighting
- Backup for instrumentation equipment
- Startup of generation equipment



Specifications

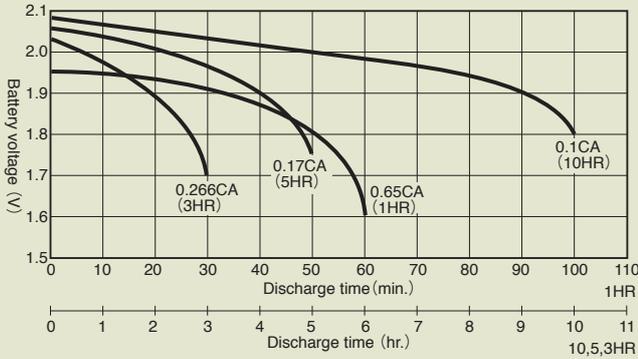
Battery type		MSJ-50-12	MSJ-100-6	※ MSJ-150	※ MSJ-200	※ MSJ-300	※ MSJ-500	
Nominal voltage	V	12	6	2	2	2	2	
Capacity (25°C)	10HR (1.80V/cell)	Ah	50	100	150	200	300	500
	5HR (1.75V/cell)	Ah	43	85	128	170	255	425
	3HR (1.70V/cell)	Ah	40	80	120	160	240	400
	1HR (1.60V/cell)	Ah	33	65	98	130	195	325
Dimensions	Overall height(max)	mm	220	220	365	365	365	365
	Casing height(±3)	mm	190 ^{Note1)}	190 ^{Note1)}	330	330	330	330
	Length(±3)	mm	363 ^{Note1)}	345 ^{Note1)}	106	106	150	241
	Width(±3)	mm	128 ^{Note1)}	128 ^{Note1)}	170	170	170	171
	Outside dimensional diagram	—	A	B	C	C	C	D
Weight (Approx.)	kg	22	21	13	15	21	35	
Charge voltage (25°C)	V/cell	2.23						
Service temperature range	Charge	°C	-15~45					
	Discharge	°C	-15~45					
	Storage	°C	-15~45					

Note1) The dimensional tolerance shall be ±2 mm.

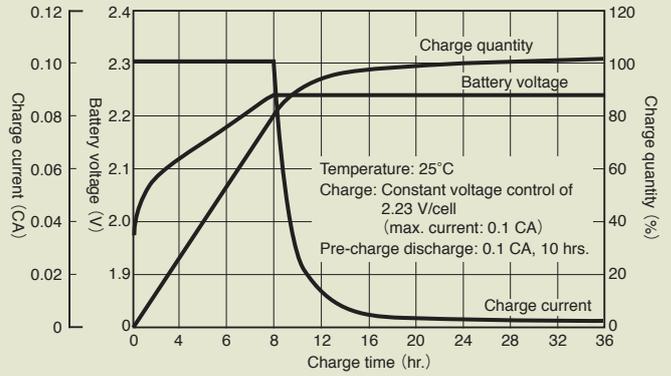
※Nut-inserted terminal types are optionally available.

Characteristics

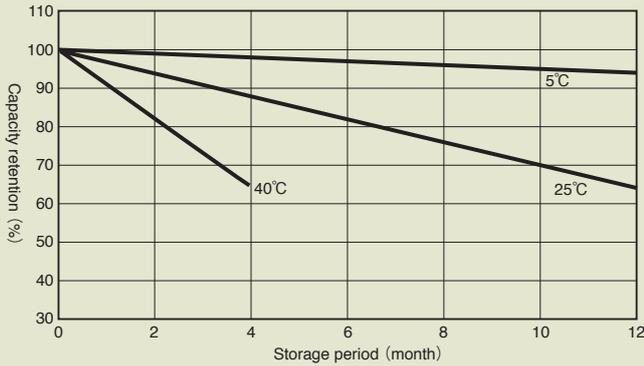
Examples of discharge characteristics at various rates (25°C)



Examples of charge characteristics

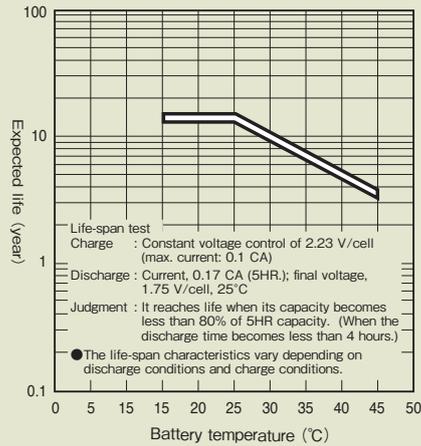


Examples of capacity retention characteristics



- The capacity retention ratio is a ratio to a 10-hour rated capacity.
- Make a supplemental charge until the capacity retention ratio becomes 80% or less.

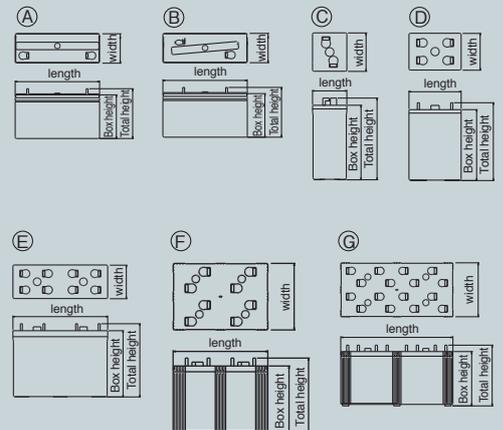
Examples of the life-span characteristics



"Expected life" is the number of years achieved in the high temperature accelerated life test converted into the period of use at constant condition at 25°C. This number of years is estimated based on the constant use conditions. It does not guarantee the battery life under all operating conditions.

