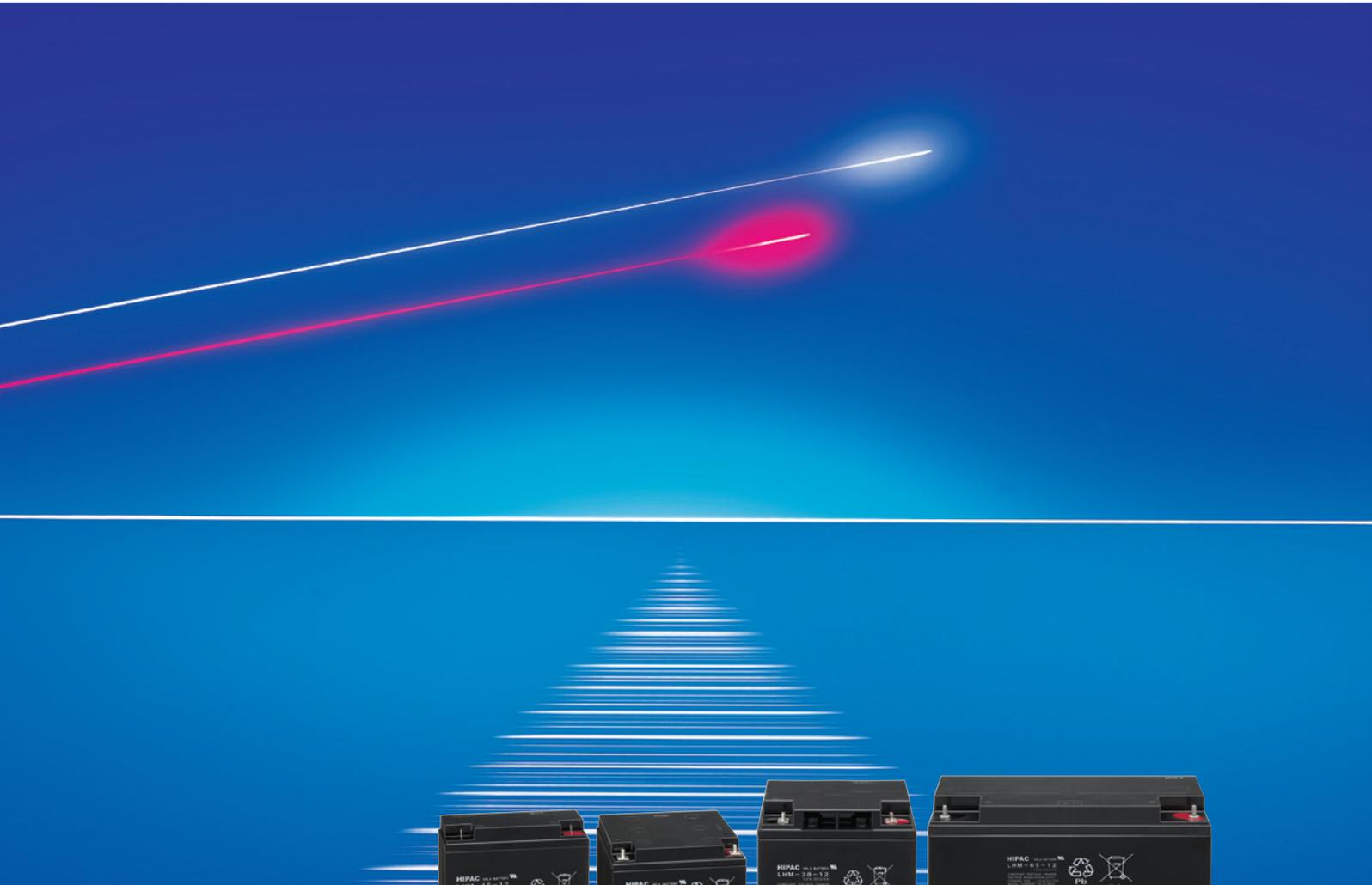


Small-Sized Valve Regulated Lead-Acid Batteries 〈HIPAC〉 LHM / HP / HF / HC Series



LHM series



HP series



HF series



HC series

The small-sized Valve Regulated Lead-Acid (VRLA) battery that we pioneered started in 1959 with many adoption to power supply unit for single lamps. Since then, we have been conducting a series of enhancements to adapt to the changing times and development of new devices such as portable TVs, video cameras, and UPSs. It has been widely used as high performance power supply.

Taking advantage of its features such as “more compact and having higher discharge performance” and “easier in handling and maintenance” than vented lead-acid storage battery, VRLA have been playing active roles in leading-edge technology segment, for UPS and stand-by power supply for communication application and for power supply for wheelchair and solar lights, etc.

Our Nabari Works, which manufactures VRLAs, 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

