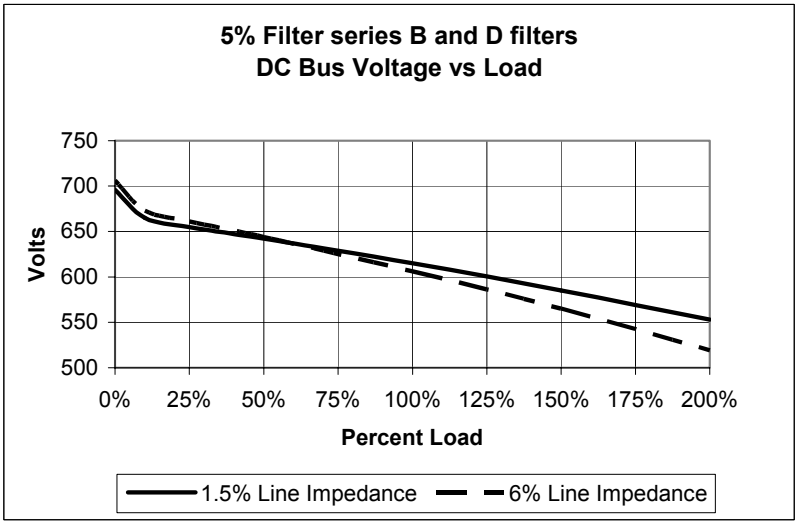
Matrix Filter Series D Over Current Applications

"Matrix Filter Operation in Constant Torque Applications with Six Pulse Rectifiers"

A properly selected Matrix Filter may be used in constant torque AC drive and DC chopper drive applications with six pulse rectifier input circuits. At rated speed, a constant torque drive may deliver 150%-200% of rated horsepower depending on the equipment selected. This results in increased line current of nominally 150%-200% of rated and depending on the application may result in RMS current requirements greater than that available from a Matrix Filter with the same horsepower rating as the drive. To determine if the RMS current will exceed the filter rating, the actual RMS current required by the drive must be calculated from the nominal drive rating and duty cycle of the load or measured with true RMS recording instruments. Be certain that this does not exceed the filter output current rating. If necessary, select the next larger filter rating.

As the power delivered by the drive increases, the line current increases causing a reduction of available voltage to the drive due to filter impedance. With high line impedance, low line voltage, and heavy overloads it is possible to reach a point where the drive may trip on under voltage. The curves in figure 1 can be used as a guide to determine the approximate DC bus voltage if the line impedance and percent overload is known.

480 volt Example Figure 1



For example, consider a constant torque 480 VAC drive with 150% torque fed from a Matrix D or B Filter and connected to a power system with 6% line impedance the DC bus voltage is 565 volts. See figure 1. Allowing for a 10% low line the minimum DC bus voltage is 522 volts. A common trip level is 508 volts in which case this application would be successful. If this calculation results in a minimum DC bus voltage at or below the trip level of the inverter, select the next larger filter size and recalculate the minimum bus voltage. Remember that the percent overload numbers in the graphs refer to the ratio of the drive load to the filter rating so selecting a larger filter will effectively reduce the percent load point on the graph.

Note: Refer to the drive's users manual or consult the drive manufacturer for the under voltage trip level and time delay settings. Published Filter power dissipation is for full load. A 150% current overload will increase filter power burden by 2.25 times. Extended over current operation may degrade the filters performance and should be avoided in high temperature environments.