MOTORGUARD SINEWAVE FILTER



Pulse Width Modulated (PWM) power supplies and Variable Frequency Drives (VFDs) are typically used to improve energy efficiency. However, a major drawback to using PWM power sources and VFDs is that the output is a square wave form, which can cause major motor damage. Critical applications such as HVAC systems and electric submersible pumps require a sinusoidal output waveform.

TCI's KMG MotorGuard sinewave filter converts the PWM wave form to a near sinusoidal wave form by eliminating the carrier frequency, allowing sensitive applications to take advantage of the efficiencies and savings that PWM output power supplies and VFDs can offer.

Features of the MotorGuard Sinewave Filter

- Universal acceptance - can be used with virtually all AC induction motors, lead lengths and lead types and used with a wide range of carrier frequencies from 2 kHz to 16 kHz and beyond
- Reach long lead lengths up to 15,000 ft. for specific applications
- Increases the life of your motor by eliminating voltage wave reflection and torque ripple
- Provides motor and cable protection by reducing motor noise, vibration and heat
- Ideal for constant torque applications

Typical Applications for Sinewave Filters

- Multiple motor applications such as conveyors, blowers, pumps and fans
- Test floor and test stand applications
- Shore-to-ship power for non-60 Hz systems
- HVAC systems to reduce audible noise
- Low voltage PWM power supply to medium voltage power

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MADE IN THE UNITED STATES OF AMERICA

Technical Specifications

Current Ratings	480 V, 600 V
	Continuous current: 8 to 750 amps; Intermittent current: 150% for 1 min/60 min
VFD Output Voltage	460/480 and 575/600 V, 3ph, at fundamental base frequency
VFD Output Frequency	Up to 80 Hz
VFD Carrier Frequency	2 kHz to 16 kHz
Filter Performance	Maximum peak voltage of output waveform: 480 V: 815 V; 600 V: 1,018 V
	Maximum dV/dt of output waveform: 480 V: 5 V/µs; 600 V: 6 V/µs
Environmental Conditions	
Maximum Elevation	Up to 2,000 m (6,600 ft.) without derating
Operating Temperature	40°C (104°F) without derating
Maximum Storage Temp	Open Panel 50° C (122° F) Enclosed Panel 40° C (104°F)
Maximum humidity	95%, non-condensing
Enclosure Options	UL Open, UL Type 1
Reference Technical Standards	
Agency Approvals	cULus Listed
Voltage Drop	3% at nominal voltage, frequency and rated current
Fusing and Protection	Unit has internal fusing protection and a performance monitoring circuit.
Capacitors	Oil filled high endurance design (no PCBs)

Part Numbering

KMG 130 A 01 A

Series:

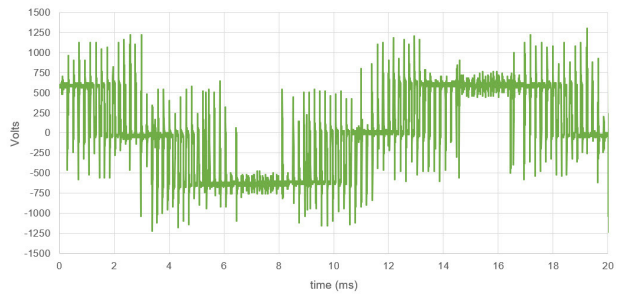
Current Rating:

Voltage Rating:
A - 480 V
C - 600 V

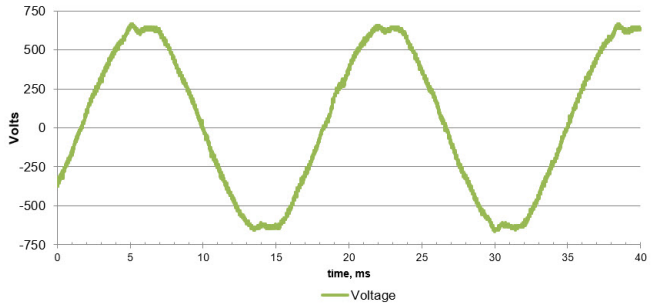
Enclosure:
00 - Open Panel
01 - Type 1

A - Standard:

Voltage without KMG MotorGuard



Voltage with KMG MotorGuard



Performance Guarantee - *Properly sized and applied, the addition of a MotorGuard Output Filter is guaranteed to bring the application into compliance with NEMA Standards Publication No. MG-1 Part 31. If the system fails to meet MG-1 Part 31 standards with the addition of a MotorGuard filter, TCI will take back the output filter and pay shipping both ways. This offer is valid for 60 days from the installation date.*

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Part #23738
Version 2.1
04/17/2020

HGA

5% ACTIVE HARMONIC FILTER





The HarmonicGuard® Active (HGA) filter is an elite system-applied harmonic filter that minimizes harmonics to less than 5% total demand distortion (TDD) at the point of common coupling. The HGA monitors the load current and reacts to changes immediately. By injecting a counter-current, the active filter cancels out harmonics and synchronizes the current and voltage waveforms while improving power factor to near unity. One HGA filter can handle multiple non-linear, harmonic-generating loads.

Additionally, the HGA meets the demanding requirements of IEEE- 519-2014. Offering top of the line performance and mitigation, the HGA provides a lower cost and a smaller footprint than a comparable 18-pulse VFD or active front end drive.

HARMONICGUARD®
SOLUTION CENTER

TCI's HarmonicGuard Solution Center is a free harmonic analysis tool that enables users to size filtering solutions to meet harmonic and power factor requirements.
Find out more: **https://hgsc.transcoil.com/**

Features of the HarmonicGuard Active Filter

- Meets the most stringent IEEE 519-2014 requirements
- TDD reduction to less than 5% at full load
- Power factor correction
- Immediate response time to step load changes
- Ability to parallel units without any calibration
- Self-commissioning installation
- 208 V - 600 V system compatibility
- Easy to use color, touch screen HMI display
- UL Listed; cUL Listed
- Communication options include: Modbus RTU over RS485, Modbus TCP/IP, EtherNet/IP, DeviceNet, and BACNet/IP

Typical Applications for Active Filters

- Large manufacturing facilities
- Wastewater treatment plants
- Automation production facilities
- Chiller systems
- Multi-well pads

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MADE IN THE UNITED STATES OF AMERICA

