

## VFD Maintenance Tips

Restarting Your Electrical Equipment after a Long Shutdown



## Introduction

Many production settings have changed in the midst of social distancing. Employees are spaced six feet apart, assembly lines shut down, and some facilities are wholly left idle. As we prepare to get back to work, engage our customers, and ramp up production, it is important to consider the condition of our machines.

Performing preventative maintenance on your electrical equipment before powering them back up is an important step to a smooth startup and in ensuring machine longevity. Variable frequency drives (VFDs) are commonplace on motor-operated equipment for several reasons. One of the most noteworthy reasons is the reduction of maintenance costs, but VFDs also have a unique maintenance cycle.

VFD preventative maintenance should be performed by a trained professional, which may be an on-staff electrician, contract electrician, or local electrical distributor. The preventative maintenance process should typically consist of 4 steps

- Visual inspection of key components
- Checking power connections
- Verifying component life
- Reforming capacitors

## Visual Inspection

During the visual inspection there are a few things that should be reviewed.

First, look for signs of condensation, corrosion, dust and foreign objects – think insects. Catching these simple issues can often be corrected onsite and save considerable repair expenses.

Next, check for heatsink and fan obstructions that can prevent the VFD from running cool.

Enclosure air filters should also be checked for dust buildup, gaskets checked for deterioration, and replaced as necessary.



*Modern VFD in an industrial control cabinet*

## Checking Power Connections

Power connections can loosen with heating and cooling cycles. Loose connections can overheat and cause VFD faults, tripped branch circuit protection, or premature failure. The inspection should verify all power connections meet the torque specifications of the electrical equipment OEM(s).

Following proper torque specifications is critical. Some types of terminal blocks are prone to damage if over torqued. The maintenance professional may go the extra mile using a thermal imaging camera to check the power wiring for hot spots and correct accordingly. To perform the thermal imaging step, the equipment will need to be operational and running near capacity.

## Verifying Component Life

VFDs are designed to operate maintenance-free for a defined period of time, usually 5 to 10 years of operating time, depending on the manufacturer and model. Larger VFDs are designed to be serviced as specific components age.

During the preventative maintenance process, the VFD should be checked to determine the remaining life of the transistors, capacitors, fans, and pre-charge contactor, much like the remaining oil life readout in a car. This allows operations and maintenance staff to plan for service down time.

## Capacitor Reforming

Most VFDs utilize aluminum electrolytic capacitor technology as a fundamental component of the power structure. When left unpowered for long periods of time the capacitor dielectric breaks down and permanent damage can occur if power is applied in this condition.

Fortunately, aluminum electrolytic capacitors can be self-healed in a process called “capacitor reforming.” Capacitor reforming consists of slowly applying voltage to the drive and capacitors using a device known as a variac transformer or a current limited DC power supply. Some newer VFD models do not require capacitor reforming, but completing the process will not hurt the VFD in any way if it is not required.

Capacitor reforming is an important step in recommissioning VFDs and you should always follow the manufacturer’s recommendations when powering up a drive idle for more than six months.

VFDs left in storage as spare parts should have their capacitors reformed every one to two years to prolong their shelf life. Protecting VFDs from extreme temperatures, corrosive gases, and moisture will extend their life while they are in storage or long term shutdown.



VFD Maintenance Monitors

## Conclusion

VFDs are designed to save energy, improve product & process quality, and reduce maintenance costs. Proactively maintaining your VFD investment on an annual basis will maximize uptime and help keep product flowing out your dock doors.