



Power to Drive
Smart Society

Safety Precautions

Panasonic lithium batteries contain lithium and other flammable organic solvents which, if misused or mishandled, may result in electrolyte leakage, deformation, heat-generation, rupture, and/or fire. Please be sure to observe the following safety precautions.

WARNING

● Charging - Never charge any battery other than rechargeable batteries - Ensure device circuit design prevents current intrusion from other power sources ● Heating - Do not incinerate batteries or heat them to high temperatures - Avoid directly soldering batteries - Do not drop batteries into solder bath ● Disassembly - Do not disassemble or deform batteries ● Accidental Ingestion - Keep out of reach of children. If swallowed, seek emergency medical care immediately	● Short-Circuiting - Do not short-circuit the positive and negative electrodes of lithium batteries - Keep batteries isolated from each other and well protected when in storage. Avoid contact with metal objects ● Reverse Connection - Do not install batteries backwards (with terminal orientation reversed) ● Devices Supporting Multiple Cells - Avoid using new and old batteries together in the same device. Replace all batteries with new ones at the same time - Do not use different types or different brands of batteries together
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Please ensure that every battery application is designed safe in order to prevent accidental ingestion should end users access or replace batteries by themselves.



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Keeping Our Society Safe and Secure with Panasonic Lithium Batteries



Daily life is supported by all kinds of energy. In particular, electric power is essential for modern living. As IoT integrates more deeply into the fabric of our society, the need for the social infrastructure to become more efficient and secure becomes greater. Most of the things we depend on to continue running normally without interruption require electricity to operate. Panasonic lithium batteries boast the reliability to serve not only as a main power source in small devices, but also as a backup supply for use in emergency situations. In everyday use or under the pressure of a disaster, Panasonic contributes to society by supplying the necessary electricity in a way that protects people and reduces its impact on the environment.



Panasonic's Lithium Primary Batteries Support Asteroid Exploration Missions with Stable Performance in Outer Space

After a seven-year journey covering six billion kilometers, the asteroid explorer *Hayabusa* returned home, its reentry capsule separating from the main spacecraft at an altitude of about 17,000 km to enter Earth's atmosphere. Panasonic BR Series cylindrical lithium primary batteries were installed in the reentry capsule and played a vital role in its swift retrieval. BR Series batteries endured years in space, retaining power thanks to low-self-discharge performance and an unparalleled ability to operate in extreme environments.

Panasonic lithium primary batteries have since been equipped in a successor spacecraft, *Hayabusa2*. Multiple cells power four separate instruments, comprising a Small Carry-on Impactor (SCI) to blast a crater on the asteroid, enabling sub-surface sample collection; a deployable camera to film the SCI explosion; a flight-data instrument assisting with reentry; and a beacon for capsule retrieval. The presence of Panasonic technology is testament to the durability of our lithium primary battery technology as *Hayabusa2* continues its 5.24-billion-kilometer voyage.



BR Series Cylindrical-Type Lithium Batteries

Coin-Type Primary Lithium Batteries

Coin-Type Lithium Batteries

- CR Series coin-type lithium batteries are available in a variety of compact sizes and capacities, from thin-type to high-drain models, to meet diverse needs with high current and stable performance in the low temperature range.
- BR Series coin-type lithium batteries are a unique Panasonic technology and offer superior performance in high temperatures. They are primarily used for memory-backup power in continuous low-drain applications in high-temperature conditions. They show stable performance after long periods in storage due to low self-discharge characteristics.

Coin-Type Lithium Batteries for High Temperatures

Compared to conventional coin-type lithium batteries, these coin-type lithium batteries feature an extended operating temperature range of between -40°C and 125°C. These batteries are suitable for use as power sources in various meters; in automotive components such as TPMS (Tire Pressure Monitoring System); and for memory backup devices in office- or factory-automation equipment.

Coin-Type Rechargeable Lithium Batteries

There's no need to replace Coin-Type Rechargeable Lithium Batteries thanks to strict design characteristics that achieve a long life-cycle even when repeatedly charged and discharged.

