

3-PHASE EMC POWER  
LINE FILTER

KRF



## Limits high frequency noise

- Reduces interference
- Protects sensitive equipment
- Eliminates drive cross-talk
- Meet FCC Regulation 15, Subpart J



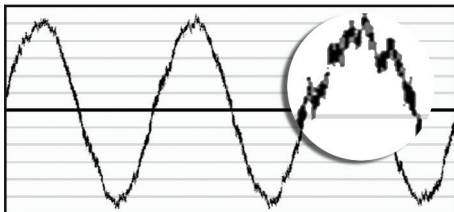
**Line Reactors • Harmonic Filters • EMC Filters • dv/dt Filters • Sinewave Filters**

Courtesy of Steven Engineering, Inc. - (800) 258-9200 - sales@steveneng.com - www.stevenengineering.com

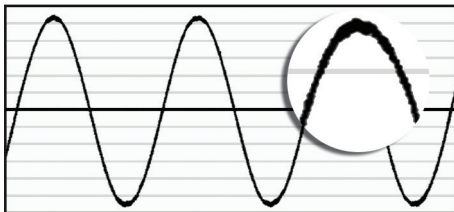
## 3-PHASE EMC POWER LINE FILTER

# KRF

### Before KRF



### After KRF



### Non-Linear Loads can draw harmonic current from the source, resulting in harmful high frequency noise

There are many pieces of equipment that can generate EMI (electro magnetic interference), variable frequency drives included. In the case of variable frequency drive, the electrical noise produced is primarily contained in the switching edges of the PWM controller. Increases in switching frequencies also increase the effective edge frequencies produced, thereby increasing the amount of electrical noise.

### Reduce High Frequency Distortion

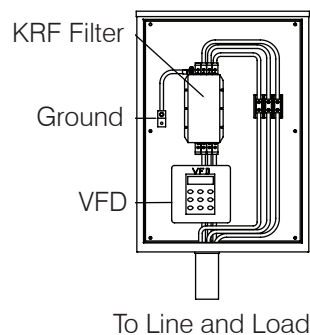
KRF filters use a combination of high frequency inductors and capacitors to reduce noise in the critical 150 kHz to 30 MHz frequency range. The inductors act as open circuits and the capacitors act as short circuits at high frequencies while allowing the lower power line frequencies to pass untouched.

KRF filters assist with cost effective compliance to EMC directives, in a compact, efficient, light-weight design. The high common mode and differential mode reduction in the critical 150 kHz to 30 MHz frequency range ensures that potential interference from AC drives is reduced or eliminated.

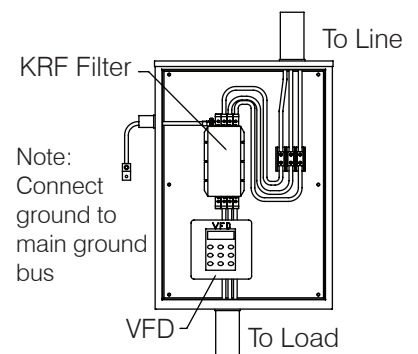
### EMI (Electro Magnetic Interference) RFI (Radio Frequency Interference)

The terms EMI and RFI are often used interchangeably. EMI is actually any frequency of electrical noise, whereas RFI is a specific subset of electrical noise on the EMI spectrum. Conducted EMI is unwanted high frequencies that ride on the utility AC wave form.

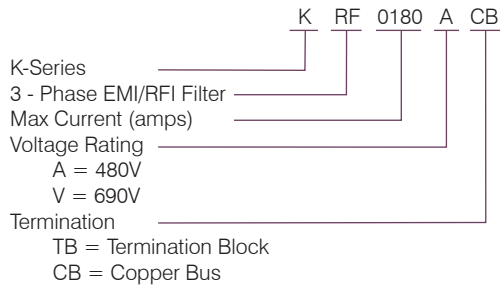
### Incorrect Interconnection Layout



### Correct Interconnection Layout



## Part Numbering System

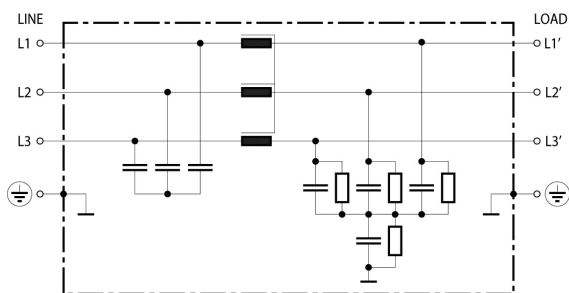


## Equipment Interference and Failure

The power line noise emissions associated with variable frequency drives can cause disturbances in nearby equipment. Typical disturbances include:

- Dimmer and ballast instability
- Lighting disturbances such as flashing
- Poor radio reception
- Instability of control systems
- Flow metering fluctuation
- Computer system failures
- Remote I/O glitches
- Encoder feedback errors
- Nuisance faults PLC
- Analog meter bouncing
- Thermostat control problems

## Typical Circuit Diagram



## Product Specifications

- 3-Phase
- System Voltage:  
 480 VAC (applied to 240 VAC - 520 VAC)  
 690 VAC (applied to 600 VAC - 760 VAC)
- Amp Ratings:  
 480V (8 - 2500)  
 690V (25 - 2500)
- Fundamental Frequency: 50/60 Hz
- Units to accommodate up to 2,500 amps
- Filtering: Advanced two-stage filtering design
- Warranty: 1 year
- Ambient Temperature: -25° to 100° C
- Maximum Altitude: 1,000 meters (3,000 feet)  
 Derating necessary above 1,000 meters
- Short Term Overload Rating: 150% rated I for 3 minutes or 250% for 30 seconds
- Tested Value: 100% tested for Hipot, ground continuity, input-output continuity and insertion loss characteristic
- Agency Approvals: ENEC, UR & cUR



Reliable  Advanced Power Quality

## KRF Typical Applications

- Motor drives
- Elevators
- Commercial Buildings
- Wind farms
- Photovoltaics
- UPS
- Power supplies

## Additional Power Quality Solutions:



### *HarmonicGuard® Active (HGA) Filter*

- Helps meet IEEE-519
- Reduces current harmonic distortion to less than 5% at full load
- Actively monitors system current, improves power factor to near unity
- Built-in touchscreen display & Modbus RTU



### *HarmonicGuard® Passive (HGP) and HarmonicGuard® HG7 Filters*

- Helps meet IEEE-519
- Improves power factor
- The HGP limits current harmonic distortion to less than 5% over a wide load range
- The HG7 reduces current harmonic distortion to less than 7% at full load



### *KDR Line Reactor*

- Prevents nuisance tripping
- Protects the source by lowering current distortion created by the drive



### *MotorGuard™ and MotorShield™ Sinewave Output Filters*

- Protects the motor by converting the PWM waveform into a near sinusoidal wave
- Prevents voltage overshoots that cause early degradation of insulation systems in motors, transformers, and cables
- Extends motor life by reducing operating temperature



### *V1k Motor Protection Output Filter*

- Protects the motor from voltage spikes due to dv/dt
- Helps stop motor insulation breakdown
- Protects cable runs (up to 3,000 feet) and reduces motor heating, noise and vibration

