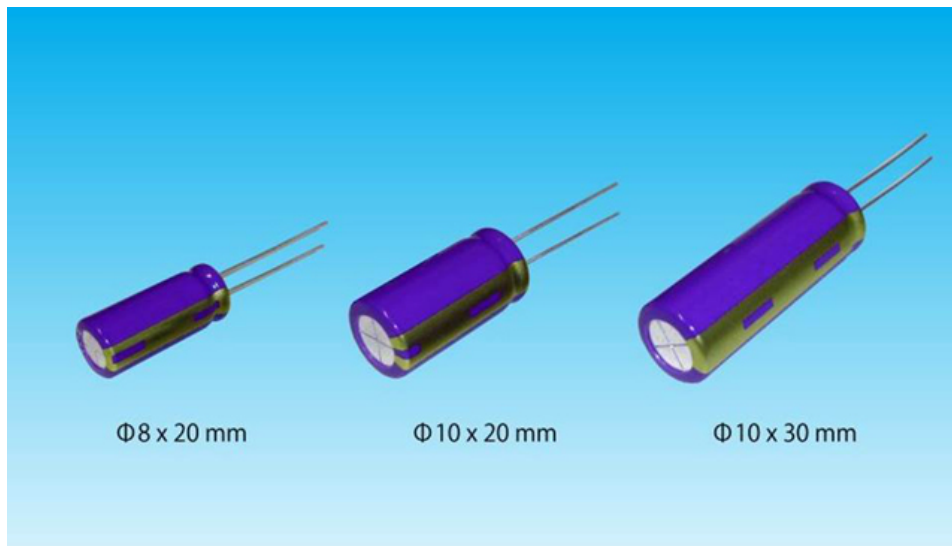


Nov 30, 2016

## Panasonic Commercializes Industry's First 2000-hour Guaranteed Electric Double Layer Capacitor as a Radial Lead Type



**HL series electric double layer capacitors**

**(November 2016, Panasonic)**

Panasonic's new HL series electric double layer capacitor is suitable for the backup power supply circuit used in industrial equipment and automobiles.

**Osaka, Japan** - Panasonic Corporation announced today that it has commercialized its HL series [electric double layer capacitor\[1\]](#) with the industry's first\*1 2000-hour operation life guarantee as a [radial lead type\[2\]](#). The new capacitor is suitable for the backup power supply circuit of industrial equipment requiring long operation life, such as storage equipment and smart meters, and automobile backup power supply circuits. Mass-production is scheduled to start in January 2017.

With the expansion of IoT and smart grid, demand for a backup power supply is on the rise for such things on the network as smart meters and storage equipment to allow them communicate or store data instantly when a power failure occurs. Industrial backup devices used in such equipment require long operation life without replacement and the capability of instantly supplying high-current output. These devices also require strength to endure outdoor installation in severe environments as well as compact-sizing and lightweight design of the power supply circuit. Panasonic has developed unique electrolyte, which permits the new electric double layer capacitor to not only achieve the industry's first\*1 2000-hour-long guaranteed operation life as a radial lead type, but to supply large-capacity current in a low-temperature environment of -40°C.

## Panasonic's new electric double layer capacitor has the following features:

1. Industry's first\*1 2000-hour-long guaranteed operation life without requiring replacement
  - Life: 2000-hour guarantee. Panasonic's conventional models\*2 offer a 1000-hour guarantee
2. Reduced [internal resistance](#)[3] enables instant discharge of large current
  - Internal resistance (1 kHz): 10~70 mΩ max.  
[Panasonic's conventional models\*2: 100~300 mΩ max.]
3. Achievement of low-temperature guarantee down to -40°C, permitting outdoor installation in severe environments as well as automotive applications
  - Temperature guarantee: -40~70°C (65°C\*3)  
[Panasonic's conventional models\*2: -25~70°C (60°C\*3)]

### Notes:

\*1: Panasonic data as of November 30, 2016 as a radial lead type electric double-layer capacitor

\*2: Panasonic's conventional models: Electric double layer capacitors (HZ series, HW series)

\*3: Upper-limit temperature of models with dimensions (diameter x height) of 18 mm x 50 mm; 18 mm x 70 mm

### Suitable applications:

Backup power supply for industrial equipment such as servers, storage equipment (SSD), smart meters; drive assisting power supply for motor, and actuators; backup power supply for a variety of automotive systems (emergency brakes, door lock release, etc.); auxiliary power supply circuit for solar cells

### [Panasonic Technology]

#### 1. Long operation life without requiring replacement provided by the industry's first 2000-hour guarantee

Electric double layer capacitors used in the backup power supply of industrial equipment are required to operate for a long period of time. In a backup power supply for automotive emergency brakes, door lock release system, etc., a compact and lightweight design is required in addition to long operation life. Panasonic's proprietary development of an electrolyte allowed it to reduce the deterioration of characteristics such as capacitance and internal resistance; consequently, the company was able to achieve the industry's first 2000-hour guarantee with radial lead type electric double layer capacitor. This enables the designer of a power supply circuit to use fewer capacitors at the time of the initial design.

