

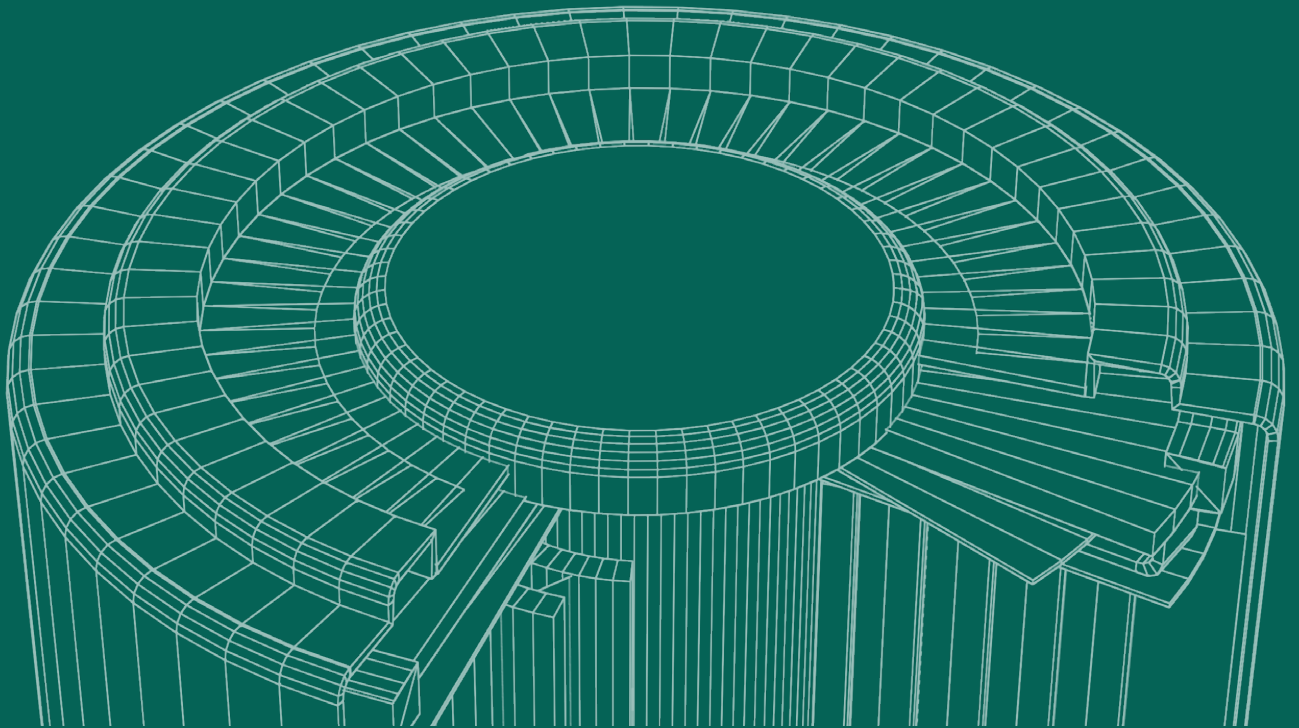


WE POWER YOUR
IDEAS



SHORT FORM CATALOG

INDUSTRIAL BATTERIES FOR PROFESSIONALS



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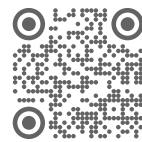
YOUR
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FIND THE RIGHT CONTENT

This Short Form Catalog provides you with a concise insight into our company and battery product range. For detailed information on individual products, we kindly invite you to visit our **homepage**. There, you will find comprehensive product descriptions, technical details, certifications and much more, including our Mediapool with product images, manuals, etc. – available for free download.



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ONE OF

THE WORLD'S LARGEST BATTERY MANUFACTURERS

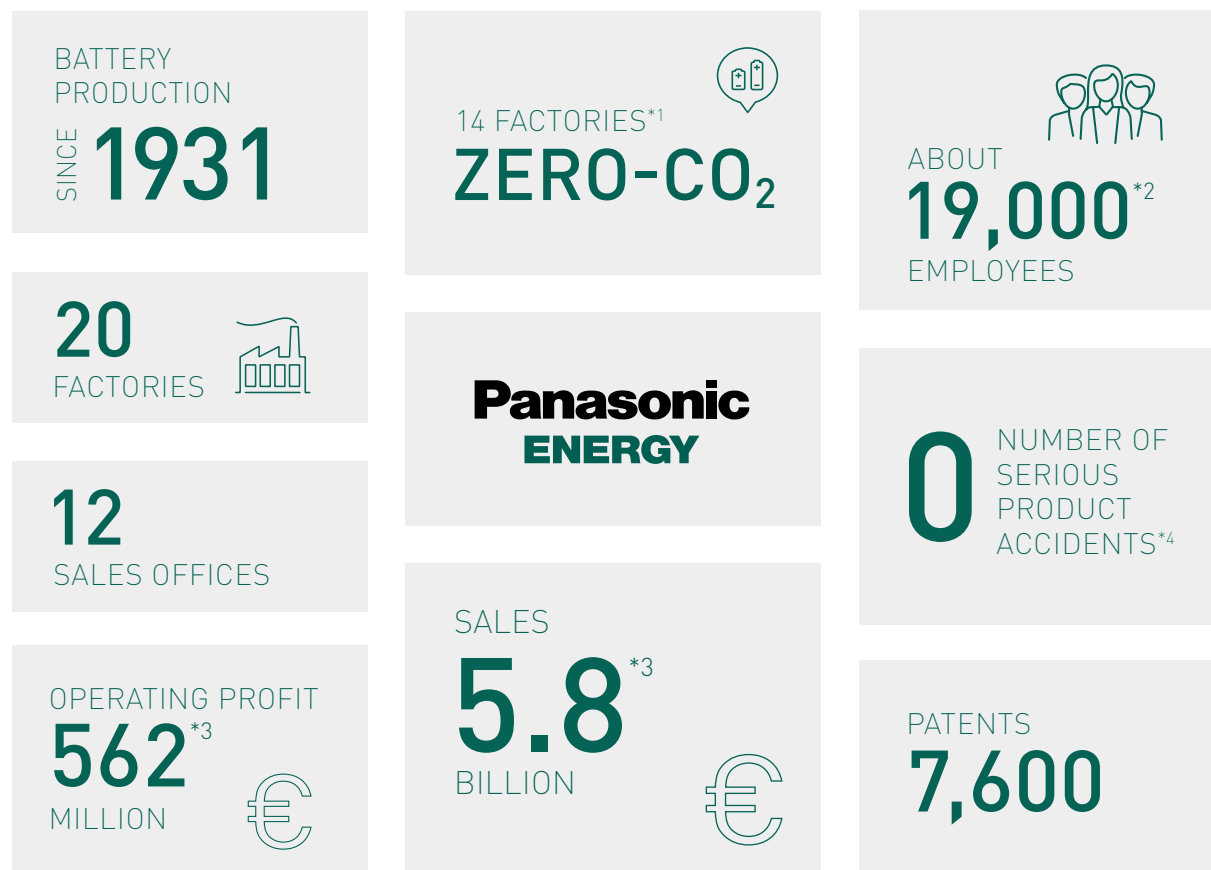
The Panasonic Energy Co., Ltd. is globally active in our consumer battery business that supports everyday convenience and comfort, as well as our B2B business such as industrial batteries and automotive batteries that support social infrastructure across a broad area.



14 CO₂-FREE FACTORIES*¹

Our goal is to produce our products with zero emissions by 2050. Already today, our batteries are manufactured emission-free in 14 factories. Find out more on page 6.

ABOUT PANASONIC



For nearly 100 years, Panasonic has contributed to enriching people's lifestyles and making society more convenient through the introduction of various industry-first technologies as a leading battery manufacturer. Our strengths are our technological capabilities in materials development, manufacturing, and intellectual property. These key strengths serve as an "Enabler" for our customers in market creation and solutions providing combined with our highly reliable brand record that we have cultivated over many years.

Going forward, we will focus on the 'automotive' and 'industrial and consumer' businesses, namely the 'green' and 'digital' fields, where we can make a significant contribution to solving environmental issues and leverage our strengths. In the automotive business, electric vehicles (EVs) are entering a period of fully-fledged dissemination on a global scale aiming to reduce environmental impact, as the global battery market is increasing significantly. In the industrial and consumer business, new demands are being generated due to the accelerating electrification of social infrastructure, such as increased data volume due to the expansion of the digital society and the effective use of renewable energy.

In these focused fields, we will maximize our contribution to society by reducing CO₂ emissions, establishing a safe and secure social infrastructure, and providing convenient and comfortable lifestyles through our cutting-edge technologies and diverse product lineup.

*¹ August 2024

*² Consolidated, as of April 1, 2024

*³ 'FY 2023' refers to the year ending March 31, 2024

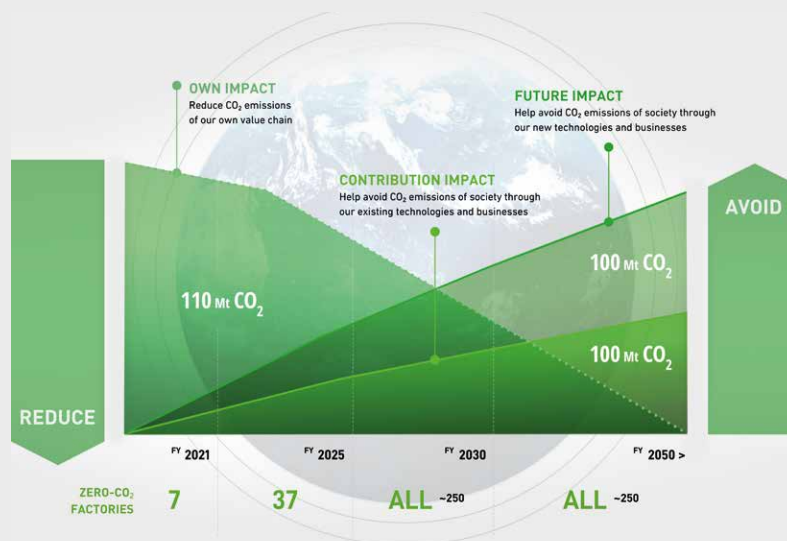
*⁴ Zero battery-attributed recalls of automotive Lithium-ion batteries

PANASONIC GREEN IMPACT: BUILDING A NET-ZERO FUTURE TOGETHER.

At Panasonic Holding, we commit to significantly reducing our CO₂ emissions, striving to achieve net-zero emissions by 2050. This forms the foundational pillar of the Panasonic GREEN IMPACT initiative. The second pillar revolves around empowering society to avoid emissions through the widespread deployment of our existing and upcoming technologies to customers globally. Together, we forge a path toward a sustainable future.

With 31 net-zero CO₂ factories already now and all of the approximately 250 Panasonic factories globally converted into net-zero factories by 2030, we take on the challenge of achieving net-zero CO₂ emissions across our entire value chain by 2050. But sustainability is not only the center of attention in our production:

Panasonic Holding provides products that are essential building blocks in the joint effort to respond to the needs of today's world. Join us in our obligation to maintain and nurture the ecology of this planet.



EMPOWERING ENERGY SOLUTIONS WITH SECONDARY BATTERIES

Harness the power of innovation with our reliable Nickel-Metal-Hydride secondary batteries. Designed to store energy efficiently and sustainably, they play a pivotal role in powering our rapidly evolving world. From renewable energy storage like solar systems and wind turbines, our secondary batteries are the go-to choice for reliability and long-lasting performance of up to 10 years. Produced without Lead or Cadmium and in a net-zero factory in Wuxi (China), our Nickel-Metal-Hydride batteries can be your sustainable energy storage solution.

If your application needs a high energy density battery, we are ready to guide you through our comprehensive lineup of Lithium-ion cells. Here, we work on three areas: strengthening our competitiveness, enhancing our supply chain, and expanding our production capacity.

OUR MISSION

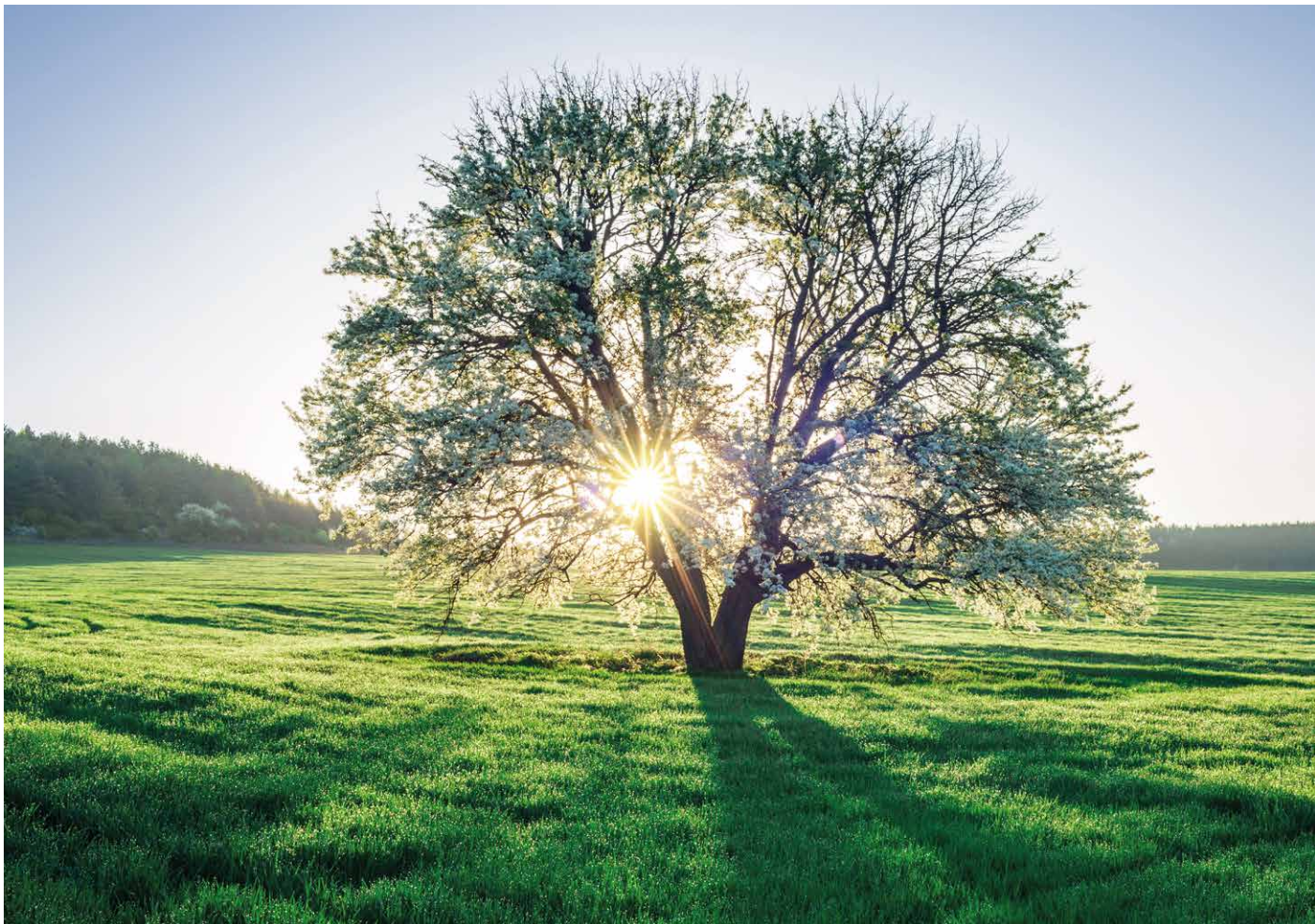
Achieving a society in which the pursuit of happiness and a sustainable environment are harmonized free of conflict.

OUR VISION

Energy that changes the future.

OUR WILL

Doing what humankind requires.



Environmental management



Zero CO₂ factories



Global warming prevention



Resource recycling



Environmental communication



Environmental performance

STATE-OF-THE-ART BATTERY PACKS



Our commitment is to deliver the optimal battery solution for our customers' applications. Panasonic offers tailor-made battery packs, including battery management systems (BMS), a suitable housing, or a diverse range of customized terminals to meet all customer needs.

Panasonic operates battery pack production facilities globally. We carefully select the most suitable production site for your product, considering production volumes, product complexity in alignment with your application, and the final delivery location.

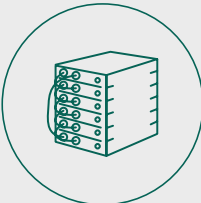
Try out our expertise in pack production, and discover how we can power your business.



Ni-MH pack for E-call



Tube pack for E-bike



ESS rack



Ni-MH module
Ni-MH ultra slim module



Ni-MH battery system

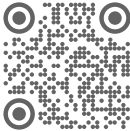


FIND THE RIGHT
MEDIA ASSET

MEDIAPOOL – A MEDIA LIBRARY, JUST AS USERS EXPECT IT.

Our online library offers a wide range of images, videos, datasheets, manuals, and catalogs, as well as white-papers. All content is categorized, but can also be found through the search function. Each relevant search result in the preview can be downloaded through the shopping cart. Additionally, the URL of a media asset can be easily copied and shared.

Get a first idea of how to use the Mediapool, or simply download any file you need. Our Mediapool is accessible for free and without registration.



Watch introduction video

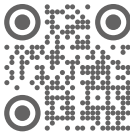
Get a first idea of how to use the Mediapool with our brief introduction video.



Use Mediapool directly

YOUTUBE CHANNEL

On our Panasonic batteries YouTube channel you can discover videos about the inner structure of our different battery chemistries, a couple of application videos and films which explain why batteries sometimes help to save human lives and sharks' lives as well. Are you getting curious? Please follow the QR code to our Panasonic batteries YouTube channel.

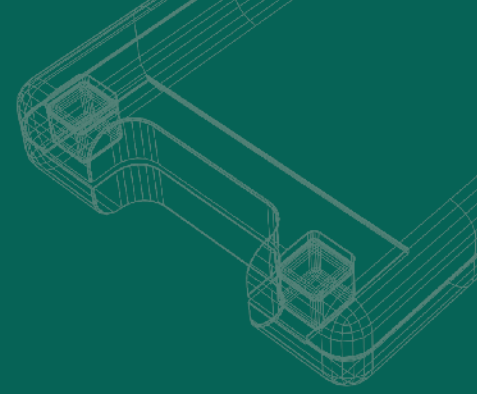


Discover more on our YouTube channel

WE POWER YOUR INDUSTRY APPLICATION

In a world that is constantly changing and offering new opportunities, it is often the idea that makes the difference. Our mission is to understand your ideas, support them and implement them together with you. Whether you are looking for creative impulses or already have a clear vision – we are here to help you find the right solution.

FIND OUT, HOW WE CAN
SUPPORT YOUR BUSINESS!