	MSJ-1000	MSJ-1500	MSJ-1500×2	MSJ-2000	MSJ-3000
	2	2	4	2	2
	1,000	1,500	1,500	2,000	3,000
	850	1,275	1,275	1,700	2,550
	800	1,200	1,200	1,600	2,400
	650	975	975	1,300	1,950
	365	375	375	375	375
	330	340	340	340	340
	471	476	696	476	696
	171	337	340	337	340
	E	F	G	F	G
	70	105	212	140	210
	2.23				
	-15~45				
	-15~45				
	-15~45				

Outside dimensional diagram





Earthquake-resistant rack

1. Specifications

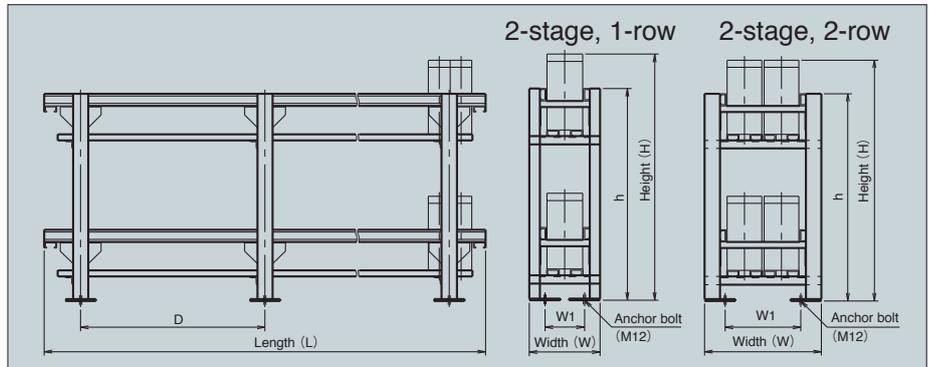
Static strength :

The product withstands the following:
 Horizontal acceleration:
 9.8 m/S² (1.0 G)
 Vertical acceleration:
 4.9 m/S² (0.5 G)

Material: Mild steel

Paint color: Acid-proof paint, Munsell 5Y7/1, semi-glossy

Installation: Fix all with anchor bolts.



Capacity (Ah)	Battery type	2-stage, 1-row earthquake-resistant rack: outside dimensions (mm) and weight (approx. in kg)								2-stage, 2-row earthquake-resistant rack: outside dimensions (mm) and weight (approx. in kg)											
		Height		Width		No. of cells	11·12 Cells	23·24 Cells	25·26 Cells	27·28 Cells	Height		Width		No. of cells	21~24 Cells	45~48 Cells	49~52 Cells	53~56 Cells		
		H	h	W	W1						H	h	W	W1							
150 200	MSE(J)-150 MSE(J)-200	1,185	1,020	339	189	Length	L	771	1,407	1,513	1,619	1,185	1,020	569	369	Length	L	771	1,407	1,513	1,619
						D	410	1,050	1,050	1,050	D					410	950	950	630×2		
						Weight	38	52	55	57	Weight					69	89	93	117		
300	MSE(J)-300	1,185	1,020	339	189	Length	L	1,035	1,935	2,085	2,235	1,185	1,020	569	369	Length	L	1,035	1,935	2,085	2,235
						D	680	790×2	860×2	940×2	D					680	790×2	860×2	940×2		
						Weight	44	74	77	81	Weight					77	127	132	137		
400	MSE(J)-200×2	1,185	1,020	569	369	Length	L	771	1,407	1,513	1,619	1,185	1,020	959	759	Length	L	801	1,437	1,543	1,649
						D	410	950	950	630×2	D					380	1,020	1,050	1,050		
						Weight	69	89	93	117	Weight					114	151	157	164		
500	MSE(J)-500	1,185	1,020	410	260	Length	L	1,161	2,187	2,358	2,529	1,185	1,020	741	541	Length	L	1,161	2,187	2,358	2,529
						D	800	910×2	660×3	720×3	D					800	910×2	960×2	960×2		
						Weight	49	82	97	100	Weight					96	160	166	172		
600	MSE(J)-300×2	1,185	1,020	569	369	Length	L	1,035	1,935	2,085	2,235	1,185	1,020	959	759	Length	L	1,065	1,965	2,115	2,265
						D	680	790×2	860×2	940×2	D					650	770×2	850×2	920×2		
						Weight	77	127	132	137	Weight					129	213	222	231		
700	MSE(J)-200+ MSE(J)-500	1,185	1,020	576	376	Length	L	1,161	2,187	2,358	2,529	1,185	1,020	973	773	Length	L	1,191	2,217	2,388	2,559
						D	800	940×2	720×2	960×3	D					770	900×2	960×2	960×2		
						Weight	81	136	141	168	Weight					137	229	239	249		
800	MSE(J)-300+ MSE(J)-500	1,185	1,020	650	450	Length	L	1,161	2,187	2,358	2,529	1,185	1,020	1,061	861	Length	L	1,191	2,217	2,388	2,559
						D	800	910×2	960×2	960×2	D					770	900×2	960×2	960×2		
						Weight	89	149	155	161	Weight					162	266	276	286		
900	MSE(J)-300×3	1,185	1,020	779	579	Length	L	1,035	1,935	2,085	2,235	1,185	1,020	1,483	1,283	Length	L	1,035	1,935	2,085	2,235
						D	680	790×2	860×2	940×2	D					680	790×2	860×2	940×2		
						Weight	103	171	178	186	Weight					187	315	329	344		
1000	MSE(J)-1000	1,200	1,035	720	520	Length	L	1,161	2,187	2,358	2,529	1,200	1,035	1,201	1,001	Length	L	1,191	2,217	2,388	2,559
						D	800	910×2	1000×2	720×3	D					800	880×2	880×2	720×3		
						Weight	93	155	162	191	Weight					188	296	307	361		
1100	MSE(J)-300×2+ MSE(J)-500	1,185	1,020	810	610	Length	L	1,161	2,187	2,358	2,529	1,185	1,020	1,545	1,345	Length	L	1,191	2,217	2,388	2,559
						D	800	910×2	960×2	960×2	D					770	900×2	960×2	960×2		
						Weight	110	185	193	201	Weight					201	342	358	375		
1200	MSE(J)-200+ MSJ-500×2	1,185	1,020	857	657	Length	L	1,161	2,187	2,358	2,529	1,185	1,020	1,639	1,439	Length	L	1,161	2,187	2,358	2,529
						D	800	910×2	960×2	960×2	D					800	910×2	960×2	960×2		
						Weight	111	187	195	203	Weight					223	373	390	406		
1300	MSE(J)-300+ MSE(J)-500×2	1,185	1,020	901	701	Length	L	1,161	2,187	2,358	2,529	1,185	1,020	1,727	1,527	Length	L	1,161	2,187	2,358	2,529
						D	770	900×2	960×2	960×2	D					770	900×2	960×2	710×3		
						Weight	119	198	206	215	Weight					238	396	412	488		
1500 2000	MSE(J)-1500 MSE(J)-2000	1,205	1,035	725	525	Length	L	2,187	4,209	4,546	4,883	1,205	1,035	1,211	1,011	Length	L	2,237	4,259	4,596	4,933
						D	900×2	760×5	830×5	740×6	D					870×2	760×5	830×5	870×5		
						Weight	158	304	317	353	Weight					308	566	587	608		
3000	MSE(J)-3000	1,205	1,035	945	745	Length	L	2,205	4,245	4,585	4,925	1,205	1,035	1,815	1,615	Length	L	2,205	4,245	4,585	4,925
						D	890×2	760×5	830×5	750×6	D					590×3	630×6	690×6	640×7		
						Weight	201	373	386	430	Weight					462	804	831	919		

