

FAQ - What is the purpose of the KMG output filter?

The purpose of the filter is to take the output power of a PWM drive and remove the high frequency voltage distortion. This distortion is a result of the modulation protocol of the drive. This distortion is typical with all PWM VFDs. The purpose of the filter is to produce a smooth waveform that is of near sine wave performance.

FAQ - What type of circuit does the KMG filter utilize?

The L-C-R, low pass filter, uses passive components. The circuit utilizes a series inductor along with parallel capacitors and resistors. The power schematic is pictured in the Installation, Operation and Maintenance Manual.

FAQ - What level of voltage distortion can I expect from the output of a KMG?

The objective of the filter is to duplicate the efforts of typical power utilities. According to utility standards, the power quality is to limit voltage distortion to approximately 5%. The MotorGuard filter follows that challenge but limits voltage distortion to between 5 and 7%. This is well within the operating standards of any conventional squirrel cage induction motor. It is well accepted by any standard transformer as well should the load to the filter be a transformer.

FAQ - What spare parts do I need to stock for KMG filters?

If down time is critical, power fuses, control circuit fuses, capacitors, and an alarm board should be stocked at the installation. In the uncommon event of failure, TCI uses commercially available control components. Inductors, capacitors, resistors, and design specific items can be acquired from TCI upon request.

FAQ - What system information do you need to determine if the KMG is right for my application?

We typically like to understand the system components and the operating environment of your application. TCI has an application worksheet available to assist you in providing this information. For additional information, please contact the TCI Technical Support Group.

FAQ - Are there special applications where I can't use the KMG filter?

The MotorGuard High Performance Output Filter is designed to work on a variety of applications where the power quality of the drive output needs conditioning. It is most commonly used for motor applications involving very long lead lengths, multiple motors, power supplies for test equipment, or inputs for a step-up transformer. Care should be taken when using the filter on vector drives, due to the feedback loop from the motor to the drive. In some instances, the KMG filter is not compatible with a vector drive. If you have a unique application, please contact TMS.

FAQ - Can I get a field demonstration of the KMG product?

While we do not have an actual demonstration unit available to be shipped in the field, we are happy to provide professional application information. If you are interested in additional information and a discussion on the use of the MotorGuard filter, please contact TMS.

FAQ - Can I get KMG filters modified for my specific applications?

TCI has designed the MotorGuard with the standard features most commonly requested. Please contact TMS or your local representative for additional information on the MotorGuard high performance filter.

FAQ - Can I use the KMG filter on any brand of drive?

TCI has developed the KMG MotorGuard filter with technical input from many major drive manufacturers. We have reviewed their drive topology to ensure compatibility; however, there is no guarantee of filter compatibility with all drive topologies. Contact TCI for application assistance if drive compatibility is in question.

FAQ - Can the KMG filter be used with any brand motor?

The brand of standard squirrel cage induction motor does not matter. For special motor applications, please contact the TCI Technical Support Group to verify compatibility.

FAQ - Do I have to buy a special drive to work with the KMG Filter?

TCI has designed and tested the MotorGuard filter with technical input from the major drive manufacturers as well as actual lab testing to ensure compatibility. TCI cannot be responsible for ongoing changes in drive topology. To date, the filter has been successfully operated with a multitude of drives. TCI feels confident the filter will be compatible with all major drive topologies. If the filter fails to function due to drive topology incompatibility, TCI will accept return of the filter for full credit.

FAQ - Do I have to set up my standard drive in a special way to work with the KMG?

The KMG requires the drive to have a carrier frequency of between 2 and 4 kHz. If the drive has a variable carrier, the average operating frequency must remain between 2 and 4 kHz. The drive should be operated in scalar mode. The maximum drive output operating frequency must be 80 Hz or less. There are no special drive requirements or modifications necessary for the successful operation of the KMG filter.

FAQ - Do KMG filters use power?

Like virtually all passive devices, there is an associated loss factor. The actual equipment efficiency depends on the RMS current loading. The power resistors are voltage, not current sensitive, and will experience a constant loss factor. Full load loss information stated in watts is available on the TCI website.

FAQ - Do you have customers who have standardized the KMG for the output of long lead applications?

TCI has collaborated with major drive manufacturers as well as equipment companies to install these filters. Drive OEMs, as well as Pump, Drilling equipment, HVAC and other equipment manufacturers are utilizing the TCI filter for successful system operation. Contact your local TCI representative for more application information.

FAQ - Does TCI have a KMG test model available for me to use in my plant?

TCI does not have test and trial models available for general use. Your TCI distributor and representative can work with you to discuss your specific application and arrange for special considerations. It is the intent of TCI to ensure proper product operation and customer satisfaction.