AUTOMOTIVE



MEDICAL



SMART BUILDING



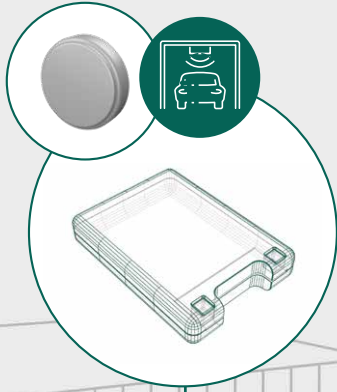
IOT



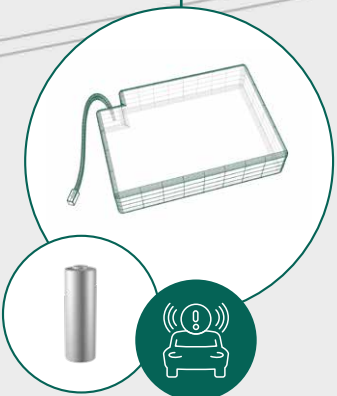
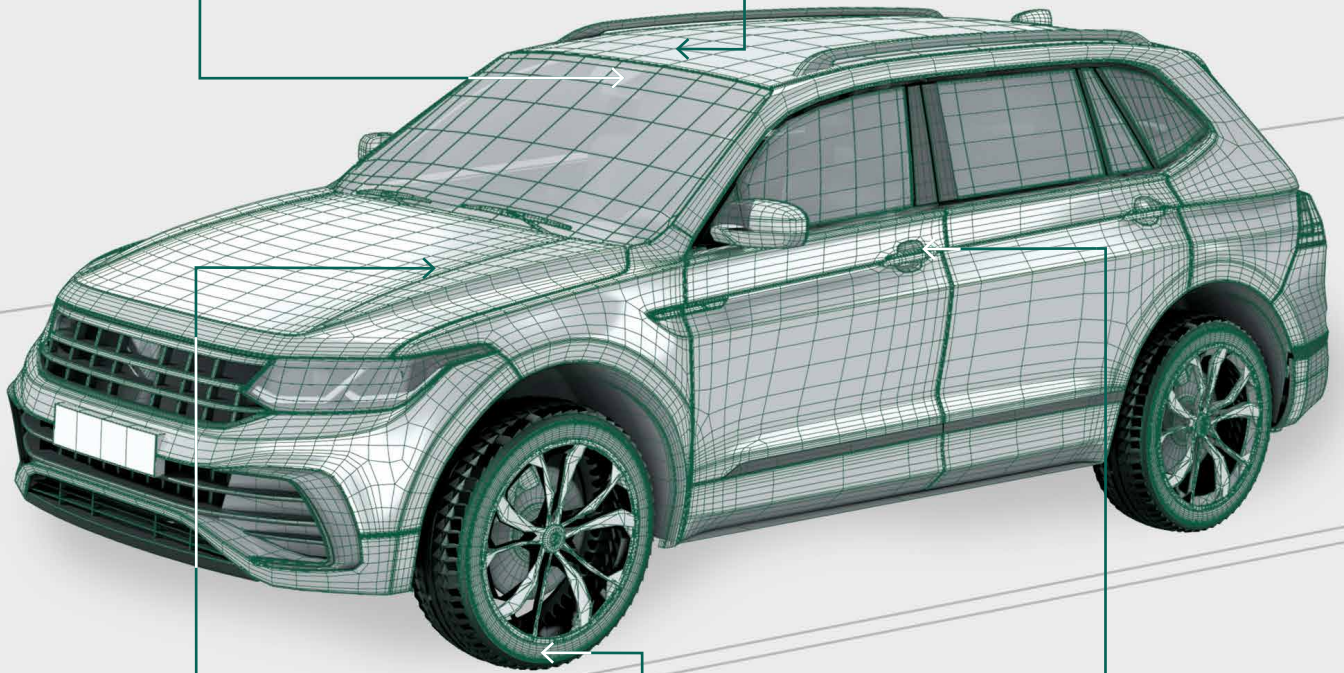
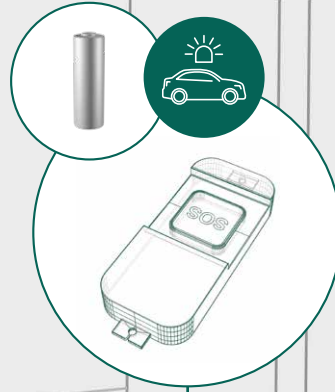
GREEN



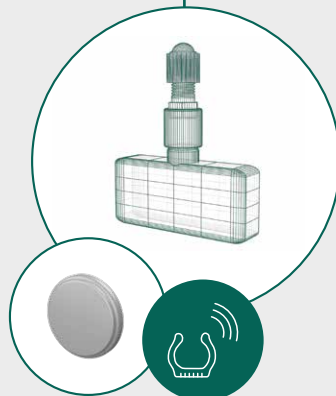
Electronic Toll
Collection (ETC)
CR-2450B



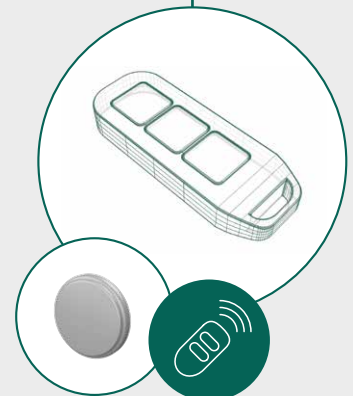
Telematic Control Unit (TCU) -
Emergency call (E-call)
BK-120AAWX



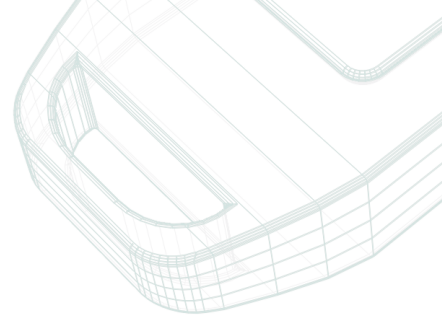
Car alarm
BK-120AAWX



Tire Pressure Monitoring
System (TPMS),
Tire Management Systems (TMS)
CR-2032A



Remote Keyless
Entry (RKE)
CR-2032



INDUSTRY APPLICATION AUTOMOTIVE

Nowadays mobility is still the key for human beings life. Panasonic batteries are designed to cope with the special demands of automotive applications in order to support safety and comfort in daily life. With our wide range of manufactured chemistries Panasonic can offer suitable solutions for your application.

FEATURES

- | High reliability & robustness
- | Easy transportation (Ni-MH)
- | Wide temperature range
- | IATF 16949 certified factories
- | Decades of mass production experience

OUR RECOMMENDATION



BK-120AAWX
page 30



CR-2450B
page 58

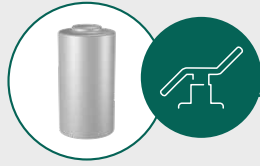


CR-2032
page 57

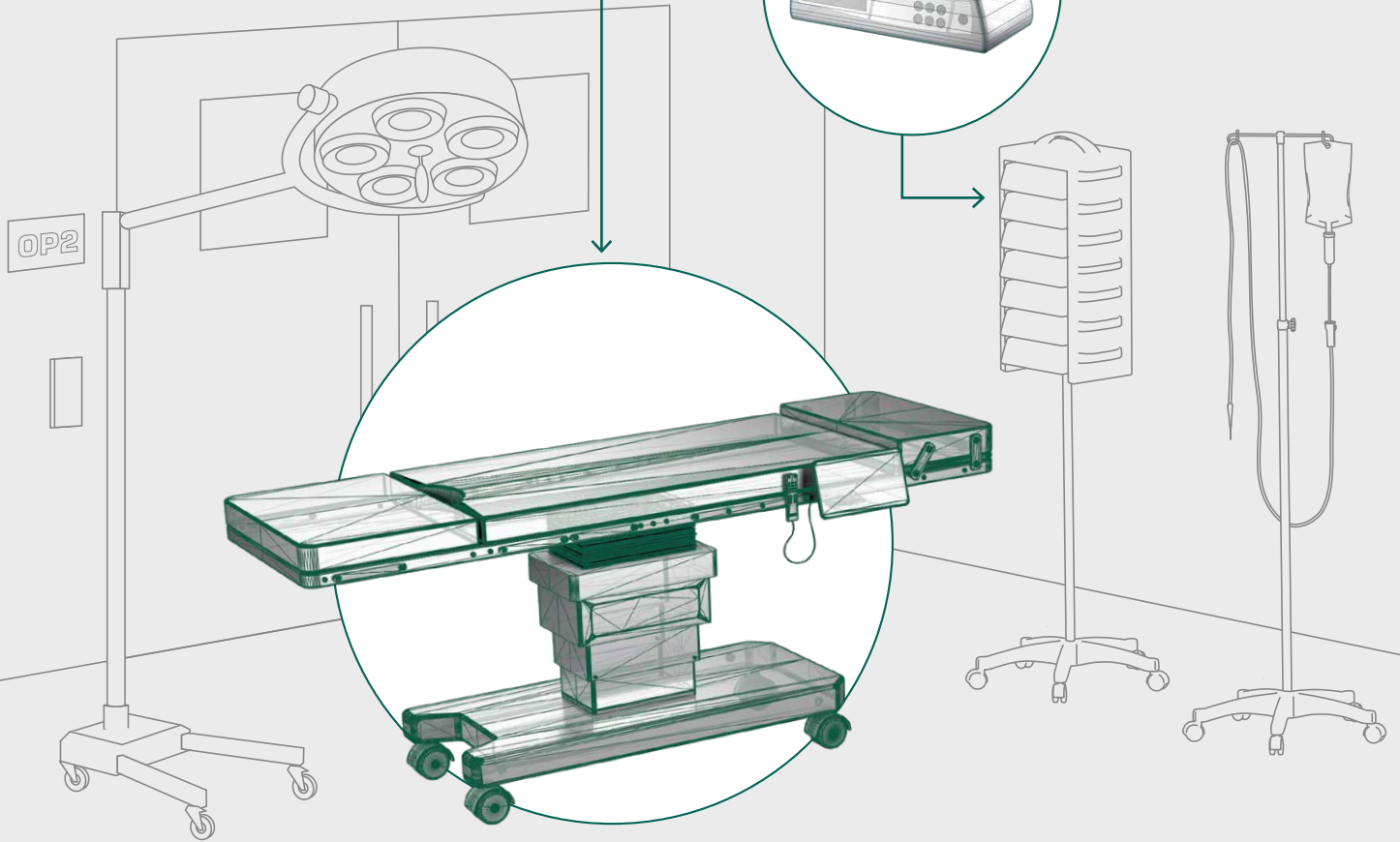


CR-2032A
page 58

Operation tables
BK-300SCP



Infusion pumps
BK-210AH



INDUSTRY APPLICATION MEDICAL

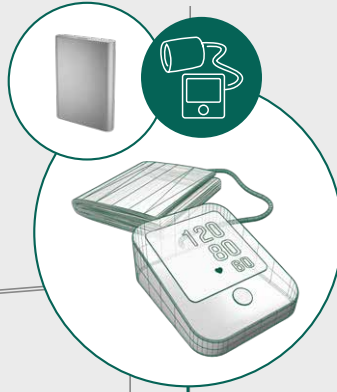


Public and personal health is absolutely crucial to everyone. Ensuring the patients well being by powering state-of-the-art medical devices with Panasonic batteries is our aspiration. Reliable and safe medical products can count on Panasonic's long experience and superior quality.

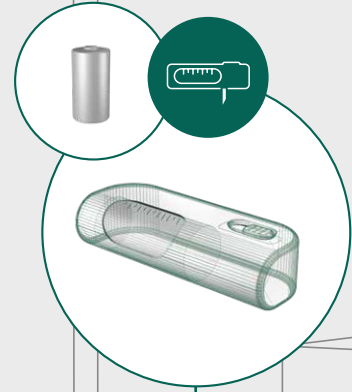
Wearables
CG-320B



Blood pressure
meters
NCA-463436A



Electronic drug
injectors
CR-2U



FEATURES

- | Panasonic batteries help to miniaturize your device
- | Decades of experience in the medical market
- | Highest internal quality standards to ensure safe products

OUR RECOMMENDATION



BK-300SCP
page 29



BK-210AH
page 27



CG-320B
page 43



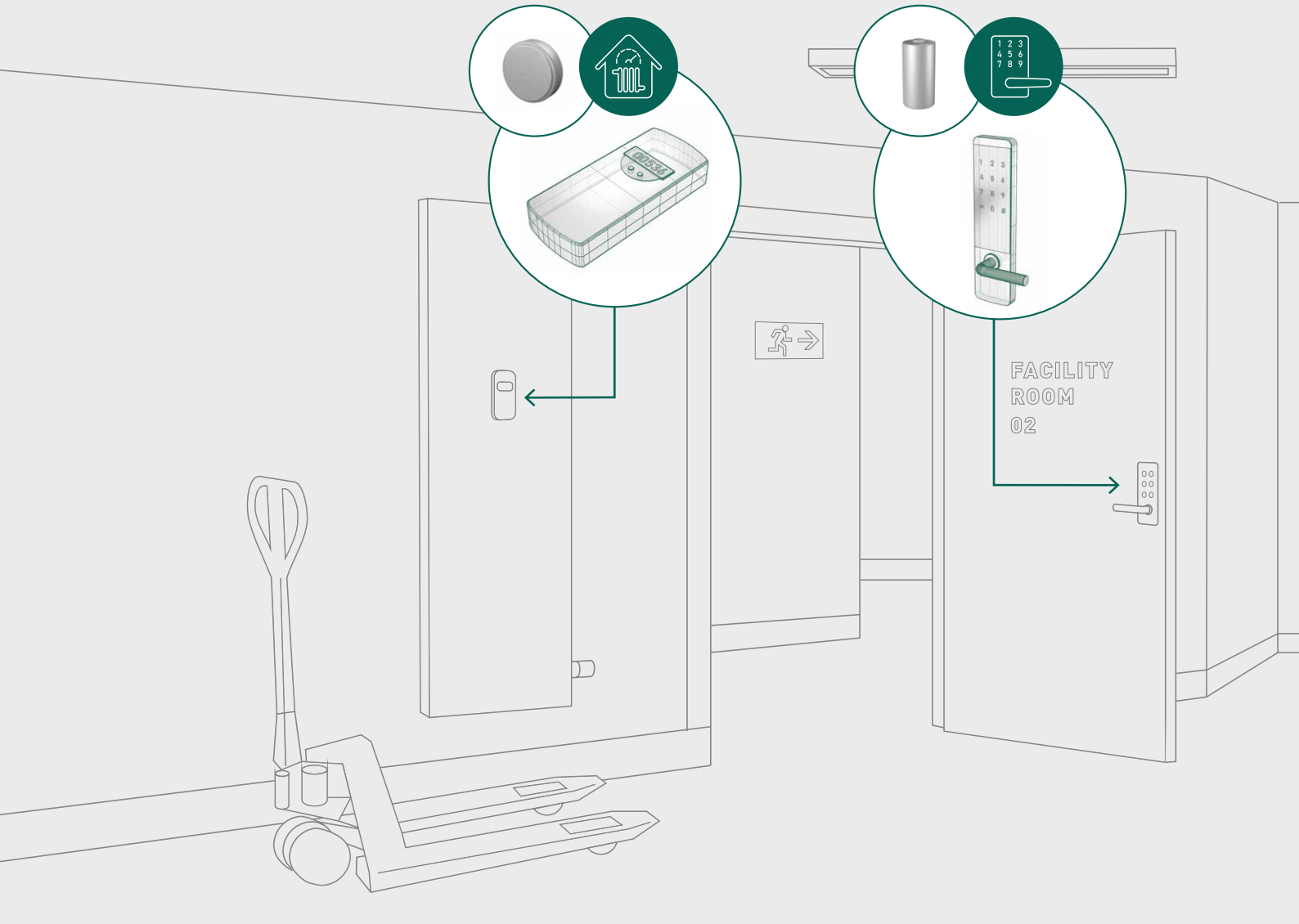
NCA463436A
page 37



CR-2U
page 51

Heat cost allocators
BR-2477A

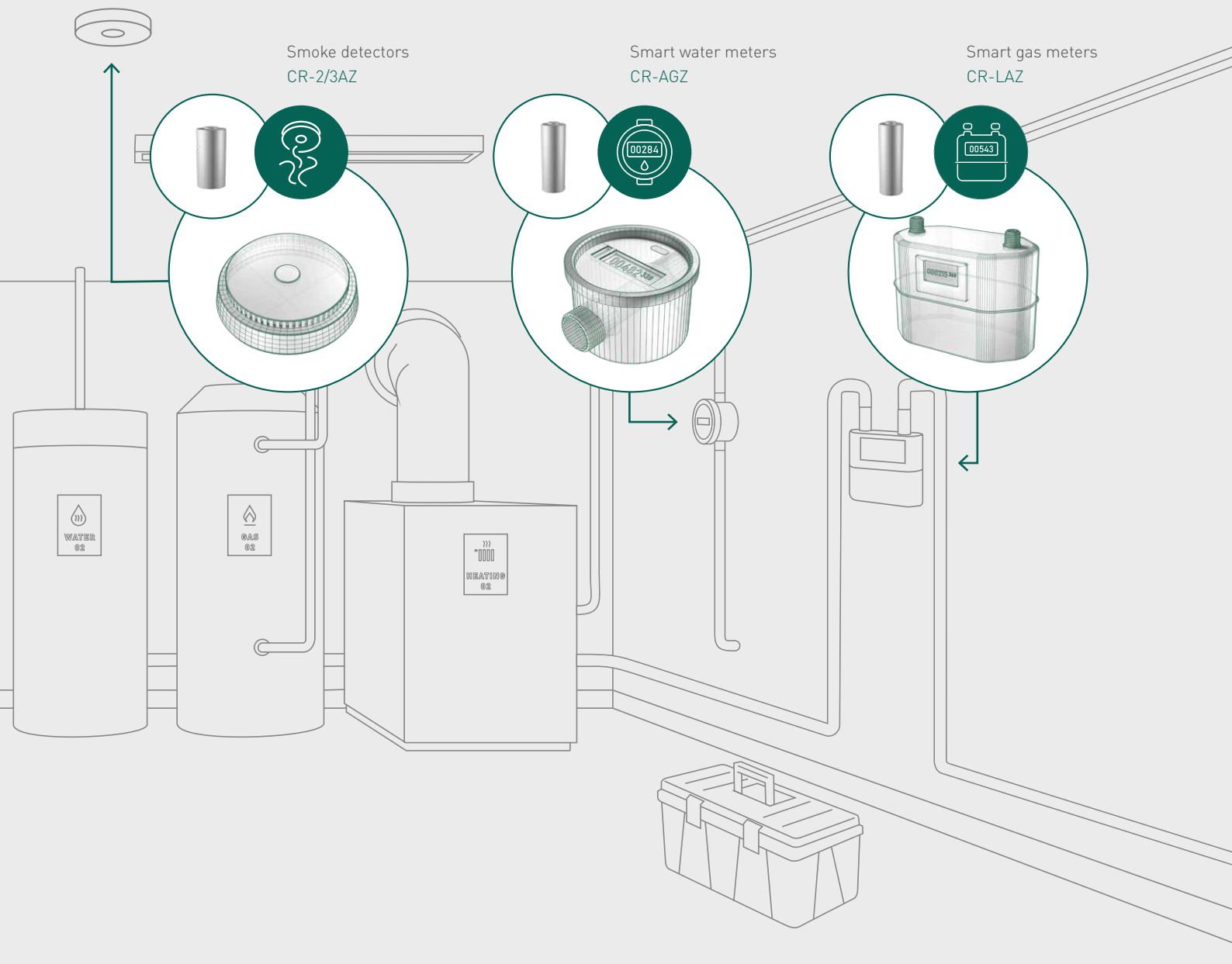
Doorlock systems
CR-123A



INDUSTRY APPLICATION SMART BUILDING



For comfortable living and working and to minimize maintenance service efforts as well as costs devices became smart. To guarantee trouble-free data security, utility meters need a reliable power source. Panasonic Lithium batteries are ideal for long-term use in applications with different temperature requirements.



FEATURES

- | Wide temperature range (-40 to 125°C)
- | Low self-discharge
- | Wide product range to meet customer needs
- | Stable connectivity over committed lifetime

OUR RECOMMENDATION



BR-2477A
page 55



CR-AGZ
page 51



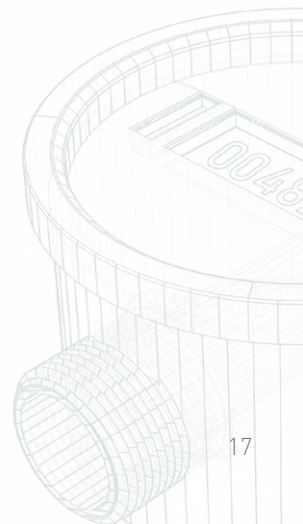
CR-LAZ
page 51



CR-2/3AZ
page 51



CR-123A
page 50

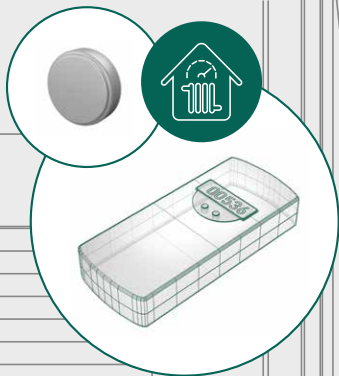


INDUSTRY APPLICATION IOT



The access to information of your assets is becoming more and more important at present. A stable connectivity network enables planning, measuring, tracking, positioning and monitoring of your business and service activities. Panasonic batteries offer reliable power supply in your daily business.