Cylindrical-Type Lithium Batteries

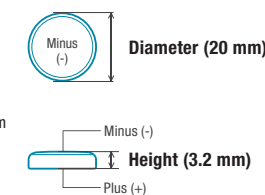
With excellent long-life characteristics and high reliability, cylindrical lithium batteries are suitable power sources for various meters such as intelligent gas meters, which shut off the gas if abnormalities are detected, offering a 10-year lifetime without maintenance.

Example Model-Number Composition

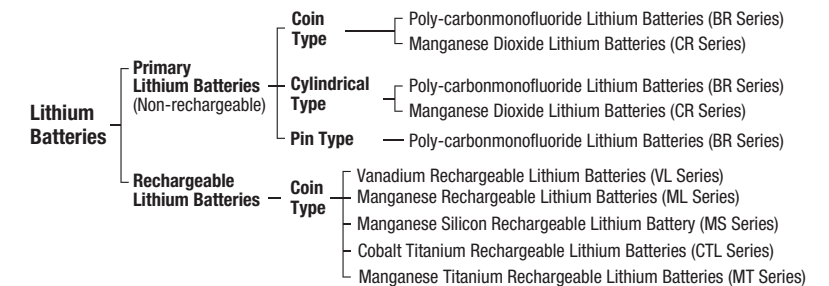
Coin Type

Ex.) **CR2032**

Height: 3.2 mm
Diameter: 20 mm
R: Round
Battery Type C: Manganese-dioxide lithium battery

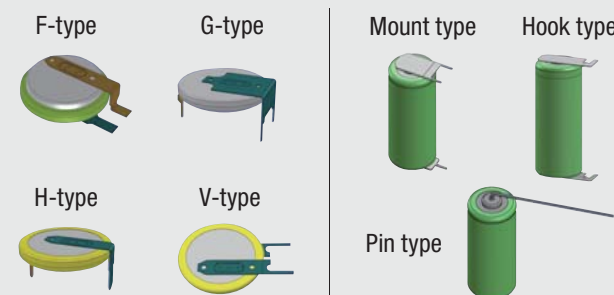


Types of Lithium Batteries



Batteries with Terminals

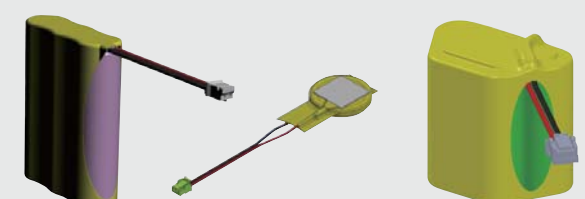
Tabbed type



Lead wire type

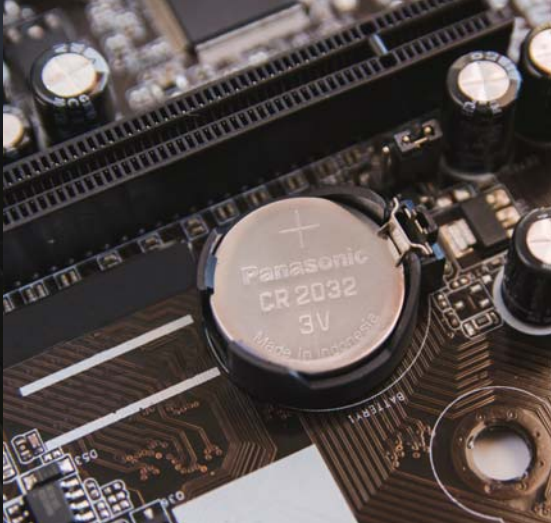


Connector lead wire type



Our lithium batteries are available in a selection of terminal shapes to meet your needs in a variety of applications. Typical types are shown above. Please see the latest technical and product information on our website at <https://industrial.panasonic.com/ww/products/batteries/primary-batteries/lithium-batteries>





