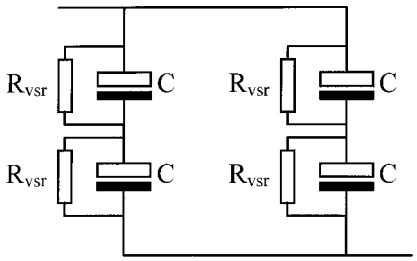
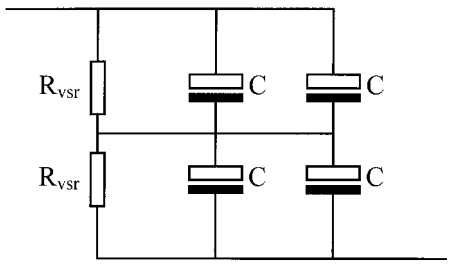
To obtain correct voltage sharing between the capacitors, it is a good idea to use voltage sharing resistors. The voltage sharing resistor is calculated:

$$R_{vsr} = \frac{1000}{0.015 \times C\,[\mu F]}\ [k\Omega]$$

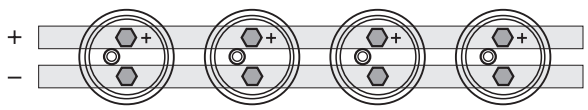
Example: C = 4700 µF
R_{vsr} = 14 kΩ

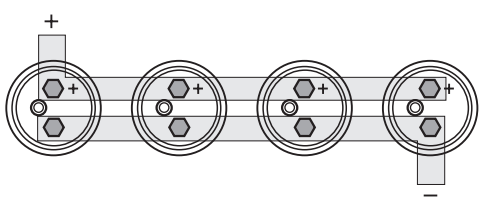
It is important to have a high quality resistor. If the resistor fails, the capacitors will break down. For high reliability the generated power in the resistor should be less than 50% of the rated value. The tolerances of the two resistors should be better or equal to ±5%. Don't forget the time constant τ, it takes some time before the voltage is shared.
There are two ways to connect the voltage sharing resistor.



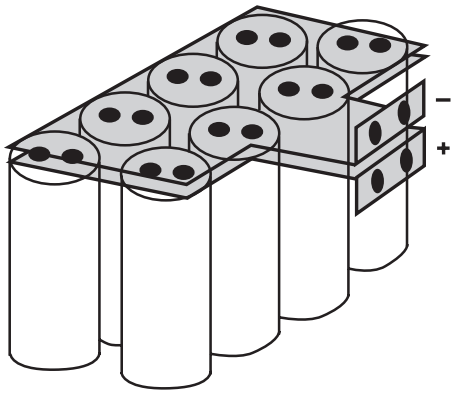


In high current applications it may be necessary to use a parallel connection. Be sure the current distribution is equal in all capacitor branches. At high frequencies, inductances can give different current distribution, as in the first illustration. In the second illustration, the distribution is equal to all capacitors.





Low inductance bus bars can be built to reduce the inductance, down to less than a nH.
In principle the negative side must cover the positive side.



5 Calculate operational life time

To calculate the operational life time (L_{OP}) you have to know the applied voltage ($U_{applied}$), the current through the capacitor (I_{RMS}), ambient temperature (T_a) and thermal resistance (R_{th}).

$P_{LOSS} = I_{RMS}^2 \times ESR$

$T_h = T_a + P_{LOSS} \times R_{th}$

$L_{OP} = f(T_h)$

ESR and R_{th}-matrix is available on request. Please contact Evox Rifa sales representative.

First find the ESR value for the right frequency and hot-spot temperature (T_h) in the ESR matrix. Calculate the power loss (P_{LOSS}). If the current consists of main frequency and different harmonics, calculate the power loss for each harmonic and add up. The thermal resistance between the winding hot spot and the ambient will be found in the R_{th} matrix. Calculate T_h and check if it agrees with the assumption when the ESR was chosen. If not take the new ESR value and make a new calculation. If T_h is known it is easy to calculate L_{OP}.

$$L_{OP} = Ax2^{\frac{85 - T_h}{C}}$$

Values for parameter A and C, is given in our catalogue.

The ESR value for electrolytic capacitors depends on the temperature and frequency. Often a value at 20°C and 100 Hz is given.

With the ESR matrix it is possible to calculate the value at other temperatures and frequencies.