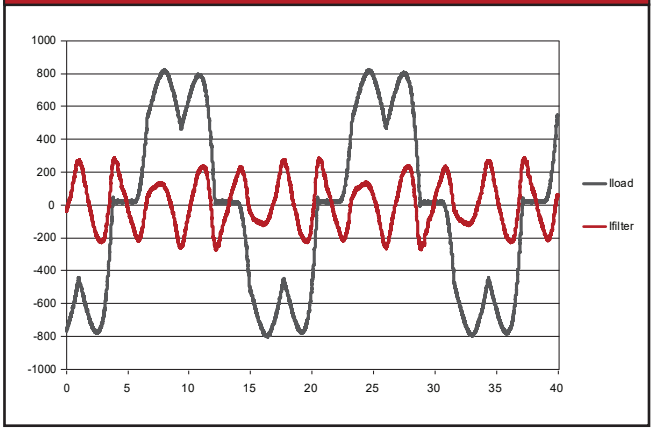
TCI®

Technical Specifications

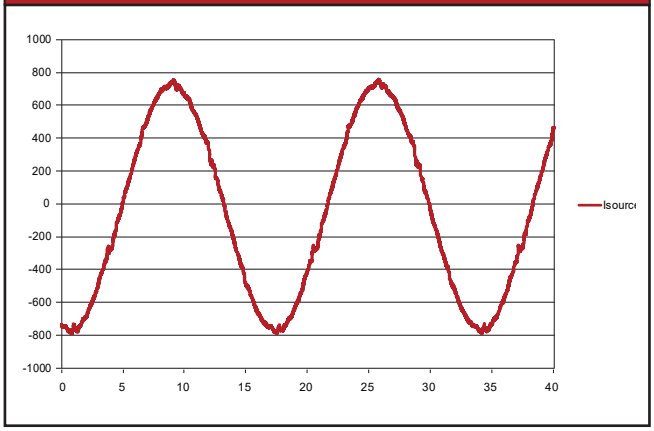
Compensation Capacity (Parallel for Higher Capacity)	208 V, 240 V & 480 V: 50A - 700A; 3-phase, 60 Hz
	600 V: 39A - 520A; 3-phase; 60 Hz
Harmonic Cancellation Spectrum	To the 50th harmonic - auto-selecting
Response Time	Less than 8 ms to step load changes
Power Factor Correction	Up to 0.98 lagging
RMS Current Attenuation	Less than 10:1
Parallel Configuration	Up to six active filters can be connected in parallel*
Display	High quality touchscreen HMI with LED backlight
Communications	Modbus RTU over RS485, Modbus TCP/IP, EtherNet/IP ®, DeviceNet, BACnet;
Over Current Protection	Molded case 65 kAIC and 100 kAIC circuit breakers
Environmental Conditions	
Ambient Temperature	Open Chassis, UL Type 1, and UL Type 12: 0°C (32°F) to 40°C (104°F) Derating above 40°C (104°F)
	UL Type 3R: -20°C (-4°F) to 40°C (104°F) Derating above 40°C
Relative Humidity	95%, non-condensing
Operating Altitude	Up to 1000m (3,300 ft) without derating Up to 3000m (9,900 ft) with derating
Storage Temperature	Open Chassis, UL Type 1 & UL Type 12: -20°C (-4°F) to 60°C (140°F)
	UL Type 3R: -40°C (-40°F) to 60°C (140°F)
Enclosure Options	Open Chassis, UL Type 1, UL Type 12, UL Type 3R
Reference Technical Standards	
Agency Approvals	UL & cUL Listed
HMI Languages	English, French, Spanish
Surge Protection	ANSI C62.42

**Consult factory for larger systems.*

Non-linear Load Waveform & Injection Current



Resulting Line Current Waveform with HGA



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Part #28722
Version 2
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HGP with PQconnect

HarmonicGuard® Passive (HGP) - Intelligent Passive Filter



The HGP Filter with PQconnect is the first intelligent passive filter to offer industry leading harmonic mitigation and allow remote monitoring and control.

- Limits total harmonic current distortion down to 5% over the widest load range in the industry
- Generator compatibility with intelligence
- IEEE-519 2014 compliant

TCI®
Advancing Power Quality

Power Quality Assurance

Electrical systems are continually compromised by the increase in non-linear loads causing harmonic distortion. Non-linear loads such as variable frequency drives (VFDs) are great for efficiency, but leave power quality polluted with harmonic distortion. The addition of a passive filter from TCI reduces the total harmonic current distortion (THID) to 5% and protects other equipment on the bus.

The HGP with PQconnect is the only drive-applied 5% passive harmonic filter on the market to provide intelligent control while still ensuring IEEE-519 compliance. The HGP offers generator compatibility with intelligence, which will eliminate any worry over leading power factor or excess VARs interfering with your generator.

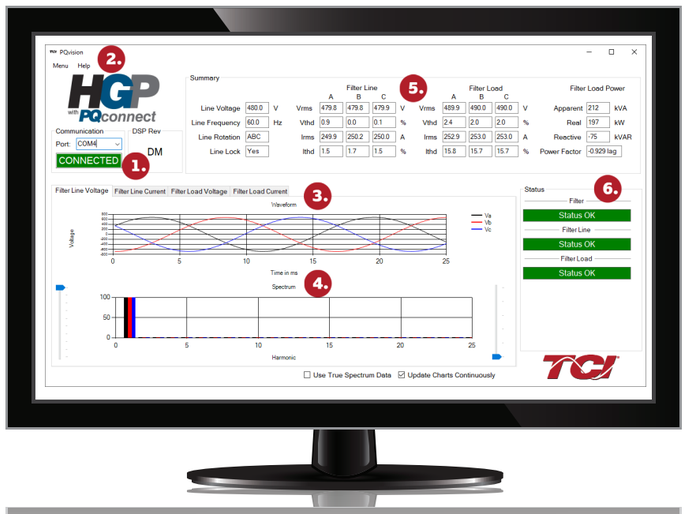
The addition of PQconnect allows users to access filter performance data via serial communications and push to any SCADA system. This is critical for preventive maintenance measures and troubleshooting. Now you can be assured that your filter is accurately mitigating harmonics and power quality is no longer an issue.

