

**WEG ELECTRIC CORP
WEG SERVICE Co.
ENGINEERING SERVICES – AUTOMATION DIVISION**

TECHNICAL NOTE: VFD CAPACITOR REFORMING

1 Purpose

This document describes the purpose and procedure for “reforming capacitors” on VFDs that have been stored, without power, for more than 1 year.

2 Material Required

- Appropriate single phase or three phase power supply.
220-230VAC Drives = power supply of 220VAC
380-480VAC Drives = power supply of 220VAC
500-600VAC Drives = power supply 300-330VAC
660-690VAC Drives = power supply 300-330VAC
- Miscellaneous material for connection of power supply.

3 Background

All WEG Variable Frequency Drives utilize Electrolytic Capacitors for storage of voltage in the inverter section of the drive. These electrolytic capacitors are made up of basically 3 parts. Two conductive plates (usually one being a metal substance similar to aluminum foil and the other being a porous material impregnated with an acidic substance similar to battery acid) that sandwich a layer of insulator material. The insulator material is generally made up of an oxide that is created when voltage is applied to the capacitor during manufacturing of the capacitor. Subsequent to this initial power up, every time the capacitor receives a charge it “rebuilds” this layer of oxide. As time elapses and there is no voltage applied to “reform” this layer the layer begins to degrade. This layer “thickness” is the determining factor for the voltage rating of the capacitor. If the layer degrades to a certain point one of two failures will occur. 1. The two conducting materials will begin to conduct current at a high rate, and this will cause a boiling of the liquid inside the capacitor. Once this boiling begins the pressure will rise internally and the capacitor will rupture. This failure usually results in a complete destruction of the drive as these capacitors are saturated internally with an acidic mixture. 2. The inrush current will arc across the oxide insulator and create a bridge between the plates. This bridge will short the plates and will cause a direct short in the power circuit that can result in other damage to the electronic components. At a minimum this second failure will require the damaged capacitor to be changed.

4 Procedure

If a VFD has not been powered up for 9 months to 1 year it is REQUIRED that the capacitors be “reformed” prior to the drive being put into service. For 220-230V and 380-480V models apply supply voltage of approximately 220Vac, three-phase or single-phase input, 50 or 60 Hz, **without** connecting a motor to the output. This voltage should be applied for a period of 1 hour. **After this energizing process, a wait period of 24 hours before installing or utilizing the drive for motor control is vital.** Part of the oxide insulation is formed during this “resting” period. For 500-600V, 500-690V and 660-690V models use the same procedure applying a voltage between 300 and 330Vac to the inverter input.

