

STATE-OF-THE-ART LITHIUM BATTERIES



LOW SELF-DISCHARGE
DECADES OF MASS PRODUCTION EXPERIENCE
SUPERIOR DESIGNED BATTERY RANGES
PROVEN RELIABILITY

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series video.



PRIMARY BR – CR

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 chemistries BR, CR and ER battery technologies are leading the industries. 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.

COMPARISON OF LITHIUM PRIMARY CHEMISTRY*1

| Chemistry | | BR | CR | ER |
|-------------|--|---------------------|---------------------|---------------------|
| Material | Cathode | CF | MnO ₂ | SOCl ₂ |
| | Anode | Lithium metal | Lithium metal | Lithium metal |
| | Electrolyte | Organic electrolyte | Organic electrolyte | Organic electrolyte |
| Performance | Nominal voltage | 3V | 3V | 3.6V |
| | Discharge capacity | + | + | + |
| | 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 |
| Environment | Safety | ++ | ++ | – |
| | Eco friendly | ++ | ++ | –*3 |

++ Very good capability
+ Good capability
– Not good capability



LITHIUM BR 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 just 0.5% per year
- Superior long-term reliability
- Years of experience in production

APPLICATIONS

- Heat cost allocators
- Water & gas meters
- Car alarm
- Smoke detectors
- Tracking & RFID
- Marine devices, etc.

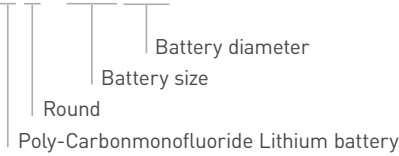
*1 Please contact Panasonic to get more detailed information about this technical comparison overview.

*2 Impedance is increasing due to the passivation phenomena.

*3 Harmful substances included.

MODEL NUMBER (EXAMPLE)

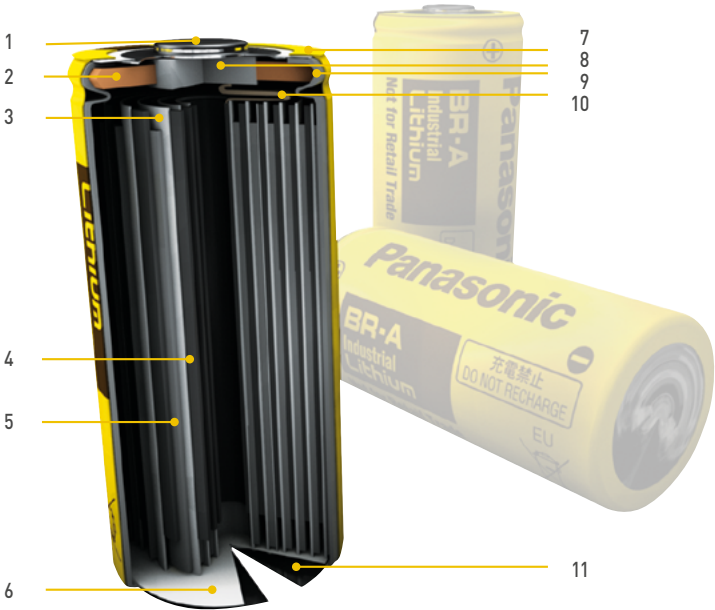
BR - 1 / 2 A A



| Model number | Nominal voltage (V) | Nominal*1 capacity (mAh) | Diameter (mm) | Total height (mm) | Weight (g) | IEC |
|--------------|---------------------|--------------------------|---------------|-------------------|------------|---------|
| BR-1/2AA*2 | 3 | 1,000 | 14.5 | 25.5 | 8.0 | - |
| BR-2/3A | 3 | 1,200 | 17.0 | 33.5 | 13.5 | BR17335 |
| BR-2/3AG | 3 | 1,450 | 17.0 | 33.5 | 13.5 | BR17335 |
| BR-A | 3 | 1,800 | 17.0 | 45.5 | 18.0 | - |
| BR-AG | 3 | 2,200 | 17.0 | 45.5 | 18.0 | - |
| BR-C | 3 | 5,000 | 26.0 | 50.5 | 42.0 | - |

3D ILLUSTRATION*3

- 1 Positive pole
- 2 Gasket
- 3 Separator
- 4 Cathode (Carbonmonofluoride)
- 5 Anode (Lithium)
- 6 Insulator
- 7 Tube
- 8 Positive pole platform
- 9 Cell can
- 10 Collector
- 11 Negative pole



Scan QR code to view 3D animated video.