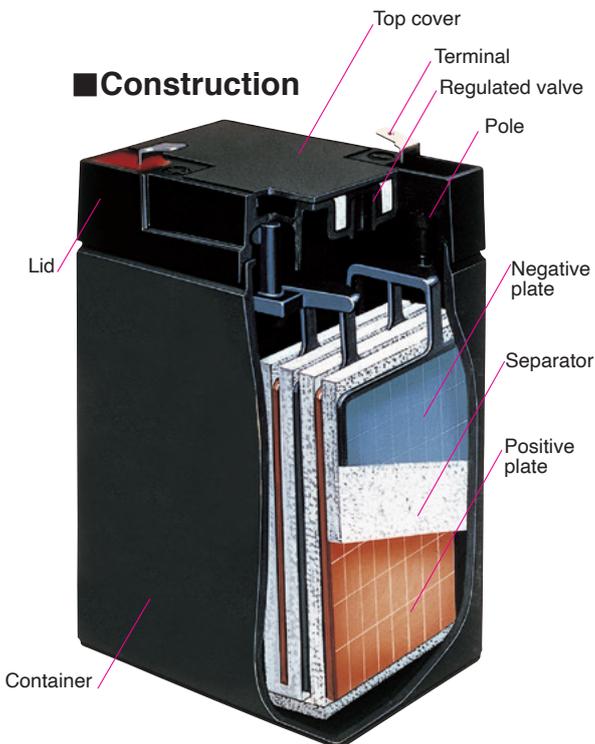


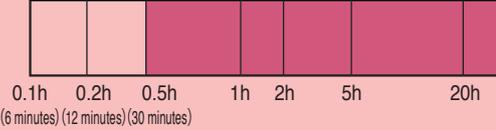
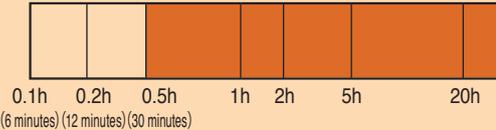
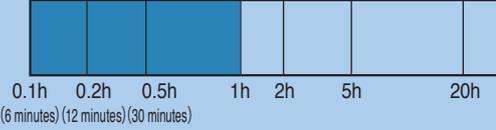
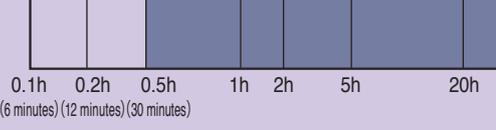
EC9711106

Line-up of small-sized VRLA batteries

	Series	Capacity (Ah:20HR)	Voltage (V)	Expected life
General-purpose type	Long-life LHM series	15, 24, 38, 65	12	Note 1) Approx. 13 years
	Standard HP series	15, 24, 38, 65	12	Note 1) Approx. 3 years or approx. 200 cycles Note 2)
High-rate discharge type	Long-life HF series	17, 28, 44	12	Note 1) Approx. 5 years
Cycle service	Cycle service HC series	24, 38	12	Note 2) Approx. 400 cycles

Construction



Standard load time (recommended value)	Features	Uses	UL
 <p>0.1h 0.2h 0.5h 1h 2h 5h 20h (6 minutes) (12 minutes) (30 minutes)</p>	<ul style="list-style-type: none"> ●The battery container and lid are made of flame-retardant resin (UL 94V-0). ●It is a long-life battery for stand-by use. 	<ul style="list-style-type: none"> ●Telecommunication systems CATV and UPS ●Emergency lighting ●Fire alarm equipment 	<ul style="list-style-type: none"> ●UL-rated product
 <p>0.1h 0.2h 0.5h 1h 2h 5h 20h (6 minutes) (12 minutes) (30 minutes)</p>	<ul style="list-style-type: none"> ●It is of the standard type and comes in many models. There is a variety of models with many different capacities. It gives equipment designers much latitude. ●It is compactly designed and allows equipment to be economically designed. 	<ul style="list-style-type: none"> ●CATV and UPS ●Emergency lighting ●Fire alarm equipment ●Disaster prevention and security systems ●Portable equipment ●Solar power generation system ●Lighting equipment 	<ul style="list-style-type: none"> ●UL-rated product
 <p>0.1h 0.2h 0.5h 1h 2h 5h 20h (6 minutes) (12 minutes) (30 minutes)</p>	<ul style="list-style-type: none"> ●High-rate discharge storage battery designed for UPS. It achieves 9-10 minutes in 3C discharge time. ●The trickle life is 5 years, about 1.7 times as long as that of the HP type. ●The battery container and lid are made of flame-retardant resin (UL94V-0). 	<ul style="list-style-type: none"> ●UPS ●Disaster prevention and security systems 	<ul style="list-style-type: none"> ●UL-rated product
 <p>0.1h 0.2h 0.5h 1h 2h 5h 20h (6 minutes) (12 minutes) (30 minutes)</p>	<ul style="list-style-type: none"> ●Designed for cycle service. The cycle life is 400 cycles, twice as long as that of the HP type. ●The capacity efficiency is 20% higher than the liquid-type battery (EB type). 	<ul style="list-style-type: none"> ●Electric wheelchairs ●Automatic guided vehicles ●Industrial cleaners ●Solar power generation systems 	

Note 1) "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.

Note 2) This is the number of charge/discharge cycles that can be expected when discharging to 0.25 CA and 1.7 V/cell (DOD100%) and charging up to 110% of the discharged capacity at 2.45 V/cell constant voltage, repeatedly at temperature of 25°C. This number of cycles is estimated based on the constant use conditions. It does not guarantee the battery life under all operating conditions.

In this catalog, "C" represents the value (C₂₀) of 20-hour-rate rated capacity. In the case of HP15-12A, for example, C (=C₂₀) = 15.

Long-life LHM series

Features

LHM series is a long-life storage battery for stand-by use.

The battery container and lid are made of flame-retardant resin (UL 94V-0).

LHM series is accredited by the UL.

For the certified varieties, see the specification table.

“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.

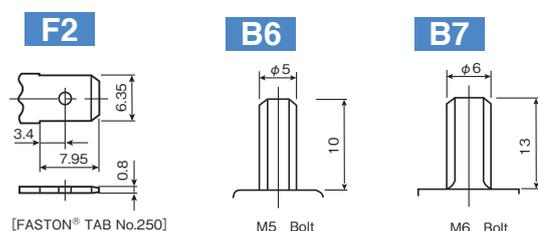
Main uses

Telecommunication system, CATV, UPS, emergency lighting, fire alarm equipment, etc.

