

# Application & Technical Support

## AC-Power capacitors



### WHY AC POWER CAPACITORS?

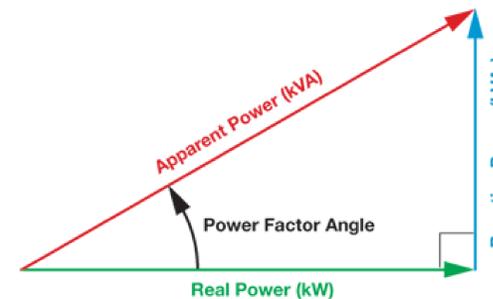
- Capacitors for AC applications, by *producing reactive power*
  - compensate for the reactive power consumption of electrical motors, transformers, etc. leading to *more stable power* with increased transmission capacity and reduced losses thanks to higher power factors
  - constitute a key component in the various *filter solutions* that *reduce harmonic content*. A non-distorted sinusoidal voltage without harmonics reduces the risk of problems in the form of disturbances in production equipment, metering errors and malfunctions in relay protection. It also extends the service life of connected equipment

### MAIN APPLICATIONS

- AC Power capacitors are used in a *wide range of applications*
  - inverters and converters
  - motor control / drives
  - motor run
  - renewable energy (Wind, solar, ...)
  - traction
  - UPS
  - battery chargers
  - elevators
  - ...

### FUNCTIONALITY

- AC Power capacitors are used in *power supply circuits* where noise suppression, voltage regulation and line current reduction is required
  - these applications typically expose the capacitor to higher order harmonics
- AC capacitors are also used in *power factor correction circuits* where they supply leading reactive power to correct the lagging current caused by inductive loads
  - the circuit is said to be running at unity power factor if the capacitive reactance of the applied capacitors exactly matches the inductive reactance of the load
- AC capacitors are also used to provide the necessary starting torque to split phase motors by introducing a phase shift on a secondary motor winding
  - motor-run* capacitors also provide the necessary power factor correction during the run stage for a more energy efficient motor operation

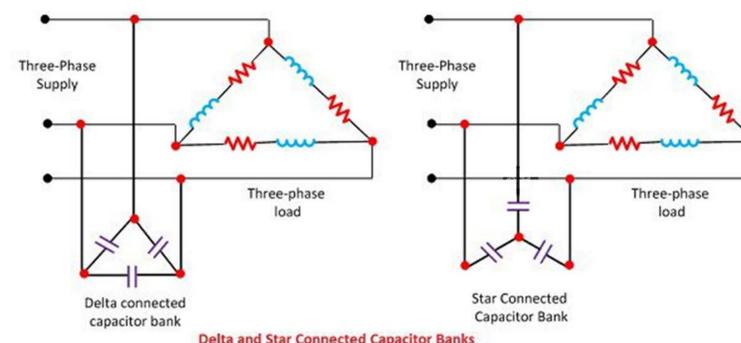


### MATERIALS AND CHARACTERISTICS

- Most AC Power plastic film capacitors are designed with *polypropylene metallized film* material
  - low-loss dielectric* material, suitable for designing capacitors for use in both low and high pulse applications
- The properties of a film capacitor are significantly dependent on the construction technology used, but a good capacitor for AC application shall have:
  - low equivalent series resistance (ESR)
  - low self-inductance
  - high Irms and Urms ratings
  - excellent mechanical stability
  - high reliability with low/under control failure rate
  - excellent self-healing capability
- The above variables are defined for a specific frequency and temperature range

### INPUT AC FILTERING

- Surge or high pulse stresses, voltage fluctuations and other line disturbances are typical for *Input AC filtering* application
- Specific attention must be paid for the choice of the capacitors to be used
  - the choice of the right capacitor is fundamental to avoid critical operating conditions and consequent possible failures
  - if required by law, certified interference suppression capacitors must be chosen



### ICEL PRODUCTS – AC POWER

- Boxed – PINS execution*
  - MHBA** – Input/output AC and DC filtering. Suitable for high Irms switching applications. High frequency, high current
  - THZ** – High performance and high reliability AC power, *harsh environment* (high temperature and high humidity level)
  - MHBM** – high current, high energy density, suitable for AC applications and high Irms switching applications upon restrictions (*NO input filtering*)
  - MAB** – AC-Motor run, MABA01 and MABA02 *EN60252-1 IMQ approved*, all types *UL810 construction only approved* (execution upon request)
- Boxed – LUGS execution*
  - MHBA** – Input/output AC and DC filtering. Suitable for high Irms switching applications. High frequency, high current
  - MHBM** – high current, high energy density, suitable for AC applications and high Irms switching applications upon restrictions (*NO input filtering*)

★recommended



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