*1 Capacity based on standard drain and cut off voltage down to 2.0V or 4.0V at 20°C.
*2 Operating temperature range is from -40°C ~ +100°C.
*3 The illustration shows only one example of Lithium battery structure.



LITHIUM CR CYLINDRICAL SERIES FOR CONSUMERS

[NON-RECHARGEABLE]

Panasonic Photo-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 the enlarged electrode surface areas, they permit a current as high as several amperes to be drawn.

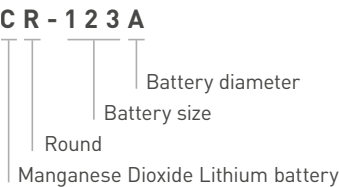
FEATURES

- Operating temperature range: between -40°C ~ +70°C
- Good pulse capability
- Stable voltage level during discharge
- Self-discharge rate at 20°C just 1% per year

APPLICATIONS

- Medical equipment
- Door lock systems
- Marine devices
- Cameras
- High energy flashlights
- Sanitary equipment, etc.

MODEL NUMBER (EXAMPLE)



| Model number | Nominal voltage (V) | Nominal*1 capacity (mAh) | Diameter (mm) | Total height (mm) | Weight (g) | IEC |
|--------------|---------------------|--------------------------|---------------|-------------------|------------|----------|
| CR-2*2 | 3 | 850 | 15.6 | 27.0 | 11.0 | CR15H270 |
| CR-123A*2 | 3 | 1,400 | 17.0 | 34.5 | 17.0 | CR17345 |
| CR-V3*2 | 3 | 3,300 | 28.4 x 14.4 | 52.0 | 39.0 | - |
| 2CR-5*2 | 6 | 1,400 | 34.0 x 17.0 | 45.0 | 38.0 | 2CR5 |
| CR-P2*2 | 6 | 1,400 | 35.0 x 19.5 | 36.0 | 37.0 | CRP2 |

3D ILLUSTRATION*3

- Positive pole
- Vent diaphragm
- Gasket
- Separator
- Anode (Lithium)
- Cathode (Manganese Dioxide)
- Tube
- Insulator
- PTC (Positive Temperature Coefficient Device)
- Collector
- Cell can
- Negative pole



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

*2 In case of usage below 20mA discharge please consult Panasonic.

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



LITHIUM CR CYLINDRICAL SERIES FOR PROFESSIONALS

[NON-RECHARGEABLE]

Ideal for industrial equipment, this series offers both excellent high-rate discharge performance and a long service life of up to ten years.

FEATURES

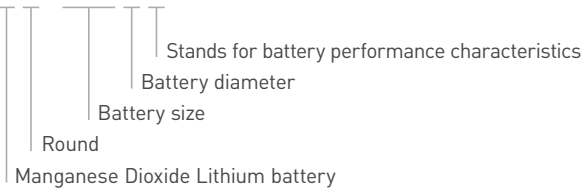
- Stable impedance throughout battery life
- Operating temperature range: between -40°C ~ +70°C
- High discharge characteristics
- Long-term reliability
- Self-discharge rate at 20°C is just 1% per year

APPLICATIONS

- Medical equipment
- E-Call
- Tracking & RFID
- Smoke detectors
- Alarm systems
- Marine devices
- Smart meter, etc.