Specifications

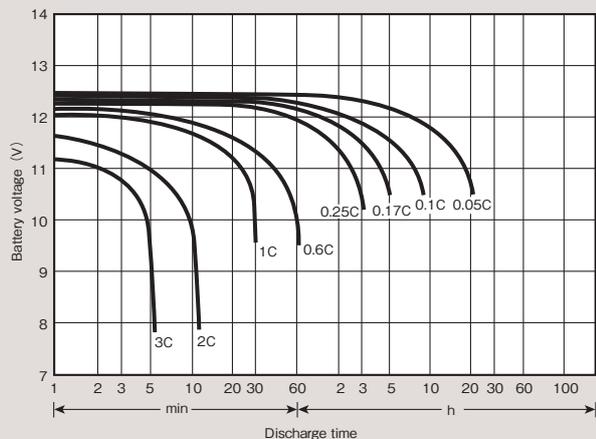
Battery type			LHM-15-12	LHM-24-12	LHM-38-12	LHM-65-12
Nominal voltage ^{Note 1)}	V		12	12	12	12
Capacity 25°C (77°F)	20HR (0.05C) 1.75V/cell	Ah	15	24	38	65
	0.1C 1.75V/cell	Ah	14	22	35	60
	5HR (0.17C) 1.75V/cell	Ah	13	20	32	55
	1HR (0.6C) 1.60V/cell	Ah	9	14	23	39
	1C 1.60V/cell	Ah	7.5	12	19	32
Dimensions ^{Note 2)}	Height	mm (inch)	167 (6.57)	125 (4.92)	170 (6.69)	175 (6.89)
	Length	mm (inch)	181 (7.13)	166 (6.54)	197 (7.76)	350 (13.8)
	Width	mm (inch)	76 (2.99)	175 (6.89)	165 (6.50)	166 (6.54)
Weight (Approx.)	kg (lb.)	6.4 (14.1)	11 (24.2)	16 (35.2)	25 (55)	
Terminal shape	—	F2	B6	B6	B7	
Flame retardant container/lid resin UL-Laboratories rating	—	UL 94V-0				
Internal impedance at 25°C ^{Note 3)} (Approx.)	mΩ	13	10	8	6	
Constant voltage charge 25°C (77°F)	Charge voltage	V	13.65			
	Max. charge current	A	4.5	7.2	11	19
Service temp. range	Charge	°C (F)	0 to 50 (32 to 122)			
	Discharge	°C (F)	-15 to 50 (5 to 122)			
	Storage	°C (F)	-15 to 40 (5 to 104)			
UL approved	—	No. MH15705				

Terminal shapes

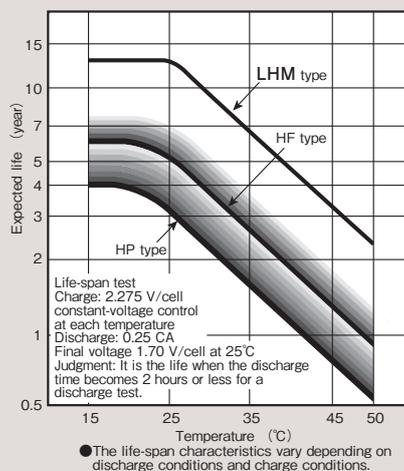


Note 1) Nominal voltage of a cell is 2V and this battery is consist of 6 cells.
 Note 2) Inch unit are for reference and inch value are shown in an approximate value.
 Note 3) This is a measured (standard) value measured by BATTERY TESTER.
 ※FASTON® is the trade mark of TE Connectivity.

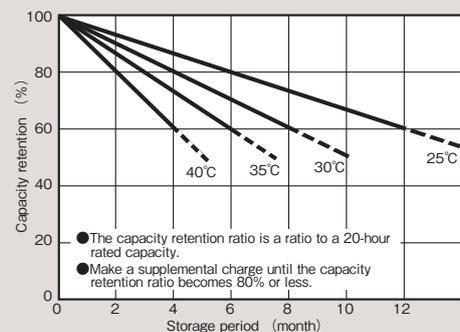
Examples of discharge characteristics at various rates (25°C)



Examples of trickle charge life-span characteristics



Examples of charge retention characteristics



Battery charge method of LHM/HF/HP series

Battery charges must be conducted appropriately in order to fully take advantage of the performance of our VRLA batteries. The batteries must be charged by constant voltage method with current restriction (constant current constant voltage charge method).

Set the charge voltage at 2.275 V/cell when the surrounding temperature is 25°C. Be sure to adjust the charge voltage according to the surrounding temperature. Set the temperature adjustment coefficient to a negative value (-3.3mV/°C/cell) so that a higher temperature is accompanied by a lower charge voltage. However, when charging

the battery in the range of 5 to 35°C (average: 25°C), the temperature adjustment is not required. In order to recover a battery's capacity, the charge quantity must be 105% or more of the discharge quantity. The level of charge current is related to the desired charge time for full recovery. In order to recover battery capacity within 24 hours, set the charge current to 0.1 CA or

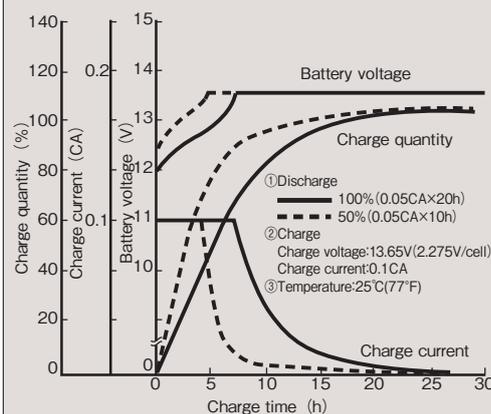
more. However, to avoid accidents and undesirable effects to battery life, keep the charge current at no higher than 0.3 CA.

Charge time and conditions

Charge method	Charge voltage 25°C (V/cell)	Temperature adjustment coefficient (mV/°C/cell)	Maximum charge current (CA)	Charge time 0.1 CA-20(h) 25°C-0.1CA		Temperature (°C)
				50% discharge	100% discharge	
Constant voltage, constant current charge (with current restriction)	2.275	-3.3	0.3	18	24	0 to 40

Note: The charge time is the approximate time for recovering 90 to 100% of the discharge quantity. When charging after the batteries have been left at a high temperature over a long period or when the batteries are connected in series, the batteries may not recover up to 90 to 100% capacities. This is so even when charged under the same conditions as described in the above table. For details, please contact our company.