HGP Filter

- Limits current harmonic distortion to less than 5%
- Fuse tuning circuit
- True 100 kA SCCR
- IEEE-519 2014 compliant
- Increases drive uptime
- Eliminates nuisance tripping and background voltage distortion

PQconnect

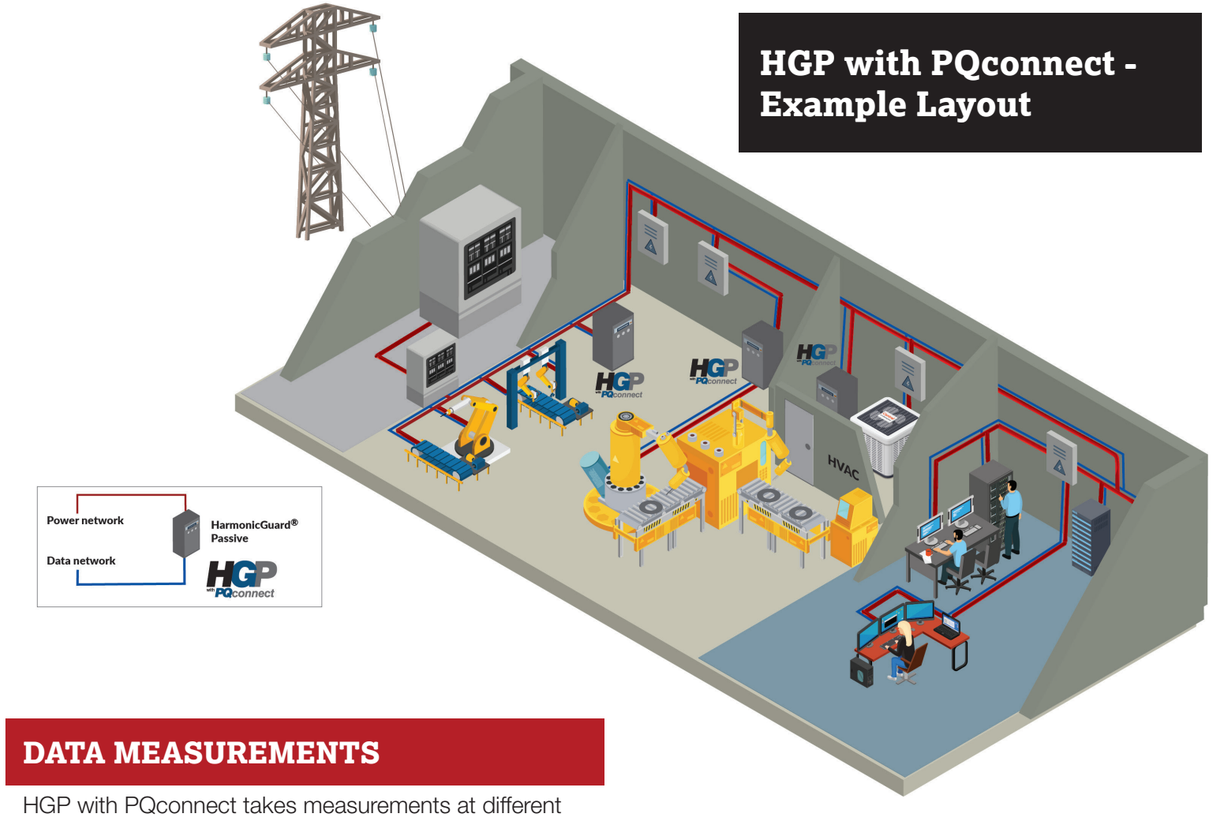
- Generator compatibility with intelligence
- Remote access
- Filter status detection
- Automated contactor controls
- Open fuse indicator
- Troubleshooting/Analysis
- Easy set-up/install
- No Contactor wiring required



PQvision* Software Application

1. Communication port and version indicator
2. Automated contactor control with no auxiliary contact needed
3. Real-time line/load current and voltage wave forms
4. Harmonic spectrum
5. Real-time voltage, current, THID, and THVD
6. Informational alerts

**The PQvision software is a free download application available from our website.*



HGP with PQconnect - Example Layout

DATA MEASUREMENTS

HGP with PQconnect takes measurements at different points within the line to give you accurate readings.

- Filter status detection
- THID (total harmonic current distortion)
- THVD (total harmonic voltage distortion)
- V (voltage)
- I (current)
- PF (power factor)

GENERATOR COMPATIBILITY WITH INTELLIGENCE

The HGP with PQconnect is now the only passive harmonic filter offering generator compatibility with intelligence. The filter autonomously controls its tuning circuit contactor based on your system requirements to ensure worry-free operation for generator based systems.

SERIAL COMMUNICATION

The HGP communication with Modbus RTU provides data monitoring and status of the filter to your SCADA system. The filter will indicate informational alerts to ensure your system stays running and resolves power quality issues.

INTELLIGENT FILTER CONTROLS

Auxiliary connection to a VFD is not required with HGP with PQconnect. The filter's digital control will automatically operate the contactor so that harmonic distortion is no longer a problem.

INDUSTRIAL STRENGTH

The HGP with PQconnect is built in the USA using high quality components and materials. This allows our passive filters to deliver best in class performance under the harshest conditions and in the most challenging applications.

TECHNICAL SPECIFICATIONS

Voltage / Frequency Rating	208, 240, 480, 600 VAC- 60 Hz 380 - 415 VAC- 50 Hz
Phase	3Ø
Motor drive input power rating range	208, 240 VAC: 5 - 100 Hp 380 - 415 VAC: 4 - 1000 KW 480, 600 VAC: 5 - 1250 Hp
THID	Less than 5% at full load
SCCR (Short Circuit Current Rating)	100 kA
Immunity from Voltage Distortion	Less than 5% THID at full load with THVD as high as 5%*
Efficiency	Greater than 99%
Overload Capability	200% of current rating for 3 minutes
Communication Options	Modbus RTU over RS485
ENVIRONMENTAL CONDITIONS	
Operating Temperature	Open: 50°C (122°F), Enclosed: 40°C (104°F)
Storage Temperature	60°C (140°F)
Elevation	Up to 2,000 m without derating. Consult factory for higher elevations.
Humidity	95% non-condensing
Protection Category	Open Chassis, UL Type 1, UL Type 3R, and UL Type 12 enclosure
Cooling Method	Natural or Forced Air Convection
REFERENCE TECHNICAL STANDARDS	
Agency Approvals	c UL us, FC, RoHS

**When configured for High Background Voltage Distortion. See IOM for guidelines for distortion greater than 5%.*

PART NUMBERING

HGP 0150 A W 1 C 1 0 0 0

Series:

Rating (HP -60Hz, KW -50Hz):

