

## Informational Document from Harmonics Limited IDHL-15

### Subject: "Hot" installation of Harmonic Suppression Systems

Harmonic Suppression Systems are installed on a 208/120 volt wye distribution system to eliminate 3rd harmonic currents caused by phase-neutral connected computer loads. The suppression system is connected between the X0 transformer lug and the system neutral-ground connection and serves to block 3rd harmonic current flow in the neutral wire and all three phase wires.

The usual method of installation is to shut down the transformer, connect the suppression system between the X0 lug and the neutral wire, and turn the transformer back on.

However, in situations where the system cannot be turned off, the suppression system may be installed "hot." Following is a brief description of this installation process.

1. A full-current capable wire is connected from the X0 transformer terminal to the input connection in the suppression system.
2. A full-current capable wire is connected from the neutral wire in the transformer to the neutral/ground bus in the suppression system. ( A UL approved tap connector can be used for this connection.)
3. A suitable sized equipment grounding wire is connected from the transformer enclosure ground point to the ground lug in the suppression system.
4. The building steel or other suitable ground, if connected directly to X0 on the transformer, is connected to the enclosure ground point. ( A UL approved tap connector can be used for this connection.)
5. A high current switch sized to carry the full rated current of the transformer (**open**) is connected between the X0 connection in the suppression system and the neutral/ground connection in the suppression system.
6. The switch is closed.

At this point, the neutral current is shared between the original connections to the transformer X0 and the switch.

7. The "original" neutral wire is disconnected from X0 on the transformer.
8. The original enclosure grounding wire (if connected directly to X0 on the transformer) is disconnected from X0.
9. The original wire to building steel is disconnected from X0 on the transformer.

At this point the neutral current is returning to X0 through the switch. The original path is no longer in the circuit. There is no change in load operation.

10. The switch is opened.
11. The switch is disconnected and removed.

The suppression system is now in place between X0 and the neutral/ground/building steel. The load is now operating without 3rd harmonic. Neutral currents will be reduced as much as 80-90%, phase currents will be reduced 10-25%, and the transformer will start to run many degrees cooler.

Note that the loads do not see any transients and system operation is not interrupted in any way.