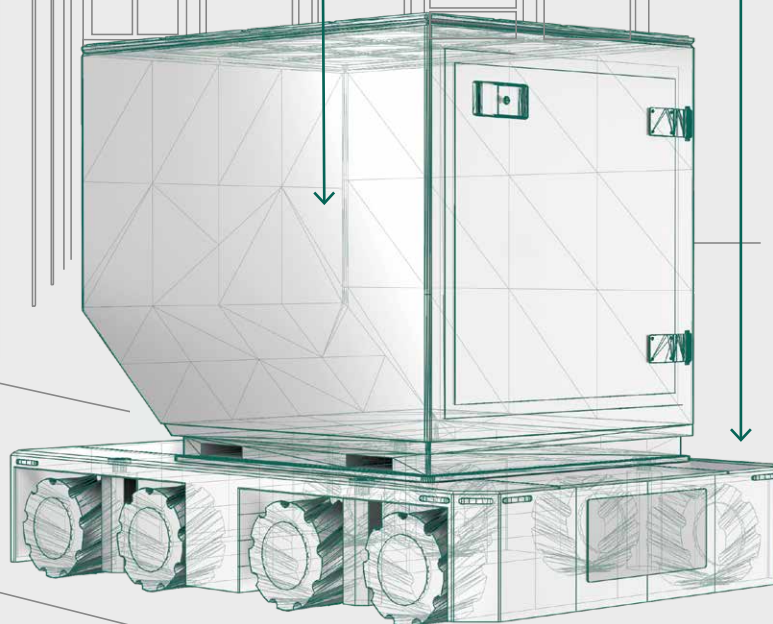
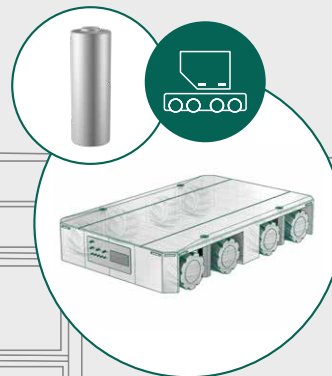
Heat cost allocators
BR-2477A

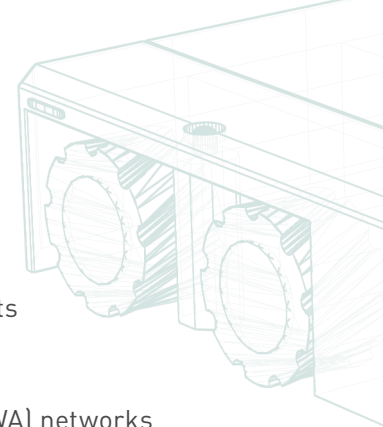


Active cooling and tracking for airfreight
BK-1100FHU



Industrial truck robots
BK-1100FHU





FEATURES

- | Wide product range to meet your applications lifetime requirements
- | Panasonic Lithium technology deliver high pulse currents even after long periods
- | Powerful Lithium batteries to energize Low Power Wide Area (LPWA) networks

OUR RECOMMENDATION



CR-2330
page 57



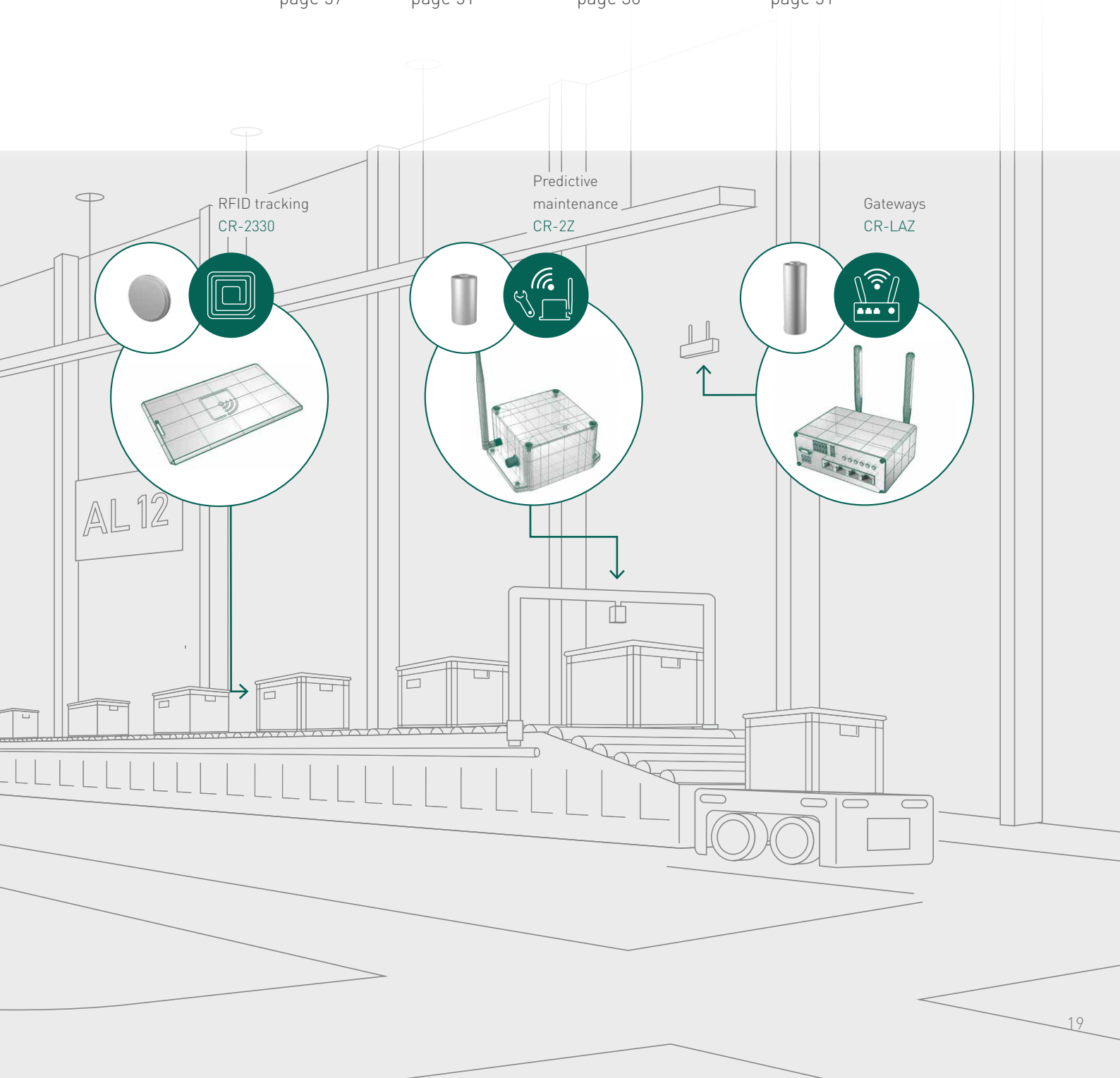
CR-LAZ
page 51

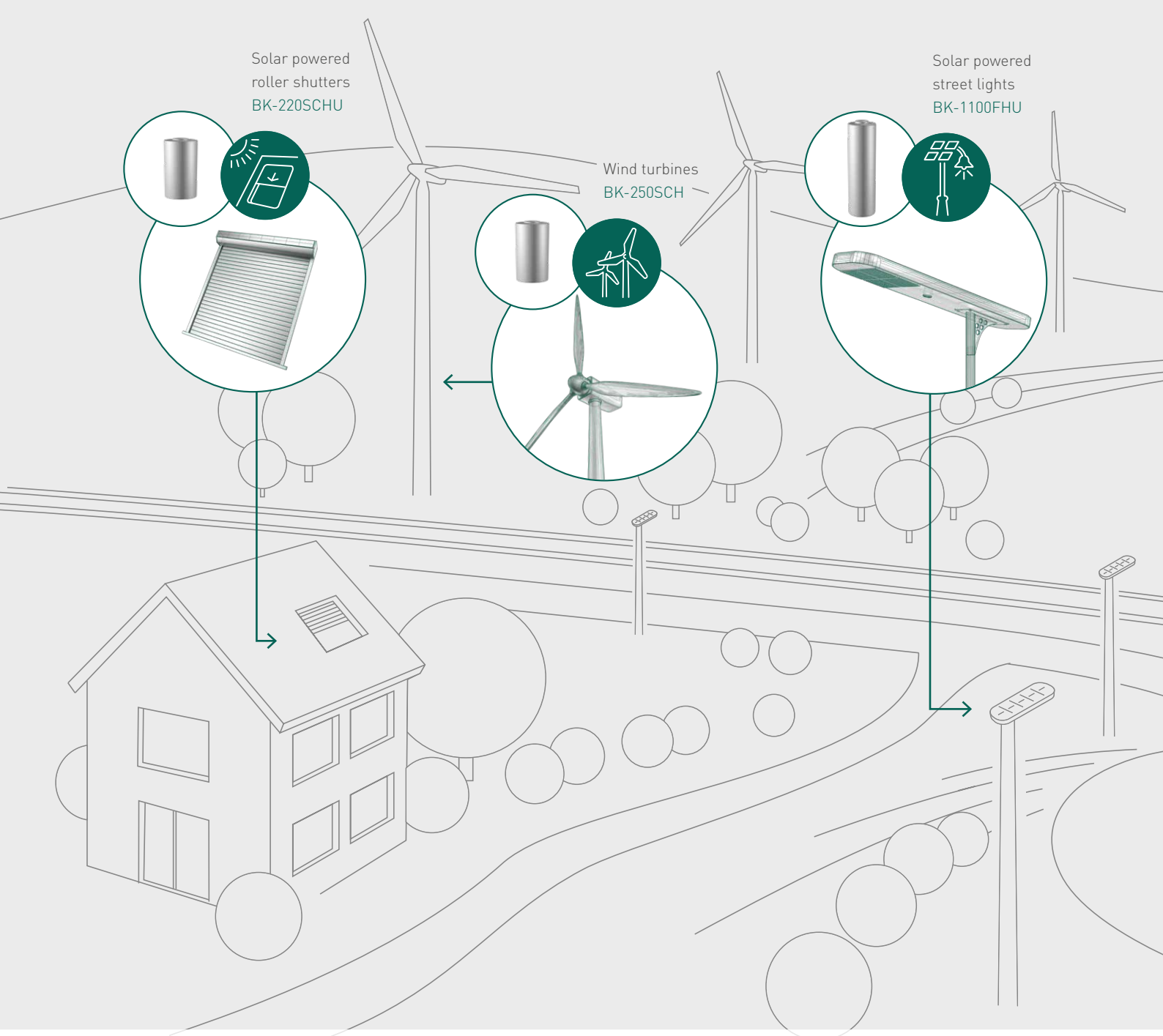


BK-1100FHU
page 30



CR-2Z
page 51





Solar powered roller shutters BK-220SCHU

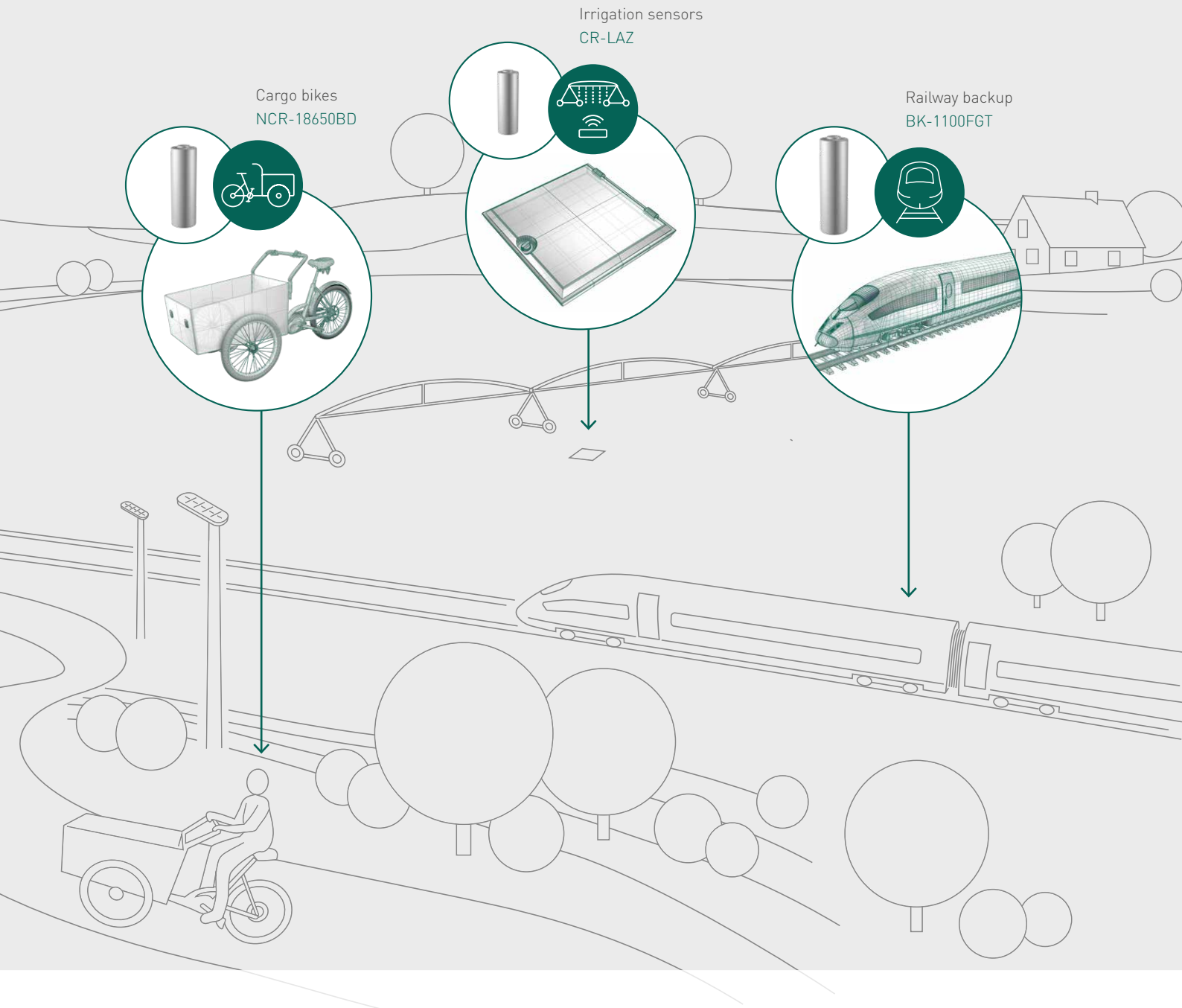
Wind turbines BK-250SCH

Solar powered street lights BK-1100FHU

INDUSTRY APPLICATION GREEN



More and more applications in our environment require autonomous and stable power supply. Saving resources and using renewable energy such as wind or sun energy is key for sustainable industries and agriculture. Panasonic offers a comprehensive product range to energize these applications.



Cargo bikes
NCR-18650BD

Irrigation sensors
CR-LAZ

Railway backup
BK-1100FGT

FEATURES

- | Excellent charge capabilities of Ni-MH chemistry in combination with solar panels
- | Maintenance free solution for rural areas
- | Minimization of total cost of ownership by reliable battery solution
- | Customized Lithium-ion battery packs based on your demand

OUR RECOMMENDATION



NCR18650BD
page 35



BK-1100FHU
page 30



BK-250SCH
page 27



BK-220SCHU
page 30



CR-LAZ
page 51



Ni-MH

IDEAL FOR PROFESSIONAL
APPLICATIONS IN CHALLENGING
ENVIRONMENTS

- | Suitable for nearly every application
- | High quality and reliability
- | Good balance in terms of capacity and lifetime
- | Superior safety
- | Excellent discharge characteristics



YOUR INFORMATION

Visit our product page and
get detailed information about
Ni-MH batteries.

ABOUT OUR Ni-MH PRODUCTS

These very tough Ni-MH batteries offer a very long service life when using intermittent charging in high ambient temperature conditions ($\leq 75^{\circ}\text{C}$ for certain types). Moreover, these batteries are ideal as a replacement for standard Ni-Cd batteries. They are

recommended for use in applications such as emergency lighting, servers, elevators, automated teller machines (ATMs), solar powered devices and as a back-up for base stations.



The infographic consists of 16 grey rectangular blocks arranged in a grid, each containing an icon and text describing a feature of the Ni-MH products. The blocks are organized as follows:

- Block 1 (Top Left):** Icon of a flame. Text: "BATTERY SAFETY IEC 62133-1".
- Block 2 (Top Middle-Left):** Text: "BATTERY SIZE AAA TO F".
- Block 3 (Top Middle-Right):** Icon of a plant. Text: "ECO FRIENDLY NO TOXIC MATERIALS".
- Block 4 (Top Right):** Text: "7 BATTERY SERIES".
- Block 5 (Second Row Left):** Icon of a battery pack. Text: "TAYLOR-MADE PACKS".
- Block 6 (Second Row Middle):** Text: "Ni-MH".
- Block 7 (Second Row Right):** Text: "ISO 9001 QUALITY".
- Block 8 (Third Row Left):** Text: "Ni-Cd" with a dashed line through it. Text below: "REPLACED BY Ni-MH".
- Block 9 (Third Row Middle-Left):** Text: "12 BILLION PRODUCED BATTERIES".
- Block 10 (Third Row Middle-Right):** Text: "ISO 14001 ENVIRONMENT".
- Block 11 (Third Row Right):** Icon of a battery module. Text: "MODULES & SYSTEMS".
- Block 12 (Bottom Row Left):** Icon of gears. Text: "PRODUCTION SINCE 1989".
- Block 13 (Bottom Row Middle-Left):** Icon of an airplane. Text: "EASY TRANSPORTATION BY AIR NO DANGEROUS GOODS".
- Block 14 (Bottom Row Right):** Text: "-40 UP TO +105°C WIDE TEMPERATURE RANGE (DEPENDING ON CELL MODEL)".

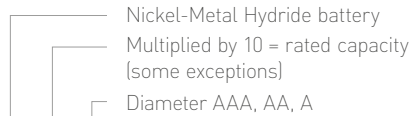
STANDARD TYPE

Ni-MH battery technology is nowadays the Ni-Cd (Nickel-Cadmium) successor technology for rechargeable and portable devices. These batteries are ideal for less complex and cost sensitive applications. For example medical equipment and handheld devices.

FEATURES

- High versatility for various applications
- Good balance in terms of capacity and lifetime
- Various sizes for wide range of applications

MODEL NUMBER (EXAMPLE)



BK 70 AA

APPLICATIONS

	Medical equipment		UPS system
	Shaver		Communication
	Toothbrush		Navigation device
	Measurement		Torchlight
	Two way radio		Construction sites signaling, etc.

MODEL NUMBER	Size	Nominal voltage (V)	Discharge capacity (mAh)		Diameter (mm)	Total height (mm)	Weight (g)	Charging temperature (°C)	Discharging temperature (°C)
			Rated	Average					
BK-70AAAJ	AAA	1.2	700	730	10.5 +0/-0.7	44.5 +0/-1.5	12	0 to +45	-10 to +65
BK-70AA	AA	1.2	700	780	14.5 +0/-0.7	49.0 +0/-1.5	18	0 to +45	-10 to +65
BK-110AAO	AA	1.2	1,100	1,180	14.5 +0/-0.7	50.5 +0/-1.5	24	0 to +45	-10 to +65
BK-150AA	AA	1.2	1,500	1,580	14.5 +0/-0.7	50.5 +0/-1.5	25	0 to +45	-10 to +65
BK-200AAP	AA	1.2	1,900	1,980	14.5 +0/-0.7	50.5 +0/-1.5	28	0 to +45	-10 to +65
BK-200A	4/5A	1.2	2,000	2,040	17.0 +0/-0.7	43.0 +0/-1.5	32	0 to +45	-10 to +65
BK-210A	A	1.2	2,100	2,200	17.0 +0/-0.7	50.0 +0/-2.0	36	0 to +45	-10 to +65
BK-250A	A	1.2	2,450	2,600	17.0 +0/-0.7	50.0 +0/-2.0	37	0 to +45	-30 to +65
BK-380A	L-A	1.2	3,700	3,800	17.0 +0/-0.7	67.0 +0/-2.0	53	0 to +45	-10 to +65
BK-450A	L-Fat/A	1.2	4,200	4,500	18.2 +0/-0.7	67.5 +0/-1.5	61	0 to +45	-10 to +65

WE POWER YOUR
IDEAS



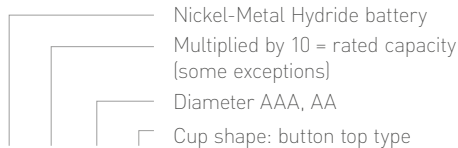
BUTTON TOP TYPE

The Panasonic button type batteries are compatible with dry batteries such as Alkaline and can be used up to 1,800 times based on IEC^{*1} standards. They provide a high capacity level and a low self-discharge.

FEATURES

- Offers long charge / discharge cycle life, about 1,800 times
- Low self-discharge and long storage life (still have 90% capacity after storage for 1 year)
- Compatibility with Alkaline battery

MODEL NUMBER (EXAMPLE)



BK 80 AAA B

APPLICATIONS



Flash light





Toothbrush



Remote control



Shaver, etc.

MODEL NUMBER		Size	Nominal voltage (V)	Discharge capacity (mAh)		Diameter (mm)	Total height (mm)	Weight (g)	Charging temperature (°C)	Discharging temperature (°C) ^{*4}
				Rated	Average					
BK-80AAB ^{*2}		AAA	1.2	750	780	10.5 +0/-0.7	44.5 +0/-1.0	12	0 to +45	-10 to +65
BK-200AAB ^{*3}		AA	1.2	1,900	1,980	14.5 +0/-0.7	50.5 +0/-1.0	28	0 to +45	-10 to +65

^{*1} IEC: Standard 61951-2 (2017) / 7.5.1.2

^{*2} Compatible with consumer AAA size.

^{*3} Compatible with consumer AA size.

^{*4} Below -20°C discharging, the performance depends on the usage condition. Please consult with Panasonic Energy engineer.

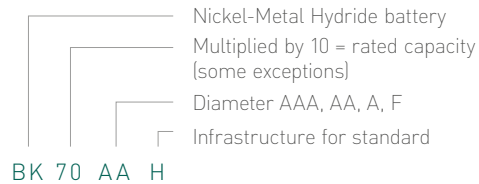
INFRASTRUCTURE STANDARD TYPE

The expected life of these back-up batteries is about 4 to 6 years and therefore approximately twice the lifetime compared to standard Ni-MH batteries. In addition they are capable of delivering excellent charge characteristics at high temperatures (60°C). Recommended applications are for example emergency lights, solar applications and back-up for base stations.

FEATURES

- | Enables use in wide range of temperatures (-10 to +60°C)
- | Small size with long operational life (4-6 years)

MODEL NUMBER (EXAMPLE)



APPLICATIONS



Medical equipment



Emergency lighting



POS system



Solar window shutter









Shaver



Infusion pump, etc.



WE POWER YOUR
SAFETY

MODEL NUMBER	Size	Nominal voltage (V)	Discharge capacity (mAh)		Diameter (mm)	Total height (mm)	Weight (g)	Charging temperature (°C)	Discharging temperature (°C)
			Rated	Average					
BK-70AAH	 AA	1.2	700	750	14.5 +0/-0.7	49.0 +0/-1.5	18	-10 to +60	-10 to +60
BK-110AAH	 AA	1.2	1,100	1,180	14.5 +0/-0.7	50.5 +0/-1.5	24	-10 to +60	-10 to +60
BK-150AAH	 AA	1.2	1,450	1,530	14.5 +0/-0.7	50.5 +0/-1.5	25	-10 to +60	-10 to +60
BK-160AH	 4/5A	1.2	1,600	1,720	17.0 +0/-0.7	43.0 +0/-1.5	29	-10 to +60	-10 to +60
BK-210AH	 A	1.2	1,900	2,050	17.0 +0/-0.7	50.0 +0/-2.0	35	-10 to +60	-10 to +60
BK-370AH	 LFat/A	1.2	3,500	3,700	18.2 +0/-0.7	67.5 +0/-1.5	60	-10 to +60	-10 to +60


HIGH RATE DISCHARGE & HIGH TEMPERATURE TYPE

These state-of-the-art back-up batteries deliver excellent current discharge characteristics at high temperatures (60°C). They are able to power applications such as back-up for UPS, POS systems and solar window shutters.