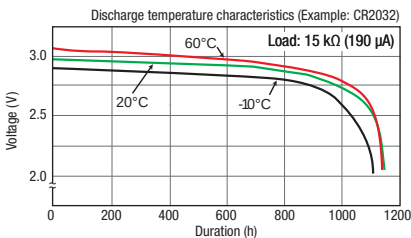
Coin-Type Lithium Batteries



Manganese Dioxide Lithium Batteries (CR Series) 3 V



- Features**
- Suitable for small electronic appliances requiring relatively high current, such as digital watches, card remote controls, and more
 - Operating temperature range of -30°C to 60°C

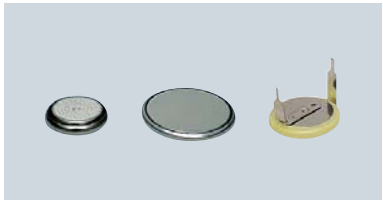


General Specifications	Model No.	Electrical characteristics (20°C)			Dimensions (mm)		Mass (g) (except terminal)	JIS	IEC
		Nominal voltage (V)	Nominal capacity (mAh)*1	Continuous drain (mA)	Diameter	Height			
		3							
	CR1025		30	0.1	10.0	2.5	0.7	CR1025	CR1025
	CR1216		25		12.5	1.6	0.7	CR1216	CR1216
	CR1220		35			2.0	1.0	CR1220	CR1220
	CR1612		40			1.2	0.8	-	-
	CR1616		55		16.0	1.6	1.2	CR1616	CR1616
	CR1620		75			2.0	1.3	CR1620	CR1620
	CR1632		140			3.2	1.8	-	-
	CR2012		55		20.0	12.0	1.4	CR2012	CR2012
	CR2016		90			1.6	1.6	CR2016	CR2016
	CR2025		165			2.5	2.3	CR2025	CR2025
	CR2032		225			3.2	2.9	CR2032	CR2032
	CR2330		265	0.2	23.0	3.0	3.8	CR2330	CR2330
	CR2354		560			5.4	5.8	CR2354	CR2354
	CR2412		100			1.2	2.0	-	-
	CR2450		620		24.5	5.0	6.3	CR2450	CR2450
	CR2477		1,000			7.7	10.5	-	-
	CR3032		500		30.0	3.2	6.8	CR3020	-

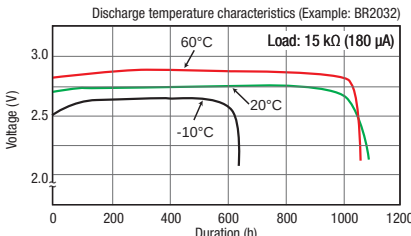
*1 Nominal capacity shown above is based on standard drain and cut-off voltage down to 2.0 V at 20°C.



Poly-carbonmonofluoride Lithium Batteries (BR Series) 3 V



- Features**
- Offers excellent long-term service life and presents an ideal power-source solution for low-drain memory backup applications
 - Operating temperature range of -30°C to 80°C



General Specifications	Model No.	Electrical characteristics (20°C)			Dimensions (mm)		Mass (g) (except terminal)	JIS	IEC
		Nominal voltage (V)	Nominal capacity (mAh)*1	Continuous drain (mA)	Diameter	Height			
		3							
	BR1220		35	0.03	12.5	2.0	0.7	-	-
	BR1225		48			2.5	0.8	-	BR1225
	BR1632		120		16.0	3.2	1.5	-	-
	BR2032		200		20.0		2.5	-	-
	BR2325		165		23.0	2.5	3.0	-	BR2325
	BR2330		255			3.0	3.2	-	-
	BR3032		500		30.0	3.2	5.5	-	-

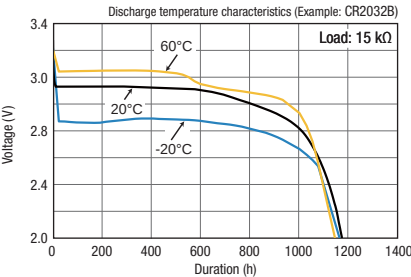
*1 Nominal capacity shown above is based on standard drain and cut-off voltage down to 2.0 V at 20°C.