MODEL NUMBER (EXAMPLE)

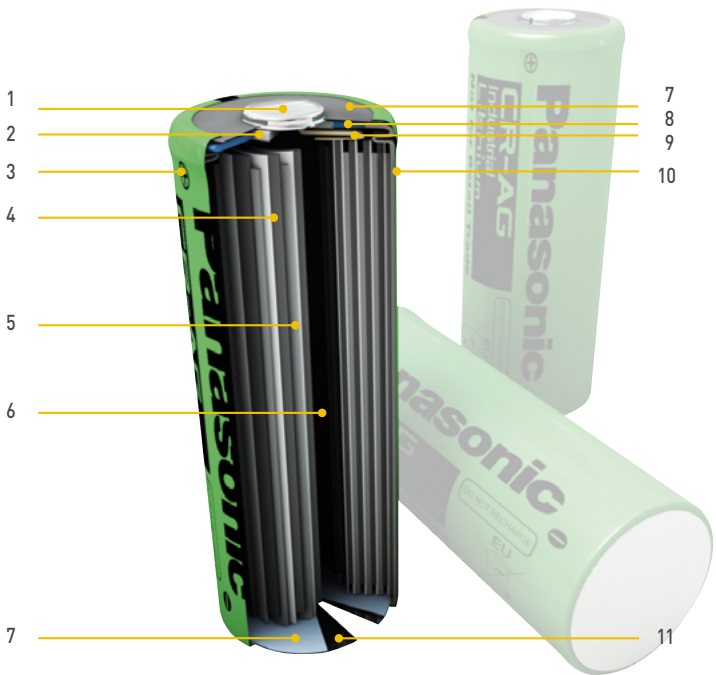
CR - 2 / 3 A Z



| | Model number | Nominal voltage (V) | Nominal*1 capacity (mAh) | Diameter (mm) | Total height (mm) | Weight (g) | IEC |
|-----|--------------|---------------------|--------------------------|---------------|-------------------|------------|-----|
| NEW | CR-2Z | 3 | 1,000 | 15.0 | 27.0 | 11.0 | - |
| | CR-2/3AZ | 3 | 1,600 | 17.0 | 33.5 | 17.0 | - |
| NEW | CR-AAZ | 3 | 1,650 | 14.5 | 50.5 | 18.0 | - |
| | CR-AG | 3 | 2,400 | 17.0 | 45.5 | 24.0 | - |

3D ILLUSTRATION*2

- 1 Positive pole
- 2 Vent diaphragm
- 3 Tube
- 4 Anode (Lithium)
- 5 Separator
- 6 Cathode (Manganese Dioxide)
- 7 Insulator
- 8 PTC (Positive Temperature Coefficient Device)
- 9 Collector
- 10 Cell can
- 11 Negative pole



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

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



LITHIUM BR 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

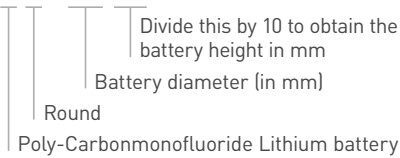
- Self-discharge rate at 20°C is just 1.0% per year
- Wide operating temperature range: between -30°C ~ +80°C
- Superior long-term reliability
- Years of experience in production

APPLICATIONS

- Tracking & RFID
- Memory back-up
- Meters, etc.

MODEL NUMBER (EXAMPLE)