Voltage Rating:
- A - 480 V
- B - 240 V
- C - 600 V
- D - 208 V
- L - 380 - 415 V

Frequency:
- W - 60 Hz
- X - 50 Hz

Enclosure:
- 0 - Open
- 1 - Type 1
- 2 - Type 12
- 3 - Type 3R

Option:
- C - Contactor
- S - No Contactor

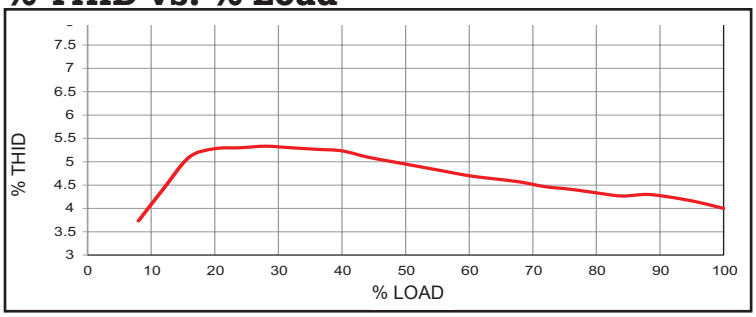
Connectivity:
- 0 - No connectivity
- 1 - PQconnect w/Modbus RTU over RS485

Option:
- 0 - No option
- F - Floor Stand (150 HP and below for Type 3R)

Option:
- 0 - Standard Voltage Distortion
- 1 - High Voltage Distortion

Option:
- 0 - No option
- H - Heater (only in Type 3R)
- V - Vibration Pads
- P - Oil Field Duty

% THID vs. % Load



At standard test conditions of 1.5% source impedance and a VFD with 3% line reactance at full load, the HGP with PQconnect will provide 5% or lower THID at 50% of load.

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Passive Harmonic Filter Offerings

HarmonicGuard & HarmonicShield Passive Product Families

TCI offers a wide variety of passive harmonic filters to suit a range of applications. High quality components and a robust design allow TCI's line of passive filters to deliver best in class performance under the harshest conditions and in the most challenging applications.

The HarmonicGuard Passive filter is a drive applied passive harmonic filter that limits current distortion to less than 5% at low loads. The HGP with PQconnect provides Bluetooth connectivity to monitor power quality and control the filter. TCI also offers a low-capacitance filter (HGL) as part of the HarmonicGuard product line - allowing for intelligent generator compatibility.

The HarmonicShield Passive Filter with PQconnect offers industry leading performance even at light loads and under harsh conditions. The HSD is a stand-alone input device that is furnished in its own enclosure and mounted adjacent to the drive/VFD or ECM (HVAC Applications). It is specifically designed to reduce harmonics caused by VFDs and ECMs. TCI offers a low-capacitance model (HSL) and EC Motor model (HSE) as part of the HarmonicShield Series.

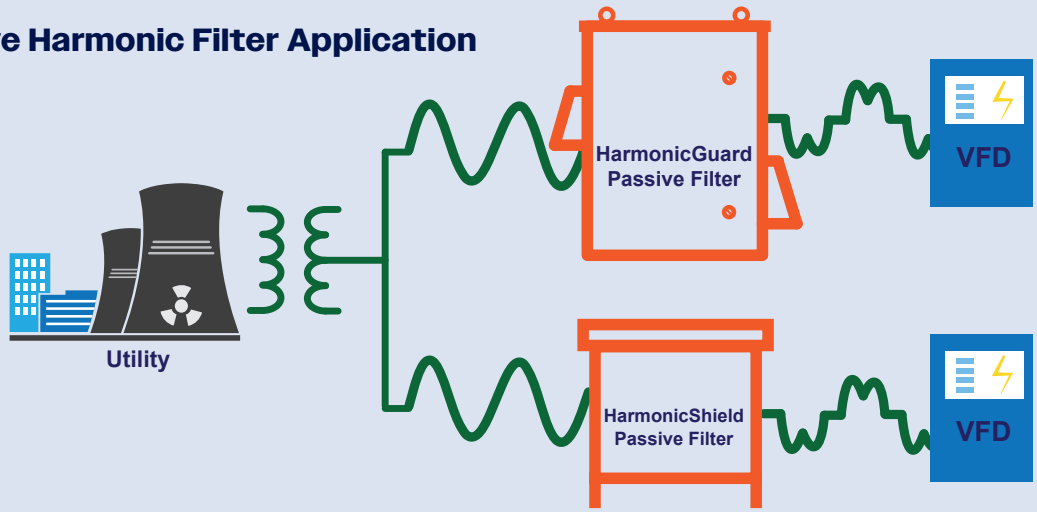
ADDITION OF PQCONNECT:

PQconnect on TCI's passive filters provides critical preventative maintenance and troubleshooting benefits to ensure smooth and long-term functionality. Be assured that your filter is accurately mitigating harmonics, eliminating your power quality issues.

FEATURES:

- Limits total harmonic current distortion down to 5% over the widest load range in the industry
- Ensures IEEE-519 2022 compliance
- Intelligent control and monitoring available with PQconnect
- Communications and data analytics available via Modbus RTU and EtherNet/IP
- Generator compatibility
- High quality components
- Made in the USA

Typical Passive Harmonic Filter Application



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MADE IN THE UNITED STATES OF AMERICA

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Technical Specifications

	HarmonicGuard Passive Series	HarmonicShield Passive Series
Voltage	60 Hz: 208, 240, 480, 600 VAC; 50 Hz: 380 - 415 VAC	60 Hz: 480, 600 VAC
Models	Standard, Low Capacitance	Standard, Low Capacitance, EC Motor Version
Power Rating	208 & 240 VAC: 5 - 200 HP 380 - 415 VAC: 4 - 1000 KW 480 & 600 VAC: 5 - 1250 HP	480 & 600 VAC: 3 - 1000 HP
THID	5% THID down to 50% loading, Low Capacitance version 5% THID at full load	5% THID down to 50% loading, Low Capacitance version 5% THID at full load
Enclosure Style	Hinged door for easy access in the field	Transformer style enclosure, no door
Component Mounting	Components mounted on back panel for easy inspection and replacement	Components mounted on base of enclosure
Mounting Options	Wall mounted	Floor mounted
Fusing	Fused branch circuit helps protect caps	No fusing
SCCR	100kA stand alone at 40 HP and above, need to add fusing below 40 HP	No SCCR
Connectivity and Intelligence	Option for PQconnect with Modbus RTU over RS485 & EtherNet/IP	Option for PQconnect with Modbus RTU over RS485 & EtherNet/IP - adds CPT into filter
UL Certifications/ Agency Approvals	UL508A - Field Maintainable by customer; cULus Listed, RoHS, and FCC	UL508 - To keep UL, filter must be maintained by factory authroized technician or shipped back to manufacturer for repairs; cULus Listed
Ambient Temperature	Open: -40°C (-40°F) to 50°C (122°F), Enclosed: -40°C (-40°F) to 40°C (104°F)	-40°C (-40°F) to 40°C (104°F)
Max Storage Temperature	60°C (140°F)	60°C (140°F)
Max Elevation	Up to 2,000m without derating. Consult factory for higher elevations.	Up to 2,000m without derating. Consult factory for higher elevations.
Cooling Method	Natural or Forced Air Convection	Convection cooled with no moving parts

