

## Precaution Statement

### 1. Precautions in use

- ① Please do not use the capacitor under the environment, which exceeds the rated performance range.
  - a) High temperature (over operating temperature)
  - b) Over voltage (over rated voltage)
  - c) Application of reverse or alternate voltage
  
- ② The outer sleeve and resin plate of the EDLC does not assure electrical insulation.
  
- ③ EDLC has finite and regulated life.
  
- ④ Please do not use or store EDLC under the following environment;
  - a) Environment where the capacitor could be exposed to water, salt water or oil, or the environment which is filled with gaseous oil or salt.
  - b) Environment which is filled with toxic gases such as hydrogen sulfide, sulfurous acid, chlorine, ammonia, bromine, or methyl bromide.
  - c) Environment where the capacitor could be exposed to acidic or alkaline solvent.
  - d) Environment where the capacitor could be exposed to direct sunlight, ozone, ultraviolet rays or radiation.
  - e) Environment under extreme vibration or mechanical impact.
  
- ⑤ Please note the followings when designing;
  - a) Please assemble the module with cell terminals upward.  
Do not mount EDLC with terminals facing downward or sideways as the electrolyte inside the EDLC may block pressure relief vent and cause it to open, electrolyte to leak, and shorten lifetime.
  - b) Please keep the sealing plate facing upward whenever handling EDLC.  
Facing it downward even for a brief time may shorten lifetime.
  - c) Please provide enough clearance space over the pressure relief vent.
  - d) Please do not locate any wire or circuit pattern over the pressure relief vent or between the anode and cathode terminal of EDLC.
  - e) Please avoid locating any heat source components near EDLC.
  - f) To assure insulation voltage, please provide adequate space among EDLC case, cathode terminal, anode terminal, circuit pattern and chassis.
  - g) Please note that electrical properties of EDLC may change according to the changes in temperature and frequency of EDLC.
  - h) When the temperature between EDLC cells in a same system differs largely, it may amplify the slight characteristic difference of each cell, and may cause the system to malfunction in the end.  
Please make sure to design the system with an adequate heat radiation to avoid variation in temperature among the cells.
  - i) When heat increase is expected due to charging and discharging of EDLC, please conduct a load test to confirm there is no abnormal heat rise, and the temperature stays within the EDLC's specified temperature range.
  - j) Please assure appropriate current balance when connecting two or more EDLC in parallel.
  - k) Please assure appropriate voltage balance when connecting two or more EDLC in series.
  - l) In case of use outside of specification, such as overvoltage and/or above specified temperature range, the electrolyte fume from inside may be expelled through releasing valve. Please take that in consideration at the time of system design.
  - m) Please establish safety design such as stopping charge/discharge in case of abnormal temperature and voltage. Applying voltage that exceeds rated voltage frequently may cause the devices to smoke or burn.  
Please design the system with fail-safe functions.
  - n) As EDLC has internal resistance, the internal heat generated by charge-discharge affects its life.  
Please choose the products with low resistance and make sure to avoid overheat of the capacitor.
  - o) Due to capacitor's internal resistance, there is a voltage drop (also referred to as "IR drop") at the beginning of charge-discharge. Please consider this voltage drop in your circuit design.

- ⑥ When a capacitor is fully charged, short-circuiting the output terminals could cause the electric current to flow as high as a few hundred amperes. Please do not install or uninstall a module when it is charged.
- ⑦ Please do not drop EDLC. Do not use it once it is dropped.
- ⑧ Please make sure of the polarity when assembling EDLC into a module.
- ⑨ Please follow the specification of the screw tightening torque.
- ⑩ Please do not deform EDLC when assembling it into a module.
- ⑪ Voltage of EDLC changes in proportion to the stored energy.  
If stable output voltage is required, circuit system such as converter needs to be added.
- ⑫ When using EDLC for industrial application, following periodical check is recommended.  
Please disconnect power from the device and fully discharge EDLC before conducting periodical check.
  - a) Appearance: Significant damage in appearance including deformation, liquid leakage, discolor, dust between the terminals and stain
  - b) Electrical characteristics: Characteristics prescribed in the catalog or product specifications.
- ⑬ Please stop the whole system when EDLC generates excessive heat or a foul smell.  
In case of excessive heat, do not get close to the part in order to avoid injury.
- ⑭ Please stop the system immediately and ventilate the area sufficiently when the safety vent on EDLC operates and releases a gas from inside.  
Never expose your face or your hand as hot gas may expel.  
If the gas is inhaled or hits eyes, please wash your eyes, gargle, and consult with a doctor immediately.  
Do not lick the electrolyte of EDLC. Wash away the electrolyte from the skin with soap and water.
- ⑮ EDLC may have been spontaneously recharged with time by a recovery voltage phenomenon.  
Discharge EDLC as necessary especially before connecting multiple EDLCs in series.
- ⑯ Please discharge EDLC before assembling or removing. There is a risk of large current flow and electrical shock when short circuiting the terminal with residual voltage.  
Note that EDLC may be self-charged while being left open-circuit even after fully discharged.
- ⑰ Do not wash EDLC.
- ⑱ Do not use any adhesive or coating materials containing halogenated solvents.

## 2. Precautions in transportation

- ① When exporting EDLC, fumigation process may be required for export in some countries.  
Please note that some types of fumigation process which uses halogenated ions may cause corrosion on EDLC materials.
- ② Due to the Export Trade Control Ordinance, the documents obtained to the exporter concerning that export trade, with information that the product is being used for developing mass destruction weapons, the exporter will have to apply and hand in the export permission from the Ministry of Industrial Trade and Industry.
- ③ During transportation of EDLC. Please make sure to place its terminal upward to avoid electrolyte leakage.
- ④ Transport operations of EDLC has been changed in line with the revision of  
"The Recommendations on the Transport of Dangerous Goods" adopted by the United Nations in December 2010.



# ELECTRIC DOUBLE LAYER CAPACITOR

Please confirm the latest information of the followings as well as laws of each country.

- United Nations (UN) Recommendations on the Transport of Dangerous Goods-Model Regulations.
- International Civil Aviation Organization (ICAO) Technical Instructions for the Safe Transport of Dangerous Goods by Air.
- International Air Transport Association (IATA) Dangerous Goods Regulations.
- International Maritime Organization (IMO) IMDG (International Maritime Dangerous Goods) -code.

### 3. Precautions in storage

① Please store EDLC at temperature between 5°C~35°C and humidity less than 75% .

Please avoid an environment with drastic temperature change which could damage the product.

② If EDLC have been stored for long periods of time, it may appear to have high leakage current.

Voltage treatment is recommended when EDLC is stored for more than six months.

For voltage treatment, please charge at 5A up to the rated voltage, and then keep applying rated voltage for about 20 hours.

### 4. Precautions in disposal

Please discharge the electricity to safety voltage before disposal.

Please follow the laws or regulations at the place of disposal.

Please drill or crash the part before incineration.

Please refer to the following report before using EDLC.

Japan Electronics and Information Technology Industries Association, JEITA RCR-2370C

"Safety Application Guide for electric double layer capacitors (Guideline of notes for electric double layer capacitors)"

Japan Electronics and Information Technology Industries Association

"Guidelines of the transport of fixed electric double-layer capacitors for use in electric and electronic equipment"