Examples of charge characteristics While in stand-by use



Standard HP series

Features

HP series is the standard type. It comes in many models.

There is a choice of different models with 12V in voltage and 15-65Ah in capacity. This gives equipment designers latitude.

HP series is accredited by the UL.

For the certified varieties, see the specification table.

HP series can be used not only for stand-by use but also for cycle service as well.

The trickle life expectancy is about 3 years (25°C, 0.25CA discharge).

The cycle life expectancy is about 200 cycles (25°C, 0.25CA, 100% discharge).

The standard load time is from 0.5 to 20 hours.

“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

●Stand-by use

CATV, UPS, emergency lighting, fire alarm equipment, disaster prevention and security systems, etc.

●Cycle service

Portable equipment, transportation equipment, lighting equipment, solar power generation systems, etc.

Specifications

Battery type ^{Note 1)}			HP15-12A (12P150)	HP24-12A (12P240A)	HP38-12A (12P380)	HP65-12A (12P650)
Nominal voltage ^{Note 2)}		V	12	12	12	12
Capacity 25°C (77°F)	20HR (0.05C) 1.75V/cell	Ah	15	24	38	65
	0.1C 1.75V/cell	Ah	14	22	35	60
	5HR (0.17C) 1.75V/cell	Ah	13	20	32	55
	1HR (0.6C) 1.60V/cell	Ah	9	14	23	39
	1C 1.60V/cell	Ah	7.5	12	19	32
Dimensions ^{Note 3)}	Height	mm (inch)	167 (6.57)	175 (6.89)	170 (6.69)	175 (6.89)
	Length	mm (inch)	181 (7.13)	166 (6.54)	197 (7.76)	350 (13.8)
	Width	mm (inch)	76 (2.99)	125 (4.92)	165 (6.50)	166 (6.54)
Weight (Approx.)		kg (lb.)	6.4 (14.1)	9.4 (20.9)	15 (33.1)	25 (55.1)
Terminal shape		—	B1	B1	B2	B7
Flame retardant container/lid resin UL-Laboratory rating		—	UL 94V-0			
Internal impedance at 25°C ^{Note 4)} (Approx.)		mΩ	15	10	8	6
Max. discharge current 5s		A	255	360	400	500
Constant voltage charge 25°C (77°F)	Voltage for stand-by use	V	13.65			
	Voltage for cycle service	V	14.70±0.30 (Temperature adjustment coefficient : -30mV/°C)			
	Max. charge current	A	4.5	7.2	11	19
Service temp. range	Charge	°C (F)	0 to 40 (32 to 104)			
	Discharge	°C (F)	-15 to 50 (5 to 122)			
	Storage	°C (F)	-15 to 40 (5 to 104)			
UL approved		—	No. MH15705			

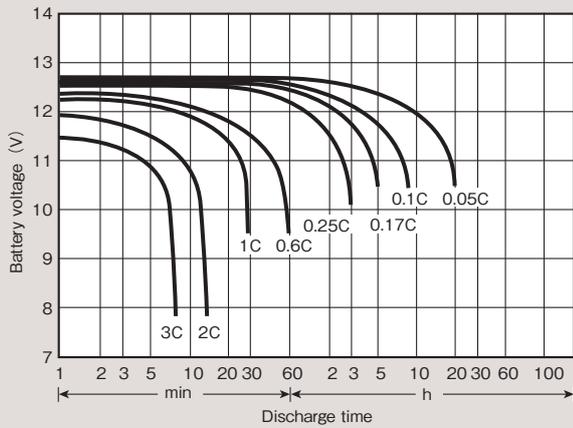
Note 1) The type in parenthesis is a type name under JIS (JIS C 8702).

Note 2) Nominal voltage of a cell is 2V and this battery is consist of 6 cells.

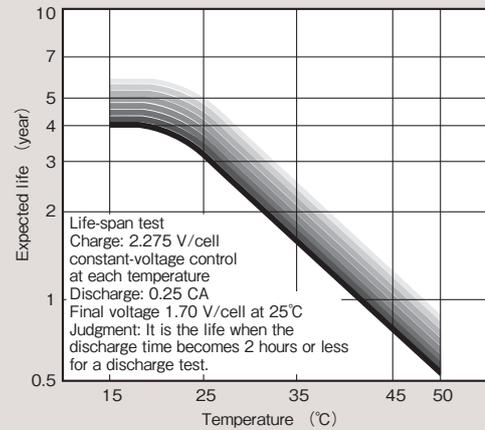
Note 3) Inch unit are for reference and inch value are shown in an approximate value.

Note 4) This is a measured (standard) value measured by BATTERY TESTER.

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

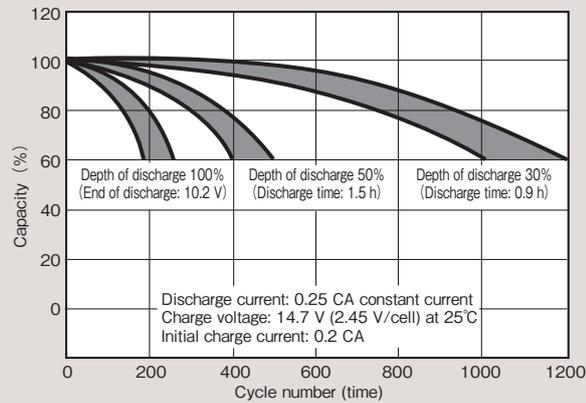


Examples of trickle charge life-span characteristics



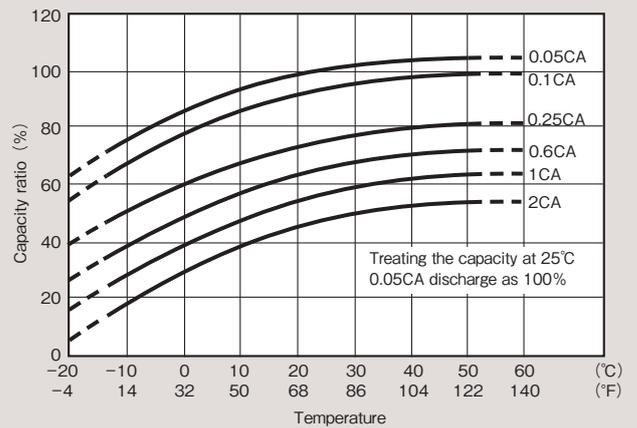
● The life-span characteristics vary depending on discharge conditions and charge conditions.