APPLICABLE ACROSS INDUSTRIES:



HVAC compressors & blowers



HVAC/R chiller systems



Water/wastewater pump systems



Irrigation pumps



Oil & gas applications

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Passive Harmonic Filter Offerings

HarmonicGuard & HarmonicShield Passive Product Families

TCI offers a wide variety of passive harmonic filters to suit a range of applications. High quality components and a robust design allow TCI's line of passive filters to deliver best in class performance under the harshest conditions and in the most challenging applications.

The HarmonicGuard Passive filter is a drive applied passive harmonic filter that limits current distortion to less than 5% at low loads. The HGP with PQconnect provides Bluetooth connectivity to monitor power quality and control the filter. TCI also offers a low-capacitance filter (HGL) as part of the HarmonicGuard product line - allowing for intelligent generator compatibility.

The HarmonicShield Passive Filter with PQconnect offers industry leading performance even at light loads and under harsh conditions. The HSD is a stand-alone input device that is furnished in its own enclosure and mounted adjacent to the drive/VFD or ECM (HVAC Applications). It is specifically designed to reduce harmonics caused by VFDs and ECMs. TCI offers a low-capacitance model (HSL) and EC Motor model (HSE) as part of the HarmonicShield Series.

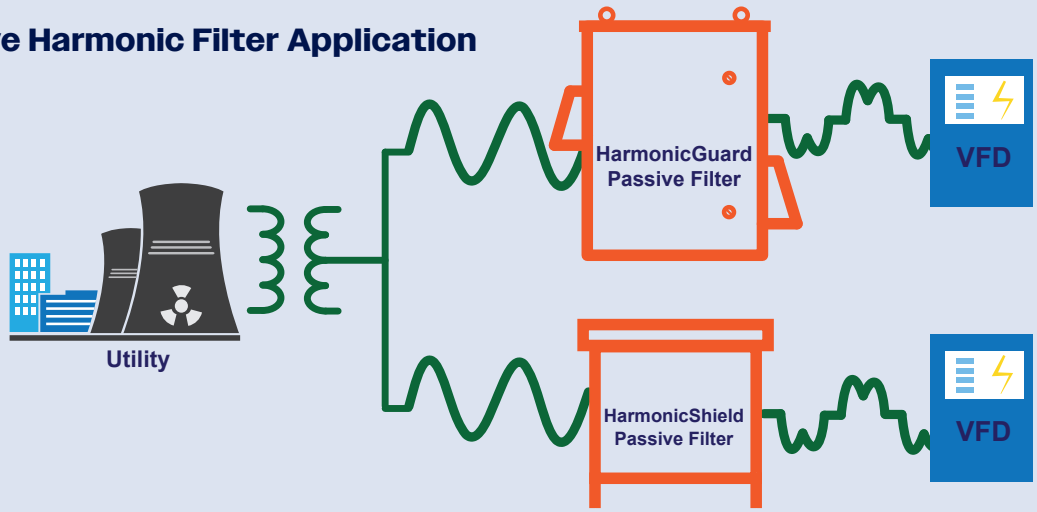
ADDITION OF PQCONNECT:

PQconnect on TCI's passive filters provides critical preventative maintenance and troubleshooting benefits to ensure smooth and long-term functionality. Be assured that your filter is accurately mitigating harmonics, eliminating your power quality issues.

FEATURES:

- Limits total harmonic current distortion down to 5% over the widest load range in the industry
- Ensures IEEE-519 2022 compliance
- Intelligent control and monitoring available with PQconnect
- Communications and data analytics available via Modbus RTU and EtherNet/IP
- Generator compatibility
- High quality components
- Made in the USA

Typical Passive Harmonic Filter Application



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MADE IN THE UNITED STATES OF AMERICA

Allient Power
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Technical Specifications

	HarmonicGuard Passive Series	HarmonicShield Passive Series
Voltage	60 Hz: 208, 240, 480, 600 VAC; 50 Hz: 380 - 415 VAC	60 Hz: 480, 600 VAC
Models	Standard, Low Capacitance	Standard, Low Capacitance, EC Motor Version
Power Rating	208 & 240 VAC: 5 - 200 HP 380 - 415 VAC: 4 - 1000 KW 480 & 600 VAC: 5 - 1250 HP	480 & 600 VAC: 3 - 1000 HP
THID	5% THID down to 50% loading, Low Capacitance version 5% THID at full load	5% THID down to 50% loading, Low Capacitance version 5% THID at full load
Enclosure Style	Hinged door for easy access in the field	Transformer style enclosure, no door
Component Mounting	Components mounted on back panel for easy inspection and replacement	Components mounted on base of enclosure
Mounting Options	Wall mounted	Floor mounted
Fusing	Fused branch circuit helps protect caps	No fusing
SCCR	100kA stand alone at 40 HP and above, need to add fusing below 40 HP	No SCCR
Connectivity and Intelligence	Option for PQconnect with Modbus RTU over RS485 & EtherNet/IP	Option for PQconnect with Modbus RTU over RS485 & EtherNet/IP - adds CPT into filter
UL Certifications/ Agency Approvals	UL508A - Field Maintainable by customer; cULus Listed, RoHS, and FCC	UL508 - To keep UL, filter must be maintained by factory authroized technician or shipped back to manufacturer for repairs; cULus Listed
Ambient Temperature	Open: -40°C (-40°F) to 50°C (122°F), Enclosed: -40°C (-40°F) to 40°C (104°F)	-40°C (-40°F) to 40°C (104°F)
Max Storage Temperature	60°C (140°F)	60°C (140°F)
Max Elevation	Up to 2,000m without derating. Consult factory for higher elevations.	Up to 2,000m without derating. Consult factory for higher elevations.
Cooling Method	Natural or Forced Air Convection	Convection cooled with no moving parts