Manganese Dioxide Lithium Batteries for High Temperatures (CR "A" and "B" Series) 3 V

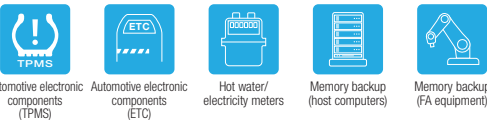


- Features**
- Engineered for use in equipment operating in high temperatures (Max. 125°C)
 - Operating temperature range of -40°C to 125°C
CR2032A, CR2050A: -40°C to 125°C
CR2032B, CR2050B2: -40°C to 120°C
CR2450A: -40°C to 105°C

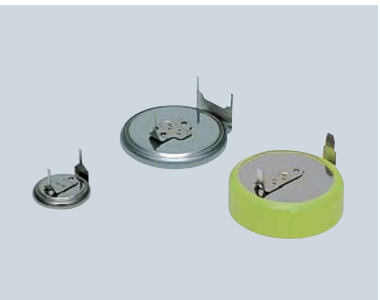


General Specifications	Model No.*1	Electrical characteristics (20°C)			Dimensions (mm)		Mass (g) (except terminal)	JIS	IEC
		Nominal voltage (V)	Nominal capacity (mAh)*2	Continuous drain (mA)	Diameter	Height			
		3							
	CR2032A		210	0.2	20.0	3.2	3.0	-	-
	CR2032B							-	-
	CR2050A		345		20.0	5.0	4.1	-	-
	CR2050B2							-	-
	CR2450A		560		24.5		6.2	-	-

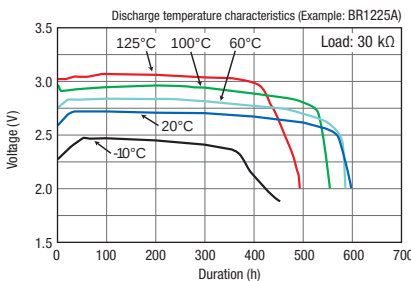
*1 Tabbed-type batteries only. *2 Nominal capacity shown above is based on standard drain and cut-off voltage down to 2.0 V at 20°C.



Poly-carbonmonofluoride Lithium Batteries for High Temperatures (BR "A" Series) 3 V



- Features**
- Ideal for supporting equipment operating within a high temperature range (Max. 125°C)
 - Operating temperature : -40°C to 125°C



General Specifications	Model No.*1	Electrical characteristics (20°C)			Dimensions (mm)		Mass (g) (except terminal)	JIS	IEC
		Nominal voltage (V)	Nominal capacity (mAh)*2	Continuous drain (mA)	Diameter	Height			
		3							
	BR1225A		48	0.03	12.5	2.5	0.8	-	-
	BR1632A		120		16.0	3.2	1.5	-	-
	BR2330A		255		23.0	3.0	3.2	-	-
	BR2450A		550		24.5	5.0	5.0	-	-
	BR2477A		1,000			7.7	8.0	-	-

*1 Tabbed-type batteries only. *2 Nominal capacity shown above is based on standard drain and cut-off voltage down to 2.0 V at 20°C.



Coin-Type Rechargeable Lithium Batteries



Memory backup
(printers, composite machines)



Memory backup
(medical equipment)



Memory backup
(FA equipment)

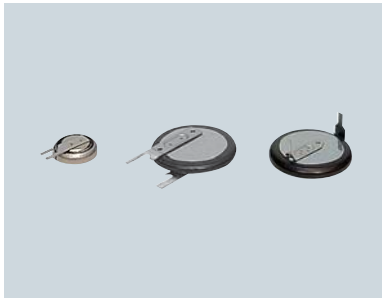


Keyless entry

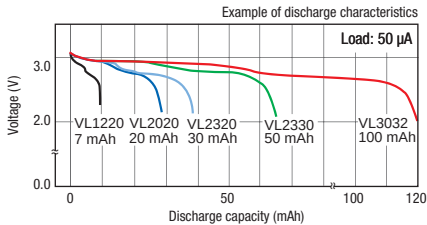


Fire alarms

Vanadium Rechargeable Lithium Batteries (VL Series) 3V



- Features**
- Retains high discharge voltage
 - Operating temperature range of -20°C to 60°C
 - Constant-voltage recharging between 3.25 V to 3.55 V