#### 2. Reduced internal resistance allows instant discharge of large current

Backup applications of industrial equipment require instant discharge of large current. Previous capacitors had difficulty in rapid discharge of large current due to the high internal resistance because of the high conductivity of the electrolyte. With the development of the unique electrolyte with improved conductivity, internal resistance has been reduced and flowing current has been increased even by using non-[acetonitrile-based \(AN\) electrolyte](#)[4] to the level comparable to or more than those using acetonitrile-based (AN) electrolyte for supplying the rapid charging and discharging required by industrial and automotive applications.

#### 3. Achievement of low-temperature guarantee down to -40°C, allowing outdoor installation in severe environments as well as automotive applications

An increasing amount of industrial equipment is used in severe-temperature environments. Smart meters, in particular, are expected to operate outdoors in cold-weather environments, and the capacitors used in a backup power supply are required to operate in the same low temperature. In general, the conductivity of an electrolyte is reduced in low temperatures and internal resistance increases accordingly to deterioration characteristics, thus the low temperature guarantee of the company's conventional radial lead type electric double layer capacitor was limited to -25°C. However, this new HL series product has achieved a guaranteed operating temperature of -40°C through the development of this new

electrolyte, and it can satisfy the [ANSI standards\[5\]](#) of the United States. Therefore, this product is suitable for equipment installed outdoors such as smart meters as well as automotive applications in cold weather.

## [Basic Specifications]

Size (diameter $\Phi$ × height)	8 × 20 mm 10 × 20 mm 10 × 30 mm 18 × 50 mm 18 × 70 mm
Endurance	70°C (65°C) 2000 hours
Category temperature range	-40~70°C: Diameter 8 × 20 mm; Diameter 10 × 20 mm; Diameter 10 × 30 mm -40~65°C: Diameter 18 × 50 mm; Diameter 18 × 70 mm
Maximum operating voltage	2.7 V. DC
Capacitance	2.5~100F
Internal resistance (ESR)	10~70 m $\Omega$ (1 kHz/20°C)

## [Term Descriptions]

[1] Electric double layer capacitor

Electric double layer capacitors (EDLC) function by using the electric double layer formed at the boundary of the solid (electrode) and liquid (electrolyte). Activated carbon used as electrode material provides very large surface area and produces very large capacitance compared with an aluminum electrolytic capacitor or a tantalum capacitor.

[2] Radial lead type

A structure consisting of a separator sandwiched by two aluminum foils coated with activated carbon and wound up in a roll

[3] Internal resistance

Internal resistance refers to ESR (Equivalent Series Resistance), indicating the resistance component of the capacitor in an equivalent circuit. The smaller this value is, the higher output (rapid charging/discharging) performance capacitor can deliver during backup.

[4] Acetonitrile-based (AN type) electrolyte

Acetonitrile-based electrolyte has low-volatile temperature, and thus the operating temperature environment is limited. Because it has a very low flash point of around 10°C, and possible generation of very toxic cyanogen gas during burning, consideration for safety is required when designing a product using the component. On the other hand, it has superior characteristics of low internal resistance.

[5] ANSI standards

American National Standard Institute industrial standards determined by the standardizing organization of the United States.

## About Panasonic

Panasonic Corporation is a worldwide leader in the development of diverse electronics technologies and solutions for customers in the consumer electronics, housing, automotive, enterprise solutions and device industries. Since its founding in 1918, the company has expanded globally and now operates 474 subsidiaries and 94 associated companies worldwide, recording consolidated net sales of 7.553 trillion yen for the year ended March 31, 2016. Committed to pursuing new value through innovation across divisional lines, the company uses its technologies to create a better life and a better world for its customers. To learn more about Panasonic:

<http://www.panasonic.com/global>.

### Media Contact:

#### Public Relations Department

Panasonic Corporation

Tel: +81-(0)3-3574-5664 Fax: +81-(0)3-3574-5699

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