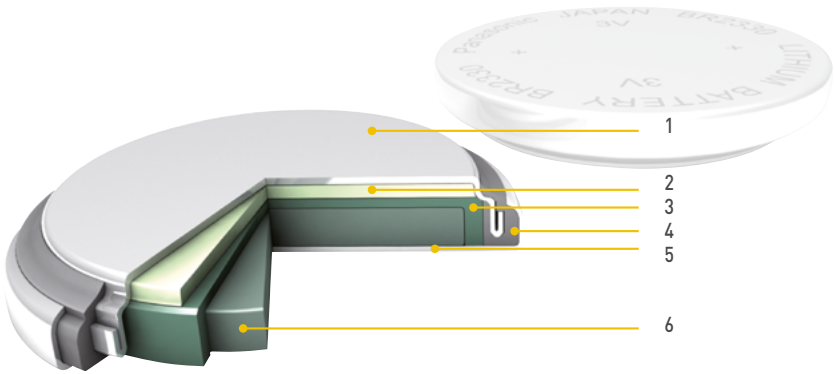
BR - 2 3 3 0



| Model number | Nominal voltage (V) | Nominal*1 capacity (mAh) | Diameter (mm) | Total height (mm) | Weight (g) | IEC |
|--------------|---------------------|--------------------------|---------------|-------------------|------------|--------|
| BR-1220 | 3 | 35 | 12.5 | 2.0 | 0.7 | - |
| BR-1225 | 3 | 48 | 12.5 | 2.5 | 0.8 | BR1225 |
| BR-1632 | 3 | 120 | 16.0 | 3.2 | 1.5 | - |
| BR-2325 | 3 | 165 | 23.0 | 2.5 | 3.0 | BR2325 |
| BR-2032 | 3 | 200 | 20.0 | 3.2 | 2.5 | - |
| BR-2330 | 3 | 255 | 23.0 | 3.0 | 3.2 | - |
| BR-3032 | 3 | 500 | 30.0 | 3.2 | 5.5 | BR3032 |

3D ILLUSTRATION*2

- 1 Negative pole
- 2 Anode (Lithium)
- 3 Separator
- 4 Gasket
- 5 Positive pole (cell can)
- 6 Cathode (Poly-Carbonmonofluoride)



*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.



LITHIUM BR-A SERIES COIN TYPE 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

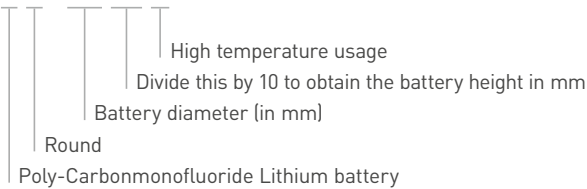
- Superior design for high temperature applications -40°C ~ +125°C
- Outstanding long-term reliability
- Years of experience in production
- Self-discharge rate at 20°C is just 0.5% per year

APPLICATIONS

- Tire Pressure Monitoring Systems (TPMS)
- Electric Toll Collection (ETC)
- Heat cost allocators, etc.

MODEL NUMBER (EXAMPLE)

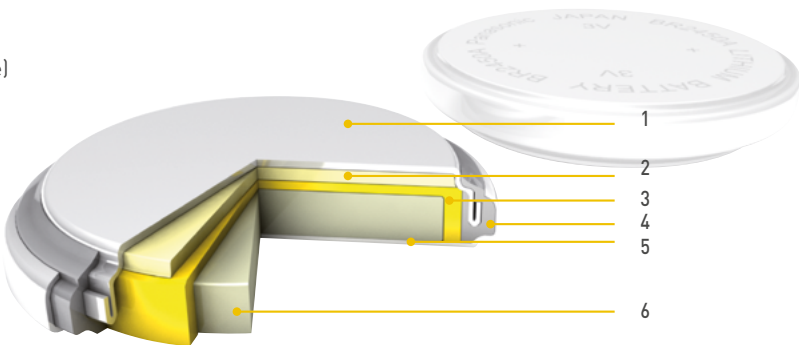
BR - 2 4 7 7 A



| Model number | Nominal voltage (V) | Nominal*1 capacity (mAh) | Diameter (mm) | Total height (mm) | Weight (g) | IEC |
|--------------|---------------------|--------------------------|---------------|-------------------|------------|-----|
| BR-1225A*2 | 3 | 48 | 12.5 | 2.5 | 0.8 | - |
| BR-1632A*2 | 3 | 120 | 16.0 | 3.2 | 1.5 | - |
| BR-2330A*2 | 3 | 255 | 23.0 | 3.0 | 3.2 | - |
| BR-2450A*2 | 3 | 550 | 24.5 | 5.0 | 5.9 | - |
| BR-2477A*2 | 3 | 1,000 | 24.5 | 7.7 | 8.0 | - |

3D ILLUSTRATION*3

- 1 Negative pole
- 2 Anode (Lithium)
- 3 Separator
- 4 Gasket
- 5 Positive pole (cell can)
- 6 Cathode (Poly-Carbonmonofluoride)



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

*2 Only batteries with terminals are available.