General Specifications	Model No.*1	Electrical characteristics (20°C)			Dimensions (mm)		Mass (g) (except terminal)	JIS	IEC
		Nominal voltage (V)	Nominal capacity (mAh)*2	Continuous drain (mA)	Diameter	Height			
	VL621	3	1.5	0.01	6.8	2.1	0.27	-	-
	VL1220		7.0	0.02	12.5	2.0	0.8	-	-
	VL2020		20.0	0.07	20.0		2.2	-	-
	VL2320		30.0	0.10	23.0		2.7	-	-
	VL2330		50.0			3.0	3.5	-	-
	VL3032		100.0	0.20	30.0	3.2	6.2	-	-

*1 Tabbed-type batteries only. *2 Nominal capacity shown above is based on standard drain and cut-off voltage down to 2.5 V at 20°C.



Memory backup
(drive recorders)



Memory backup
(PCs)



Memory backup
(communication/
radio)

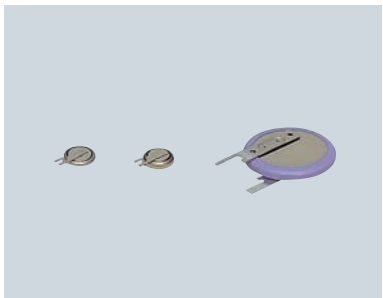


Memory backup
(medical equipment)

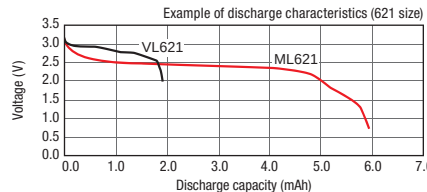


Memory backup
(FA equipment)

Manganese Rechargeable Lithium Batteries (ML Series) 3V



- Features**
- Ideal for long-term memory backup with extra-high capacity
 - Operating temperature range of -20°C to 60°C
 - Constant-voltage recharging between 2.8 V to 3.0 V for ML1220T, 2.8 V to 3.2 V for others



General Specifications	Model No.	Electrical characteristics (20°C)			Dimensions (mm)		Mass (g) (except terminal)	JIS	IEC	
		Nominal voltage (V)	Nominal capacity (mAh)*	Continuous drain (mA)	Diameter	Height				
	ML421	3	2.3	0.005	4.8	2.1	0.11	-	-	
	ML614		3.4	0.01	6.8	1.4	0.16	-	-	
	ML621		5.0			2.1	0.23	-	-	
	ML920		11.0		9.5	2.0	0.4	-	-	
	ML1220		17.0	0.03	12.5		0.8	-	-	
	ML1220T*2		15.0				0.8	-	-	
	ML2020		45.0	0.12	20.0		2.2	-	-	

*1 Nominal capacity shown above is based on standard drain and cut-off voltage down to 2.0 V at 20°C. *2 Operating temperature range of -20°C to 85°C.

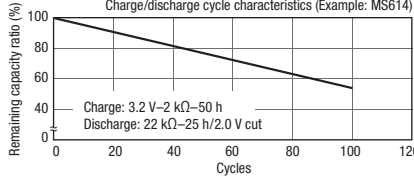


Memory backup
(cameras)

Manganese Silicon Rechargeable Lithium Batteries (MS Series) 3V



- Features**
- Supports over 100 full charge-discharge cycles
 - Operating temperature range of -20°C to 60°C
 - Constant-voltage charging between 2.8 V to 3.3 V



General Specifications	Model No.	Electrical characteristics (20°C)			Dimensions (mm)		Mass (g) (except terminal)	JIS	IEC
		Nominal voltage (V)	Nominal capacity (mAh)*1	Continuous drain (mA)	Diameter	Height			
	MS614	3	2.7	0.01	6.8	1.4	0.20	-	-

*1 Nominal capacity shown above is based on standard drain and cut-off voltage down to 2.0 V at 20°C.