Examples of cycle service lifespan characteristics

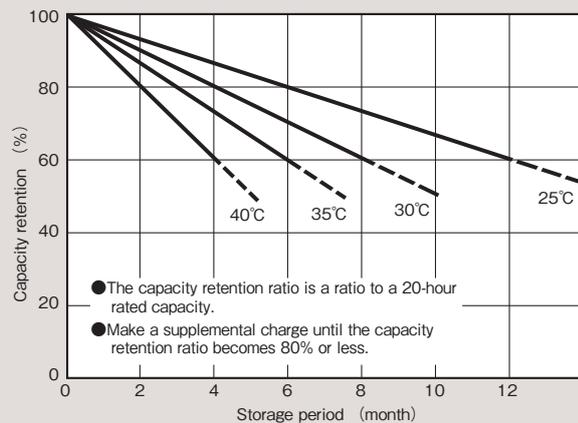


● The life-span characteristics vary depending on discharge conditions and charge conditions.

Examples of relationship between temperature and capacity



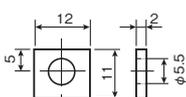
Examples of charge retention characteristics



● The capacity retention ratio is a ratio to a 20-hour rated capacity.
● Make a supplemental charge until the capacity retention ratio becomes 80% or less.

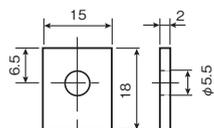
Terminal shapes

B1



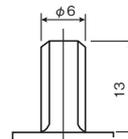
M5 Bolt and nut

B2



M5 Bolt and nut

B7



M6 Bolt

Long-life HF series

Features

HF series is a long-life storage battery for high-rate discharge.

It achieves a capacity 10-20% larger than the HP series and achieves 9-10 minutes in 3C discharge time.

The standard load time is from 0.1 to 1 hour.

The trickle life expectancy

The trickle life expectancy is about 5 years (25°C, 0.25CA discharge), about 1.7 times as long as the HP series.

The battery container and lid are made of flame-retardant resin (UL 94V-0).

“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

UPS, disaster prevention and security systems, etc.

Specifications

Battery type		HF17-12A	HF28-12A	HF44-12A	
Nominal voltage ^{Note 1)}	V	12	12	12	
Capacity 25°C (77°F)	20HR (0.05C) 1.75V/cell	Ah	17	28	44
	5HR (0.17C) 1.75V/cell	Ah	14.5	24	37.5
	3C 1.30V/cell	Ah	7.6	12.6	19.8
Dimensions ^{Note 2)}	Height	mm (inch)	167 (6.57)	175 (6.89)	170 (6.69)
	Length	mm (inch)	181 (7.13)	166 (6.54)	197 (7.76)
	Width	mm (inch)	76 (2.99)	125 (4.92)	165 (6.50)
Weight (Approx.)	kg (lb.)	6.4 (14.1)	9.4 (20.7)	15 (33)	
Terminal shape ^{Note 3)}	—	B1	B1	B2	
Flame retardant container / lid resin UL-Laboratory rating	—	UL 94V-0			
Internal impedance at 25°C (Approx.) ^{Note 4)}	mΩ	15	10	8	
Max. discharge current 5s	A	255	360	400	
Constant voltage charge 25°C (77°F)	Charge voltage	V	13.65		
	Max. charge current	A	5.1	8.4	13
Service temp. range	Charge	°C (F)	0 to 40 (32 to 104)		
	Discharge	°C (F)	-15 to 50 (5 to 122)		
	Storage	°C (F)	-15 to 40 (5 to 104)		
UL approved	—	No. MH15705			

Note 1) Nominal voltage of a cell is 2V and this battery is consist of 6 cells.

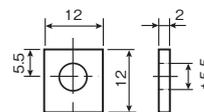
Note 2) Inch unit are for reference and inch value are shown in an approximate value.

Note 3) () inside a table is optional specifications.

Note 4) This is a measured (standard) value measured by BATTERY TESTER.

