Precaution Statement

The circuits described as examples in this catalog and the "delivery specifications" are featured in order to show the operations and usage of our products, however, this fact does not guarantee that the circuits are available to function in your equipment systems.
We are not in any case responsible for any failures or damage caused by the use of information contained herein.
You should examine our products, of which the characteristics are described in the "delivery specifications" and other documents, and determine whether or not our products suit your requirements according to the specifications of your equipment systems. Therefore, you bear final responsibility regarding the use of our products.
Please make sure that you take appropriate safety measures such as use of redundant design and malfunction prevention measures in order to prevent fatal accidents and/or fires in the event any of our products malfunction.

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 Supercapacitor does not assure electrical insulation.

③ Supercapacitor has finite and regulated life.

④ Please do not use or store Supercapacitor 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) Supercapacitor screw terminal When using cells and modules, be sure to install the terminal with the terminal facing upward except for horizontal productshorizontal product.
Do not mount Supercapacitor with terminals facing downward or sideways as the electrolyte inside the Supercapacitor may block pressure relief vent and cause it to open, electrolyte to leak, and shorten lifetime.
Please set the valve is on the upper side when used horizontally.

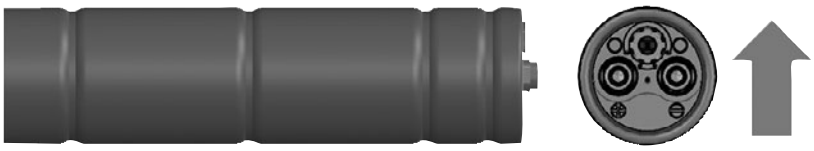

Figure. Installation of horizontal products

b) Please keep the sealing plate facing upward whenever handling Supercapacitor.
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 Supercapacitor.
e) Please avoid locating any heat source components near Supercapacitor.
f) To assure insulation voltage, please provide adequate space among Supercapacitor case, cathode terminal, anode terminal, circuit pattern and chassis.
g) Please note that electrical properties of Supercapacitor may change according to the changes in temperature and frequency of Supercapacitor.
h) When the temperature between Supercapacitor 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 Supercapacitor, please conduct a load test to confirm there is no abnormal heat rise, and the temperateture stays within the Supercapacitor's specified temperature range.

j)Please assure appropriate current balance when connecting two or more Supercapacitor in parallel.
k)Please assure appropriate voltage balance when connecting two or more Supercapacitor 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 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 Supercapacitor 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 Supercapacitor. Do not use it once it is dropped.

⑧ Please make sure of the polarity when assembling Supercapacitor into a module.

⑨ When assembling Supercapacitor into a circuit, position it so that the case and the circuit electronic components do not come in contact with each other.

⑩ Please follow the specification of the screw tightening torque.

⑪ Please do not deform Supercapacitor when assembling it into a module.

⑫ Voltage of Supercapacitor changes in proportion to the stored energy.
If stable output voltage is required, circuit system such as converter needs to be added.

⑬ When using Supercapacitor for industrial application, following periodical check is recommended.
Please disconnect power from the device and fully discharge Supercapacitor 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.

⑭ Please stop the whole system when Supercapacitor generates excessive heat or a foul smell.
In case of excessive heat, do not get close to the part in order to avoid injury.

⑮ Please stop the system immediately and ventilate the area sufficiently when the pressure relief vent on Supercapacitor 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 Supercapacitor. Wash away the electrolyte from the skin with soap and water.

⑯ Supercapacitor may have been spontaneously recharged with time by a recovery voltage phenomenon.
Discharge Supercapacitor as necessary especially before connecting multiple Supercapacitors in series.

⑰ Please discharge Supercapacitor 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 Supercapacitor may be self-charged while being left open-circuit even after fully discharged.

⑱ Do not wash Supercapacitor.

⑲ Do not use any adhesive or coating materials containing halogenated solvents.
Additional notes about products with lead terminals
a)Align the distance between the capacitor terminals with the distance between the printed wiring board holes. (If the distances differ, use a lead forming processed product.)
b)Provide clearance space specified below at the section over the capacitor pressure relief vent.
φ 8 (6.3) to φ 16 2 mm or more
φ 18 to φ 22: 2.5 mm or more
c)Ensure that no wire or circuit patterns are placed over the capacitor pressure relief vent.
If the capacitor pressure valve is attached to the printed wiring board side, create an air release hole for the pressure relief vent taking the location of the pressure valve into consideration.

d)Provide clearance space specified below at the section over the rubber on the capacitor lead terminal side.
(Do not attach the capacitor directly to the board. Provide space in between them.)
φ 8 (6.3) to φ 18 2 mm or more
φ 20 to φ 22: 3 mm or more

e)Do not wire a circuit pattern below the sealing section of the capacitor. If a circuit pattern needs to be wired near the capacitor, reserve 1 mm or more (ideally 2 mm) between them.

f)Avoid attaching any heat source components near the capacitor or on the back (under the capacitor) of the printed wiring board.

g)When attaching a capacitor on a tow-sided printed wiring board, design it so that any unnecessary board holes or through holes for interfacial connection do not come under the capacitor.

h)When attaching a capacitor on a tow-sided printed wiring board, design it so that wire or circuit patterns do not come in contact with the assembled sections of the capacitor.

i)To assure insulation voltage, provide adequate space between the capacitor case, cathode terminal, anode terminal, circuit pattern, and chassis when designing.

2. Precautions in transportation

①When exporting Supercapacitor, 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 Supercapacitor materials.

②Due 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.

③During transportation of Supercapacitor. Please make sure to place its terminal upward to avoid electrolyte leakage both vertical and horizontal products.

④Transport operations of Supercapacitor 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.
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

①Please store Supercapacitor at temperature between 5℃～35℃ and humidity less than 75%.
Please avoid an environment with drastic temperature change which could damage the product.

②Long term storage may cause an increase of leakage current, decrease of capacitance, increase of internal resistance, etc..
Before using the part after a long term storage over 6 months, please charge it with a current of 5mA per Farad, up to the rated voltage,then keep the voltage for around 20 hours.
Please then measure the electric characteristics to ensure the part still has the desired performance.

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 Supercapacitor.

Japan Electronics and Information Technology Industries Association, JEITA RCR-2370B
"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”（Japanese only）