Digital watches

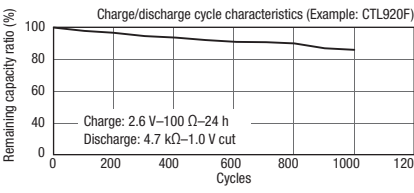


Sensor devices

Cobalt Titanium Rechargeable Lithium Batteries (CTL Series) 2.3V



- Features**
- High-current 2.3 V lithium rechargeable battery with sustained discharge endurance
 - Operating temperature range of -20°C to 60°C
 - Constant-voltage charging between 2.5 V to 2.7 V



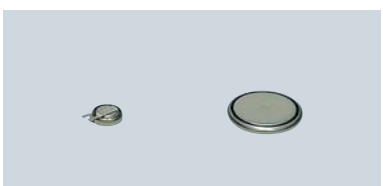
General Specifications	Model No.	Electrical characteristics (20°C)			Dimensions (mm)		Mass (g) (except terminal)	JIS	IEC
		Nominal voltage (V)	Nominal capacity (mAh)**	Continuous drain (mA)	Diameter	Height			
	CTL621F	2.3	3.6	0.02	6.8	2.1	0.15	-	-
	CTL920F		7.7	0.05	9.5	2.0	0.45	-	-
CTL1616F	13.0		0.10	16.0	1.6	1.00	-	-	

*1 Nominal capacity shown above is based on standard drain and cut-off voltage down to 2.0 V at 20°C.

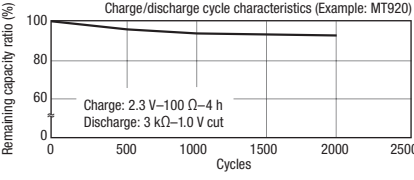


Digital watches

Manganese Titanium Rechargeable Lithium Batteries (MT Series) 1.5V

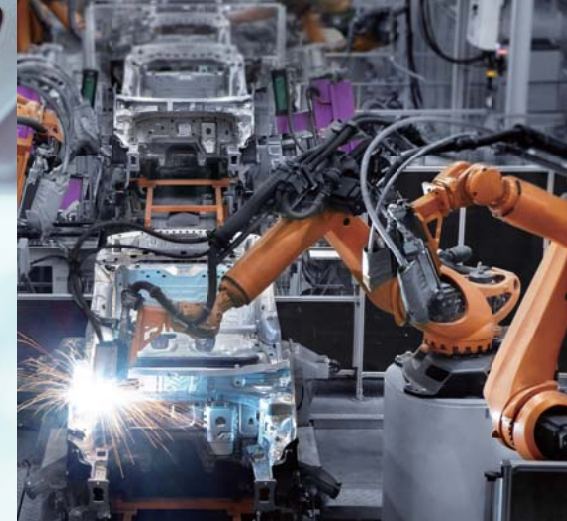


- Features**
- High-current 1.5 V lithium rechargeable battery with sustained discharge endurance
 - Operating temperature range of -10°C to 60°C
 - Constant-voltage charging between 1.8 V to 2.6 V



General Specifications	Model No.	Electrical characteristics (20°C)			Dimensions (mm)		Mass (g) (except terminal)	JIS	IEC
		Nominal voltage (V)	Nominal capacity (mAh)*1	Continuous drain (mA)	Diameter	Height			
	MT516F	1.5	1.8	0.025	5.8	1.6	0.15	-	-
	MT621		2.5	0.05	6.8	2.1	0.25	-	-
	MT920		5.0		9.5	2.0	0.50	-	-

*1 Nominal capacity shown above is based on standard drain and cut-off voltage down to 2.0 V at 20°C.