Notes: 1. The weight is that of the rack alone, not including the battery. 2. Battery arrays, rack structures, and dimensions are negotiable.

Standard type MSE series

Long life type MSJ series

Specifications of standard cubicle

●48 V series

Battery type	Method of battery installation	Dimensions (mm)			No. of panels	Battery array	No. of batteries stored	Cubicle weight (approx. in kg)	Overall weight ^(*) (approx. in kg)
		Length (L±5)	Depth (D±5)	Height (H±5)					
MSE(J)-150 MSE(J)-200	A	700	600	1,950	1	3-stage, 2-row	19~24	190	540 580
MSE(J)-300		900	600	1,950	2	3-stage, 2-row	19~24	220	750
MSE(J)-500		1,000	700	1,950	2	3-stage, 2-row	19~24	240	1,130
MSE(J)-150 MSE(J)-200	B	700	550	1,850	1	6-stage, 1-row	21~24	145	460 510
MSE(J)-300		900	550	1,850	1	6-stage, 1-row	21~24	185	700
MSE(J)-500		1,200	550	1,850	2	5-stage, 1-row	21~24	260	1,120

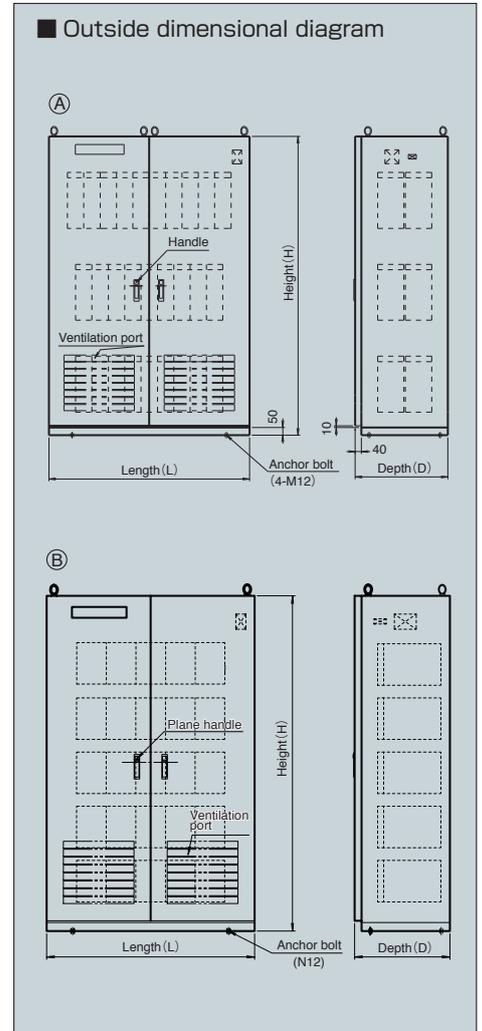
Note 1: Overall weight is based on the assumption that there are 24 batteries.

●100 V series

Battery type	Method of battery installation	Dimensions (mm)			No. of panels	Battery array	No. of batteries stored	Cubicle weight (approx. in kg)	Overall weight ^(*) (approx. in kg)
		Length (L±5)	Depth (D±5)	Height (H±5)					
MSE(J)-150 MSE(J)-200	A	1,200	600	1,950	2	3-stage, 2-row	49~54	240	950 1,120
MSE(J)-300		1,600	600	1,950	2	3-stage, 2-row	49~54	260	1,450
MSE(J)-500		1,800	700	1,950	2	3-stage, 2-row	49~54	430	2,420
MSE(J)-150 MSE(J)-200	B	1,300	550	1,850	2	6-stage, 1-row	46~54	240	950 1,100
MSE(J)-300		1,700	550	1,850	2	6-stage, 1-row	46~54	310	1,470
MSE(J)-500		2,250	550	1,950	3	5-stage, 1-row	45~54	440	2,370

Note 1: Overall weight is based on the assumption that there are 54 batteries.

- Height (H) includes that of the channel base.
- This table is just an example. Dimensions and arrays are negotiable.



An example of combined battery capacities in parallel

Type	Rated capacity (Ah), a 10-hour rate	Example parallel connections
MSE(J)-400	400	MSE(J)-200 × 2
MSE(J)-600	600	MSE(J)-300 × 2
MSE(J)-700	700	MSE(J)-200 + MSE(J)-500
MSE(J)-800	800	MSE(J)-300 + MSE(J)-500
MSE(J)-900	900	MSE(J)-300 × 3
MSE(J)-2500	2,500	MSE(J)-1000 × 2 + MSE(J)-500
MSE(J)-4000	4,000	MSE(J)-2000 × 2
MSE(J)-5000	5,000	MSE(J)-2000 + MSE(J)-3000
MSE(J)-6000	6,000	MSE(J)-3000 × 2
MSE(J)-7000	7,000	MSE(J)-2000 × 2 + MSE(J)-3000
MSE(J)-8000	8,000	MSE(J)-2000 + MSE(J)-3000 × 2
MSE(J)-9000	9,000	MSE(J)-3000 × 3

For short-time large-current discharge

UP-R series



Features

- **Excellent large-current discharge characteristics**
The 10-minute rate discharge characteristics of these series are about 40% higher than those of the MSE with combinations of newly designed high-performance plates and separators.
- **Compact design**
The cell volume of these series under the same load based on an assumed load time of 10 to 15 minutes is about 40% less than that of the MSE.
- **Easy to install, connect, and inspect**
These series equip monobloc batteries of 12 V and 24 V and use top-flat, nut-inserted terminals that significantly simplify the process of installation and connection. Moreover, terminals are arranged in the front to facilitate inspection.

