

CTM Magnetics

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Subject: Contactor Contamination
Application: Input Harmonic Filters
Location: Permian Basin

SEALED CONTACTORS KEEP OUTDOOR HARMONIC FILTERS EFFECTIVE

Overview:

Many harmonic filters use NEMA 3R outdoor cabinets in blowing dust or high humidity environments. A harmonic filter waiting in the field for 30 days to be connected can collect enough dust on the contactor to fail on startup. A failed contactor removes the capacitors from the harmonic filter circuit, severely reducing filter performance, see figures 1 and 2 below. CTM received 5 competitor harmonic filter cabinets from the field recently; all 5 units had failed contactors. Without continuous grid monitoring, a harmonic filter with failed contactors would never be detected and 35% THID would be sent to the grid instead of 5% THID. How much of the large voltage distortion problems in the Permian Basin are caused by harmonic filters with failed contactors sending 35% distortion back to the grid? Measure your harmonic filter performance, you paid for capacitance and 5% distortion, not 35% distortion.

ENGINEERING PROCESS & SOLUTION

Sealing contactors requires electrical, mechanical, thermal, and compliance engineering knowledge and testing. CTM reviewed and tested many options prior to selecting our sealed contactor solution. CTM manufactures our harmonic filters in our UL 508A listed panel facility; our sealed solution maintains our UL listing. Sealed CTM contactors have been thermally tested to ensure full ratings and environmentally tested to ensure the contactors maintain long life in our products. 100% of CTM’s GridHawk®, GridHawk® HD, and GridHawk® XD harmonic filters now have sealed contactors suitable for outdoor harsh environments. CTM customers can now deploy harmonic filters into harsh environments with confidence that the sealed contactors will keep the capacitors in the filter circuit; delivering 5% THID back to the grid, not 35% THID.

Harmonic Current Distortion (% THID) With and Without Capacitors (420 A Unit)

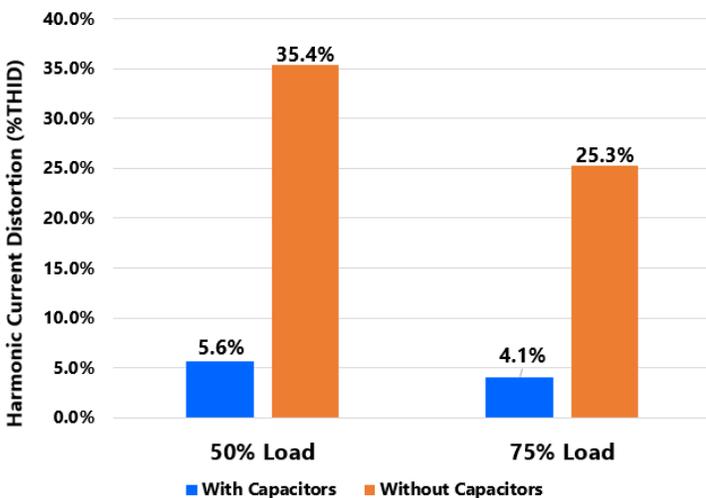


Figure 1. Filter Performance With and Without Capacitors

Harmonic Filter Schematic

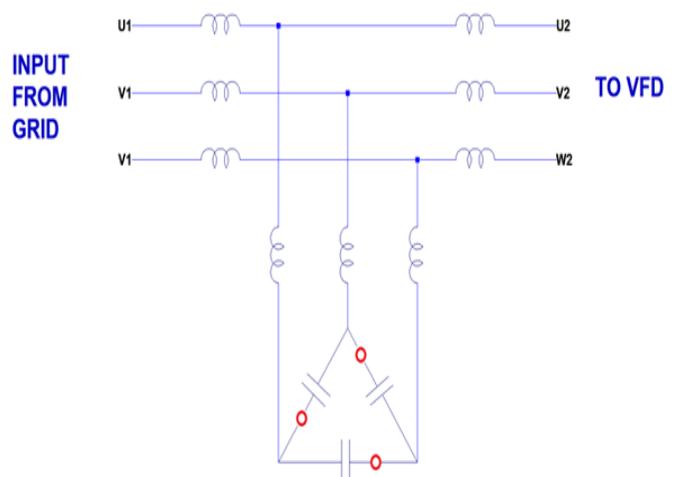


Figure 2. Contactor Locations on Harmonic Filters (red dots)