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



PIN TYPE POLY-CARBONMONOFLUORIDE LITHIUM (BR 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

- LED-type night fishing floats
- Various illumination products
- Fishing pole tip lights
- Toys, etc.

| Model number | Nominal voltage (V) | Nominal*1 capacity (mAh) | Diameter (mm) | Total height (mm) | Weight (g) | IEC |
|--------------|---------------------|--------------------------|---------------|-------------------|------------|-----|
| BR-425 | 3 | 25 | 4.2 | 25.9 | 0.6 | - |
| BR-435 | 3 | 50 | 4.2 | 35.9 | 0.9 | - |



LITHIUM CR 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
- High discharge characteristics
- Stable voltage level during discharge
- Long-term reliability
- Self-discharge rate at 20°C is just 1.0% per year
- Temperature range -30°C ~ +60°C

APPLICATIONS

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

MODEL NUMBER (EXAMPLE)

CR - 2032

| | | | | |
|----|---|---|---|--|
| CR | 2 | 0 | 3 | 2 |
| | | | | Divide this by 10 to obtain the battery height in mm |
| | | | | Battery diameter (in mm) |
| | | | | Round |
| | | | | Manganese Dioxide Lithium battery |

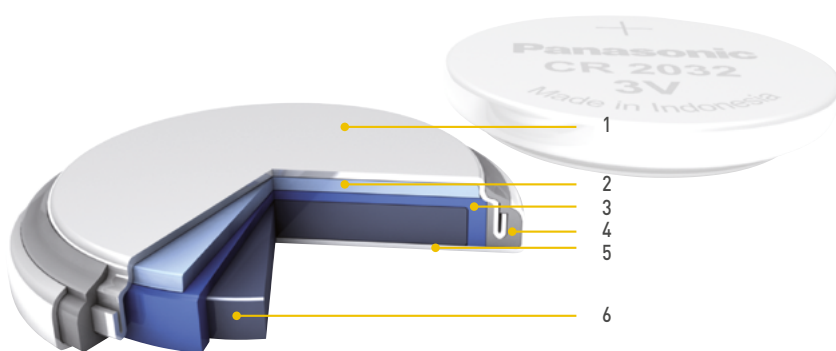
| Model number | Nominal voltage (V) | Nominal*1 capacity (mAh) | Diameter (mm) | Total height (mm) | Weight (g) | IEC |
|--------------|---------------------|--------------------------|---------------|-------------------|------------|--------|
| CR-1025 | 3 | 30 | 10.0 | 2.5 | 0.7 | CR1025 |
| CR-1216 | 3 | 25 | 12.5 | 1.6 | 0.7 | CR1216 |
| CR-1220 | 3 | 35 | 12.5 | 2.0 | 1.2 | CR1220 |
| CR-1612 | 3 | 40 | 16.0 | 1.2 | 0.8 | - |
| CR-1616 | 3 | 55 | 16.0 | 1.6 | 1.2 | CR1616 |
| CR-1620 | 3 | 75 | 16.0 | 2.0 | 1.3 | CR1620 |
| CR-1632 | 3 | 140 | 16.0 | 3.2 | 1.8 | - |
| CR-2012 | 3 | 55 | 20.0 | 1.2 | 1.4 | CR2012 |