FEATURES

- Long operational life (4-6 years)
- High rate discharge (5lt discharge at 20°C) available

MODEL NUMBER (EXAMPLE)



 Nickel-Metal Hydride battery
 Multiplied by 10 = rated capacity (some exceptions)
 Diameter A, SC
 Infrastructure for high rate discharge
BK 330 A PH

APPLICATIONS



Medical equipment



UPS system



Garden tool



POS system






Robot cleaner

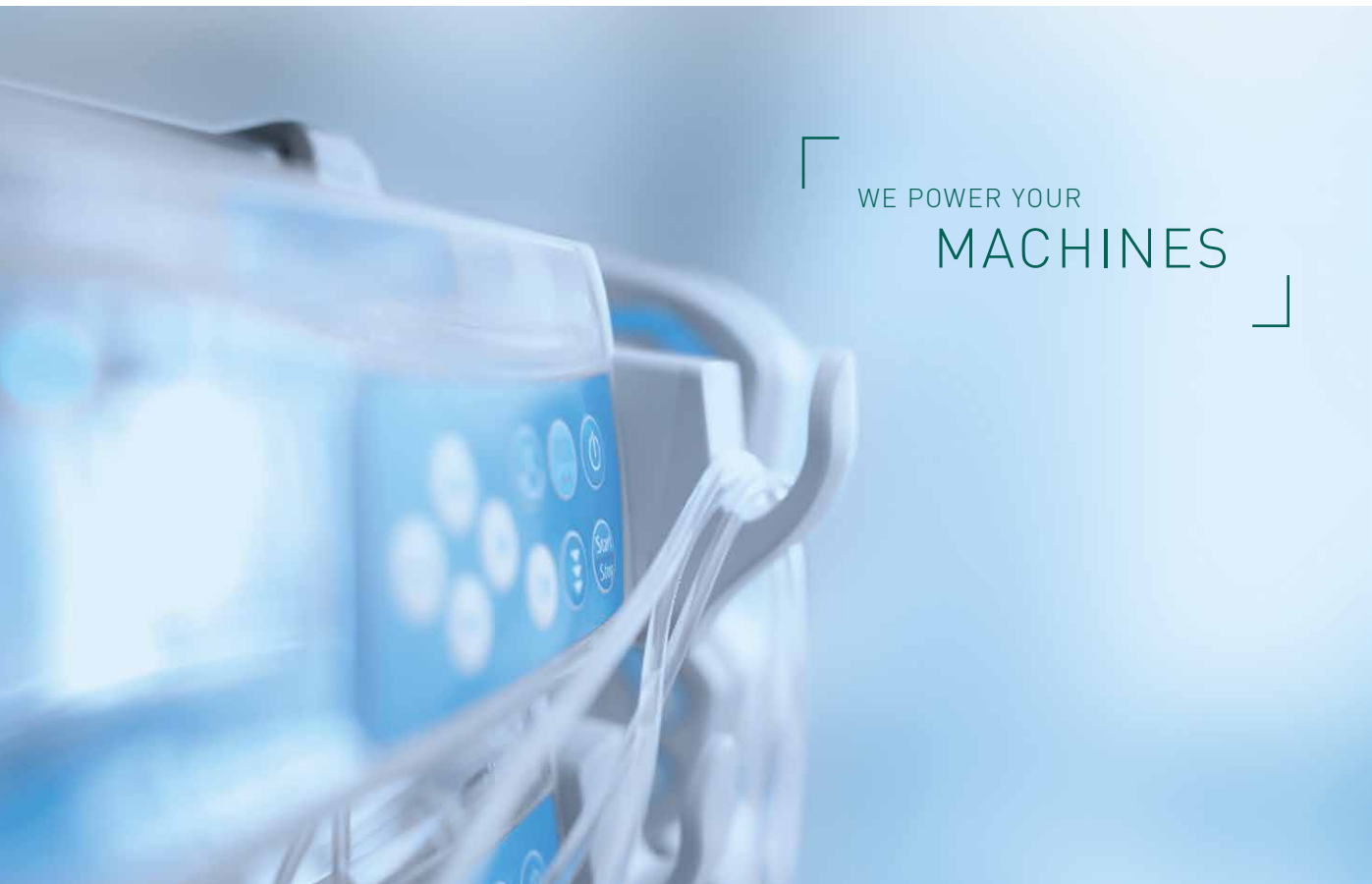


Solar window shutter, etc.



Electric vehicle

MODEL NUMBER	Size	Nominal voltage (V)	Discharge capacity (mAh)		Diameter (mm)	Total height (mm)	Weight (g)	Charging temperature (°C)	Discharging temperature (°C)
			Rated	Average					
BK-250SCH	 SC	1.2	2,500	2,650	23.0 +0/-1.0	43.0 +0/-1.5	53	-10 to +60	-10 to +60
BK-330APH	 LFat/A	1.2	3,200	3,300	18.2 +0/-0.7	67.5 +0/-1.5	59	-10 to +60	-10 to +60
BK-850FPH	 F	1.2	8,500	8,950	33 +0/-1.0	91.0 +0/-2.5	220	-20 to +75	-20 to +85



WE POWER YOUR
MACHINES

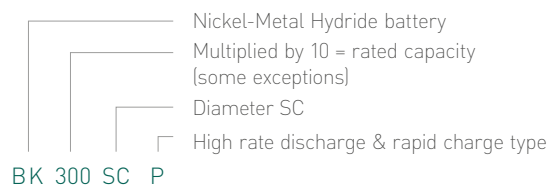
HIGH RATE DISCHARGE & RAPID CHARGE TYPE

These battery types provide excellent current discharge characteristics and are designed for rapid charging. They are most suitable for power tools, robot cleaners and other high power high cycle applications.







FEATURES



- | Excellent large current discharge characteristics
- | Rapid charge-capable

MODEL NUMBER (EXAMPLE)



APPLICATIONS

-  Medical equipment
-  Garden tool
-  Robot cleaner
-  Electric vehicle
-  Power tool
-  Operating table, etc.

MODEL NUMBER	Size	Nominal voltage (V)	Discharge capacity (mAh)		Diameter (mm)	Total height (mm)	Weight (g)	Charging temperature (°C)	Discharging temperature (°C)
			Rated	Average					
BK-260SCP*1 	SC	1.2	2,450	2,700	23.0 +0/-1.0	43.0 +0/-1.5	55	0 to +45	-10 to +65
BK-300SCP*1 	SC	1.2	2,800	3,050	23.0 +0/-1.0	43.0 +0/-1.5	57	0 to +45	-10 to +65

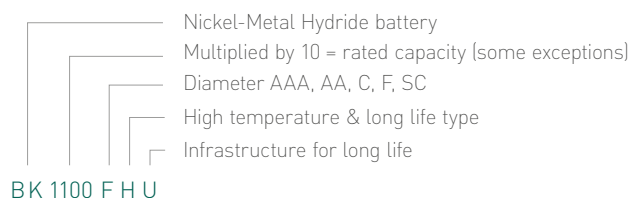
INFRASTRUCTURE LONG LIFE TYPE



These very tough Ni-MH batteries offer a very long service life when using intermittent charging at high ambient temperature conditions. Moreover, these batteries are ideal as a replacement for standard Ni-Cd batteries. They are recommended for use in applications such as emergency lighting, servers, elevators, automated teller machines (ATM), solar powered devices and as a back-up for base stations.

FEATURES








- | Expected lifetime is about 8 to 10 years
- | Superior charge efficiency under high temperature conditions
- | Available in various sizes
- | Very long service life when using intermittent charging at high ambient temperature conditions
- | Excellent low self-discharge characteristics

MODEL NUMBER (EXAMPLE)







MODEL NUMBER	Size	Nominal voltage (V)	Discharge capacity (mAh)		Diameter (mm)	Total height (mm)	Weight (g)	Charging temperature (°C)	Discharging temperature (°C)
			Rated	Average					
BK-60AAAHU 	AAA	1.2	500	550	10.5 +0/-0.7	44.5 +0/-1.5	12	-10 to +75	-20 to +75
BK-120AAAHU 	AA	1.2	1,200	1,280	14.5 +0/-0.7	50.5 +0/-1.5	24	-20 to +75	-20 to +75

APPLICATIONS

-  Solar powered application
-  Server
-  UPS system
-  Elevator
-  Emergency light
-  Active cooling and tracking for airfreight
-  Industrial trucks robots, etc.

*1 For high power use application such as power tools.

MODEL NUMBER	Size	Nominal voltage (V)	Discharge capacity (mAh)		Diameter (mm)	Total height (mm)	Weight (g)	Charging temperature (°C)	Discharging temperature (°C)
			Rated	Average					
BK-220SCHU 	SC	1.2	2,200	2,350	23.0 +0/-1.0	43.0 +0/-1.5	50	-20 to +75	-20 to +75
BK-310CHU 	C	1.2	3,100	3,300	25.8 +0/-1.0	50.0 +0/-2.0	80	-20 to +75	-20 to +75
BK-1100FHU 	F	1.2	11,000	12,000	33.0 +0/-1.0	91.0 +0/-2.5	250	-20 to +75	-20 to +85
BK-1100FGT 	F	1.2	11,000	12,000	33.0 +0/-1.0	91.0 +0/-2.5	245	-20 to +75	-40 to +75

AUTOMOTIVE BACKUP TYPE

This new Panasonic Ni-MH battery series is particularly designed for E-call systems. The long life reliability and the high discharge capability make these batteries ideal for these demanding applications. Also, our new batteries are eco-friendly designed and non-flammable.

FEATURES

- Excellent low temperature discharge performance
- Provides high safety battery pack
- Complies with automotive standard production (IATF, VDA6.3)

APPLICATIONS



E-call

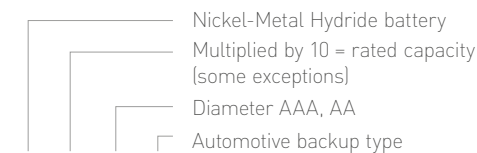


ADAS back-up






Low temperature data logger

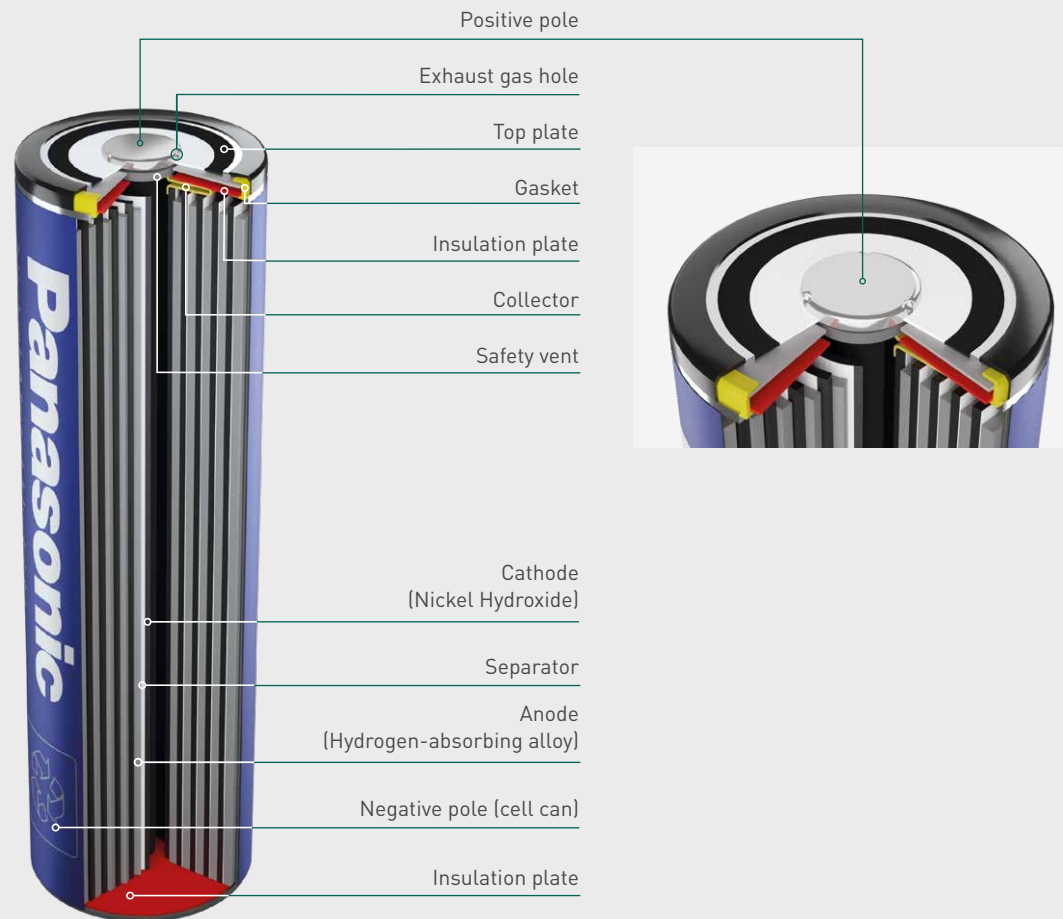
MODEL NUMBER (EXAMPLE)



BK 60 AAA WS

MODEL NUMBER	Size	Nominal voltage (V)	Discharge capacity (mAh)		Diameter (mm)	Total height (mm)	Weight (g)	Charging temperature (°C)	Discharging temperature (°C)
			Rated	Average					
BK-60AAWS 	AAA	1.2	500	550	10.5 +0/-0.7	44.5 +0/-1.5	11	-20 to +60	-30 to +85
BK-120AWS 	AA	1.2	1,100	1,180	14.5 +0/-0.7	50.5 +0/-1.5	24	-20 to +60	-40 to +85
BK-120AAWX 	AA	1.2	1,100	1,180	14.5 +0/-0.7	50.5 +0/-1.5	24	-20 to +70	-40 to +105

BATTERY INSIDE*1



*1 The illustration shows only one example of Ni-MH battery structure.

TAILOR-MADE Ni-MH BATTERY PACKS MEET CUSTOMER NEEDS

Most Ni-MH batteries are used in the form of battery packs and installed in devices. When the battery pack is used, the type of battery, number of cells, shape of the pack, constituent parts of the pack, etc., are determined by the ratings (voltage, load current) of the device, charge specifications, space availability in the battery compartment, use conditions, etc. At Panasonic, we are designing and manufacturing battery packs individually by taking the safety and reliability of the batteries into consideration to power your ideas.

FEATURES

- Wide temperature range from -20°C up to +75°C (in case of BK-60AAAHU, min. -10°C)
- Superb long-term reliability for backup usage
- Low self-discharge characteristics

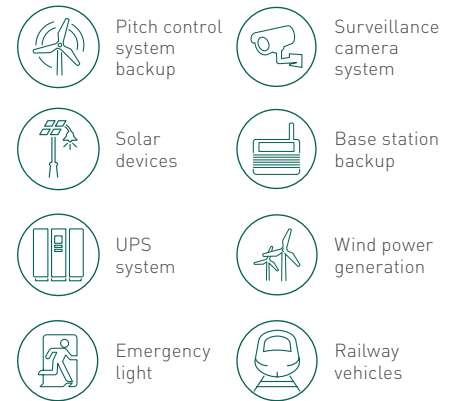
BATTERY PACK SPECIFICATION (with a built-in BMS)

SPECIFICATIONS*1	
Part number (Tentative)	BK-11F8010T1
Module numbers (pcs)	8
Rated capacity (Ah)	100
Nominal voltage (V)	96
Temperature range (°C)*2	-40 to +75 (up to +60 for charging)
Weight (kg)	288
Dimensions (mm) W x D x H	1258 x 598 x 235
Expected life (years)*3	12 to 16
Additional function	Remote diagnosis function / Calculation of battery lifetime

ESTIMATED LIFE BY EVALUATING ACCELERATED LIFE

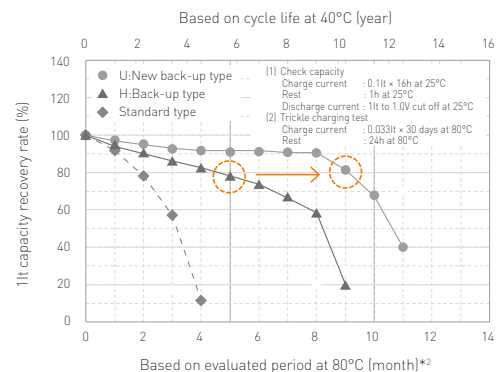
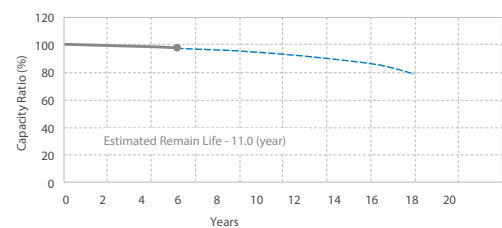


APPLICATIONS



REMOTE DIAGNOSIS FUNCTION

- Enable checking battery health and monitoring battery conditions
- Allows calculation of remaining battery lifetime

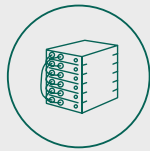


*1 Under development.

*2 Please consult discharge / charge current value.

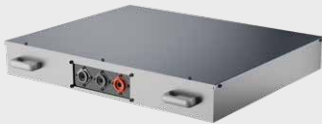
*3 Based on Panasonic suggested condition.

BATTERY PACKS



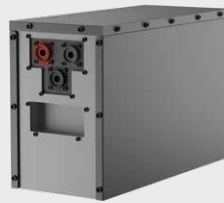
STANDARD BATTERY PACK SYSTEM

BK-11F8010T1 (build by 8 pcs of module) 96 V / 100 Ah



ULTRA SLIM BATTERY MODULE

Option a) 12 V / 100 Ah | b) 6 V / 200 Ah

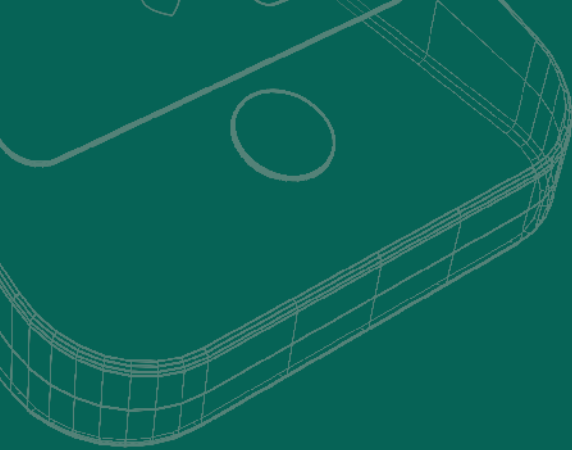


STANDARD BATTERY MODULE

Option a) 12 V / 100 Ah | b) 6 V / 200 Ah



WE POWER YOUR
ENERGY



LITHIUM-ION

EXCELLENT BATTERY
SAFETY AND SUPERIOR
PERFORMANCE

- | Stable power supply with flat discharge voltage
- | Excellent reliability
- | Low self-discharge
- | High energy density



YOUR INFORMATION

Visit our product page and
get detailed information about
Lithium-ion batteries.

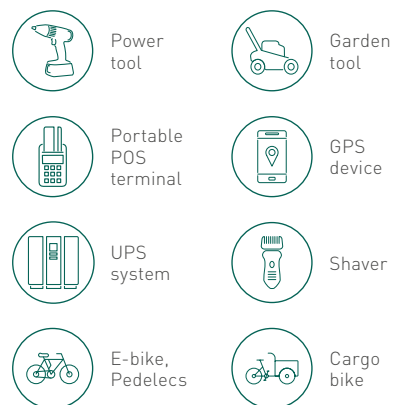
CYLINDRICAL SINGLE CELL

A perfect combination of high energy density (NNP technology), safety and long-life shows what is possible with Lithium-ion battery technology from Panasonic. Excellent battery safety on one hand, and superior battery performance on the other: this is what Panasonic stands for.