Cylindrical-Type Lithium Batteries

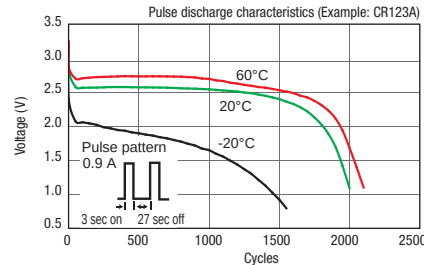
- 
Lights
- 
Electronic door locks
- 
Fire alarms
- 
Meters (gas, water, electricity)
- 
Automotive electronic components (eCall)
- 
Automotive electronic components (tracking systems)
- 
Automotive electronic components (security alarms)
- 
Medical equipment (AEDs)

Manganese Dioxide Lithium Batteries (CR Series) 3 V/6 V



Features

- Offers excellent high-rate discharge with ample power and extended life when used in security equipment, lights, etc.
- Operating temperature range of -40°C to 70°C*
* Note: Consult Panasonic before using these batteries at temperatures between -40°C to -20°C and 60°C to 70°C.
- Available on the consumer market



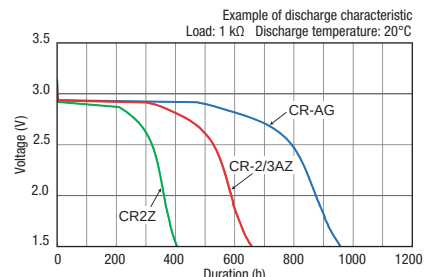
General Specifications	Model No.	Electrical characteristics (20°C)			Dimensions (mm)			Mass (g) (except terminal)	JIS	IEC
		Nominal voltage (V)	Nominal capacity (mAh)*1	Continuous drain (mA)	Diameter	Height				
	CR2	3	850	20	15.6	27.0		11.0	CR15H270, CR2	CR15H270
	CR123A		1,400		17.0	34.5		17.0	CR17345, CR123A	CR17345
	Model No.	Electrical characteristics (20°C)			Dimensions (mm)			Mass (g) (except terminal)	JIS	IEC
	Nominal voltage (V)	Nominal capacity (mAh)*1	Continuous drain (mA)	Length	Width	Height				
2CR5	6	1,400*2	20	34.0	17.0	45.0	38.0	2CR5	2CR5	
CR-P2				35.0	19.5	36.0	37.0	CR-P2	CR-P2	
CR-V3	3	3,300*1	200	28.4	14.4	52.0	39.0	—	—	

*1 Nominal capacity shown above is based on standard drain and cut-off voltage down to 2.0 V at 20°C. *2 Nominal capacity shown above is based on standard drain and cut-off voltage down to 4.0 V at 20°C.



Features

- Targeted at industrial equipment and offers stable electrical discharge and long life
- Operating temperature range of -40°C to 70°C



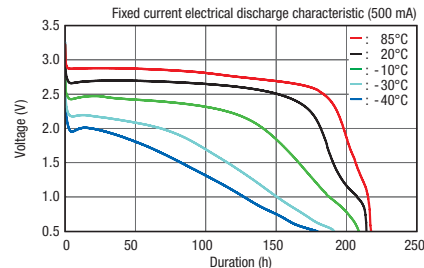
General Specifications	Model No.*1	Electrical characteristics (20°C)			Dimensions (mm)		Mass (g) (except terminal)	JIS	IEC
		Nominal voltage (V)	Nominal capacity (mAh)*2	Continuous drain (mA)	Diameter	Height			
	CR-AG	3	2,400	2.5	17.0	45.5	22.0	-	-
	CR-2/3AZ		1,600		33.5	33.5	17.0		
	CR2Z		1,000		15.6	27.0	11.0		

*1 Provided with terminals or lead wire and connectors. *2 Nominal capacity shown above is based on standard drain and cut-off voltage down to 2.0 V at 20°C.



