

A photograph showing a row of five grey Variable Frequency Drive (VFD) units mounted in a metal rack. Each unit has a control panel on the left side with an orange display screen and several buttons. Cables are visible at the bottom of the units.

# Key Aspects of Basic VFD Maintenance: What You Need to Know



Although variable-frequency drives (VFDs) are durable and reliable, they are also sensitive electronics that can become damaged when not maintained properly. The simplest aspect of VFD care involves maintaining an appropriate environment for the drive. Like computers, VFDs should be kept isolated from moisture and dust, and connections should be checked regularly to ensure that the drive remains free of contaminants. However, even if kept in perfect conditions, VFDs still require some degree of regular maintenance. For instance, it's important to tighten loose connections, clean dust buildup using condensed (dry) air, and replace fans when they show signs of wear. In this guide, we will consider the essentials of VFD maintenance to ensure that you get maximum value from your VFD purchase.



## Three Key Aspects of Maintaining VFDs

Fortunately, VFD maintenance is not overly complicated. We can condense VFD maintenance into just three core principles:

- ☑ **Keep the Drive Clean:** VFDs may have side vents to allow for air circulation (NEMA 1), or they may be sealed enclosures (NEMA 12). NEMA 1 enclosed VFDs, while efficient at cooling, are more susceptible to dust buildup, which can eventually compromise the cooling systems and lead to overheating. To combat this, it's important to inspect the enclosure's interior and exterior regularly, using dry condensed air to clear any dust or debris. This step on its own can significantly extend the lifespan of a NEMA 1 enclosed VFD while also optimizing its performance.
- ☑ **Keep the Drive Dry:** VFDs should not be exposed to moisture. Excess water corrodes the drive's circuit board, leading to faults and premature equipment failure. This concern is heightened when dealing with NEMA 1 drives, which have easy entry points for water droplets via the side vents. To combat this risk, keep the VFD in as dry an environment as possible. You may consider using a dehumidifier to reduce moisture, but be cautious about where you position it. If placed directly over the drive, the dehumidifier may drop collected water right back onto the device, causing the very damage you sought to prevent. Be careful to review your mitigation methods regularly because operating conditions will affect the amount of moisture on and around the drive. Condensation from cool air coming in contact with the warm drive and vice versa will inadvertently cause condensation even the best thought out systems.
- ☑ **Keep the Connections Tight:** It's critical to check your VFD's connections regularly and thoroughly, even in clean rooms. It doesn't take much to loosen a connection: subtle mechanical vibrations or thermal fluctuations can compromise a connection, as can retorquing or overtightening screws. As such, it pays to be intentional about adjustments and ensure that they are done properly and on schedule. Failure on either count can force you to replace the VFD early.

## Key Benefits of Ongoing VFD Maintenance for Your Business

A well-maintained VFD promises a range of benefits to your business.



- **Energy Savings:** VFDs reduce energy costs by regulating the speed of AC motors. However, to benefit fully from these savings, you need to ensure that the VFD itself is running efficiently.
- **Reduced Repair Costs:** Without a VFD, motors are typically controlled by single-speed starting devices that induce abrupt starts and stops. These methods expose the motor to high torque and massive current surges up to 10 times the current at full-load. VFDs instead gradually bring the motor to full speed, which lessens the stress on the device. Decreasing mechanical and electrical stress on motor components allows them to run for longer without developing defects, making a VFD a wise investment. However, these savings only hold if your VFD doesn't itself require costly repairs or replacements. Ongoing maintenance is cheap and easy, and it saves you from larger expenses down the line.
- **Extend Motor Life:** Proper maintenance checks extend the life of any mechanical device. Motors and VFDs are no exception. Rather than incur frequent repair or replacement costs, it's far preferable to invest a small amount of time into ongoing maintenance that protects your equipment from damage.