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

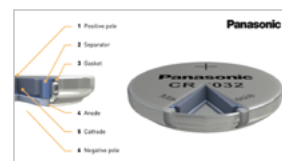
| Model number | Nominal voltage (V) | Nominal* ¹ capacity (mAh) | Diameter (mm) | Total height (mm) | Weight (g) | IEC |
|--------------|---------------------|--------------------------------------|---------------|-------------------|------------|--------|
| CR-2016 | 3 | 90 | 20.0 | 1.6 | 1.6 | CR2016 |
| CR-2025 | 3 | 165 | 20.0 | 2.5 | 2.5 | CR2025 |
| CR-2032 | 3 | 220 | 20.0 | 3.2 | 3.1 | CR2032 |
| CR-2330 | 3 | 265 | 23.0 | 3.0 | 4.0 | CR2330 |
| CR-2354 | 3 | 560 | 23.0 | 5.4 | 5.9 | CR2354 |
| CR-2412 | 3 | 100 | 24.5 | 1.2 | 2.0 | - |
| CR-2450 | 3 | 620 | 24.5 | 5.0 | 6.3 | CR2450 |
| CR-2477 | 3 | 1,000 | 24.5 | 7.7 | 10.5 | - |
| CR-3032 | 3 | 500 | 30.0 | 3.2 | 7.1 | CR3032 |

3D ILLUSTRATION*²

- 1 Negative pole
- 2 Anode (Lithium)
- 3 Separator
- 4 Gasket
- 5 Positive pole (cell can)
- 6 Cathode (Manganese Dioxide)



Scan QR code to view 3D animated video.



LITHIUM VL, ML, MT COIN SERIES (RECHARGEABLE)

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

FEATURES

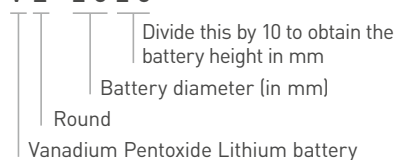
- Rechargeable Lithium technology
- Self-discharge rate at 20°C is only 2.0% per year for VL and ML battery types
- 1,000 charge-discharge cycles for VL and ML at 10% depth of discharge
- Superior long-term reliability
- Years of experience in production

APPLICATIONS

- Computers
- Remote Keyless Entry (RKE)
- Fax machines
- Mobile phones
- Watches, etc.

MODEL NUMBER (EXAMPLE)

VL - 2020



*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.

VANADIUM PENTOXIDE LITHIUM (VL SERIES)

| Model number | Nominal voltage (V) | Nominal* ¹ capacity (mAh) | Diameter (mm) | Total height (mm) | Weight (g) | IEC |
|--------------|---------------------|--------------------------------------|---------------|-------------------|------------|-----|
| VL-621 | 3 | 1.5 | 6.8 | 2.1 | 0.3 | - |
| VL-1220 | 3 | 7.0 | 12.5 | 2.0 | 0.8 | - |
| VL-2020 | 3 | 20.0 | 20.0 | 2.0 | 2.2 | - |
| VL-2320 | 3 | 30.0 | 23.0 | 2.0 | 2.7 | - |
| VL-2330 | 3 | 50.0 | 23.0 | 3.0 | 3.5 | - |
| VL-3032 | 3 | 100.0 | 30.0 | 3.2 | 6.2 | - |

MANGANESE LITHIUM (ML SERIES)

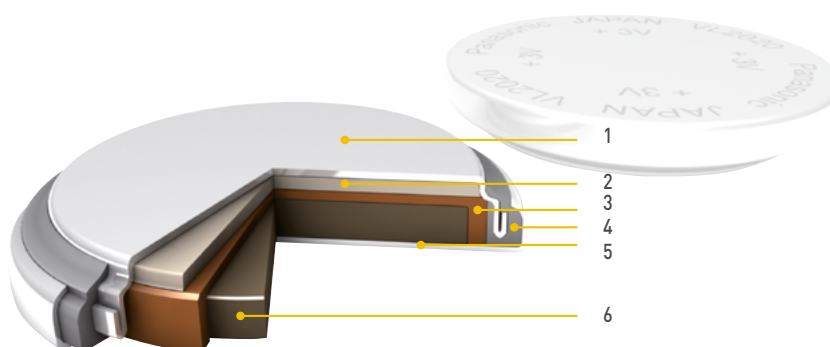
| Model number | Nominal voltage (V) | Nominal* ² capacity (mAh) | Diameter (mm) | Total height (mm) | Weight (g) | IEC |
|--------------|---------------------|--------------------------------------|---------------|-------------------|------------|-----|
| ML-421 | 3 | 2.3 | 4.8 | 2.1 | 0.1 | - |
| ML-614 | 3 | 3.4 | 6.8 | 1.4 | 0.2 | - |
| ML-621 | 3 | 5.0 | 6.8 | 2.1 | 0.2 | - |
| ML-920 | 3 | 11.0 | 9.5 | 2.0 | 0.4 | - |
| ML-1220 | 3 | 17.0 | 12.5 | 2.0 | 0.8 | - |
| ML-2020 | 3 | 45.0 | 20.0 | 2.0 | 2.2 | - |