FAQ - Does TCI have any application testimonies that prove the performance of the KMG filter?

There are currently a great many TCI KMG filters in field use. Current field applications range from use as a power supply filter for shore to ship power to extreme long lead lengths found in down hole pumping installations.

FAQ - Does TCI have any unique success stories using the KMG filter?

TCI has widely used these filters in deep well pumping applications. They are successfully operating in Canada, the US and Central/South America on oil and gas exploration and pumping operations. This filter has allowed the use of modern low voltage drives with step-up transformers and custom designed medium voltage motors in extremely long lead applications to accomplish tasks never before possible with standard low voltage drive technology. Please contact your TCI representative for more details.

FAQ - Does the KMG High Performance Output Filter have an effect on motor shaft bearing currents?

Yes, by virtue of attenuating the high frequency components present in the PWM wave form and producing near sinusoidal voltage at the motor terminals, the amount of common mode current flowing through the motor bearings is greatly reduced. There is also a reduction in the amount of EMI when the KMG is installed.

FAQ - How do I size the KMG filter?

We have selection charts listing nominal horsepower ratings with maximum continuous current ratings. If you have non-standard motors or motors other than NEMA design B with high full load amp ratings, you can use the actual motor nameplate FLA for making the selection. Contact your TCI distributor or representative if the current rating is in question.

FAQ - How does the KMG filter affect the line voltage to the drive?

The filter has no effect on the input line voltage to the drive. This tuned filter has been lab and field-tested and demonstrates excellent, near sine wave output performance.

FAQ - How does the KMG vary from a dv/dt filter or line reactor on the output side of the VFD?

The V1k dv/dt output filter is designed to limit the peak voltage to approximately 1,000 volts. These filters are successful in most simple drive/motor applications where lead lengths are about 1,000 feet or less, and a modulated output waveform is acceptable to the load. In terms of a line reactor, the inductive reactance achieved with a line reactor works to slow down the rise time of the spike but can do nothing to limit the magnitude of it. The MotorGuard goes beyond this to eliminate the carrier frequency effects in the modulation process. The result is a smooth sinusoidal waveform and load friendly power supply.

FAQ - How is the KMG rated?

The KMG High Performance Output Filter is a current rated device and is available in 460/480 volt and 575/600 volt versions. The Price List Guide lists nominal horse power and maximum continuous currents based on the NEC motor full load current table for standard 460 volt and 575 volt motors.

FAQ - How will the KMG filter protect my motor?

The filter eliminates the effects of dv/dt on the motor insulation by removing the high frequency voltage distortion generated by the drive output power semi-conductors. The modern variable frequency drive has revolutionized the use of the conventional squirrel cage induction motor; however, current drive topology can contribute to insulation problems in the motor. The KMG greatly attenuates the carrier frequency voltage distortion and lowers the level of line distortion.

FAQ - Is it necessary to use an inverter grade motor with the KMG filter?

No, the KMG filter is designed to be used with any NEMA squirrel cage induction motor.

FAQ - Is special startup required for the KMG filters?

The MotorGuard filter was designed for ease of installation and commissioning. Special programming or factory qualified start up is not required. The comprehensive Installation, Operation, and Maintenance Manual provided with the filter is sufficient for most installations by a qualified installer.

FAQ - On what lead lengths do you suggest using the KMG filter?

The KMG MotorGuard filter is typically used on extremely long lead applications, typically beyond 1,000 feet. These filters are currently in use on applications with varying lead lengths, up to as much as 15,000 feet.

FAQ - What are the environmental limitations of the KMG filter?

Like most electronic equipment, heat, humidity, high elevations, and dirty environments require special considerations. The KMG Industrial filter is designed for use in protected indoor environments similar to the standard drive. Normal indoor industrial environments are specified as having a maximum ambient temperature of 40 degrees C and are protected from dirt and moisture. The KMG General Purpose filter is designed for the NEMA 1 indoor and NEMA 3R outdoor enclosure. Please contact your TCI distributor or representative if additional application assistance is required.

FAQ - What are the standard ratings for the KMG filter?

The MotorGuard output filter is available as a standard product in horsepower ratings of 5 through 600 HP.

FAQ - What voltages do the KMG filters come in?

The MotorGuard output filter is available as a standard product in both 460/480 and 575/600 volt versions.

FAQ - Why did TCI name the KMG filter "MotorGuard"?

TCI designed and developed the sine wave filter to correspond with the industry's demand for a High Performance Output Filter. This filter must improve the power quality and greatly reduce the effects of dv/dt on motor applications. The term "MotorGuard" signifies the function of guarding the motor from damaging voltage distortion that has been known to cause premature motor failure.