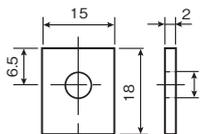
Terminal shapes

B1



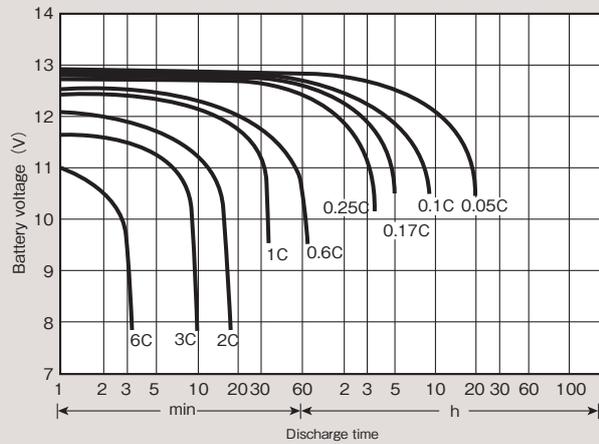
M5 Bolt and nut

B2

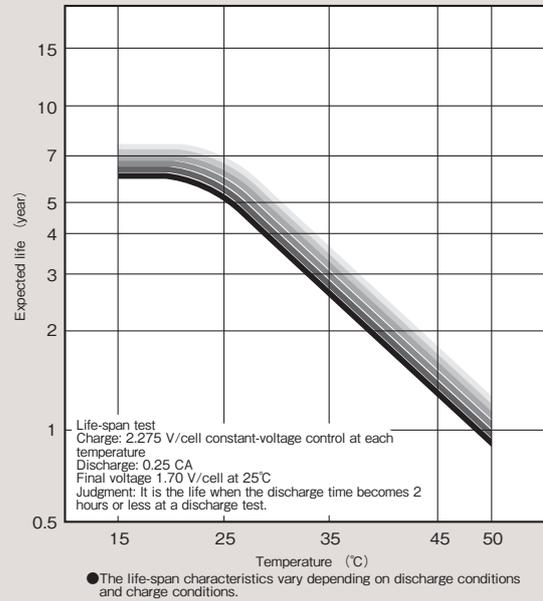


M5 Bolt and nut

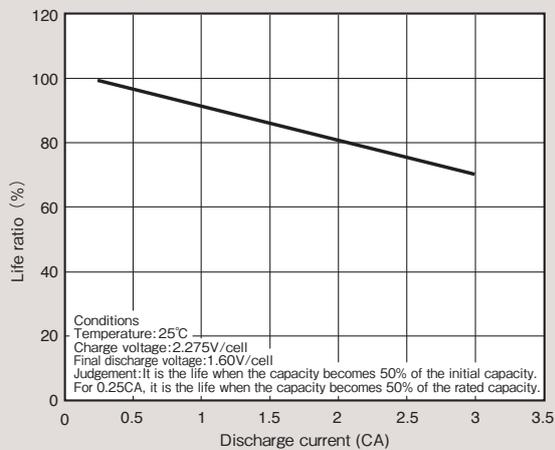
Examples of discharge characteristics at various rates (25°C)



Examples of trickle charge life-span characteristics

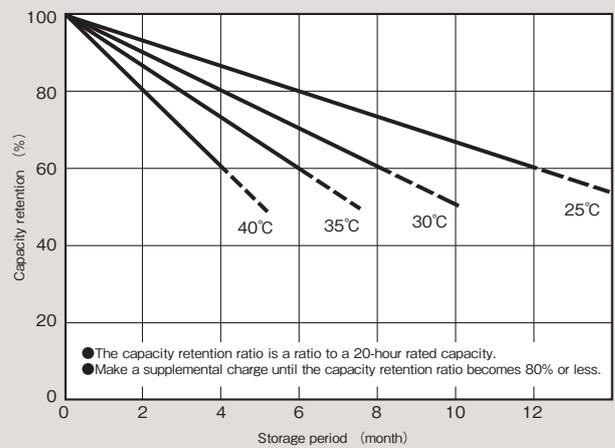


Examples of relationship between discharge current and life ratio



Note: Life ratio is 100% when discharge current is 0.25 CA.

Examples of charge retention characteristics



- The capacity retention ratio is a ratio to a 20-hour rated capacity.
- Make a supplemental charge until the capacity retention ratio becomes 80% or less.

HC series

Features

HC series is a cycle service storage battery.

It is a storage battery designed for cycle service. Expected cycle life ^{Note 1)} is about 400 cycles (25°C, 0.25CA 100% discharge), about twice as long as the HP series.

Note 1) This is the number of charge/discharge cycles that can be expected when discharging to 0.25 CA and 1.7 V/cell (DOD100%) and charging up to 110% of the discharged capacity at 2.45 V/cell constant voltage, repeatedly at temperature of 25°C. This number of cycles is estimated based on the constant use conditions. It does not guarantee the battery life under all operating conditions.

Main uses

Electric wheelchairs, Automatic guided vehicles, industrial cleaners, solar power generation systems, etc.

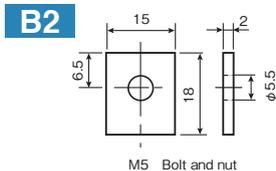
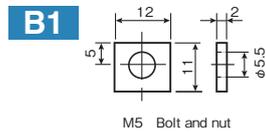
Specifications

Battery type			HC24-12A	HC38-12A
Nominal voltage ^{Note 1)}		V	12	12
Capacity 25°C (77°F)	20HR (0.05C) 1.75V/cell	Ah	24	38
	0.1C 1.75V/cell	Ah	22	35
	5HR (0.17C) 1.75V/cell	Ah	20	32
	1HR (0.6C) 1.60V/cell	Ah	14	23
Dimensions ^{Note 2)}	Height	mm (inch)	125 (4.92)	170 (6.69)
	Length	mm (inch)	166 (6.54)	197 (7.76)
	Width	mm (inch)	175 (6.89)	165 (6.54)
Weight (Approx.)		kg (lb.)	9.5 (19.9)	16.2 (33.1)
Terminal shape		—	B1	B2
Flame retardant container/lid resin UL-Laboratory rating		—	UL94HB	
Internal impedance at 25°C (Approx.)		mΩ	10	8
Max. discharge current 5s		A	360	400
Service temp. range	Charge	°C (F)	0 to 40 (32 to 104)	
	Discharge	°C (F)	-15 to 50 (5 to 122)	
	Storage	°C (F)	-15 to 40 (5 to 104)	

Note 1) Nominal voltage of a cell is 2V and this battery is consist of 6 cells.

Note 2) Inch unit are for reference and inch value are shown in an approximate value.

