6. SERIES CAPACITOR CONNECTION
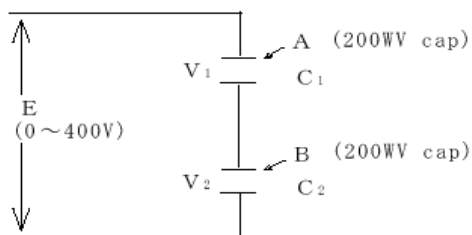

Fig. 6.1

C$_1$:   Capacitance of Capacitor A
C$_2$:   Capacitance of Capacitor B
V$_1$:   Terminal voltage of Capacitor A
V$_2$:   Terminal voltage of Capacitor B
E: Voltage of Power Supply

When two capacitors are connected in series, voltage at terminals of each capacitor on charging is applied in reverse proportion to the capacitance of each capacitor as shown below.

$$V_1 = E \times \frac{C_2}{C_1 + C_2} \qquad \text{------- 6.1}$$

$$V_2 = E \times \frac{C_1}{C_1 + C_2} \qquad \text{------- 6.2}$$

$$E = V_1 + V_2 \qquad \text{------- 6.3}$$

This means that voltage applied to either capacitor may be over the rated capacitor to cause safety vent operation if capacitance values of them are much different.

After the completion of charging, terminal voltage on each capacitor varies with the level of leakage current. Then over voltage may be applied to the terminals on either capacitor if another capacitor has high leakage current, which possibly causes safety vent operation.

To prevent difference in terminal voltage values, it is useful to put Voltage Distribution Resistors as shown in Fig. 6.2 and to select two capacitors with little difference in capacitance. We recommend to use the capacitors in same production lot.

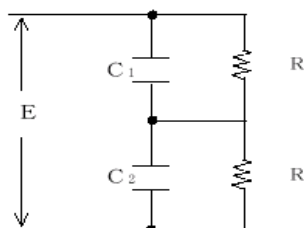Follow the formula 6.4 to use Voltage Distribution Resistors.

Fig. 6.2

$$R = \frac{WV}{I} \text{ x 2 (k}\Omega\text{)} \qquad \text{--------- 6.4}$$

WV :   Rated voltage (V)
I   :   Leakage current (mA)
          [Specified value after 5 minutes application of rated voltage]