Features

- The safe, reliable, and powerful choice for in-vehicle apparatuses with compact design and excellent discharge performance in low temperatures
- Operating temperature range of -40°C to 85°C (please consult Panasonic when anticipating usage in temperatures above 70°C)
- 1,650 mAh CR-AAK model suits high-rate discharge roles
- 1,800 mAh CR-AAU model suits reliable long-term usage



General Specifications	Model No.*1	Electrical characteristics (20°C)			Dimensions (mm)		Mass (g) (except terminal)	JIS	IEC
		Nominal voltage (V)	Nominal capacity (mAh)*2	Continuous drain (mA)	Diameter	Height			
	CR-AAK	3	1,650	100	14.5	50.5	18	-	-
	CR-AAU		1,800	2.5					

*1 Provided with terminals or lead wire and connectors. *2 Nominal capacity shown above is based on standard drain and cut-off voltage down to 2.0 V at 20°C.

CR Series cylindrical-type lithium batteries are a popular choice where the device demands a sustained high-drain discharge, such as in flashlights, fire and smoke alarms, security devices, and RFIDs. Panasonic BR Series offers superior performance and reliability when powering meters that are in use for extended periods, as well as for long-term memory backup applications.

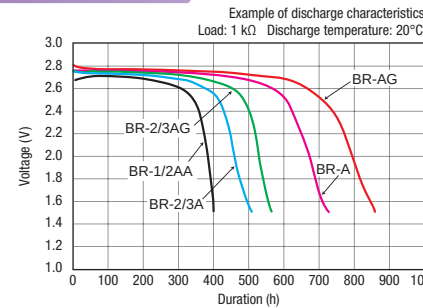
- 
Commercial equipment (communication/ measurement devices)
- 
Meters (gas, water, electricity, hot water)
- 
Memory backup (large FA equipment)
- 
Automotive electronic components (security alarms)

Poly-carbonmonofluoride Lithium Batteries (BR Series) 3 V



Features

- Excellent long-term storage characteristics position these cells as the most suitable power source for a wide variety of metering devices and memory backup applications
- Operating temperature range of -40°C to 85°C (BR-1/2AA -40°C to 100°C)



General Specifications	Model No.*1	Electrical characteristics (20°C)			Dimensions (mm)		Mass (g) (except terminal)	JIS	IEC
		Nominal voltage (V)	Nominal capacity (mAh)*2	Continuous drain (mA)	Diameter	Height			
	BR-1/2AA	3	1,000	2.5	14.5	25.5	8.0	-	-
	BR-2/3A		1,200		17.0	33.5	13.5	BR17335	BR17335
	BR-2/3AG		1,450			45.5	18.0	-	-
	BR-A		1,800				42.0	-	-
	BR-AG		2,200		26.0	50.5	42.0	-	-
	BR-C		5,000	5.0		50.5	42.0	-	-

*1 Provided with terminals or lead wire and connectors. *2 Nominal capacity shown above is based on standard drain and cut-off voltage down to 2.0 V at 20°C.

Pin-Type Lithium Batteries

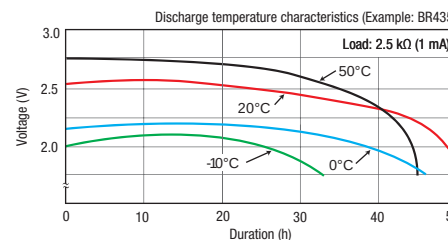
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Electrical floats
- 
Small transmitters

Poly-carbonmonofluoride Lithium Batteries (BR Series) 3 V



Features

- Panasonic original battery design: a tiny device that can power LED lights
- Operating temperature range of -30°C to 80°C



General Specifications	Model No.	Electrical characteristics (20°C)			Dimensions (mm)		Mass (g) (except terminal)	JIS	IEC
		Nominal voltage (V)	Nominal capacity (mAh)*1	Continuous drain (mA)	Diameter	Height			
	BR425	3	25	0.5	4.2	25.9	0.6	-	-
	BR435		50	1.0		35.9	0.9	-	-

*1 Nominal capacity shown above is based on standard drain and cut-off voltage down to 2.0 V at 20°C.