APPLICABLE ACROSS INDUSTRIES:



HVAC compressors & blowers



HVAC/R chiller systems



Water/wastewater pump systems



Irrigation pumps



Oil & gas applications

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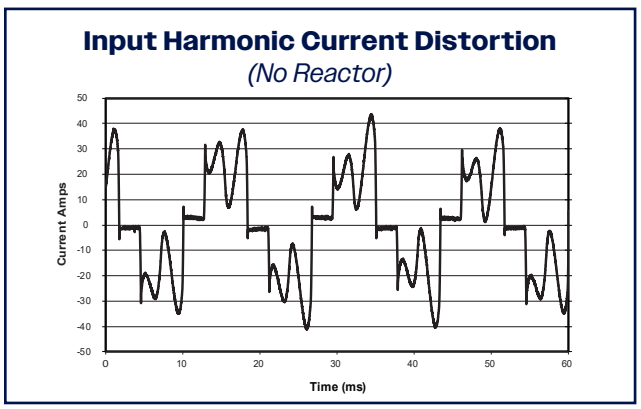
Optimized Line Reactor Offerings

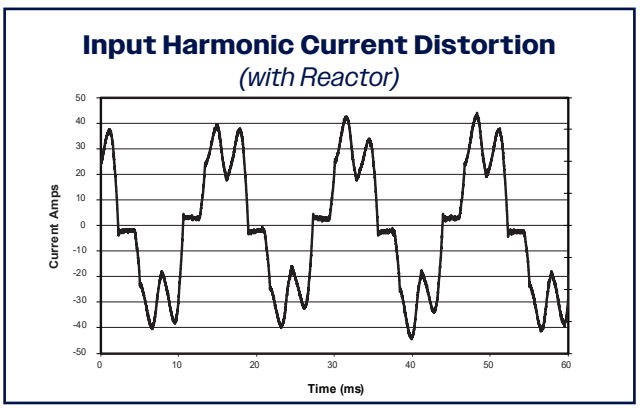
KDR & KLR Line & Load Reactor Product Families

TCI's line reactors are electrical componnets that help to protect 6-pulse rectifiers and power conversion devices such as variable frequency drives (VFDs). When used in conjuction with a VFD, a KDR line reactor can help reduce harmonics and protect the drive from harmful voltage spikes. KDR line reactors are recommended on the input of each VFD in multiple drive applications.

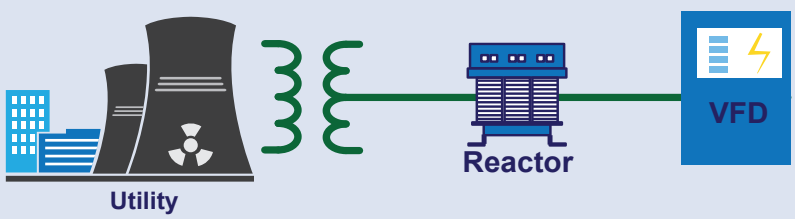
FEATURES:

- Helps to meet IEEE-519 2022 requirements
- Full range of voltage options
- 1/4 HP - 1250 HP
- Available in Ultra Low, Low, and High Impedance
- Strong durable design specifically for VFD applications
- Drive Lifetime Warranty
- UL Listed
- Made in the USA



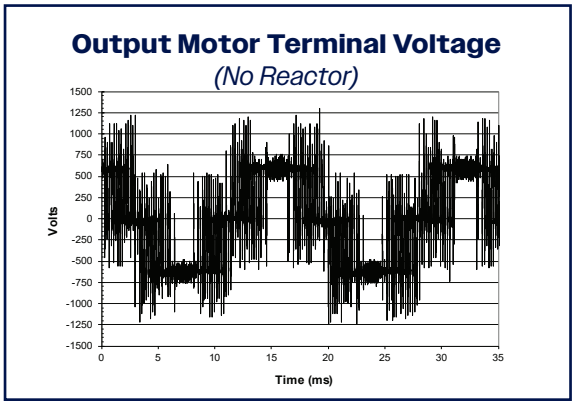


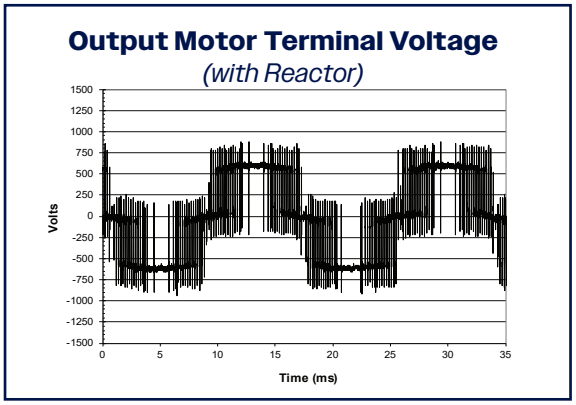
TCI REACTORS ON INPUT SIDE OF VFD:



Technical Specifications

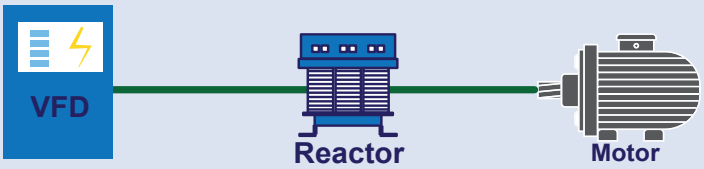
Voltage	208 - 690 VAC
Frequency	50 & 60 Hz
Power Rating	1/4 - 1250 HP
Impedance (Z)	Ultra Low, Low, High Impedance
Short Term Overload Rating (Amps)	Tolerate 200% rated I for a maximum of 3 minutes per hour
Inductance Characteristics (L)	Minimum 95% L at 110% Load; Minimum 80% L at 150% Load
Enclosure Options	Open, UL Type 1, NEMA 1, UL Type 3R
Environmental Conditions	
Ambient Temperature	40°C/50°C (105°F/122°F) Open or equivalent
	40°C (104°F) Enclosed
Operating Altitude	Up to 2,000 m (6,000 ft) without derating
Reference Technical Standards	
Agency Approvals	cULus, CE Marked
Warranty	For the life of the drive with which the reactor is installed





OUTPUT OF A VFD:

KDR and KLR reactors are constructed with durability in mind and can be used on both the input and output of a VFD. When used on the output of a drive, KDR and KLR reactors reduce voltage distortion at the motor terminals extending the service life and minimizing insulation stress on any motor.