- **Parallel connections to correspond large capacities**
Batteries are the same in length and height, and their widthwise dimensions alone are variable with capacity and voltage. This design facilitates parallel connection.
- **Service life-span ranging from 7 to 9 years^(note) for a 10-minute rate discharge.**

Main uses

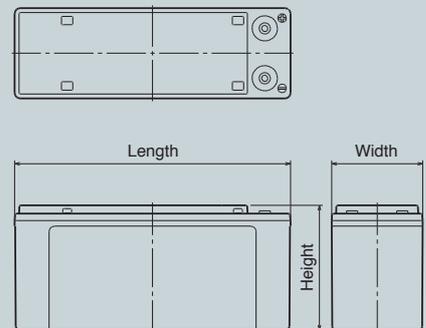
- UPS
- Startup of generation equipment
- Operation of receiving and substation equipment
- Emergency lighting

Note: Expected service life-span at a constant temperature of 25°C, as estimated based on the results in house accelerated life test.

Specifications

Battery type		UP300-12R	UP400-12R
Nominal voltage	V	12	12
Capacity (25°C)	10HR (1.80V/cell)	Ah	100
	1HR (1.60V/cell)	Ah	81
	30MR (1.60V/cell)	Ah	71
	10MR (1.60V/cell)	Ah	50
Dimensions	Height (±3)	mm	225
	Length (±3)	mm	494
	Width (±3)	mm	163
Weight (Approx.)	kg	45	64
Charge voltage (25°C)	V/cell	2.23	
Service temperature range	Charge	°C	-15~45
	Discharge	°C	-15~45
	Storage	°C	-15~40

Outside dimensional diagram

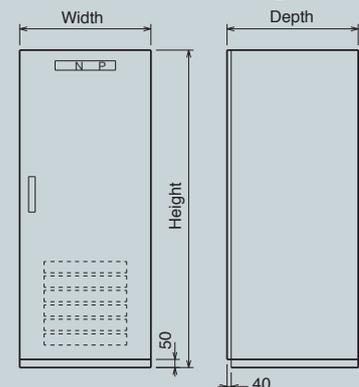


Specifications of standard cubicle

Outside dimensions (mm)			Cubicle weight (approx. in kg)	Battery storage per cubicle			Weight including battery (approx. in kg)	
Width	Depth	Height		Battery type	No. of batteries	No. of cells		Battery array
500±5	800±5	1,950±5	150	UP300-12R	9	54	5-stage, 1-row	560
700±5	800±5	1,950±5	210	UP300-12R	14	84	5-stage, 1-row	850
700±5	800±5	1,950±5	210	UP400-12R	9	54	5-stage, 1-row	790
800±5	800±5	1,950±5	240	UP300-12R	15	90	5-stage, 1-row	920
950±5	800±5	1,950±5	300	UP400-12R	15	90	5-stage, 1-row	1,310

- For UPS units and other cases where battery cubicles form an array, the dimensions and specifications for paint colors can be standardized. In such case, consult with us.

Outside dimensional diagram

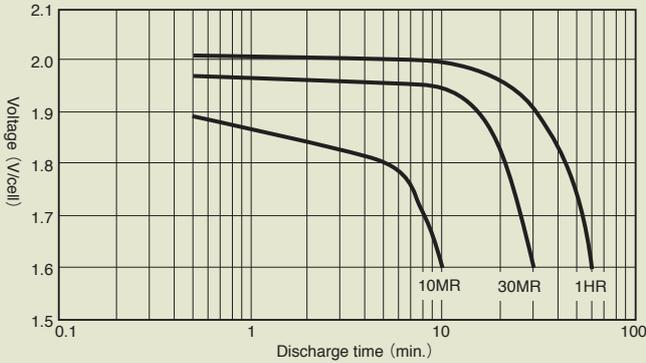


Large-current discharge

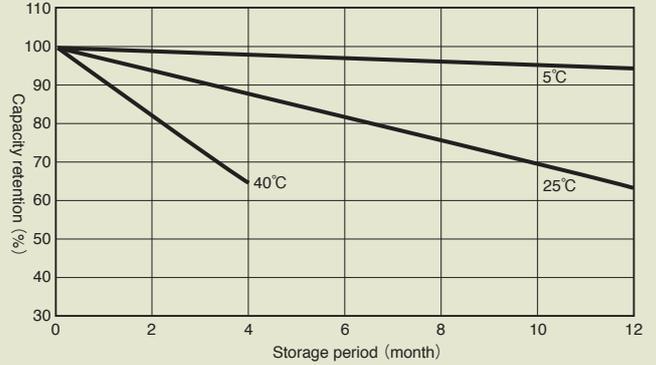
UP-R series

Characteristics

Examples of discharge characteristics at various rates (25°C)

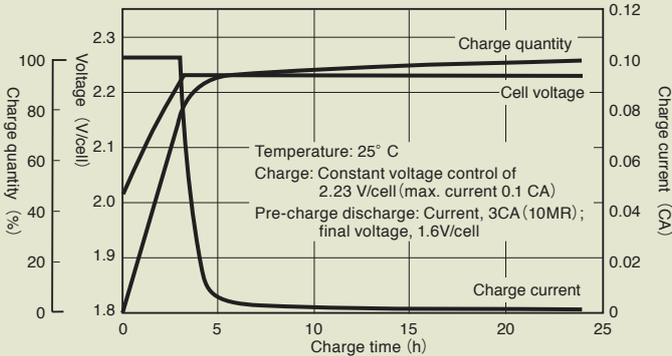


Examples of capacity retention characteristics

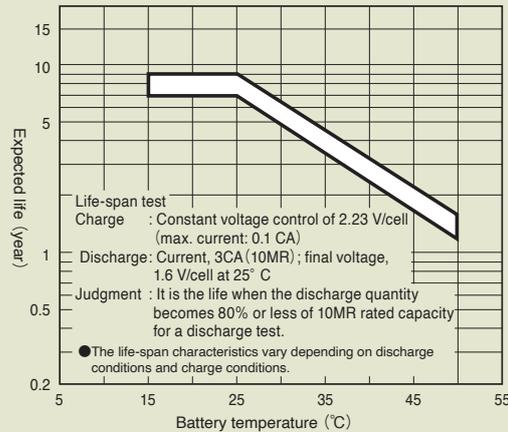


- The capacity retention ratio is a ratio to a 10-hour rated capacity.
- Make a supplemental charge until the capacity retention ratio becomes 80% or less.