MANGANESE TITANIUM LITHIUM (MT SERIES)

| Model number | Nominal voltage (V) | Nominal* ³ capacity (mAh) | Diameter (mm) | Total height (mm) | Weight (g) | IEC |
|--------------|---------------------|--------------------------------------|---------------|-------------------|------------|-----|
| MT-516 | 1.5 | 1.8 | 5.8 | 1.6 | 0.2 | - |
| MT-621 | 1.5 | 2.5 | 6.8 | 2.1 | 0.3 | - |
| MT-920 | 1.5 | 5.0 | 9.5 | 2.0 | 0.5 | - |

3D ILLUSTRATION*⁴

- 1 Negative pole
- 2 Anode (Lithium Aluminium alloy)
- 3 Separator
- 4 Gasket
- 5 Positive pole (cell can)
- 6 Cathode (Vanadium Pentoxide)



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

*² Based on standard drain and cut off voltage down to 1.0V at 20°C.

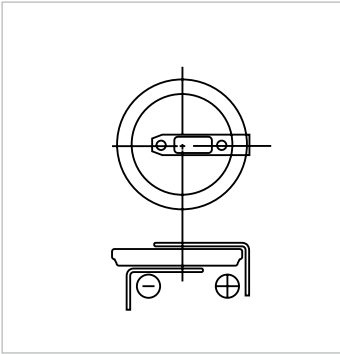
*³ Based on standard drain and cut off voltage down to 0.5V at 20°C.

*⁴ The illustration shows only one example of Lithium battery structure.

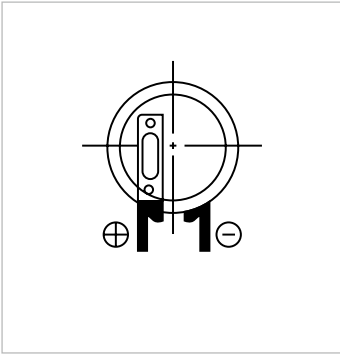
TERMINAL TYPES

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.

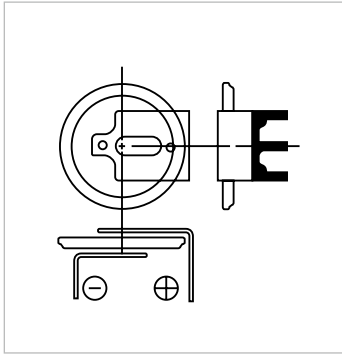
H TYPE



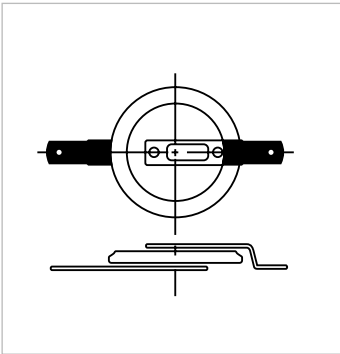
V TYPE



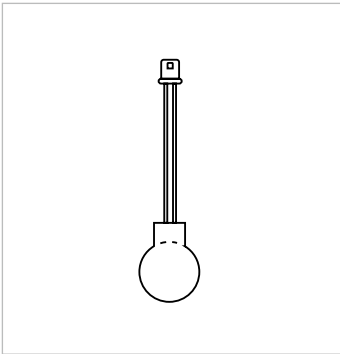
G TYPE



F TYPE



S TYPE



BR-1/2A WITH AXIAL PIN TERMINAL