APPLICABLE ACROSS INDUSTRIES:

- Conveyors
- HVAC/R chiller systems
- Water/wastewater pump systems
- Sprinkler & Irrigation pumps
- Oil Rigs

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FILTRO ARMÓNICO PASIVO AL 5%



Las armónicas producidas en un sistema de energía eléctrica debidas a cargas no lineales pueden afectar de manera adversa la infraestructura y las cargas del sistema. El filtro HarmonicShield™ (HSD) de TCI es un filtro armónico pasivo de conexión en serie que limita la distorsión armónica de la corriente a menos del 5% en un amplio rango de cargas. Debido a los efectos de la distorsión armónica de los variadores de frecuencia (VFD), los estándares IEEE 519-2014 requieren varios niveles de mitigación de armónicas. El HSD reduce la THD (distorsión armónica total) de la corriente a menos del 5%.

El HSD ofrece el mejor desempeño de la industria aun con cargas ligeras y en las condiciones más difíciles. El filtro HSD es un dispositivo de entrada independiente que se suministra en su propio gabinete y que se monta adyacente al variador/VFD. Está diseñado para reducir las armónicas causadas por los variadores y por los VFD.

Características del filtro HarmonicShield:

- Limita la distorsión armónica de la corriente a menos del 5% en un rango amplio de cargas
- Cumple con IEEE 519-2014
- Diseño de filtro rentable y libre de mantenimiento - no requiere ajustes mecánicos
- Gabinete enfriado por convección
- Rango de 3 HP a 600 HP
- 480 VCA; 600 VCA

Aplicaciones típicas del VFD

- Bombas de petróleo y gas
- Sistemas de bombeo de agua y aguas residuales
- Compresores y sopladores de aire acondicionado y refrigeración
- Bombas de riego
- Extrusoras

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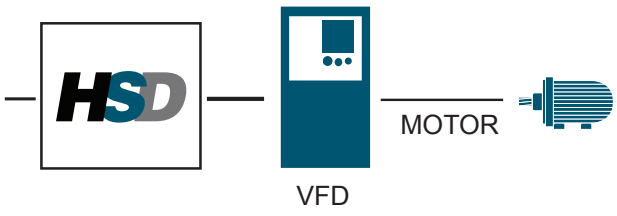
Especificaciones técnicas

Voltaje	480 VCA; 600 VCA
Frecuencia	60 Hz
Potencia nominal	3 - 600 HP
Tipos de carga	Cargas de rectificadores trifásicos de puente de diodos, como variadores de CA PWM (modulación de ancho de pulso)
Inmunidad de distorsión del voltaje	Menos del 5% de THID a plena carga con una THVD tan alta como el 0.5%
Capacidad de sobrecarga	200% de la capacidad de la corriente hasta durante 3 minutos/hora
Condiciones ambientales	
Temperatura ambiente máxima	40°C (104°F)
Temperatura ambiente máxima de almacena-miento	60°C (140°F)
Elevación máxima	Hasta 1,000 m (3,300 pies) sin derrateo. Consulte a la fábrica para elevaciones mayores.
Humedad	95% sin condensación
Normas técnicas de referencia	
Opciones de gabinete	UL Tipo 1 o UL Tipo 3R
Aprobaciones de agencias reguladoras	Listado en cULus

NOTA: HSD está clasificado como dispositivo auxiliar, no como panel de control industrial. Conforme las directivas de UL y de NFPA NEC, no se requiere clasificación o marcado de SCCR.

Aplicaciones típicas del HSD



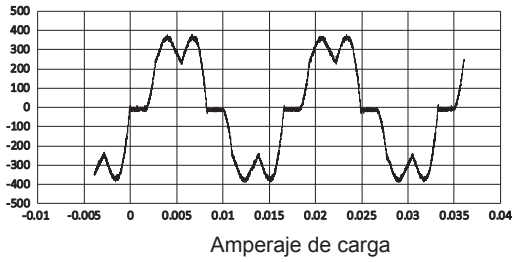
Consulte el sitio web para conocer las pautas de configuración.

Número de parte

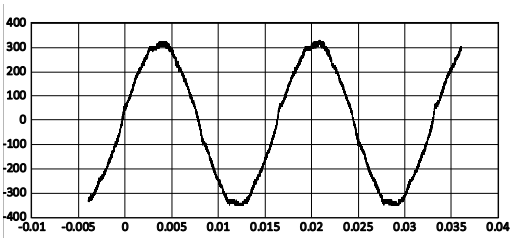
HSD 0150 A W 3 0 0 0 0

- Serie
- Caballos de fuerza
- Capacidad de voltaje
  - A - 480 V
  - C - 600 V
- Frecuencia
  - W - 60 Hz
- Gabinete
  - 1 - UL Tipo 1
  - 3 - UL Tipo 3R
- Opción
  - 0- sin contactor
  - 1- con contactor
- Opción
  - 0 - Estándar, sin zapatas
  - 1 - Zapatas
- Opción
  - 0 - Estándar
- Opción
  - 0 - Estándar

Forma de onda de corriente sin HSD



Forma de onda de corriente con HSD



Garantía de desempeño - *Seleccione e instale el filtro de armónicas HarmonicShield® apropiado en una aplicación de variador de frecuencia de CA de par variable y de frecuencia variable, dentro de nuestras especificaciones técnicas publicadas y le garantizamos que la distorsión de la corriente de entrada será menor o igual al 5% de THID para la serie de filtros HSD estándar a plena carga y menos del 8% al 30% de carga. Si el filtro que instale de manera apropiada y con el tamaño adecuado no cumple con su nivel de THID especificado, TCI proporcionará material para las modificaciones necesarias o un filtro de reemplazo sin cargo.*

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Parte #30253
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Output Protection Offerings

dV/dt, Reactors, and Sine Wave Product Families

TCI offers a wide variety of output protection options to suit a range of applications. High quality components and a robust design allow TCI's line reactors, dV/dt filters, and sine wave filters to deliver best in class performance under the harshest conditions and in the most challenging applications.

KDR and KLR reactors are constructed with durability in mind and can be used on both the input and output of a VFD. When used on the output of a drive, KDR and KLR reactors reduce voltage distortion at the motor terminals extending the service life and minimizing insulation stress on any motor.