Constant-voltage charge: an example of UP400-12R



Examples of the life-span characteristics



"Expected life" is the number of years achieved in the high temperature accelerated life test converted into the period of use at the constant condition at 25°C. This number of years is estimated based on the constant use conditions. It does not guarantee the battery life under all operating conditions.

Life-span test
 Charge : Constant voltage control of 2.23 V/cell (max. current: 0.1 CA)
 Discharge: Current, 3CA (10MR); final voltage, 1.6 V/cell at 25°C
 Judgment : It is the life when the discharge quantity becomes 80% or less of 10MR rated capacity for a discharge test.

- The life-span characteristics vary depending on discharge conditions and charge conditions.

UP300-12R 25°C 10HR 100Ah Constant Current Discharge Characteristics Unit:(A)

F.V./time	(min)			
	5	10	30	60
1.6 V	398	301	143	81
1.7 V	348	265	127	76
1.8 V	309	236	118	71
1.9 V	206	174	89	58

UP400-12R 25°C 10HR 150Ah Constant Current Discharge Characteristics Unit:(A)

F.V./time	(min)			
	5	10	30	60
1.6 V	597	451	215	122
1.7 V	522	397	191	115
1.8 V	464	355	177	107
1.9 V	309	261	134	87

Constant Power Discharge Characteristics Unit:(W)

F.V./time	(min)			
	5	10	30	60
1.6 V	637	481	230	131
1.7 V	592	450	217	130
1.8 V	557	426	213	129
1.9 V	391	331	170	111

Constant Power Discharge Characteristics Unit:(W)

F.V./time	(min)			
	5	10	30	60
1.6 V	956	722	345	196
1.7 V	888	676	326	196
1.8 V	835	639	319	193
1.9 V	587	496	255	166

Space-saving, large-capacity, long-life, and long-time loads

MU series

Features

● Use of a unit structure

Space-saving, earthquake-resistant, and shorter installation time. With its unit structure that allows the housing of its single cells in a metal frame and connecting the metal frame for installation, the series eliminates the need for a rack. The new series requires 40 to 50% fewer setting man-hours and about a setting area 50% smaller than that of the MSE (J) series (from our earlier models).

● Long-life

A newly developed lead-calcium-tin alloy is used to make the positive grid more resistant to corrosion.

● Easy to inspect the battery

With fewer terminals (reduced by one-fourth to one-half), the MU series has its terminal surfaces arranged in the front, making it easy to inspect voltage measurements and other operations, and thereby shortening the inspection time.

● Expected life ranges from 13 to 15 years. note)

Note: "Expected life" is the number of years achieved in the high temperature accelerated life test converted into the period of use at constant condition at 25°C.

This number of years is estimated based on the constant use conditions. It does not guarantee the battery life under all operating conditions.

Main uses

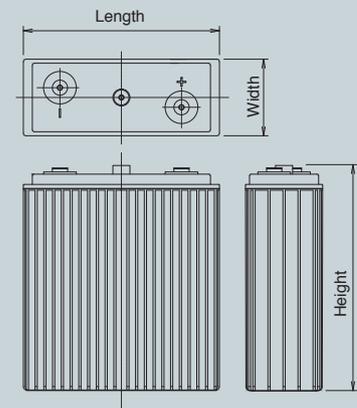
- Telecommunication system
- Operation of receiving and substation equipment
- Backup for instrumental equipment
- UPS (Backup time is more than one hour)



Specifications of single-cell and outside dimensions

Battery type		MU-1000	MU-1500	
Nominal voltage	V	2	2	
Capacity (25°C)	10HR (1.80V/cell)	Ah	1,000	1,500
	5HR (1.75V/cell)	Ah	850	1,275
	3HR (1.70V/cell)	Ah	800	1,200
	1HR (1.60V/cell)	Ah	550	825
Dimensions	Height (±3)	mm	507	507
	Length (±3)	mm	303	437
	Width (±3)	mm	172	172
Weight (Approx.)	kg	58	85	
Floating charge voltage (25°C)	V/cell	2.23		
Service temperature range	Charge	°C	-15~45	
	Discharge	°C	-15~45	
	Storage	°C	-15~40	

■ Outside dimensional diagram

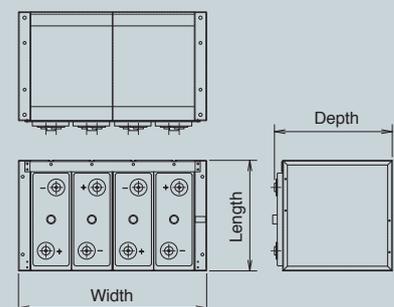


Specifications of unit cell and outside dimensions

Type	Nominal voltage (V)	10-hour rate capacity (Ah)	Dimensions (mm)			Weight (approx. in kg)	Method for connection
			Height (±3)	Width (±3)	Depth (±3)		
MU-1000-12	12	1,000	339	1,145	509	388	6 pcs. in series
MU-1500-8	8	1,500	473	799	509	380	4 pcs. in series

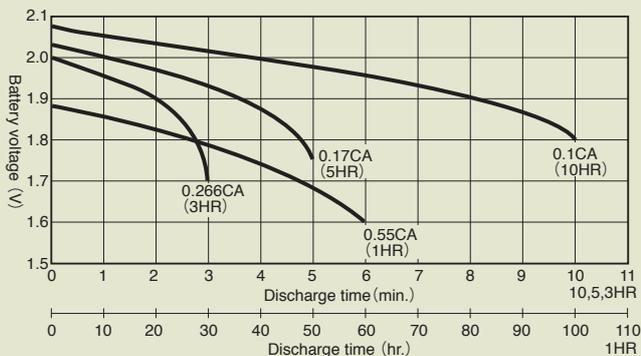
● These specifications of unit cell show an example. For the composition of unit cells, consult with us.