Terminal shapes

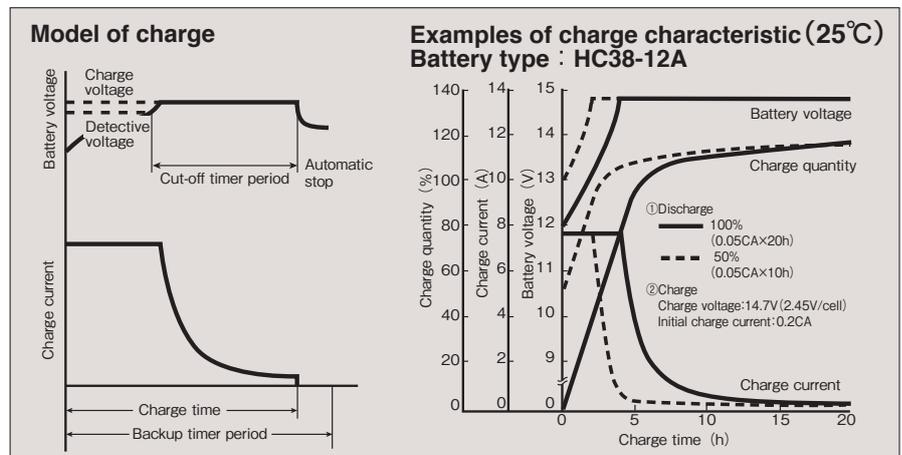


Battery charge method of HC series

In order to use the life of a battery fully, poor charged state and overcharge must be avoided. As an effective measure, start the cut-off timer when the battery voltage becomes a set value and automatically cut the charge after a certain period of time has passed. Depending on the ambient temperature, the charge voltage may require correction. Set the temperature adjustment coefficient to a negative value (-5mV/°C/cell) so that a higher temperature is accompanied by a lower charge voltage. However, when charging the battery in the range of 5 to 35°C (average: 25°C), temperature adjustment is not required.

The charge time can be controlled by changing the initial charge current and voltage. The table below shows the relationship between the charge time and charge conditions. In case of five hour charging a large initial charge current is required. For safety and protection, we recommend the use of a 6-hour backup timer circuit. The battery charge shall be completed when the appropriate charge quantity becomes 110%.

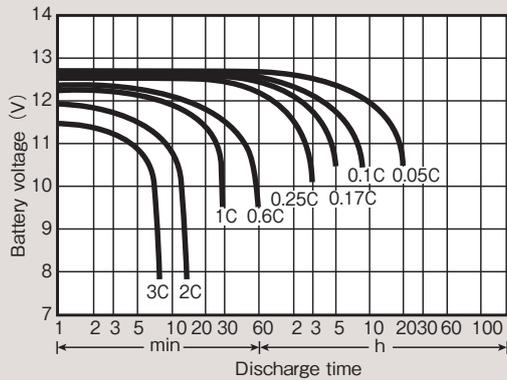
Constant current constant voltage charge



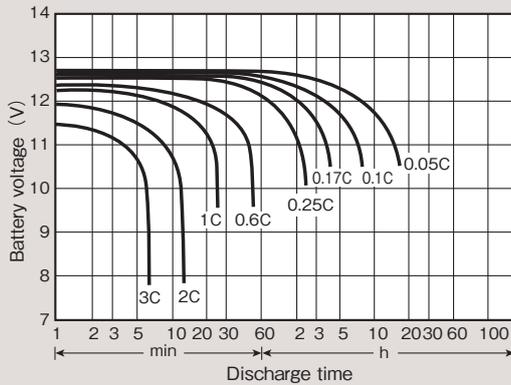
Charge time and conditions

Charge time (DOD 100%) (h)	Initial charge current (CA)	Charge voltage 25°C (V/cell)	Detective voltage 25°C (V/cell)	Cut off timer (h)	Temperature adjustment coefficient (mV/°C /cell)	Temperature (°C)	Appropriate charge quantity (%)
15	0.1	2.45	2.40	8	- 5	0 to 40	110
10	0.2	2.45	2.40	6			
5	0.3	2.50	2.45	3			

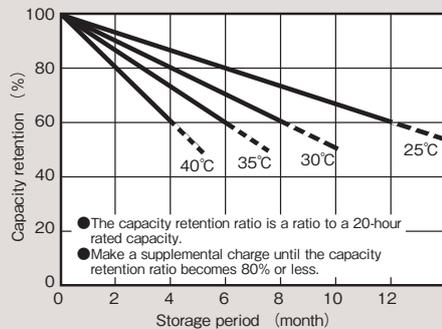
Examples of discharge characteristics at various rates (25°C)



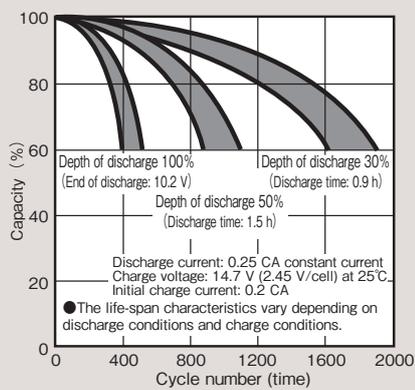
Examples of discharge characteristics at various rates (0°C)



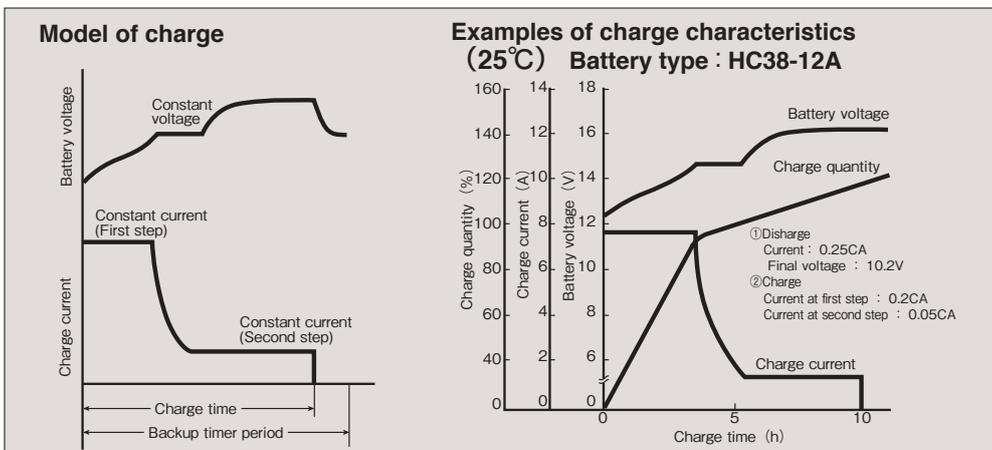
Examples of charge retention characteristics