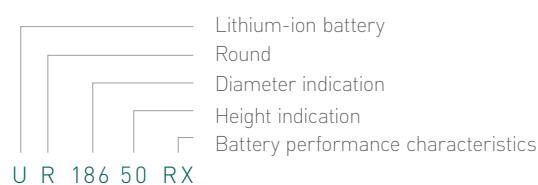
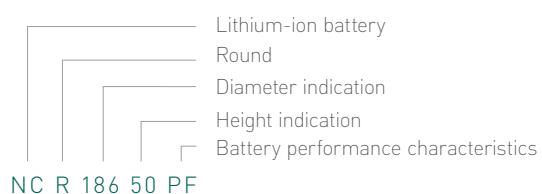
FEATURES









- High energy density and high voltage ensure small battery dimensions
- Long-life, stable power supply with flat discharge voltage
- Use of Lithium-ion batteries requires a safety unit
- Safety technologies such as HRL available

APPLICATIONS



MODEL NUMBER (EXAMPLE)






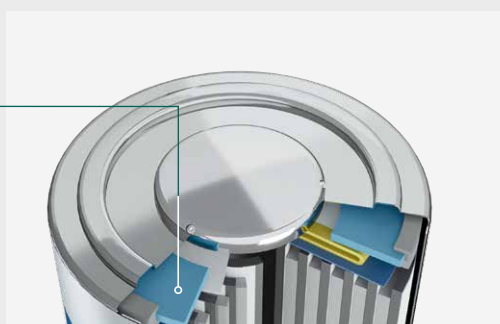
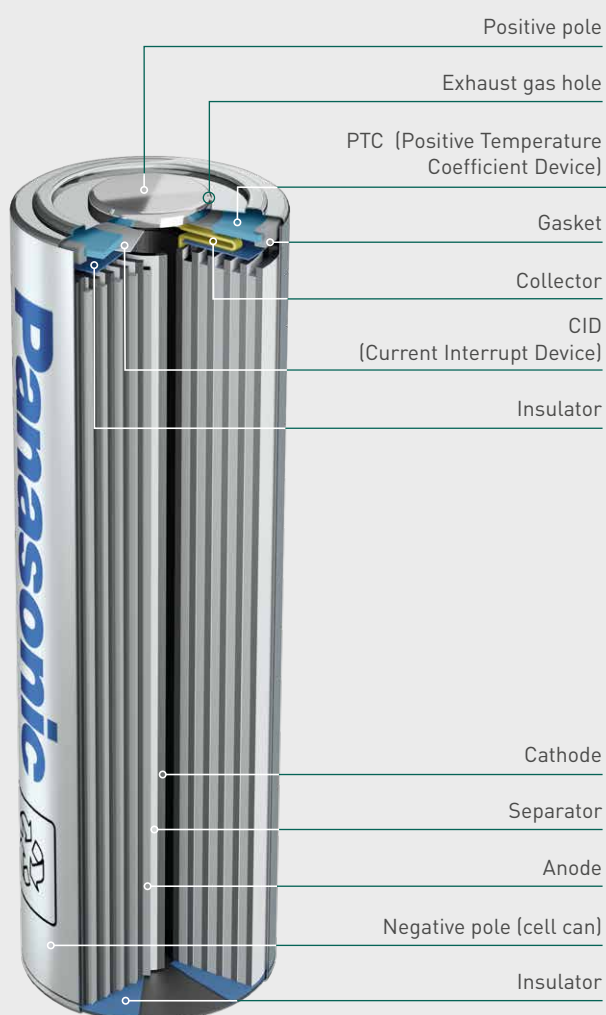
MODEL NUMBER	Technology	Nominal voltage (V)	Typical*1 capacity (mAh)	Size	Diameter (mm)	Total height (mm)	Weight (g)
NCR18500A	 NNP ^{*2} , HRL ^{*3}	3.6	2040	18500	18.15	49.36	33.5
NCR1850B	 Lithium-ion High capacity type	3.6	2350	18500	18.25	49.36	35.5
NCR18650BD	 Lithium-ion Long cycle type	3.6	3180	18650	18.25	65.10	48.5
NCR18650BF	 NNP ^{*2} , HRL ^{*3}	3.6	3350	18650	18.24	65.10	46.5
NCR18650GA	 NNP ^{*2} , HRL ^{*3} , Lithium-ion High power type	3.6	3450	18650	18.24	65.10	48.5
UR14500AC	 Lithium-ion Standard type	3.6	800	14500	13.90	49.20	18.6
UR18650A	 Lithium-ion Standard type	3.6	2250	18650	18.10	64.80	43.0
UR18650AA	 Lithium-ion Standard type	3.6	2250	18650	18.10	64.80	42.1

*1 4.20V charge

*2 NNP - Nickel Oxide Based New Platform

*3 HRL - Heat Resistance Layer

MODEL NUMBER		Technology	Nominal voltage (V)	Typical*1 capacity (mAh)	Size	Diameter (mm)	Total height (mm)	Weight (g)
UR18650RX		Lithium-ion High power type	3.6	2,050	18650	18.24	65.10	46.5
UR1865ZM2		Lithium-ion Standard type	3.6	2,550	18650	18.5	63.3	46.4
UR1865ZP		Lithium-ion Standard type	3.6	2,600	18650	18.5	65.3	46.9



BATTERY INSIDE*2

*1 4.20V charge

*2 Some batteries are not equipped with a PTC. Please consult Panasonic for further information. The illustration shows only one example of a Lithium-ion battery structure.

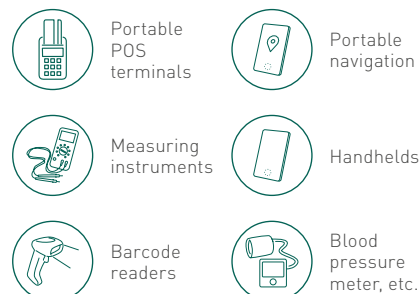
PRISMATIC SINGLE CELL

A perfect combination of high energy density (NNP technology), safety and long-life shows what is possible with Lithium-ion battery technology from Panasonic. Excellent battery safety on one hand, and superior battery performance on the other: this is what Panasonic stands for.

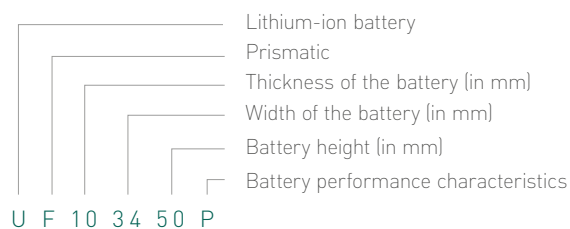
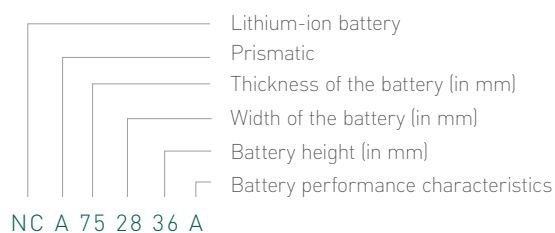
FEATURES








- High energy density and high voltage ensure small battery dimensions
- Long-life, stable power supply with flat discharge voltage
- Use of Lithium-ion batteries requires a safety unit
- Safety technologies such as HRL available

APPLICATIONS



MODEL NUMBER (EXAMPLE)





















MODEL NUMBER		Technology	Nominal voltage (V)	Typical ^{*1} capacity (mAh)	Width (mm)	Thickness (mm)	Total height (mm)	Weight (g)
CGA103450A		Co system	3.7	1950	33.80	10.50	48.50	39.2
CGA463443XA		High voltage charge system	3.8	910	33.80	4.60	42.45	15.5
CGA463450XA		High voltage charge system	3.8	1030	33.80	4.55	49.45	17.6
CGA553450XA		High voltage charge system	3.8	1310	33.80	5.70	49.65	21.5
CGA573442		Co system	3.7	960	33.80	5.60	41.80	18.5
NCA103450		NNP ^{*2} , HRL ^{*3}	3.6	2350	33.80	10.50	48.50	38.3
NCA463436A		NNP ^{*2} , HRL ^{*3}	3.6	720	34.30	4.60	35.50	12.4

*1 4.20V charge

*2 NNP - Nickel Oxide Based New Platform

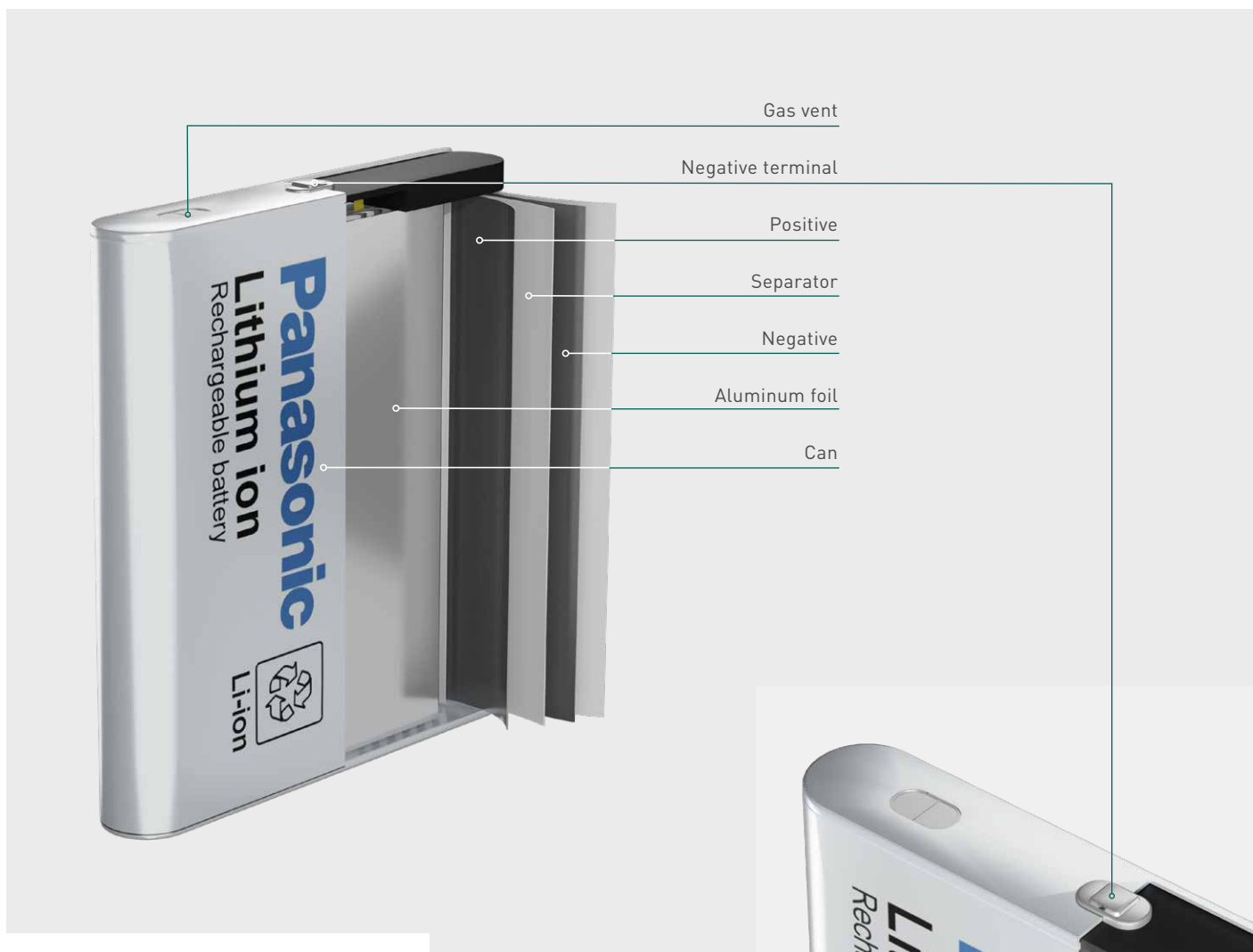
*3 HRL - Heat Resistance Layer

MODEL NUMBER		Technology	Nominal voltage (V)	Typical ^{*1} capacity (mAh)	Width (mm)	Thick-ness (mm)	Total height (mm)	Weight (g)
NCA523436		NNP ^{*2} , HRL ^{*3}	3.6	840	34.30	5.15	35.50	14.1
NCA572742SA		NNP ^{*2} , HRL ^{*3}	3.6	890	41.50	5.70	41.50	14.5
NCA593446		NNP ^{*2} , HRL ^{*3}	3.6	1,300	33.80	5.90	46.0	20.6
NCA622944SA		NNP ^{*2} , HRL ^{*3}	3.6	1,170	28.70	6.25	44.45	18.1
NCA623535		NNP ^{*2} , HRL ^{*3}	3.6	1,100	35.20	6.30	35.10	17.6
NCA653864		NNP ^{*2} , HRL ^{*3}	3.6	2,200	38.10	6.50	64.35	36.6
NCA653864SA		NNP ^{*2} , HRL ^{*3}	3.6	2,400	38.10	6.50	64.60	37.0
NCA673440		NNP ^{*2} , HRL ^{*3}	3.6	1,265	33.80	6.75	40.35	20.3
NCA752836A		NNP ^{*2} , HRL ^{*3}	3.6	1,010	27.90	7.80	35.70	16.7
NCA793540		NNP ^{*2} , HRL ^{*3}	3.6	1,570	35.10	7.95	40.50	24.7
NCA843436		NNP ^{*2} , HRL ^{*3}	3.6	1,300	33.90	8.70	35.70	23.0
NCA882936SA		NNP ^{*2} , HRL ^{*3}	3.6	1,310	28.70	8.80	36.30	20.1
NCA903864A		NNP ^{*2} , HRL ^{*3}	3.6	3,280	38.0	9.0	63.80	50.7
NCA496080SA		NNP ^{*2} , HRL ^{*3}	3.6	3,490	60.0	4.95	80.25	57.0
NCA103443		NNP ^{*2} , HRL ^{*3}	3.6	2,010	33.80	10.50	42.7	33.4
NCA593142SA		NNP ^{*2} , HRL ^{*3}	3.6	1,110	30.95	5.90	42.25	17.7
NCA596080		NNP ^{*2} , HRL ^{*3}	3.6	4,170	60.0	5.85	80.2	67.0
NCA596080SA		NNP ^{*2} , HRL ^{*3}	3.6	4,530	60.0	5.95	80.2	68.0





*1 4.20V charge

*2 NNP - Nickel Oxide Based New Platform

*3 HRL - Heat Resistance Layer



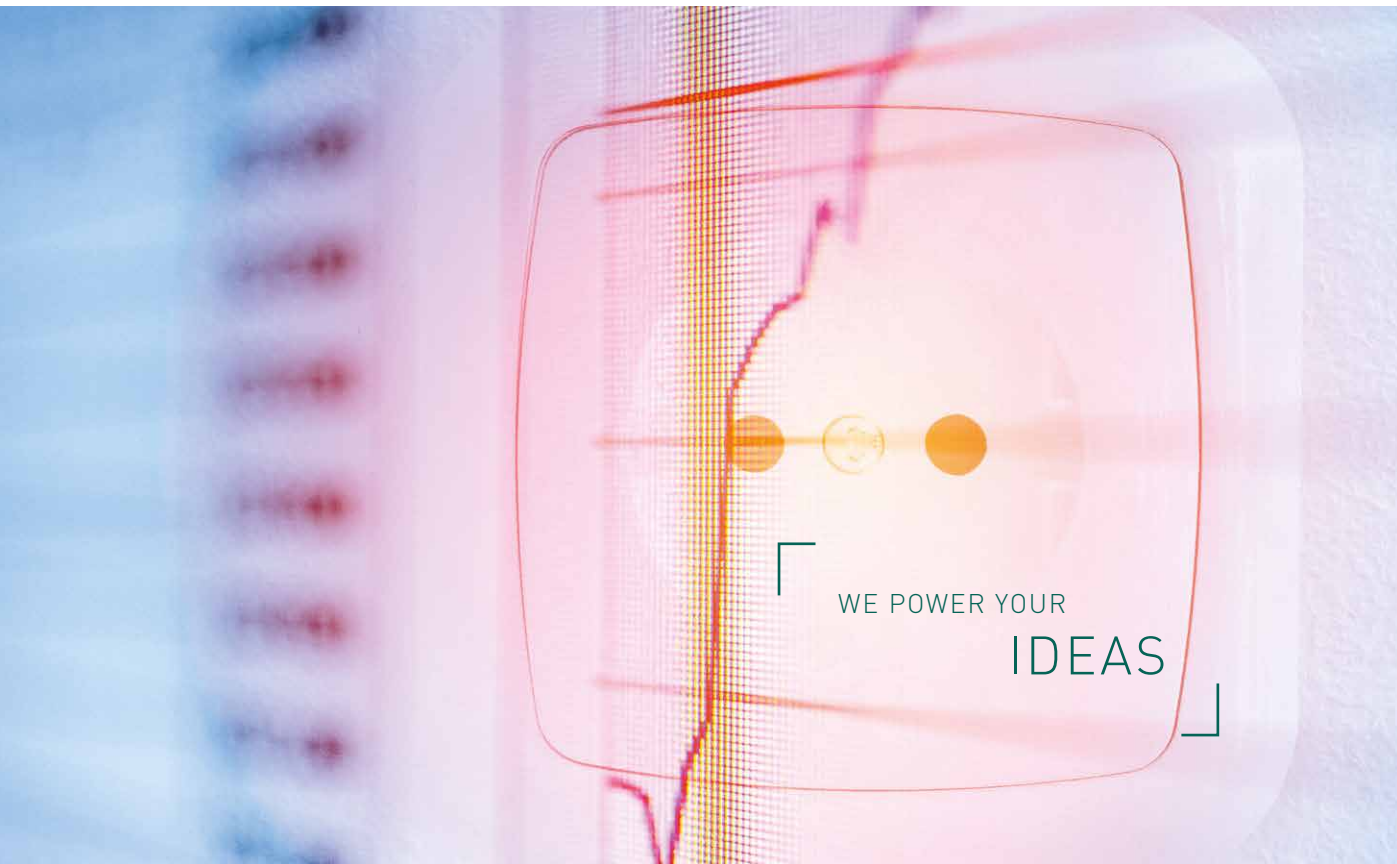
BATTERY INSIDE*1



MODEL NUMBER		Technology	Nominal voltage (V)	Typical*2 capacity (mAh)	Width (mm)	Thick-ness (mm)	Total height (mm)	Weight (g)
UF103450PN		LCO system*1	3.7	2,000	33.80	10.50	48.80	38.5
UF463443GUM		LCO system*3	3.7	850	33.85	4.55	42.60	16.0
UF463450FP		LCO system*3	3.7	960	33.85	4.45	49.60	18.5
UF553450ZP		LCO system*3	3.7	1,200	33.85	5.55	49.80	22.3

*1 The illustration shows only one example of a Lithium-ion battery structure.

*2 4.20V charge

*3 LCO system - This Panasonic system uses a Cobalt-based cathode and offers high capacity. Some batteries are not equipped with a PTC. Please consult Panasonic for further information.



MODEL NUMBER		Technology	Nominal voltage (V)	Typical*1 capacity (mAh)	Width (mm)	Thickness (mm)	Total height (mm)	Weight (g)
UF653450SQ		LCO system*2	3.7	1,300	33.85	6.35	49.80	25.1
UF703450F		LCO system*2	3.7	1,480	33.85	7.0	49.80	28.1

NOTICE TO READERS

We are unable to support single cell business or accept orders from consumers. We design Lithium-ion battery packs including a suitable safety unit device based on the technical specification of the customer. Due to the need for careful review when selecting Lithium-ion battery solutions, please contact your local Panasonic sales office. In order to avoid a lack of supply please check the battery availability with your Panasonic sales team before design-in.



*1 4.20V charge

*2 LCO system - This Panasonic system uses a Cobalt-based cathode and offers high capacity. Some batteries are not equipped with a PTC. Please consult Panasonic for further information.



LITHIUM-ION PIN-TYPE

MINIATURE RECHARGEABLE
BATTERIES – ESPECIALLY
DESIGNED FOR WEARABLES

- | Compact design
- | Extremely light & robust
- | Long-life
- | Quick charging
- | High reliability & safety



YOUR INFORMATION

Visit our product page and
get detailed information about
Lithium-ion Pin-type batteries.

PIN-TYPE

The industry's smallest-diameter cylindrical rechargeable battery has been developed using extremely fine components and materials compared to standard Lithium-ion batteries. Its outstanding technical design makes this battery ideal for wearable devices with heavy power demands.