■ Outside dimensional diagram

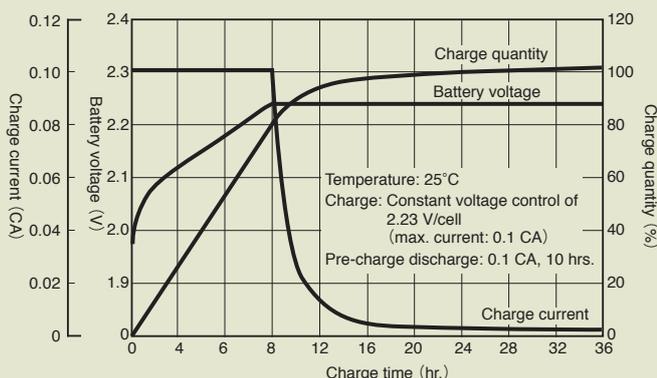


Specifications

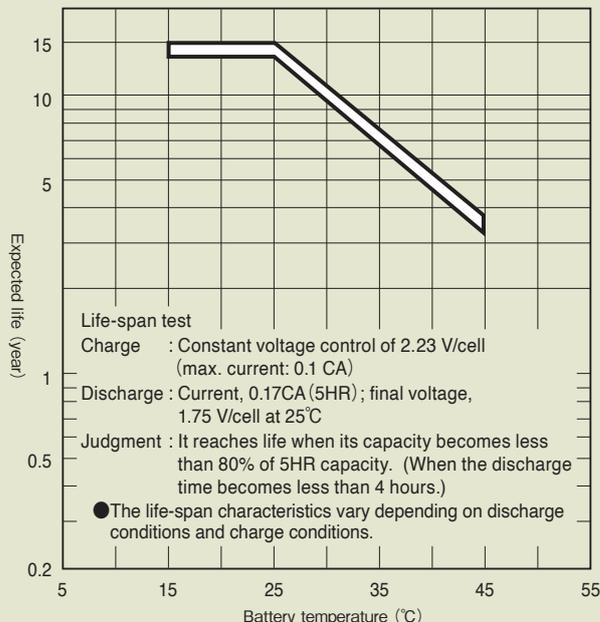
Examples of discharge characteristics at various rates (25°C) An example of MU-1500



Examples of charge characteristics

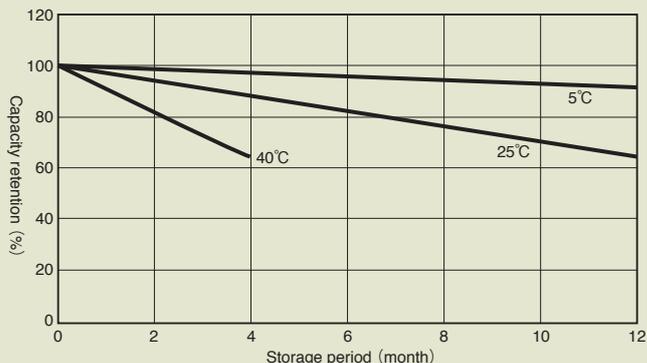


Examples of the life-span characteristics



"Expected life" is the number of years achieved in the high temperature accelerated life test converted into the period of use at constant condition at 25°C. This number of years is estimated based on the constant use conditions. It does not guarantee the battery life under all operating conditions.

Examples of capacity retention characteristics



MU1000 25°C 10HR 1000Ah SKENA2013-476A
 Constant Current Discharge Characteristics Unit:(A)

F.V./time (min)	60	90	120	180	240	300	360	480	600
1.6V	649	487	395	289	232	196	169	134	112
1.7V	555	436	363	268	217	181	158	126	106
1.8V	454	380	327	243	200	168	147	118	100
1.9V	344	312	273	208	169	143	126	102	86

Constant Power Discharge Characteristics Unit:(W)

F.V./time (min)	60	90	120	180	240	300	360	480	600
1.6V	1038	780	632	463	372	313	271	214	180
1.7V	944	742	618	456	369	309	269	215	180
1.8V	818	684	590	439	360	302	264	213	180
1.9V	655	593	520	395	322	273	240	194	165

MU-1500 25°C 10HR 1500Ah
 Constant Current Discharge Characteristics Unit:(A)

F.V./time (min)	180	240	300	360	480	600
1.6V	434	348	294	254	201	169
1.7V	403	326	272	238	189	159
1.8V	365	300	252	220	177	150
1.9V	312	254	215	189	153	130

Constant Power Discharge Characteristics Unit:(W)

F.V./time (min)	180	240	300	360	480	600
1.6V	695	558	470	406	322	271
1.7V	685	554	463	404	322	271
1.8V	658	540	453	397	319	270
1.9V	593	483	410	360	292	247