Examples of cycle service life-span characteristics



2-Step constant current charge



Charge time and conditons

Charge time (DOD 100%) (h)	Charge current at first step (CA)	Switching voltage (V/cell)	Charge current at second step (A)	Switching voltage temperature adjustment coefficient (mV/°C/cell)	Temperature (°C)	Appropriate charge quantity (%)
15	0.1	2.45	0.05C	- 5	0 to 40	110 to 130
10	0.2					
8	0.3					

Notes of Precaution Before Usage

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

Danger

1. The storage battery generates hydrogen gas which may cause ignition-induced explosion due to fire or short-circuit.
2. When using metal tools such as torque wrench and open-end wrench, they should be insulated with vinyl tape or the like. Use of a non-insulated metal tool may cause heat and sparks generated by short-circuit to cause burns, damage to the storage battery, and ignition-induced explosion.
3. Do not install the storage battery in a closed space or near fire. Installing it in such places may cause ignition, smoke, or ignition-induced explosion due to hydrogen gas generated from it.
4. Do not connect the positive and negative terminals of the storage battery with wire or other metal objects. The storage battery may raise its temperature or generate hydrogen gas, which can cause liquid leakage, ignition, smoke, or ignition-induced explosion.

Warnings

1. Do not use the storage battery near a part generating heat such as a transformer. Use of the storage battery near a part generating heat accelerates its deterioration, which may cause electric leakage, ignition, smoke, ignition-induced explosion, etc.
2. Do not install the storage battery in a place with a risk of flooding. Installation of the storage battery in such places may cause electric shock or fire due to electric leakage.
3. Do not let pipe wrench, spanner and other tools to come into contact with sections with different voltage (electrical potential difference). If they contact like that, heat or sparks generated by short circuit may cause burns, or fracture, liquid leakage, ignition, smoke, or ignition-induced explosion of the storage battery.
4. Do not install it with tilting angle of more than 90° angle from the upright position. Installation with such angle may cause liquid leakage, ignition, smoke, and ignition-induced explosion of the storage battery.
5. Make sure not to mistake the polarity of the array (positive pole and negative pole). Connecting with opposite polarity may cause fire or damage to the charger.
6. Do not place spanner or other metal objects on the storage battery. The heat and sparks generated by short circuit may cause burns to your body, fracture, liquid leakage, ignition or smoke of the storage battery, and a fire due to ignition-induced explosion.
7. Do not disassemble, modify or destroy the

- storage battery. Disassembling, modifying or destroying it may cause liquid leakage, ignition, smoke, or ignition-induced explosion of the storage battery.
8. Charge the storage battery with a charger dedicated for it, or follow the conditions for charging specified by us. Charging under other charging conditions will cause the storage battery to increase its temperature or generate hydrogen gas, which may cause liquid leakage, ignition or ignition-induced explosion.
 9. Do not clean the battery with dry cloth or feather duster. Cleaning with a dry cloth or feather duster may induce static electricity and cause ignition-induced explosion. Clean it with a cloth moist with water.
 10. When performing maintenance or inspection, take measures to prevent electric shock, such as wearing rubber gloves. Working without the measures to prevent electric shock may result in electric shock.
 11. Replace the storage battery by the replacement time indicated in the operating instructions or on the device. If the battery is used after the replacement time, it may cause trouble like internal short circuit of the storage battery and damage to the container, etc., resulting in liquid leakage, ignition, smoke, ignition-induced explosion, etc.
 12. The storage battery holds dilute sulfuric acid inside. If the liquid leaks from the battery and gets on your skin or clothes, immediately wash it with plenty of water. If the liquid gets into your eyes, immediately wash your eyes with plenty of clean water such as tap water, and then seek medical attention. If dilute sulfuric acid gets into the eyes, it may cause blindness, and if it gets on the skin, it may cause burns.
 13. As the spent storage battery still has electric energy left in it, insulate its terminals. It may cause liquid leakage, ignition, smoke or ignition-induced explosion.

Cautions

1. Do not use the storage battery in a dusty place. It may cause a short circuit.
2. When installing it, take measures to prevent electric shock, such as wearing rubber gloves. Working without the measures to prevent electric shock may result in electric shock.
3. Do not use the storage battery in any application other than that specified. If it is used in an application other than those specified, it may cause liquid leakage, ignition, smoke, or ignition-induced explosion of the storage battery.
4. Do not use the battery for the following applications 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 damage to human body;
- 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.

5. The range of operating temperature of the storage battery is as follows:

Discharging: -15°C to 50°C (when using equipment)

Charging: 0°C to 40°C (0°C to 50°C for LHM type)

Storage: -15°C to 40°C (keep the temperature below 30°C as much as possible.)

Outside of this temperature range, the performance and life of the storage battery may be reduced, and it may be damaged or deformed. Use at high temperature leads to shorter life. We recommend the use of the storage battery at temperature from 5°C to 35°C.

6. Do not put organic solvents (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, detergents, paint (e.g., lacquer, paint), cleaning tools (e.g., wet tissues, chemical duster, chemical mop, floor wax, floor cleaners), chemicals and other similar items into contact with the container or lid. Any such practice may form cracks in the container or lid, resulting in liquid leakage.

7. Check voltage, temperature, appearance, etc. of the storage battery regularly. Not checking the battery regularly may cause damage to the storage battery or ignition-induced explosion.

8. We are working on recycling the material of the spent storage batteries (re-using lead, plastic, etc. as raw materials). When disposing of spent batteries, consign to 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 September 2024.
- 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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