

ARCO ELECTRIC PRODUCTS

2325 E. MICHIGAN ROAD

SHELBYVILLE, IN 46176

HCMC SERIES FIXED PFC CAPACITORS



HARMONIC DISTORTION

Harmonic distortion is the resulting non-sinusoidal current waveform generated by a non-linear load. The most common non-linear load is a pulse rectifier which is used in most switch mode power supplies (solid state variable speed AC and DC drives and uninterruptible power supplies). The distorted current waveform generates a distorted source voltage due to the electrical power system impedance. A distorted waveform can be analyzed by decomposing it into a fundamental component (line frequency) and higher frequency components of varying amplitude. The effects of harmonic distortion on metallized film capacitors used in the construction of the power factor correction equipment are (1) higher operating temperature because of higher I²R losses and (2) higher voltage stress on the dielectric fluid in the capacitor cells. Both of these factors will shorten the life of the power factor correction capacitor cells if they are not protected by tuning filter reactors.

DESCRIPTION

General

- The HCMC Series capacitor design is used in applications where the total harmonic distortion levels within the plant or facility are at a level which is detrimental to the operational life of the power factor correction equipment. The HCMC capacitor units incorporate tuning filter reactors along with high quality three phase cells which are vacuum-impregnated metallized polypropylene filled and hermetically sealed in a rugged steel welded case. This series of power factor correction capacitors is suitable for low voltage linear applications

Construction

- The three phase cells which are used in the construction of the power factor banks are drawn steel rectangular cans which are vacuum-impregnated with a dielectric fluid to give added insulation,

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excellent corona protection, and a moisture barrier. The single and multiple assembly capacitor cell design units come with a manufactured 16 gauge steel weatherproof cover, and they have provision for floor, wall, or ceiling mounting pedestals. The single cell units come equipped with main lug connection, and the multiple assembly units incorporate a copper buss arrangement with a main lug connection.

Capacitor Cell Design

- The dielectric fluid used in the capacitor cells is a green Non-PCB, non-toxic, biodegradable, and Class III combustible fluid.
- Self-healing technology in case of overload, the self-healing properties of the low loss metallized polypropylene will prevent permanent dielectric breakdown.
- Internal Pressure-Sensitive Interrupter which safely removes the capacitor from service at the end-of-life or under heavy fault conditions while still maintaining the integrity of the steel casing.
- Internal resistors discharge voltage is less than 50 volts in less than 1 minute after the cell has electrically been removed from the circuit.

Capacitor Losses

- The capacitor design has a total loss which is less than .5 Watts per kVAR at 60 HZ 25 degrees C.

Tuning Filter Reactors

- The tuning filter inductors which are tuned to the 4.7th level are designed for harmonic filtering and U. L. component recognized. Construction consists of copper wire wound on steel cores, and the tuning filter inductors are rated for three phase operation. They are also designed and rated for 150% of the normal 50 HZ capacitor current (1.44 amperes per kVAR at 480 VAC/50HZ). Design maximum temperature rise for the tuning filter inductors is 115 degrees Celsius.
- The core is made of laminated grain oriented electrical steel (Grade M6 or better). The brackets are ASTM structural steel or structural aluminum. The coils are wedged in place and core locked in place using vertical ties or rods.
- The windings are copper wire (MW35C – round) (MW36C -rectangular) or copper foil. Terminations consist of tin plated copper alloy ring lugs, U. L. recognized terminal blocks, or solid copper bus. The terminations are pressure crimped or TIG welded to the windings. Sheet insulation is DuPont Nomex 410 of thickness as required for U.L. insulation systems.
- The tunings filter inductors are double impregnated (vacuum/pressure impregnated and baked by varnish dip and bake). The insulation system is rated Class H (180 degrees Celsius) at 600 VAC. The inductors are Hi-Pot tested (2500 VAC – 50 HZ for 1 minute) line-to-line and line-to-ground.
- The tuning filter inductors are air gapped to avoid saturation. The inductance is measured under full load and within (+/-) 5% of design value. Inductor losses in watts per unit are no greater than those listed in U.L. file #E116124.

Electrical Characteristics

- 240 VAC, 480 VAC, 600 VAC rated Voltage at 60 HZ
- The three phase capacitor internal connection is Delta.

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- Capacitance Tolerance is + or – 15%.
- Overcurrent Tolerance is 135% of rated current continuously.
- Overvoltage Tolerance is 110% of rated voltage
- Standard Operating Temperature is -40 F to +115 F. Operation above 115 F will shorten the capacitor life.

Wiring Cable Insulation

- All internal conductors are insulated stranded copper wire rated at 90 C.

Fuse Protection & Indicator Lights (Optional – Add Suffix Letter “L” to Catalog Number)

- The internal protection fuses are time-delay and rated at 600 VAC with the sizing based upon the nominal amperage rating of the kVAR size in accordance with the National Electric Code requirements.

WARRANTY

- **5-YEAR WARRANTY** on the capacitor cells
- **For single phase applications change Prefix Number from 3 to 1 on the Catalog Number.**
- **For 208 VAC applications divide kVAR size by .75 to find equivalent in 240 VAC rated size.**

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SIZES AVAILABLE

kVAR	240 VAC	480 VAC	600 VAC
	Catalog Number	Catalog Number	Catalog Number
25	324025HCMC	348025HCMC	360025HCMC
30	324030HCMC	348030HCMC	360030HCMC
50	324050HCMC	348050HCMC	360050HCMC
60	324060HCMC	348060HCMC	360060HCMC
75	324075HCMC	348075HCMC	360075HCMC
90	324090HCMC	348090HCMC	360090HCMC
100	3240100HCMC	3480100HCMC	3600100HCMC
120	3240120HCMC	3480120HCMC	3600120HCMC
125	3240125HCMC	3480125HCMC	3600125HCMC
150	3240150HCMC	3480150HCMC	3600150HCMC
200	3240200HCMC	3480200HCMC	3600200HCMC
250	3240250HCMC	3480250HCMC	3600250HCMC
300	3240300HCMC	3480300HCMC	3600300HCMC
350	3240350HCMC	3480350HCMC	3600350HCMC
400	3240400HCMC	3480400HCMC	3600400HCMC
450	3240450HCMC	3480450HCMC	3600450HCMC
500	3240500HCMC	3480500HCMC	3600500HCMC
550	3240550HCMC	3480550HCMC	3600550HCMC
600	3240600HCMC	3480600HCMC	3600600HCMC

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