FEATURES

- | Extremely small diameter pin-shaped Lithium-ion battery which expands design options for micro devices
- | Rechargeable battery that can be used repeatedly and has the output capability required for near field communications
- | High-strength metal exterior provides excellent reliability and robustness

APPLICATIONS



Electric pen



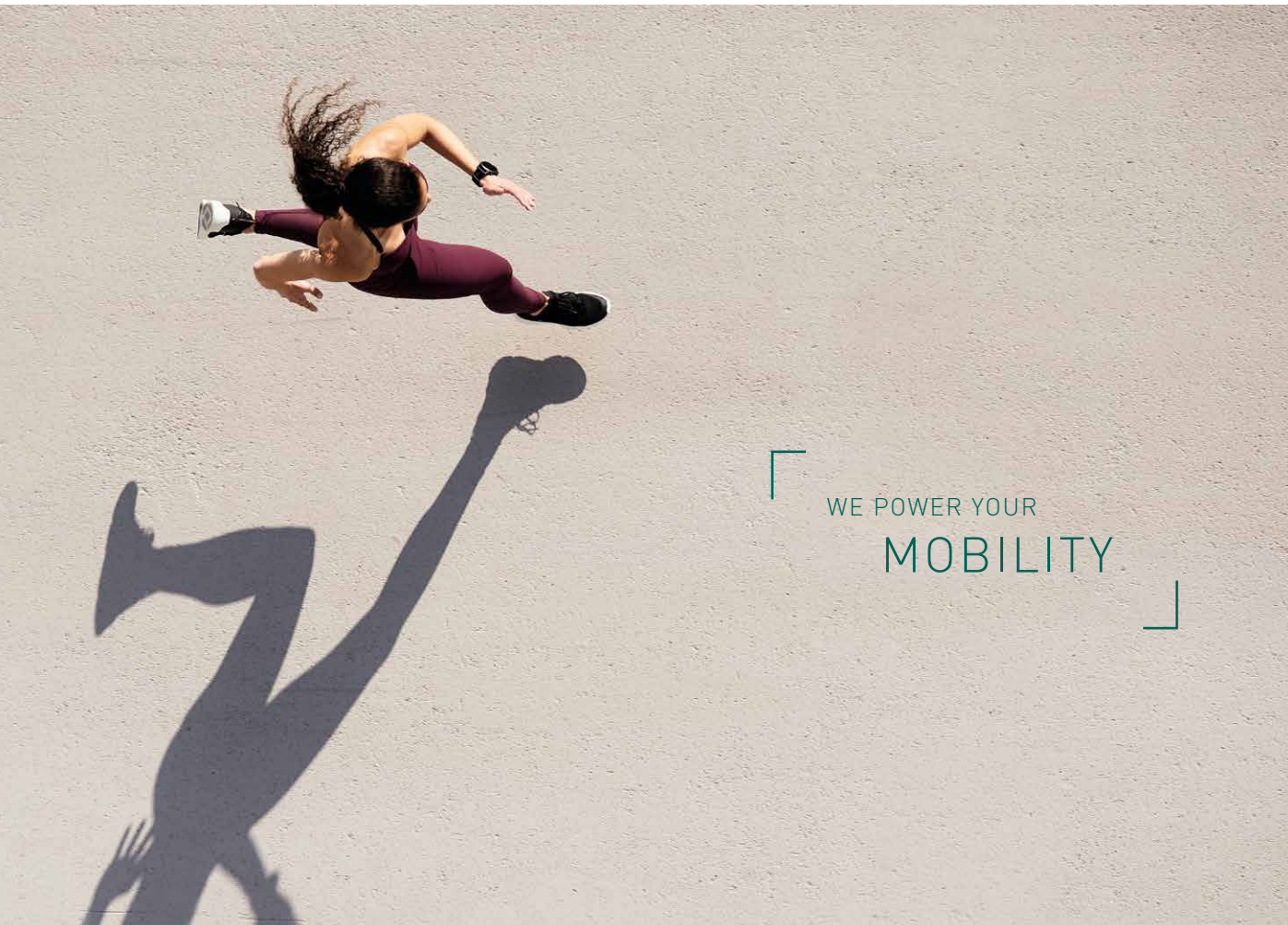
Wearables







Hearing aid



Smart glasses



MODEL NUMBER		Technology	Nominal voltage (V)	Typical* ¹ capacity (mAh)	Diameter (mm)	Total height (mm)	Weight (g)
CG-320B* ²		Co system	3.8	16	3.65	20	0.5
CG-420A* ²		Co system	3.8	23	4.7	20	0.8
CG-420B* ²		Co system	3.8	29	4.7	20	0.9
CG-425A* ²		Co system	3.8	32	4.7	25	1.0

BATTERY INSIDE*³



Positive cap

Gasket

Insulator

Collector

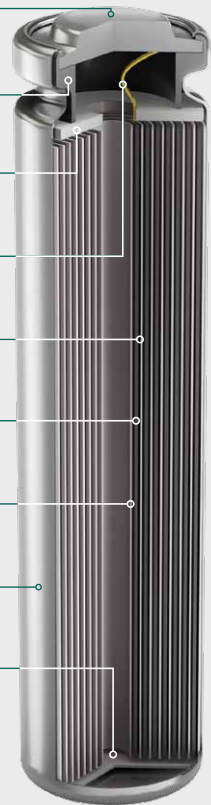
Cathode (Lithium Cobalt-Oxide)

Separator

Anode (Graphite)

Casing

Insulator



*¹ 4.35V charge

*² This battery is supplied with tabs.

*³ The illustration shows only one example of a Lithium-ion Pin-type battery structure.



LITHIUM

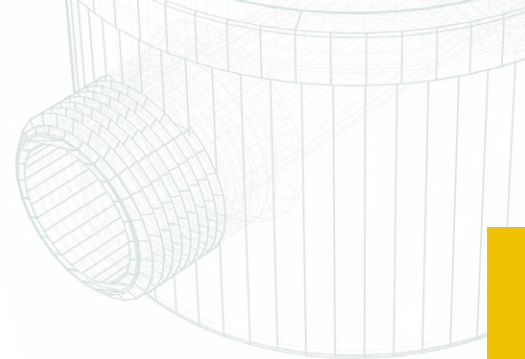
STATE-OF-THE-ART LITHIUM BATTERIES

- | Low self-discharge
- | Decades of mass production experience
- | Superior designed battery ranges
- | Proven reliability



YOUR INFORMATION

Visit our product page and get detailed information about Lithium batteries.



ABOUT OUR LITHIUM PRODUCTS

Today, Panasonic's Lithium battery technologies are becoming more and more important. Due to their superior quality and performance characteristics these batteries are able to power a broad range of applications.

Find out why Panasonic is especially emphasizing its famous BR and CR technologies which have set the standard for outstanding quality in the market for many years.

<p>UP TO +125°C WIDE TEMPERATURE RANGE (DEPENDING ON CELL MODEL)</p>	<p>6 DIFFERENT SUB CHEMIS-TRIES</p>	<p> ECO FRIENDLY NO TOXIC MATERIALS</p>	<p>4  FACTORIES TO SUPPORT GLOBAL DEMAND</p>
<p> TAYLOR- MADE PACKS & TERMINALS</p>	<p>LITHIUM</p>		<p>ISO 9001 QUALITY</p>
<p>IATF 16949-2016 AUTOMOTIVE</p>	<p>NO  PASSIVATION</p>	<p>BATTERY  SAFETY IEC 62133-1 IEC 60086-4</p>	<p>> 20 YEARS LONG LIFE (DEPENDING ON USAGE CONDITIONS)</p>
<p> PRODUCTION SINCE 1971</p>	<p>> 50 YEARS EXPERIENCE</p>	<p>NO TOXIC MATERIALS</p>	<p>ISO 14001 ENVIRONMENT</p>

BR AND CR PRIMARY

These days Lithium battery technologies are getting more and more important. Due to their high voltage, low self-discharge and proven reliability a broad range of applications can be powered. In particular the BR, CR and ER battery technologies are leading the indus-

tries. Please study the comparison overview below and find out why Panasonic is especially emphasizing on its famous BR and CR technology which is a proof for outstanding quality for years in the market.

CHEMISTRY COMPARISON* ¹		BR	CR	ER	
MATERIAL	Cathode	CF	MnO ₂	SOCl ₂	
	Anode	LITHIUM METAL			
	Electrolyte	ORGANIC ELECTROLYTE			
PERFORMANCE	Nominal voltage	3V	3V	3.6V	
	Voltage during discharge (Initial)	LOW CURRENT	++	++	+
		HIGH CURRENT	+	++	-
	Voltage during discharge (End of capacity)	LOW CURRENT	++	++	++
		HIGH CURRENT	+	++	-
	Pulse performance at low temperature	INITIAL	+	++	-
		END OF LIFE	+	++	-
	Storage performance	++	+	- ²	
	Reliability	++	+	- ²	
	Safety	++	++	-	
ENVIRONMENT	Eco friendly	++	++	- ³	

++ Very good applicability
 + Good applicability
 - Not good applicability

*¹ Please contact Panasonic to get more detailed information about this technical comparison overview.

*² Impedance increasing due to the passivation phenomena.

*³ Harmful substances included.

BR LITHIUM CYLINDRICAL SERIES

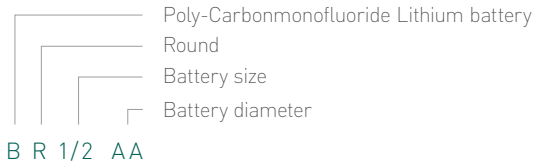
(NON-RECHARGEABLE)

Our Panasonic Poly-Carbonmonofluoride Lithium batteries (BR series) are ideal for applications such as meters or smoke detectors which demand either long-term power supply reliability or need to handle a wide temperature range.

FEATURES

- | Operating temperature range: between -40°C ~ +85°C
- | Self-discharge rate at 20°C is less than 0.5% per year
- | Superior long-term reliability
- | 40+ years of experience in production

MODEL NUMBER (EXAMPLE)



APPLICATIONS



Heat cost allocators



Car alarms



Tracking & RFID



Marine devices



Water meters



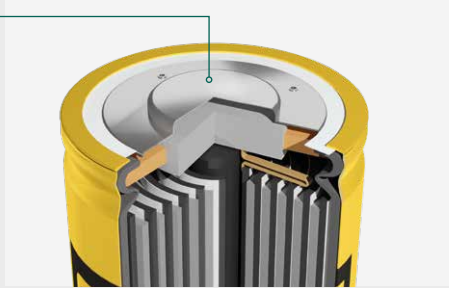
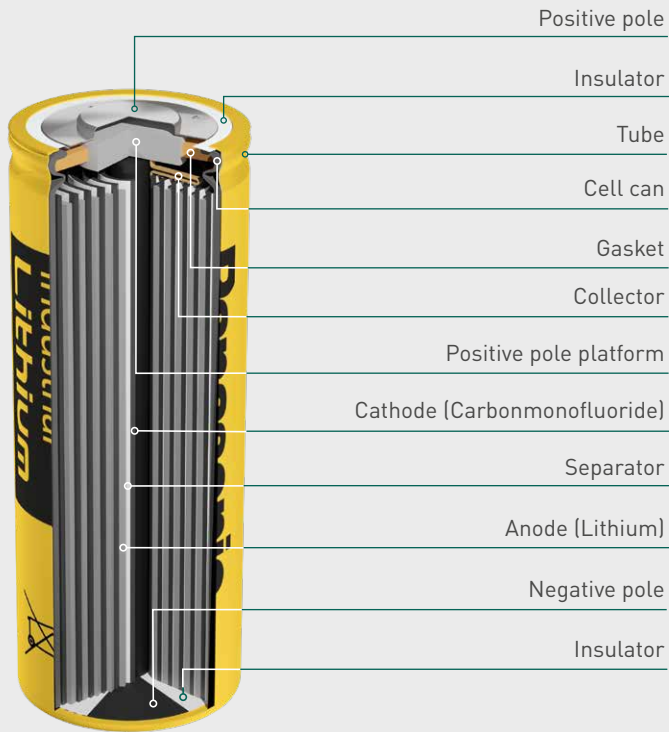
Gas meters








Smoke detectors



WE POWER YOUR
METERING



BATTERY INSIDE*1

MODEL NUMBER		Nominal voltage (V)	Nominal*2 capacity (mAh)	Size	Diameter (mm)	Total height (mm)	Weight (g)	Discharging temperature (°C)
BR-1/2AA*3*4		3	1,000	1/2 AA	14.5	25.5	8	-40 to +100
BR-2/3A*4		3	1,200	2/3 A 17355	17.0	33.5	13	-40 to +85
BR-2/3AG*4		3	1,450	2/3 A 17355	17.0	33.5	13	-40 to +85
BR-A*4		3	1,800	A	17.0	45.5	18	-40 to +85
BR-AG*4		3	2,200	A	17.0	45.5	18	-40 to +85
BR-C*4		3	5,000	C	26.0	50.5	41	-40 to +85

*1 The illustration shows only one example of Lithium battery structure.

*2 Capacity based on standard drain and cut off voltage down to 2.0V at 20°C.

*3 Operating temperature range is from -40°C ~ +100°C.

*4 Cells are supplied with tabs or lead-wires only. For available configurations please consult the Panasonic homepage or your sales contact.

CR LITHIUM CYLINDRICAL SERIES

(NON-RECHARGEABLE)

Panasonic Lithium CR type cylindrical batteries come as either single cells or dual cell packs. All cylindrical type Manganese Dioxide (CR series) Lithium batteries feature a spiral structure. With their enlarged electrode surface areas, they permit a current as high as several amperes to be drawn. In addition these batteries are convenient for equipments which are considered to replace the battery at the field.

FEATURES

- | Operating temperature range: between -40°C ~ $+70^{\circ}\text{C}$ ^{*1}
- | Good pulse discharge capability
- | Stable operation voltage
- | Self-discharge rate at 20°C is just 1% per year

APPLICATIONS



Medical equipment



Marine devices



Sanitary equipment



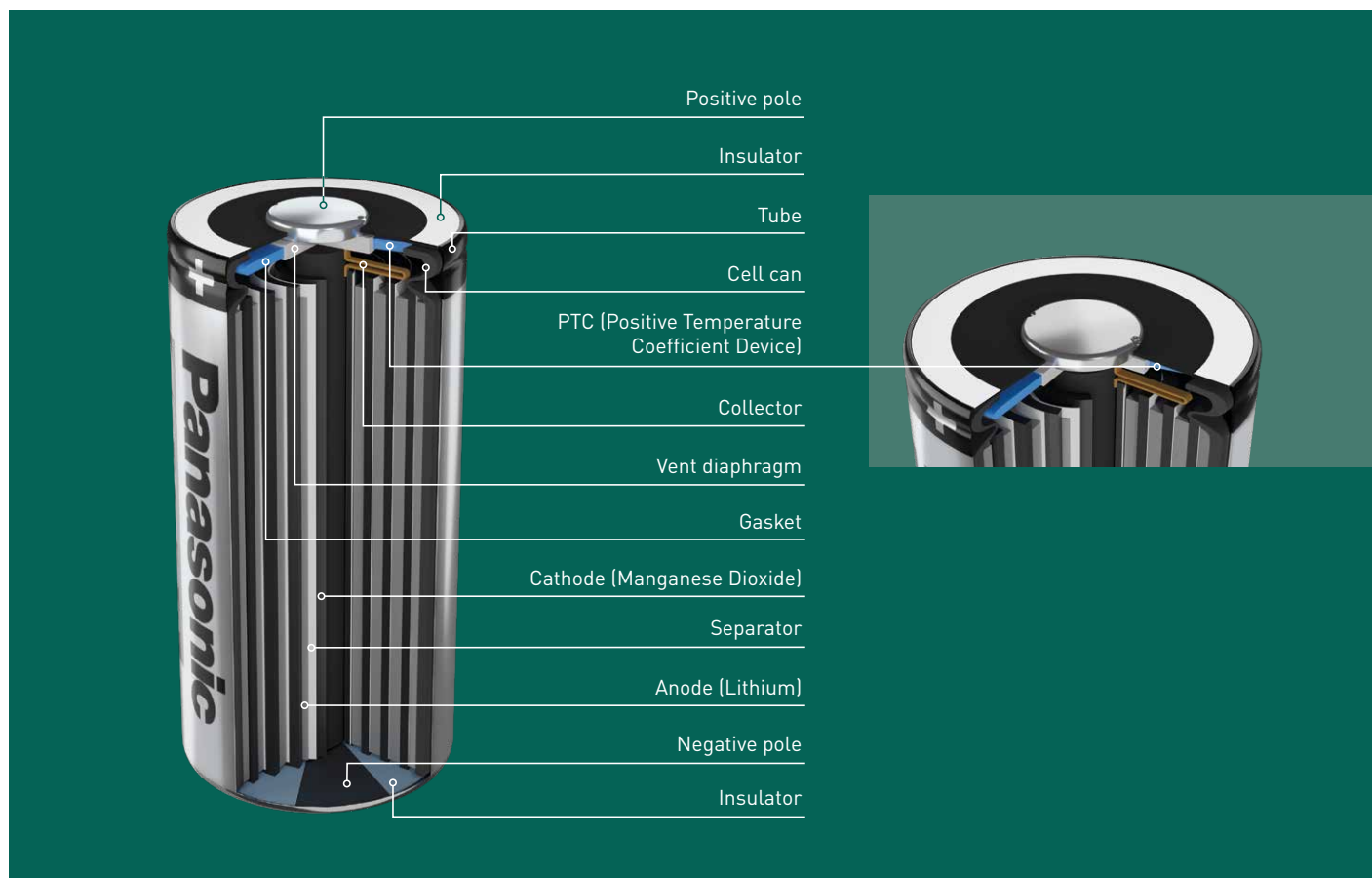
Door lock systems



High energy flashlights



Cameras

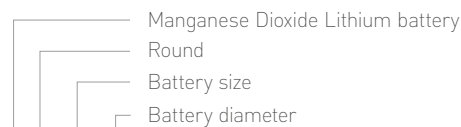


BATTERY INSIDE^{*2}





^{*1} Please consult your Panasonic sales representative when anticipating usage in operation temperature is between -40°C to -20°C .

^{*2} The illustration shows only one example of Lithium battery structure.

MODEL NUMBER (EXAMPLE)



C R 123 A

MODEL NUMBER		Nominal voltage (V)	Nominal ^{*1} capacity (mAh)	Size	Diameter (mm)	Total height (mm)	Weight (g)	Discharging temperature (°C)
CR-2 ^{*2}		3	850	15270	15.6	27.0	11	-40 to +70
CR-123A ^{*2}		3	1,550	17345	17.0	34.5	16	-40 to +70
2CR-5 ^{*2}		6	1,550	-	34.0 x 17.0	45.0	38	-40 to +70
CR-P2 ^{*2}		6	1,550	-	35.0 x 19.5	36.0	37	-40 to +70

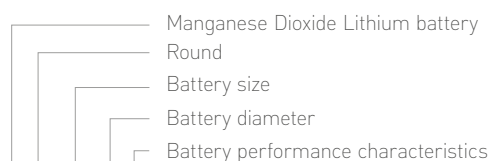
CR LITHIUM CYLINDRICAL SERIES FOR INDUSTRIAL (NON-RECHARGEABLE)

Ideal for industrial equipment, this series offers both excellent high-rate discharge performance and a service life of 15 years or more.

FEATURES

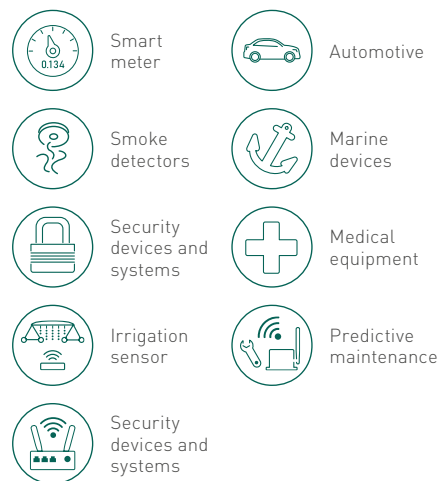
- Stable impedance throughout battery life
- Operating temperature range: between -40°C ~ +85°C^{*3}
- Superior high drain discharge performance
- Long-term reliability
- Self-discharge rate at 20°C is just 1% per year

MODEL NUMBER (EXAMPLE)



C R 2/3 A Z

APPLICATIONS



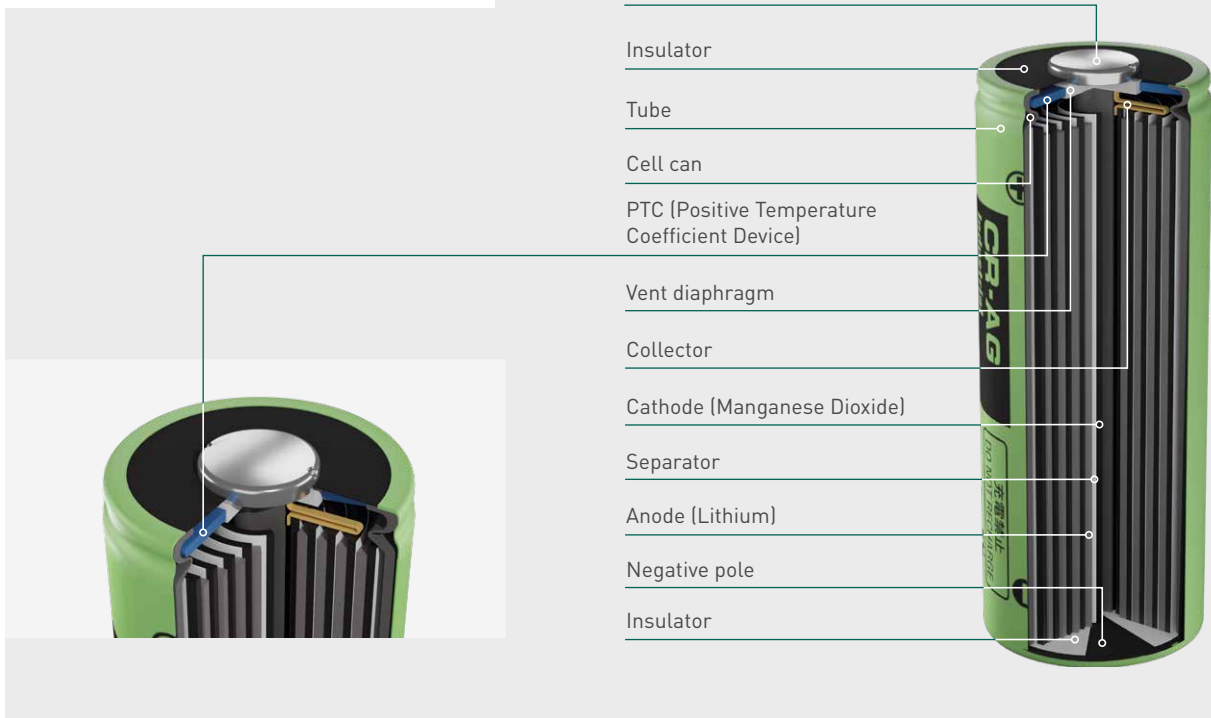
^{*1} Capacity based on standard drain and cut off voltage down to 2.0V or 4.0V at 20°C.

^{*2} Please consult your Panasonic sales representative when anticipating usage in operation temperature is between -40°C to -20°C, or +60°C to +70°C.