## Functions of VFD Maintenance

VFD maintenance keeps units safe from environmental damage from dust or moisture. It also prevents minor internal faults from causing larger, costlier damage. Best practices for VFD maintenance include:

- Visual inspections
- Regular cleanings
- Regular connection checks
- Replacing cooling fans every 3-5 years
- Replacing main bus capacitors every 7 years
- Replacing other components on an OEM-suggested timeline

It's also important to keep accurate records of these steps to ensure that none is overlooked. If there is ambiguity about when a part was last inspected or replaced, you may waste money on unnecessary repairs. Following all of these guidelines is the best way to maintain smooth, reliable function at a minimal operating cost to your facility.

## Troubleshooting VFDs

If your VFD is not functioning properly, there are a few easy troubleshooting steps you can take before considering it broken.

**1. Check the input rectifier.** Before you begin, it's critical to remove power and wait until the DC bus is free of voltage.

**2. Check the variable speed drive output.** Use a DMM in diode mode to check the bridge rectifier. Use a multimeter to measure the output of the variable speed drive. To do this, place the positive lead on the negative terminal of the VFD, then place the negative lead onto the input and output terminals (one at a time). An acceptable voltage drop is from 0.299 to 0.675 vdc, and you should see a consistent reading between all phases. Once completed now put negative lead to + terminal and repeat.

**3. Check the bus capacitors.** Cracks or deformations in the bus capacitor can lead to malfunction. Check for signs of damage and ensure that the pressure plug is situated properly.

**4. Check the internal power supplies.** If all power-off assessments look good, apply power to the drive. Measure DC bus (1.4 x input) and logic supply voltage. If a scope is available measure AC ripple on the DC bus, depending on the age of the Bus capacitors no more than 3V is allowed.



## Trust Renown Electric for Expert Motor Repair



Regular, basic maintenance is key to keeping your VFD in working order. Keeping your drive's interior clean and dry and its connections tight can easily prolong its working life and increase its day-to-day performance.

If you do begin to experience issues with your motor drive and the above troubleshooting steps don't resolve the problem, we encourage you to contact Renown Electric for expert advice. Renown offers on-site predictive maintenance programs, including motor testing, on-site voltage monitoring and active state-of-the-art VFD testing to assess power quality and drive output. If your components do need to be repaired or replaced, we can handle that too: as an ISO 9001:2015-certified company and an authorized dealer for most major manufacturers, we have the equipment and know-how to restore your VFD to proper function. Remember, all drive repairs should be load tested and feedback verified to ensure the drive repair was a success.



To consult with Renown's experts about VFD installation, maintenance, or replacement, [contact us](#) online, or give us a call at 877-742-3665.

## About Renown Electric

Founded in 1984 and centrally located in Concord, Ontario, Renown Electric operates from a 25,000 square foot state-of-the-art main repair facility, a 30,000 square foot large motor repair facility with 50 ton cranes throughout, and a 12,000 square foot warehouse dedicated to motor management and inventory of new products. Our team includes over 50 employees who excel in all aspects of electric and mechanical motor repair, remanufacture, overhaul, field service, on-site rewind, and engineering support.

We are proud to serve a diverse customer base from a wide range of industries from across the globe. No matter the size of the company, from a small start-up to a massive multinational concern, Renown offers unmatched customer service to support you every step of the way.

Renown is an authorized dealer and service representative for most major manufacturers, so our customers are assured the highest-quality products and repairs. Our engineering expertise and production capability allows us to remanufacture all major AC & DC motors up to 50,000 HP.

Our company has CSA qualification for the repair and service of motors and generators in hazardous locations, as well as [ISO 9001:2015](#) certification; we utilize the latest computerized testing techniques to ensure our repairs meet or exceed OEM specifications.

Renown has a large fleet of service and delivery vehicles—including a selection with cranes for simple and prompt job-site pick-up and returns.

Renown's commitment to service extends beyond the reaches of our shop by offering predictive maintenance programs designed to meet the customers' requirements. Programs include on-site laser alignment, balancing, vibration analysis, infrared thermography, oil analysis, and non-destructive testing.

To learn more about Renown Electric and the services we provide, [contact us](#) today.

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