Panasonic ENERGY
Energy that changes the future.

Ideal for Smart Meters for Gas and Water
Introduction to Lithium Primary Batteries

1. Social Background of Smart Meters for Gas and Water

In recent years, smart meters, which can remotely transmit gas and water usage data from households, commercial facilities, and factories, have become increasingly popular. By using smart meters, remote automatic meter readings can be performed without face-to-face or contact, which not only improves the work efficiency of meter readers at gas and water companies, but also enables the creation of new services such as real-time visualization of gas and water usage to gas and water users.

In addition, joint meter readings have been launched, in which the usage data from gas and water smart meters are integrated into electric power smart meters and transmitted to energy companies. The environment surrounding smart meters continues to evolve.

Fig.1 Image of Smart Meters for Gas and Water

2. New Value Provided by Smart Meters

Smart meters not only bring benefits to gas and water companies and users, but also provide new value to social infrastructure as a whole. For example, real-time monitoring of gas and water usage through smart meters can improve the efficiency of infrastructure operations by making it possible to adjust and control supply levels appropriately in response to changes in usage. Moreover, by analyzing a large amount of data collected from smart meters, it is possible to detect early deterioration of gas and water pipes and to quickly detect gas and water leaks in the event of natural disasters. This can lead to more efficient maintenance and shorter recovery times in the event of a gas or water leak.

3. Power Issues in Smart Meters

Although smart meters have many advantages, securing a stable power source is extremely important to maximize their value. Gas and water meters are usually located far from electrical outlets. However, not many households have outdoor outlets. Therefore, by incorporating a battery inside the meter, it is possible to secure a stable and long-lasting power source for data collection and communication.

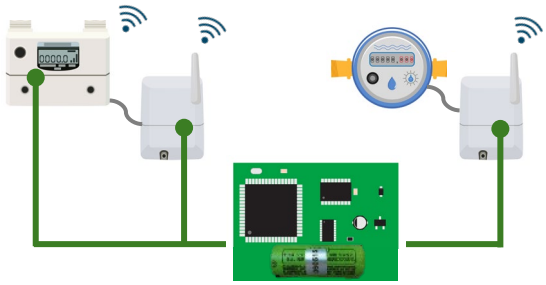

Fig.2 Image of battery mounted on smart meter and external radio

In addition, data transmission and reception via wireless communication is becoming common with the latest smart meters. In order to collect more detailed data, it is necessary to increase the amount of data and communication distance, which also increases power consumption. Therefore, a large capacity of the battery inside the meter is also required, but since there is not always enough space to accommodate a large battery inside the meter, a small battery with a large capacity is indispensable.

Furthermore, in order to continue functioning as a device that supports social infrastructure, including in times of disaster, it is required to have excellent operating characteristics and high reliability that will never stop operating even in harsh environments such as cold regions.

4. Panasonic Energy Smart Meter Batteries

Our company offers a range of products in various sizes and capacities, so you can choose the most suitable battery for your purpose, including not only the smart meter itself but also the external wireless unit. Some water meters measure the flow rate by applying a magnetic field, such as an electromagnetic type, but we also offer products that use stainless steel in the battery casing so that the battery material does not affect meter measurement.

Table 1 our company Products for Smart Gas and Water Meters

Model	CR-AG	CR-AGZ	CR-LAZ	CR-LAS
Capacity	2400mAh	2700mAh	3000mAh	3500mAh
Diameter	17.0mm		17.0mm	17.5mm
Height	45.5mm		50.5mm	50.0mm
Temp Range	-40~85°C			
Can Material/ Sealing	Fe/ Crimping			SUS/ Laser
Product Link	Link	Link	Link	Link

Generally, CR cylindrical batteries (lithium manganese dioxide primary batteries) or ER cylindrical batteries (lithium thionyl chloride primary batteries) are used for gas and water smart meters. The advantage of CR cylindrical batteries is that since the operating voltage is lower than that of ER cylindrical batteries, the input voltage of the smart meter drive IC can be kept low, which is expected to save power.

There is also a difference between the two in terms of long-term discharge characteristics (Figure. 3). Since the operating voltage of ER cylindrical batteries remains constant and then drops suddenly at the end of discharge, it is difficult to know the remaining battery level.

On the other hand, since the operating voltage of CR cylindrical batteries gradually drops toward the end of discharge, it is possible to predict the remaining battery level by monitoring the operating voltage. This makes it possible to predict the timing of battery replacement to a certain extent, thereby improving the efficiency of maintenance and maintenance of smart meters.