^{*3} Please contact Panasonic when anticipating usage in operation temperature 70°C or above.

MODEL NUMBER		Nominal voltage (V)	Nominal* ¹ capacity (mAh)	Size	Diameter (mm)	Total height (mm)	Weight (g)	Discharging temperature (°C)
CR-AAK		3	1,650	AA 14500	14.5	50.5	18	-40 to +85
CR-AAU		3	1,800	AA 14500	14.5	50.5	18	-40 to +85
CR-2Z		3	1,000	15270	15.6	27.0	11	-40 to +85
CR-2U		3	1,000	15270	15.6	27.0	11	-40 to +85
CR-2/3AU		3	1,600	2/3A 17335	17.0	33.5	16	-40 to +85
CR-2/3AZ		3	1,600	2/3A 17335	17.0	33.5	16	-40 to +85
CR-AG		3	2,400	A	17.0	45.5	22	-40 to +85
CR-AGZ		3	2,700	A	17.0	45.5	23	-40 to +85
CR-LAZ		3	3,000	A	17.0	50.5	26	-40 to +85

BATTERY INSIDE*²



*¹ Capacity based on standard drain and cut off voltage down to 2.0V at 20°C.

*² The illustration shows only one example of Lithium battery structure.

BR LITHIUM COIN SERIES

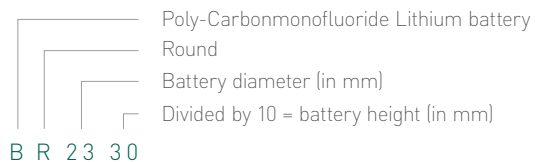
(NON-RECHARGEABLE)

Panasonic Lithium BR coin type batteries feature high energy density, and were developed and commercialized using Panasonic's extensive experience in battery technology. They exhibit stable performance under high ambient temperatures.

FEATURES

- | Self-discharge rate at 20°C is less than 1.0% per year
- | Wide operating temperature range: between -30°C ~ +85°C
- | Superior long-term reliability
- | 44+ years of experience in production

MODEL NUMBER (EXAMPLE)



APPLICATIONS



Tracking & RFID










Real Time Clock (RTC)

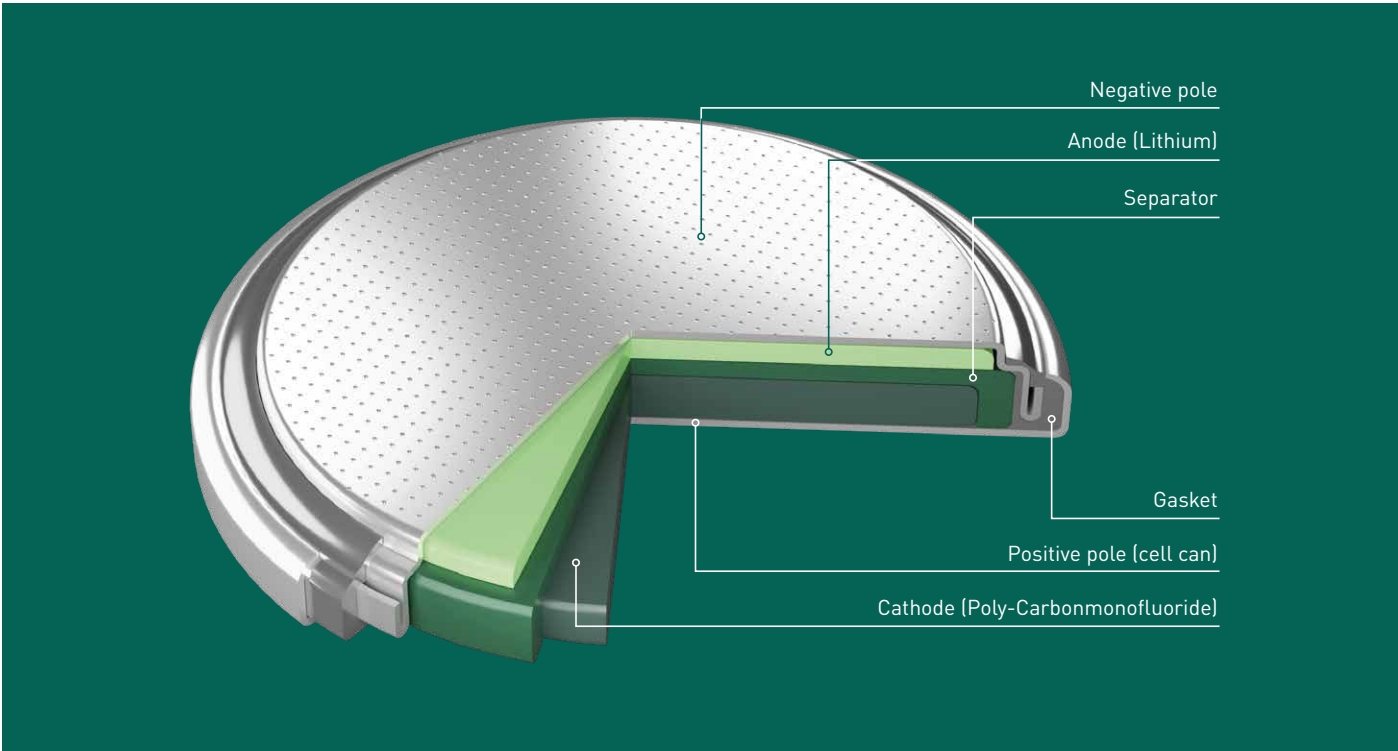


Memory back-up



Meters, etc.

MODEL NUMBER		Nominal voltage (V)	Nominal ^{*1} capacity (mAh)	Diameter (mm)	Total height (mm)	Weight (g)	Discharging temperature (°C)
BR-1220		3	35	12.5	2.0	0.7	-30 to +85
BR-1225		3	48	12.5	2.5	0.8	-30 to +85
BR-1632		3	120	16.0	3.2	1.5	-30 to +85
BR-2032		3	200	20.0	3.2	2.6	-30 to +85
BR-2325		3	165	23.0	2.5	3.0	-30 to +85
BR-2330		3	255	23.0	3.0	3.2	-30 to +85
BR-3032		3	500	30.0	3.2	5.7	-30 to +85



BATTERY INSIDE*1



*1 The illustration shows only one example of Lithium battery structure.

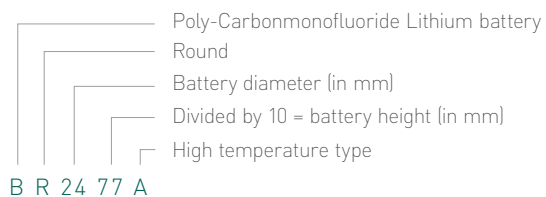
BR-A LITHIUM COIN TYPE SERIES FOR HIGH TEMPERATURE USAGE (NON-RECHARGEABLE)

The high energy density and the special material for gasket and separator make this battery series the ideal power supply in high ambient temperature applications.

FEATURES

- | Superior design for high temperature applications (-40°C ~ +125°C)
- | Outstanding long-term reliability
- | 24+ years of experience in production
- | Self-discharge rate at 20°C is less than 0.5% per year

MODEL NUMBER (EXAMPLE)



APPLICATIONS



Tire Pressure Monitoring Systems (TPMS)








Electronic Toll Collection (ETC)



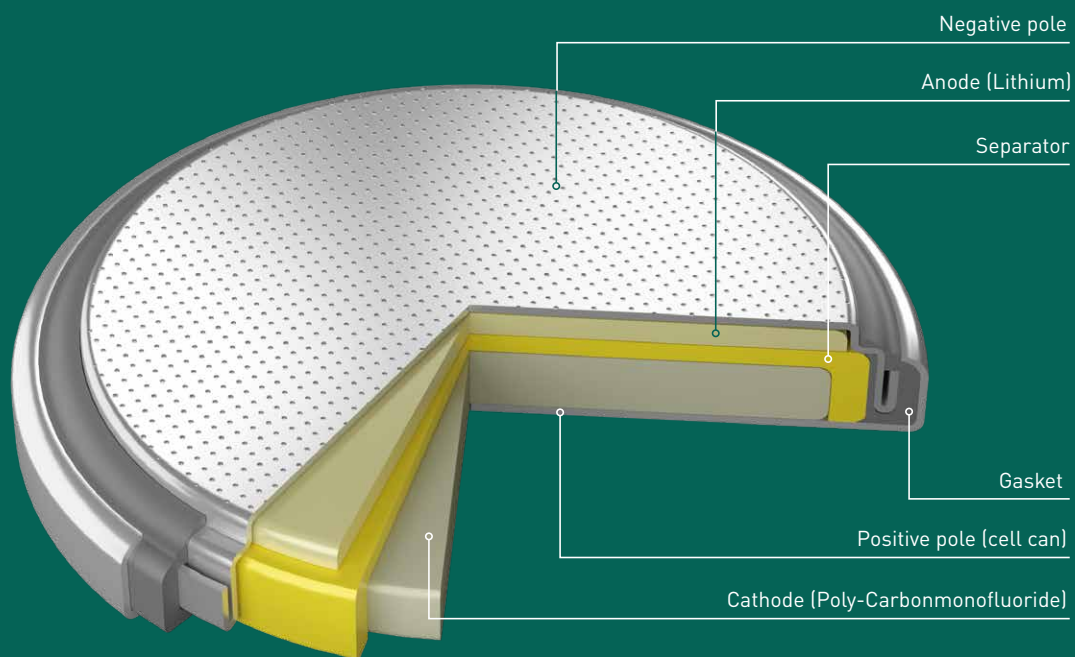
Heat cost allocators, etc.



WE POWER YOUR
APPLICATIONS

MODEL NUMBER		Nominal voltage [V]	Nominal ^{*1} capacity [mAh]	Diameter (mm)	Total height (mm)	Weight (g)	Discharging temperature [°C]
BR-1225A		3	48	12.5	2.5	0.8	-40 to +125
BR-1632A ^{*2}		3	120	16.0	3.2	1.5	-40 to +125
BR-2330A ^{*2}		3	255	23.0	3.0	3.2	-40 to +125
BR-2450A ^{*2}		3	550	24.5	5.9	4.9	-40 to +125
BR-2477A ^{*2}		3	1,000	24.5	7.7	7.9	-40 to +125

BATTERY INSIDE^{*3}



^{*1} Based on standard drain and cut off voltage down to 2.0V at 20°C.

^{*2} Cells are supplied with tabs or lead-wires only. For available configurations please consult the Panasonic homepage or your sales contact.

^{*3} The illustration shows only one example of Lithium battery structure.

CR LITHIUM COIN MANGANESE DIOXIDE SERIES

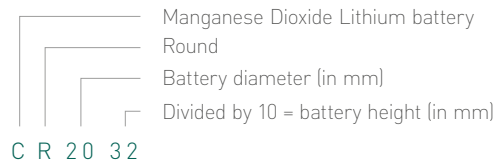
(NON-RECHARGEABLE)

These batteries have a proven track record of excellence in equipment requiring high currents. Additionally Panasonic has many years of manufacturing experience with this battery technology.







FEATURES









- | Good pulse capability
- | Stable voltage level during discharge
- | Long-term reliability
- | Self-discharge rate at 20°C is just 1.0% per year
- | Temperature range: -30°C ~ +85°C^{*1}

MODEL NUMBER (EXAMPLE)











APPLICATIONS

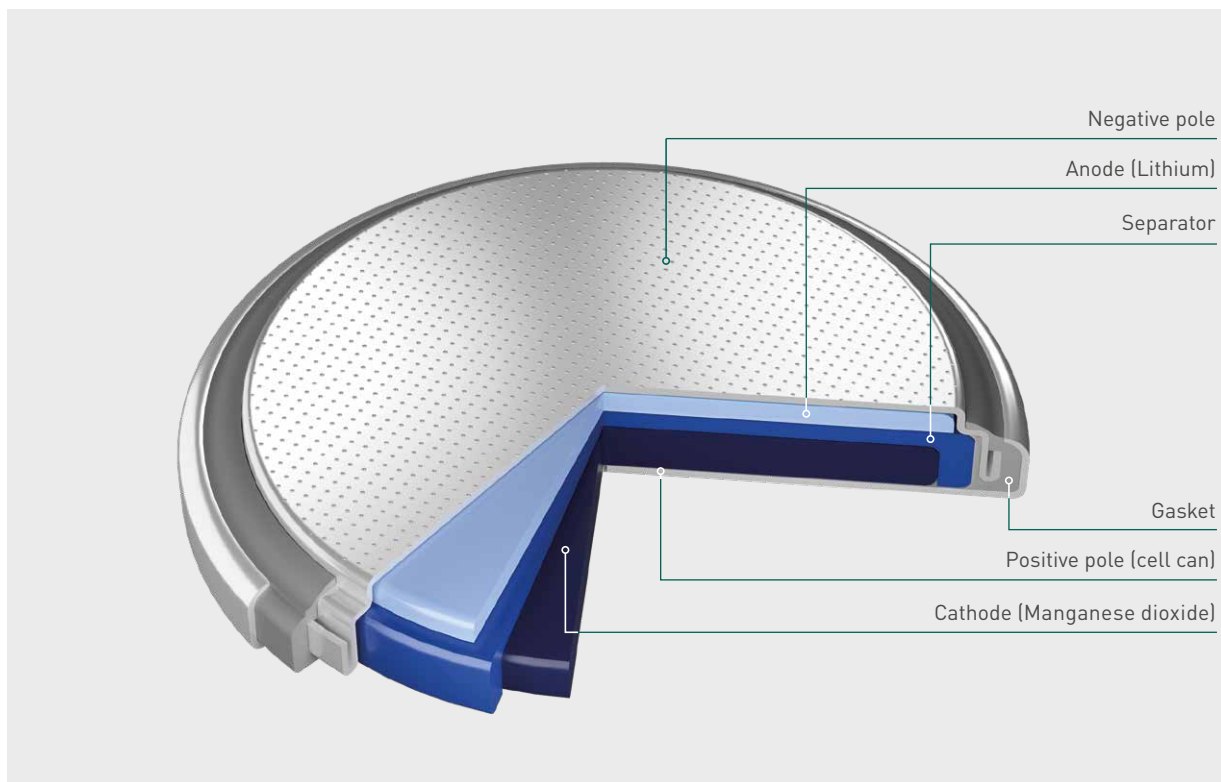
-  Remote Keyless Entry (RKE)
-  Electricity meters
-  Medical equipment
-  Tracking & RFID
-  Vending machines
-  Price tags, etc.

MODEL NUMBER		Nominal voltage (V)	Nominal ^{*2} capacity (mAh)	Diameter (mm)	Total height (mm)	Weight (g)	Discharging temperature (°C)
CR-1025		3	30	10.0	2.5	0.6	-30 to +85
CR-1216		3	25	12.5	1.6	0.7	-30 to +85
CR-1220		3	35	12.5	2.0	0.9	-30 to +85
CR-1616		3	55	16.0	1.6	1.0	-30 to +85
CR-1620		3	75	16.0	2.0	1.3	-30 to +85
CR-1632		3	140	16.0	3.2	1.9	-30 to +85
CR-2012		3	55	20.0	1.2	1.4	-30 to +85
CR-2016		3	90	20.0	1.6	1.6	-30 to +85

^{*1} Please contact Panasonic when anticipating usage in operation temperature 70°C or above.

^{*3} Based on standard drain and cut off voltage down to 2.0V at 20°C.

MODEL NUMBER		Nominal voltage (V)	Nominal ^{*1} capacity (mAh)	Diameter (mm)	Total height (mm)	Weight (g)	Discharging temperature (°C)
CR-2025		3	165	20.0	2.5	2.3	-30 to +85
CR-2032		3	225	20.0	3.2	2.8	-30 to +85
CR-2330		3	265	23.0	3.0	3.7	-30 to +85
CR-2354		3	560	23.0	5.4	5.7	-30 to +85
CR-2412		3	100	24.5	1.2	2.0	-30 to +85
CR-2450		3	620	24.5	5.0	6.2	-30 to +85
CR-2477		3	1,000	24.5	7.7	10.5	-30 to +85
CR-3032		3	500	30.0	3.2	6.9	-30 to +85



BATTERY INSIDE^{*2}

^{*1} Based on standard drain and cut off voltage down to 2.0V at 20°C.

^{*2} The illustration shows only one example of Lithium battery structure.

CR-A/B LITHIUM COIN HIGH TEMPERATURE MANGANESE DIOXIDE SERIES

(NON-RECHARGEABLE)

Comprising key design elements of the BR-A high temperature series in combination with the benefits of the conventional CR coin series, these batteries offer the best of both worlds in a cost effective manner.

FEATURES

- Excellent durability in high temperatures (up to 125°C^{*1}) allows various usages automotive electrical components and outdoor devices to be used under severe environments
- Superior pulse discharge characteristics even at low temperatures and can be used in a wide operating temperature
- Excellent long-term reliability enables safe and long-term use

APPLICATIONS

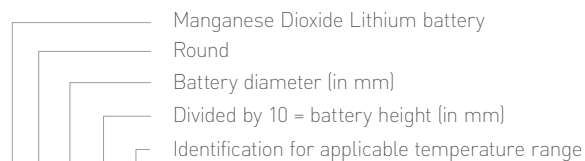


Tire Pressure Monitoring Systems (TPMS)








Electric Toll Collection (ETC)

MODEL NUMBER (EXAMPLE)



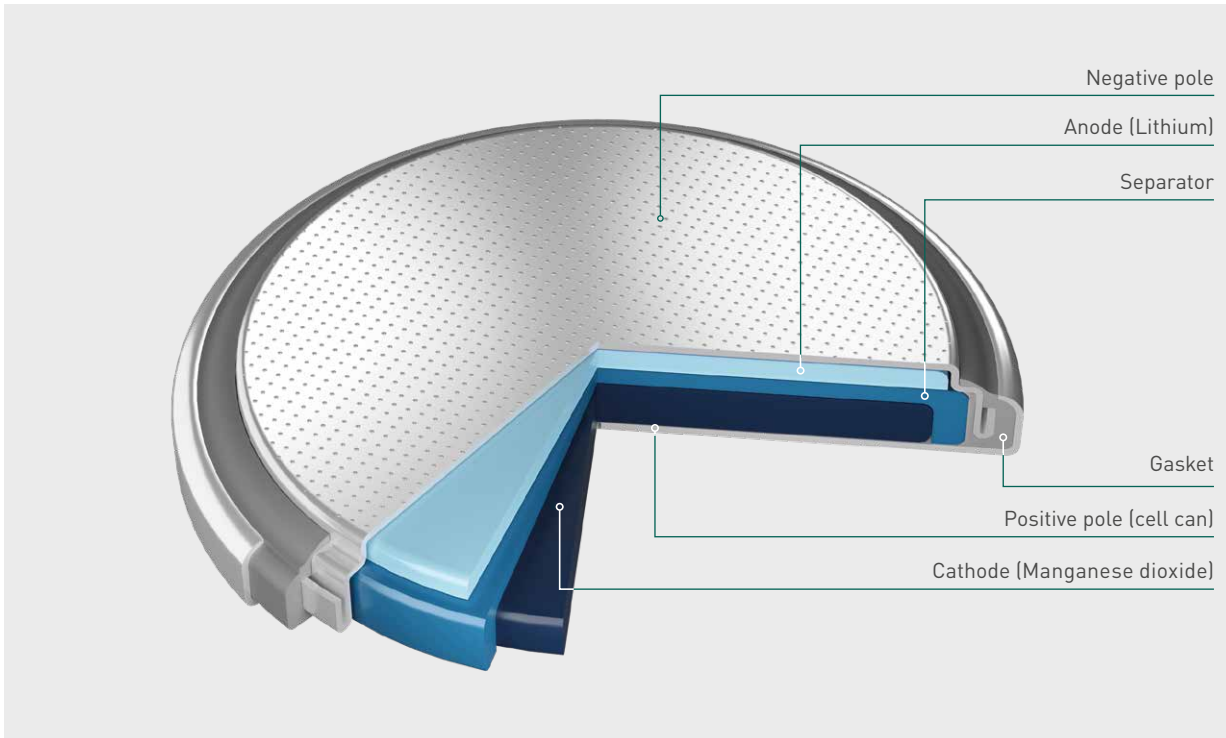
C R 20 32 A(or B)

MODEL NUMBER ^{*1}	Nominal voltage (V)	Nominal ^{*2} capacity (mAh)	Diameter (mm)	Total height (mm)	Weight (g)	Discharging temperature (°C)
CR-2032A ^{*3} 	3	210	20.0	3.2	3.0	-40 to +125
CR-2032B ^{*3} 	3	210	20.0	3.2	3.0	-40 to +120
CR-2050A ^{*3} 	3	345	20.0	5.0	4.1	-40 to +125
CR-2050B2 ^{*3} 	3	345	20.0	5.0	4.1	-40 to +120
CR-2450B ^{*3} 	3	560	24.5	5.0	6.2	-40 to +105

^{*1} Max. operating temperature +120°C for „B” and +125°C for „A” type models (dia 20mm), +105°C for CR-2450B.

^{*2} Based on standard drain and cut off voltage down to 2.0V at 20°C.

^{*3} Cells are supplied with tabs or lead-wires only. For available configurations please consult the Panasonic homepage or your sales contact.



BATTERY INSIDE*1



*1 The illustration shows only one example of Lithium battery structure.

