



## PRODUCT APPLICATION NOTE

### Protection of Variable Frequency Drives

#### **Surge Protection of VFDs and Electrical Systems in CNC Routing and Machining Equipment**

Variable frequency drives (VFDs) are integrated into Computer Numerical Control (CNC) machining equipment to control the motorized processes within the equipment. These VFDs and other sensitive equipment inside the CNC systems must be protected from overvoltage events that can result in downtime, loss of productivity, and lost revenues.



#### **The Challenge**

Modern CNC machinery is being used to replace manual processes on the production floor that can lead to waste, inefficiencies and quality problems. They are an investment in productivity and profitability.

CNC equipment contains embedded microprocessors, computers, programmable logic controls (PLCs) and other electronic circuitry that is used to delegate the programming,

tool changes, motor speed and other processes within the sophisticated CNC systems. To support these processes, variable frequency drives (VFDs) are integrated into the CNC equipment to regulate servo motors, motion control and the other programming that is required to create highly detailed components from raw materials.

The VFDs and all the other sensitive electrical systems inside the machinery must be protected from transient voltage surges.



The offending surges can be utility-generated overvoltage events, or power fluctuations created by machinery operating in adjacent areas of the plant. All will have the same adverse effect on both the machinery and shop productivity.

#### **Solution**

To protect the VFDs and electronics inside CNC machining systems Raycap recommends Strikesorb<sup>®</sup> surge protective device (SPD) technology. Strikesorb provides solutions for Class I and Class II electrical protection based on the IEC 61643-11 standard. The unique properties of the Strikesorb technology ensure that no internal fuses are needed, thus eliminating a potential cause of failure to the protection device.

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INNOVATING POWER PROTECTION WORLDWIDE

Raycap's solutions can provide a stable electrical environment that eliminates any losses caused by electrical surge events. Its integrated solutions, featuring the Strikesorb SPD technology, are trusted to protect electrical equipment from damage caused by grid-side surges, or large load switching occurring either in house or caused by industrial neighbors.

Figure 1 illustrates a typical configuration of Strikesorb protection installed in a VFD cabinet. The electrical requirements for power line surge protection in VFDs under 600 volts require that the protection be in compliance with IEEE C62.41.1, IEEE C62.41.2, and IEEE Standard 519.

Typical requirements state that surge protection is installed inside the control panel to protect the unit from damaging transient voltage surges. The surge protection must always be mounted near the incoming

power source and properly wired to all three phases and ground. For CNC protection applications that may not be able to accommodate busbar integration, Rayvoss® stand alone surge protective devices (Figure 2) provide an excellent alternative.

### Conclusion

Ensuring the reliability and availability of all mandatory functions on the shop floor is essential to successful operations. Trust Strikesorb to protect CNC equipment from the destruction that can be caused by electrical surges.



Figure 1: Typical Strikesorb installation, integrated busbar inside the VFD cabinet.

### Strikesorb Benefits

- Maintenance-free operation
- Safe operation: No smoke, fire or explosion
- Unique capability to withstand multiple high-energy transients
- Ultra-high short circuit current rating
- Low let-through voltage, providing excellent protection compared with competitive SPD products
- Class I/ Class II compliant SPD per IEC 61643-11
- Strikesorb modules are fully UL-recognized as either Type 2 or Type 4 devices, according to the UL1449 5<sup>th</sup> Edition safety standard.
- Rayvoss systems are UL 1449 5<sup>th</sup> Edition Type 2 listed devices
- 10 year global product warranty
- Extended lifecycle
- Eliminates the need for fuses
- Ease of installation



Figure 2: Raycap's Rayvoss stand alone SPD.

**Raycap is a trusted partner, providing maintenance-free electrical protection solutions for mission-critical applications in hundreds of thousands of installations worldwide. For a detailed presentation on how Raycap's Strikesorb-based solutions for protection of CNC machinery can protect your operation contact a local dealer, distributor, integrator or Raycap today!**

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