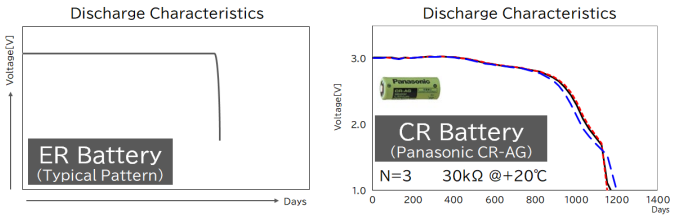

Fig.3 Discharge characteristics of ER and CR batteries

5. Supply in battery pack form

On request, it is possible to provide a battery pack consisting of multiple single cell batteries. We can also consult with you about customizing connectors and lead wires.

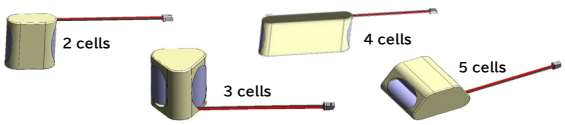

Fig.4 Battery packs with leadwire

6. Long-Life Characteristics Based on Panasonic's Unique Technology

Through product development utilizing our company's proprietary technology, we have realized long-life batteries that can withstand expected applications of more than 20 years. For example, when used for a long period of time, the resistance of ordinary CR cylindrical batteries increases due to internal chemical reactions. As a result, the discharge characteristics deteriorate, which may adversely affect the operation of the equipment (Figure. 5).

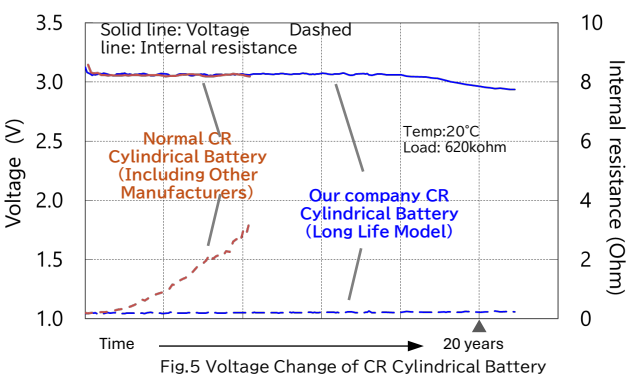

Fig.5 Voltage Change of CR Cylindrical Battery

On the other hand, it has been confirmed based on data used to date that our company's CR cylindrical batteries can maintain stable characteristics without increasing resistance even when used for a long period of more than 20 years.

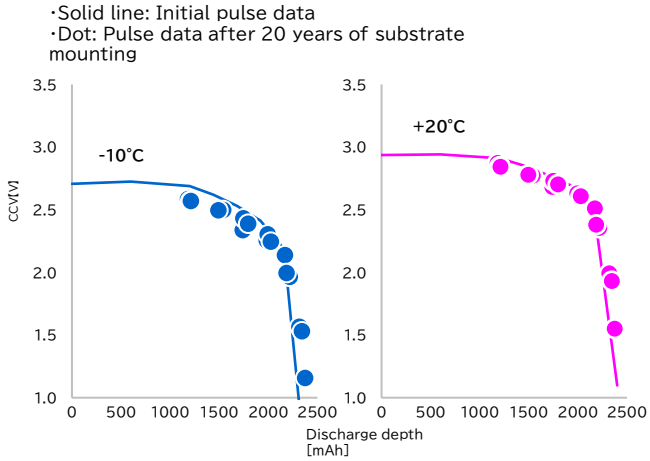

Fig.6 Pulse data after 20 years of substrate mounting (300 mA, 1sec)

Figure 6 shows the discharge characteristics of the batteries mounted on the substrate of an actual gas meter, and after 20 years of storage in a warehouse, compared with those at the start of storage.

As can be seen from this figure, unlike normal CR cylindrical batteries, our company batteries do not show any significant difference in the discharge characteristics curve from the start of storage even after 20 years. This indicates that our company batteries do not deteriorate significantly even after long-term use.

7. Stable global supply chain

With multiple plants and sales offices not only in Japan but also overseas, Panasonic Energy is able to deliver the products it needs through an efficient and stable global supply chain and to communicate with customers in detail locally.

Panasonic Energy will contribute to the realization of a sustainable society in which affluent lifestyles and the environment are in harmony, by focusing on dry batteries that support convenient and comfortable daily living, social infrastructure in a wide range of fields, and batteries that support EV and other automotive industries.

■ If you have any questions about this document, please contact the following:

☆ Link to Contact Page (Americas Region)

The contents of this document are current as of February 2025.

The values shown are not guaranteed. Also, products specifications may be revised without notice.

■ List of CR Long Life Type Part Numbers

Link to the Part Number List Page