Specifications of assembled battery

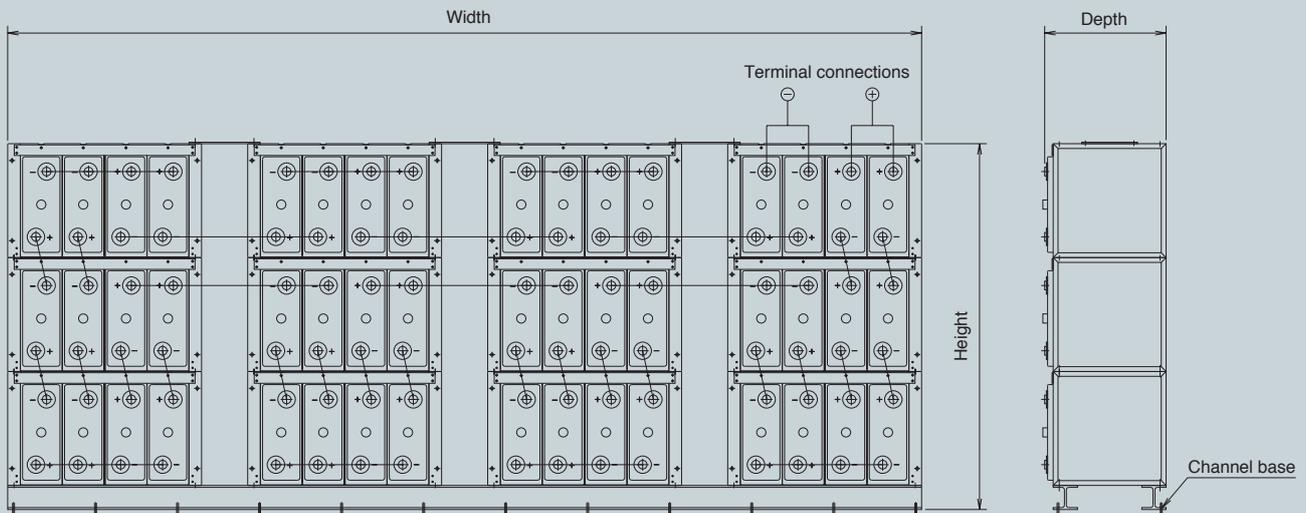
Type	Nominal voltage V	10-hour rate capacity (Ah)	Dimensions(mm)			Weight (approx. in kg)	Setting area m ²
			Height (±5)	Width (±5)	Depth (±5)		
MU-1000-12×2	24	1,000	778	1,145	509	830	0.583
MU-1000-12×4	48	1,000	1,456	1,145	509	1,620	0.583
MU-1500-8×3	24	1,500	1,519	799	509	1,190	0.406
MU-1500-8×6	48	1,500	1,519	1,788	509	2,390	0.910
MU-2000-6×4	24	2,000	1,456	1,145	509	1,620	0.532
MU-2000-6×8	48	2,000	1,456	2,480	509	3,250	1.262
MU-3000-4×6	24	3,000	1,519	1,788	509	2,390	0.910
MU-3000-4×12	48	3,000	1,519	3,766	509	4,760	1.916

●The height includes that of the channel base. The dimensions do not include those of the terminal connections.

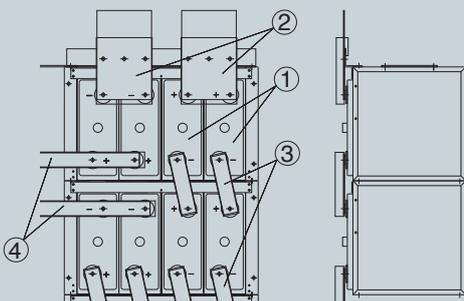
●The MU-4000, 5000, and 6000 consist of parallel connections. Specifications of assembled battery show an example. For the composition of assembled batteries, consult with us.

Outside dimensional diagram of an assembled battery

■ Installation diagram (an example)



■ Details of terminal connections (an example)



No.	Part name
1	Single cell
2	Connection plate (for terminal)
3	Connection plate (between cells)
4	Connection plate (between blocks)

Standard stationary valve-regulated lead acid battery

HSE series

Standard type
HSE series



Features

- A rich lineup and compatibility with parallel connections
A rich lineup, along with possible parallel connections, that corresponds various capacity requirements.
- Low maintenance
These series eliminate the need for water additions, specific gravity measurements, and equalizing charge, resulting in reduced maintenance and lower cost.
- Expected life ranges from 5 to 7 years. ^{note)}

Note: "Expected life" is the number of years achieved in the high temperature accelerated life test converted into the period of use at constant condition at 25°C. This number of years is estimated based on the constant use conditions. It does not guarantee the battery life under all operating conditions.

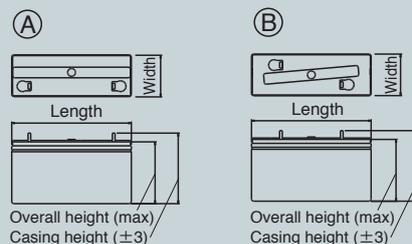
Main uses

- Telecommunication system
- Operation of receiving and substation equipment
- Emergency lighting
- UPS
- Backup for instrumentation equipment
- Startup of generation equipment

Specifications

Battery type			HSE-30-12	HSE-40-12	HSE-50-12	HSE-60-6	HSE-80-6	HSE-100-6
Nominal voltage		V	12	12	12	6	6	6
Capacity (25°C)	10HR (1.80V/cell)	Ah	30	40	50	60	80	100
	5HR (1.75V/cell)	Ah	26	34	43	51	68	85
	3HR (1.70V/cell)	Ah	24	32	40	48	64	80
	1HR (1.60V/cell)	Ah	18	24	30	36	48	60
Dimensions	Overall height (max)	mm	220	220	220	220	220	220
	Casing height (±3)	mm	190	190	190	190	190	190
	Length (±3)	mm	235	299	363	217	281	345
	Width (±3)	mm	128	128	128	128	128	128
	Outside dimensional diagram	—	A	A	A	B	B	B
Weight (Approx.)		kg	15	18	22	14	18	21
Floating charge voltage (25°C)		V/cell	2.23					
Service temperature range	Charge	°C	-15~45					
	Discharge	°C	-15~45					
	Storage	°C	-15~45					

■ Outside dimensional diagram



Notes of Precaution Before Usage

Before using stationary valve-regulated lead acid batteries (called "VRLA battery" hereafter), make sure you read its accompanying user's manual or precautionary notes carefully. VRLA batteries possess energy. Inappropriate usage can cause fluid leakage, heat generation, explosion, and bodily injury. If you do not fully understand our VRLA battery's user's manual of precautionary notes, direct your questions to our company.