VL, ML, CTL, AND MT (SECONDARY) LITHIUM COIN SERIES (RECHARGEABLE)

These Panasonic rechargeable Lithium coin batteries are designed mainly for memory back-up applications. Their voltage ranges from 1.5V to 3V.

FEATURES

- Rechargeable Lithium technology
- Self-discharge rate at 20°C is only 2.0% per year for VL and ML battery types
- 1,000 charge-discharge cycles for VL and ML at 10% depth of discharge
- Superior long-term reliability
- Years of experience in production

APPLICATIONS



Remote Keyless Entry (RKE)



Computers

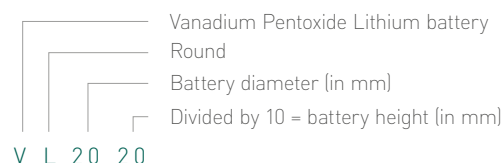


Mobile phones






Watches, etc.


MODEL NUMBER (EXAMPLE)



VL LITHIUM COIN VANADIUM PENTOXIDE SERIES

MODEL NUMBER		Nominal voltage (V)	Nominal ^{*1} capacity (mAh)	Diameter (mm)	Total height (mm)	Weight (g)	Discharging temperature (°C)
VL-1220 ^{*2}		3	7	12.5	2.0	0.8	-20 to +60
VL-2020 ^{*2}		3	20	20.0	2.0	2.1	-20 to +60
VL-2330 ^{*2}		3	50	23.0	3.0	3.5	-20 to +60



ML LITHIUM COIN MANGANESE SERIES

MODEL NUMBER		Nominal voltage (V)	Nominal ^{*3} capacity (mAh)	Diameter (mm)	Total height (mm)	Weight (g)	Discharging temperature (°C)
ML-2020		3	45	20.0	2.0	2.2	-20 to +60




^{*1} Based on standard drain and cut off voltage down to 2.0V at 20°C. State-of-Charge ex-factory: ~70%

^{*2} Cells are supplied with tabs or lead-wires only. For available configurations please consult the Panasonic homepage or your sales contact.

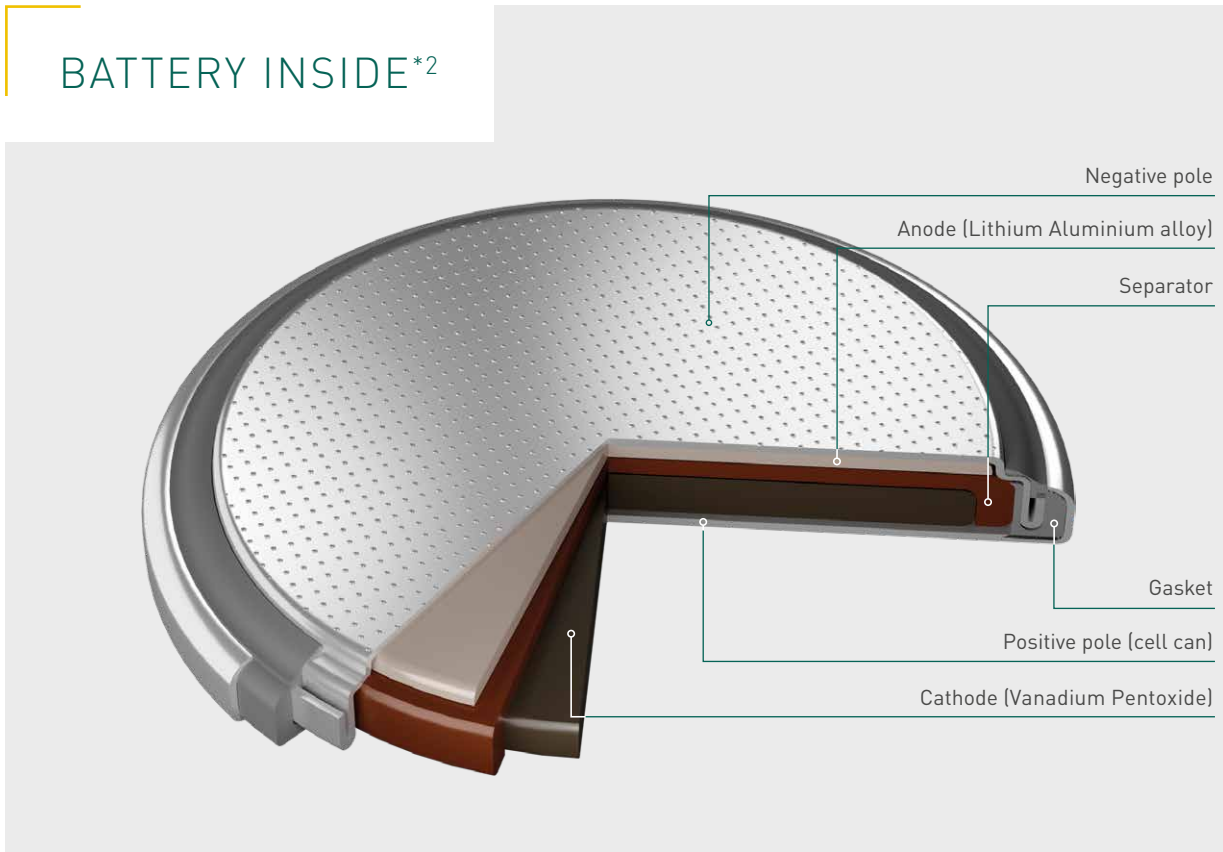
CTL LITHIUM COIN MANGANESE TITANIUM SERIES

MODEL NUMBER		Nominal voltage (V)	Nominal*1 capacity (mAh)	Diameter (mm)	Total height (mm)	Weight (g)	Discharging temperature (°C)
CTL-621F		2.3	3.6	6.8	2.1	0.2	-20 to +60
CTL-920F		2.3	7.7	9.5	2.0	0.4	-20 to +60
CTL-1616F		2.3	13.0	16	1.6	0.1	-20 to +60

MT LITHIUM COIN MANGANESE TITANIUM SERIES

MODEL NUMBER		Nominal voltage (V)	Nominal*1 capacity (mAh)	Diameter (mm)	Total height (mm)	Weight (g)	Discharging temperature (°C)
MT-516		1.5	1.8	5.8	1.6	0.1	-10 to +60
MT-621		1.5	2.5	6.8	2.1	0.2	-10 to +60
MT-920		1.5	5	9.5	2.0	0.4	-10 to +60

BATTERY INSIDE*2



*1 Based on standard drain and cut off voltage down to 0.5V at 20°C. State-of-Charge ex-factory: ~70%.

*2 The illustration shows only one example of Lithium battery structure.

BR PIN-TYPE POLY-CARBONMONOFLUORIDE LITHIUM SERIES

(NON-RECHARGEABLE)

Panasonic offers a unique pin shape and space-saving design to meet the requirements of small-scale applications.

FEATURES

- Superior design for high temperature applications -30°C ~ +80°C
- Outstanding long-term reliability
- Years of experience in production
- Self-discharge rate at 20°C is just 0.5% per year

APPLICATIONS





Various illumination products



Fishing pole tip lights



Toys, etc.

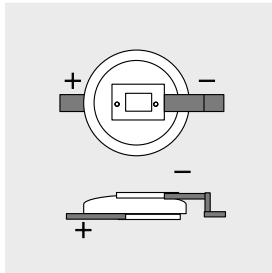
MODEL NUMBER		Nominal voltage (V)	Nominal* capacity (mAh)	Diameter (mm)	Total height (mm)	Weight (g)	Discharging temperature (°C)
BR-425		3	25	4.2	25.9	0.6	-30 to +80
BR-435		3	50	4.2	35.9	0.9	-30 to +80

TERMINAL TYPES

Panasonic offers a broad range of different tabs for our Lithium batteries in order to meet all customer needs. In addition, tailormade solutions are possible as well.

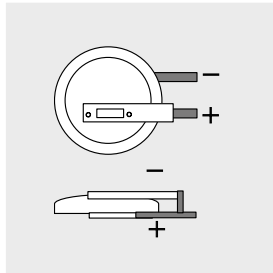
F TYPE

Surface mount
(wide distance)



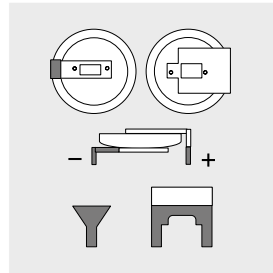
F TYPE

Surface mount
(short distance)



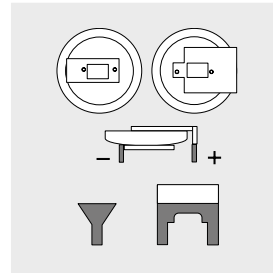
G TYPE - 3 PINS

Through hole horizontal
mount (wide distance)



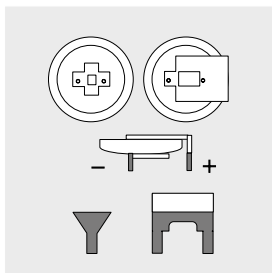
G TYPE - 3 PINS

Through hole horizontal
mount (normal distance)



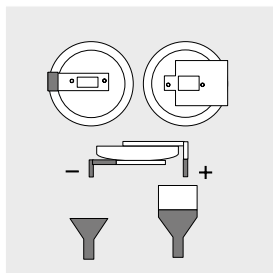
G TYPE - 3 PINS

Through hole horizontal
mount (short distance)



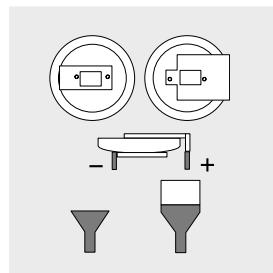
H TYPE - 2 PINS

Through hole horizontal
mount (wide distance)



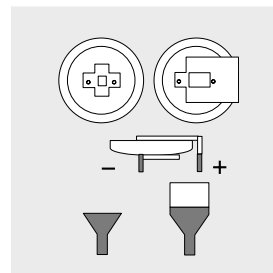
H TYPE - 2 PINS

Through hole horizontal
mount (normal distance)



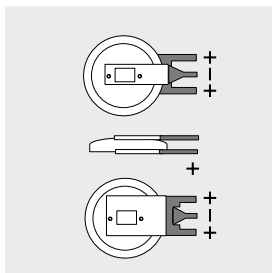
H TYPE - 2 PINS

Through hole horizontal
mount (short distance)



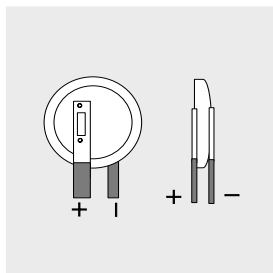
V TYPE - 3 PINS

Through hole vertical
mount



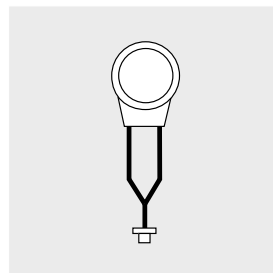
V TYPE - 2 PINS

Through hole vertical
mount



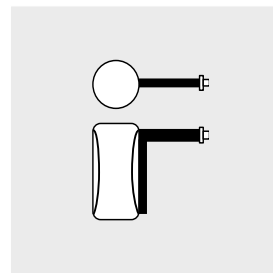
LEAD WIRE TYPE

Coin cell



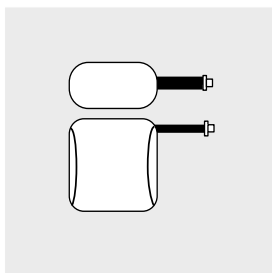
LEAD WIRE TYPE

Single cylindrical cell



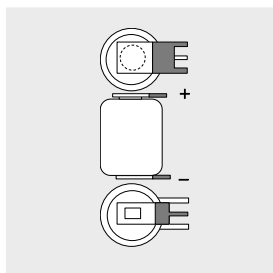
LEAD WIRE TYPE

2 to 6 cells of cylindrical
batteries in parallel or in series



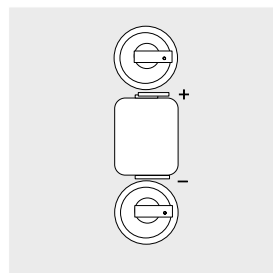
TAB TERMINAL

Cylindrical batteries for
through hole mounting



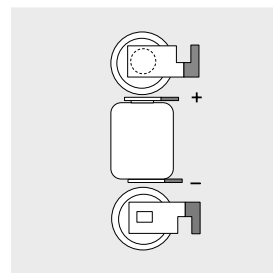
TAB TERMINAL

Cylindrical batteries for
lead wire attaching



TAB TERMINAL

Cylindrical batteries for
hanging on PCB (hook type)





ALKALINE

IDEAL FOR HIGH-PERFORMANCE
STANDARD APPLICATIONS

- | Low self-discharge
- | Decades of mass production experience
- | Superior designed battery ranges
- | Proven reliability



YOUR INFORMATION

Visit our product page and
get detailed information about
Alkaline batteries.

ALKALINE

Panasonic Alkaline batteries are made from the same basic materials as Zinc-Carbon batteries, but deliver generally higher performance and fulfilling the highest quality. These batteries can therefore power high-performance standard applications.

FEATURES

- | Developed for high and medium drain appliances
- | Continuously reliable energy provision
- | Long shelf life
- | Excellent leakage resistance
- | Superior low temperature behavior



Do you want to look inside an Alkaline battery (CT scan)?

APPLICATIONS



Smoke detectors



Marine devices



High energy flashlights



Scales



Cleaning and hygiene services



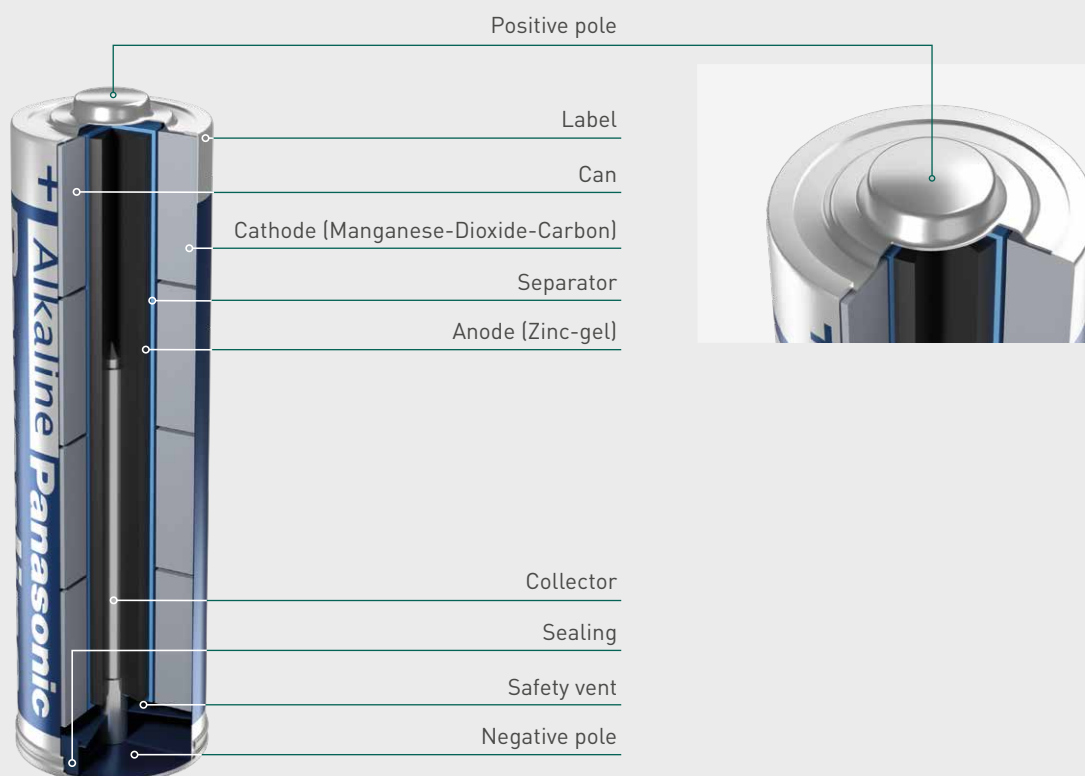
Gas barbecue igniter, etc.



WE POWER YOUR
SAFETY

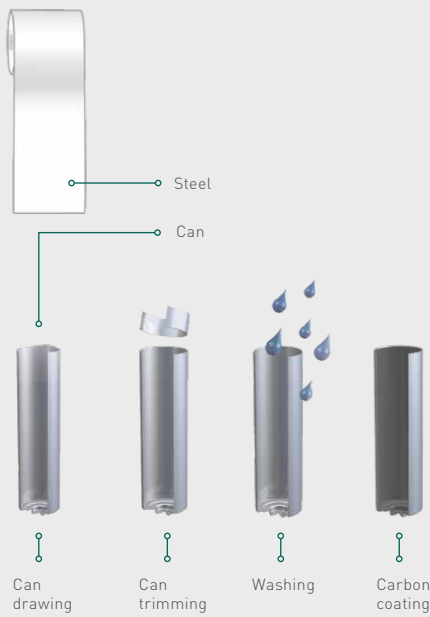
MODEL NUMBER		Size	Nominal voltage (V)	Diameter (mm)	Total height (mm)	Weight (g)	IEC
LR-03AD		AAA	1.5	10.5	44.5	11.4	LR03
LR-6AD		AA	1.5	14.5	50.5	23	LR6
LR-14AD		C	1.5	26.2	50.0	68.5	LR14
LR-20AD		D	1.5	34.2	61.5	141.5	LR20
6LR-61AD		9V	9	26.5 x 17.5	48.5	45.5	6LR61

BATTERY INSIDE*1

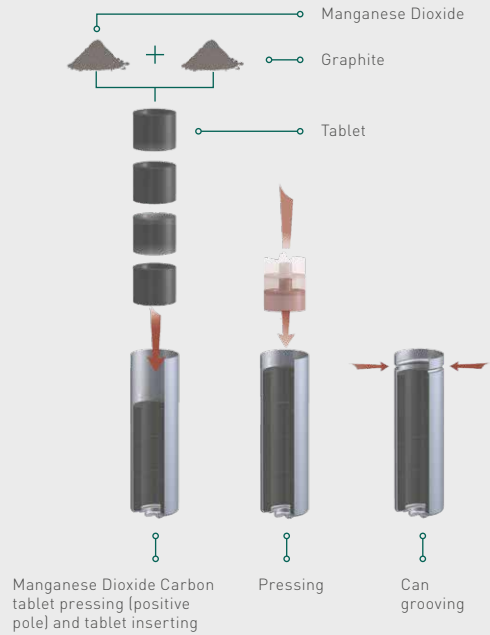


CONSTRUCTION – PRODUCTION PROCESS

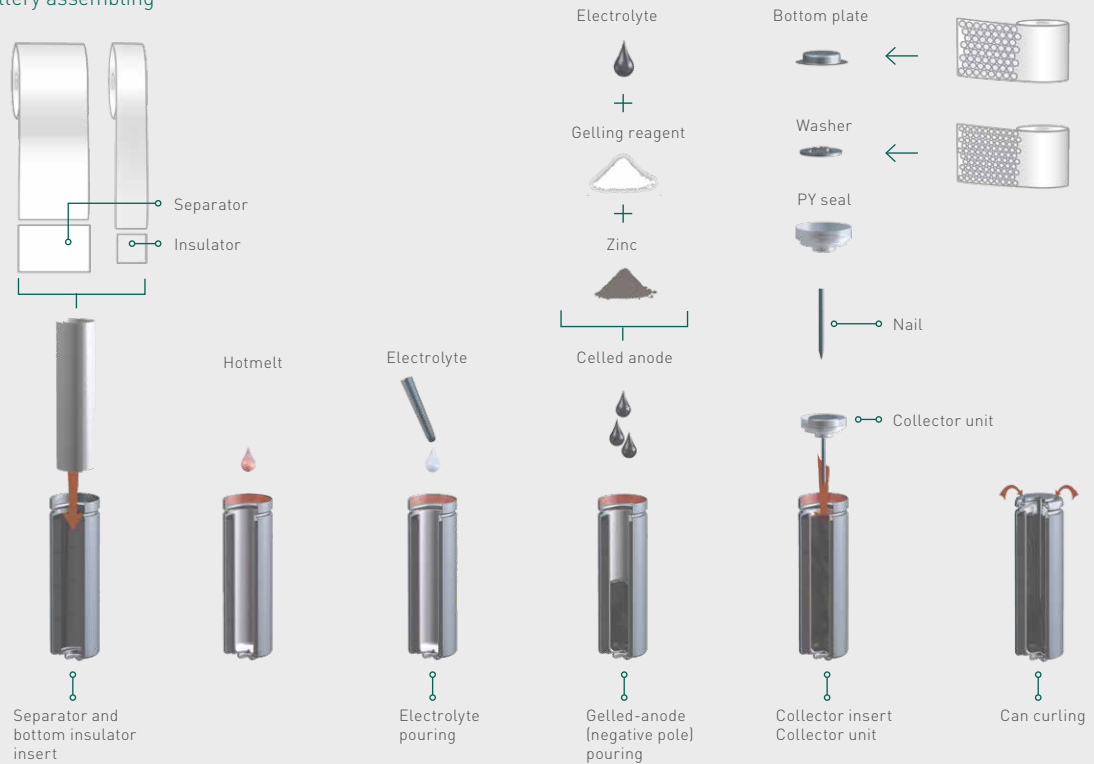
Can production procedure – Steel can production



Cathode unit LR6 – Mixtablets (+) pressing



Assembling LR6 – Battery assembling



FIND

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