⚠ Danger

1. When using a storage battery, ventilate the room to reduce the concentration of hydrogen gas to 0.8% or less. Storage battery emits hydrogen gas and may cause ignition-induced explosion. The indoor ventilation should prevent uneven distribution of hydrogen concentration caused by accumulation of the gas.
2. Do not install the battery near a place producing fire or spark. Doing so may cause ignition-induced explosion or fire.
3. The electrolytic solution of the storage battery is dilute sulfuric acid. When it got into your eyes or got onto your skin or clothes, wash it off immediately with a large amount of tap water or other clean water. Especially when it gets into your eyes or when you put it into your mouth by mistake, seek medical attention immediately. It may cause burns and blindness.
4. When cleaning the storage battery, do not use a feather duster or dry cloth but use a cloth moist with water. Not doing so may cause ignition-induced explosion due to static electricity.

⚠ Warnings

1. Do not put mild PVC or any other sheathed wire or sheet containing plasticizer into contact with the container or lid. Do not put any organic solvent (e.g., acetone, toluene, xylene, methyl ethyl ketone, ethyl acetate, ethyl alcohol, methyl alcohol, benzene, thinner), acetic acid, fuel (e.g., gasoline), oils, rustproofing agent, detergent, paint (e.g., lacquer, paint), cleaning tool (e.g., wet tissues, chemical duster, chemical mop, floor wax, floor cleaner), chemical, or similar items into contact with the container or lid. Any such practice will form cracks in the container or lid, resulting in liquid leakage.
2. When using metal tools such as torque wrench and open-end wrench, they should be insulated with vinyl tape or other means. If the positive terminal of the storage battery comes into contact with the negative terminal, it will cause short circuit and may end-up in burns, damage to the battery, or ignition-induced explosion.
3. Do not install the storage battery in a place with a risk of flooding. Doing so may cause electric shock or fire.
4. When handling the storage battery, do not let its positive and negative terminals short-circuited. Doing so may cause liquid leak from the battery, cause it to heat-up, or cause ignition-induced explosion, fire or smoke.
5. Put the insulating covers properly to the terminals and connecting conductors. Not doing so may cause electric shock, short circuit, burns, damage to the battery, or ignition-induced explosion.
6. Always use protective equipment such as protective goggles, rubber gloves, and rubber sole shoes when performing inspections. If your body directly touches the conductive parts, it may cause an electric shock.
7. Do not use the storage battery beyond timing of its replacement. Doing so may cause the following accidents:
 - It cannot start personal power generator at time of an emergency.
 - It cannot maintain the load during a power failure. (UPS stops, emergency lamp does not turn on, etc.)
 - It cannot be used for the specified time. (Voltage may drop instantly in some cases.)
 - It damages peripheral equipment by liquid leakage.
 - It generates smoke and fire.
 - It burns out.
 - It ignites to induce explosion.
8. Don't spark or short-circuit a used storage battery as it still has electrical energy left in it. It may cause ignition-induced explosion.

⚠ Cautions

1. Charge the storage battery under the charging conditions as we specify. Charging it under any other conditions may cause it not to be fully charged or

result in liquid leakage, heating-up, ignition-induced explosion, a decline in performance, or a shorter life.

2. Before installing the storage battery, make sure to read the operating instructions. After reading the instructions, keep it for future reference in time of need. For any question, please contact your nearest branch office. Installing the storage battery improperly may result in liquid leakage, electric shock, or battery damage.
3. The temperature range for operation of the storage battery is -15°C to $+45^{\circ}\text{C}$. Using the battery outside this temperature range may facilitate its deterioration, or may cause it to freeze or heat up resulting in damage or deformation. Using the battery at high temperature shortens its life. We recommend you to use the battery in the range between 5°C and 30°C .
4. Do not use the storage battery at locations exposed to direct sunlight. Doing so may cause the parts of the battery to deteriorate.
5. Do not wet the storage battery with water or seawater. Doing so may damage the battery or cause a fire. It may also result in corrosion of the terminals and connection plates.
6. Do not use the storage battery near the parts generating heat, such as transformer. Doing so may cause damage to the battery or shorten its life.
7. Do not use the storage battery in a dusty place. Doing so may cause the battery to short-circuit.
8. Install the equipment according to the fire prevention regulations issued by each local municipality in accordance with Fire Service Act Enforcement Regulations (Order of the Ministry of Home Affairs) No.6, Article 12, or, in case where the sum of the product of nominal capacity and the number of cells is 4800Ah cell or more, in accordance with Article 13 and 44 of Fire Prevention Ordinance.
9. Do not use the battery for the following purposes and devices:
 - Applications and devices that are expected to affect the maintenance of human life, such as medical devices;
 - Applications and devices that are expected to potentially lead to personal injury;
 - Applications and devices that are expected to involve in human safety such as traffic control and plant control; and
 - Applications and devices that are expected to have a significant impact to the society.When using the battery for these applications and devices, multiple backup system, etc. need to be considered.
10. Use the valve-regulated lead acid battery with the terminals on top. Do not use it with it being tilted over 90° . Doing so may cause liquid leakage.
11. Keep the discharge current of the storage battery at the maximum value specified in the instruction manual or less. Not doing so may cause damage to the battery.
12. Conduct regular inspection on the storage battery at the intervals specified in the Fire Service Act and other regulations. Inspect it and, if it is out of the specification specified in the instruction manual, take action according to the manual. Record all of the actions taken.
If you use the battery with it being out of specification, it may cause damage to the battery, burnout, or performance deterioration.
13. We are working on recycling the material of the used storage batteries (re-using lead, plastic, etc. as raw materials). When disposing of used batteries, entrust the disposal service provider in accordance with the law on disposal of waste and environmental laws. If you have any questions, please contact the distributor or the nearest branch office.
Dispose of spent storage batteries with note on the following:
 - * Detach the connecting conductors of the battery.Electrical energy left in the battery may cause an electric shock, smoke, or fire.

- The contents of this catalog are current as of June 2023.
- Items listed in this catalog are based upon tests conducted at our company, but are not to be used as guarantees for actual results in the field.
- Pictures and illustrations used for examples of product usage do not necessarily depict examples of current use.
- We do not guarantee that methods of this product's usage, as well as components and equipment using this product, do not infringe upon industrial property rights of any third party.
- It is to be understood that specifications and configurations of this product can be changed without prior notice.
- It is to be understood that the actual product may somewhat differ in color and markings from the pictures displayed due to irregularities in printing.
- Be sure to read the user's manual before using.



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