The V1K dV/dt Filter provides motor protection by limiting voltage spikes to below 1,000 V for applications with lead lengths from 100-1,000ft. The V1K greatly extends the life of the motor and cable, offers a 30% reduction in common mode current, increases the voltage rise time and slows pulse transitions to reduce dV/dt.

TCI offers two sine wave filter options; the KMG MotorGuard and the MSD MotorShield. Sine wave filters convert the PWM wave form to a near sinusoidal wave form by eliminating the carrier frequency, allowing senstitive applications to take advantage of the efficiencies and savings that PWM output power supplies and VFDs can offer.

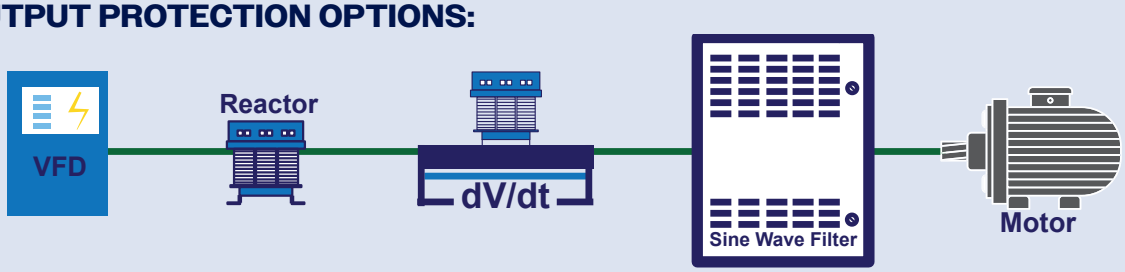
ADDITION OF PQCONNECT:

PQconnect on TCI's sine wave filters provides critical preventative maintenance and troubleshooting benefits to ensure smooth and long-term functionality. KMG with PQconnect enables pumping and VFD process control adjustments to optimize uptime and prevent power quality issues. Real-time power quality data can be used to monitor and trend for early detection of abnormal conditions.

FEATURES:

- Reactors feature strong and durable design specifically for VFD applications.
- V1K reduces common mode by a minimum of 30%.
- V1K limits voltage spikes to below 1,000 V for specific applications, and KMG and MSD eliminate high dV/dt voltage spikes ensuring optimal motor and cable protection.
- Sine Wave filters offer less than 5% THVD performance
- TCI Sine Wave Filters offer universal acceptance - can be used with virtually all AC induction motors, lead lengths and lead types and used with a wide range of carrier frequencies.

OUTPUT PROTECTION OPTIONS:



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Technical Specifications

	KMG Sine Wave Series	MSD Sine Wave Series	V1K dV/dt Filter	KDR Line Reactor
Application Voltages	208 V - 600 V			208 V - 690 V
480 VAC Current Ratings	8 - 750 Amps	9 - 480 Amps 40 - 960 Amps	2 - 750 Amps	0.5 - 1500 Amps
600 VAC Current Ratings	8 - 600 Amps	8 - 450 Amps 500 - 850 Amps		
VFD Carrier Frequency	2 - 16 kHz		2-4 kHz	Up to 8 kHz
Fundamental/ Output Frequency	Up to 80 Hz (derating above 80Hz)		0-60Hz (derating above 60Hz)	Up to 60 Hz (derating above 60Hz)
Reactor Insulation Class	Class H (180°C) or better			
Motor Lead Length	Up to 15,000 ft. for specific applications		Up to 1,000 ft.	Up to 100 ft.
Over-Load Rating	150% rated current for 1 minute per hour		200% rated current for 2 minutes per hour 150% rated current for 5 minutes per hour	200% rated current for 3 minutes per hour
Ambient Temperature	Open: -30°C (-22°F) to 50°C (122°F) Enclosed: -30°C (-22°F) to 40°C (104°F)		-40°C (-40°F) to 40°C (104°F)	
Maximum humidity	95%, non-condensing			
Operating Alititude	Up to 2,000 m (6,600 ft.) without derating			
Agency Approvals	cULus Listed			
Enclosure Options	Open, UL Type 1	Open, UL Type 1/3R	Open, UL Type 1, UL Type 3R Open, UL Type 1, UL Type 3R	
Warranty	One year of useful service, not to exceed 18 months from date of shipment.			For the life of the drive with which the reactor is installed

APPLICABLE ACROSS INDUSTRIES:



HVAC compressors & blowers



HVAC/R chiller systems



Water/wastewater pump systems



Irrigation pumps



Oil & gas applications

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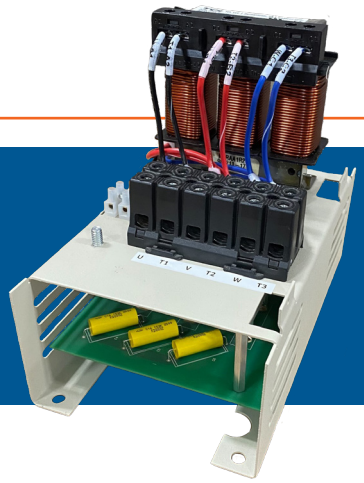
dV/dt Output Filter Offerings

V1K Product Family



Peak voltages on a 480 V system can reach 1,600 V, and on a 600 V system can reach 2,100 V. These high peak voltages will cause a rapid breakdown of motor insulation, leading to motor failure. The V1K dV/dt filter is an output device that prevents voltage spikes from variable frequency drives (VFD) from exceeding 1,000 V. The V1K minimizes these voltage wave amplitudes and slows the rate of voltage increases.

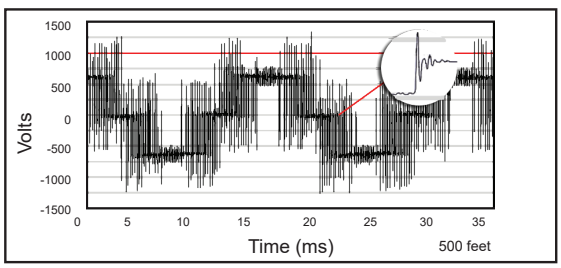
REFLECTIVE WAVE PHENOMENON:

Voltage wave reflection is a function of the voltage rise time (dV/dt) and the length of the motor cables. If the impedance on either end of the cable run does not match, the voltage pulses will be reflected back in the direction from which it arrived. As these reflected waves encounter other waves, their values add, causing higher peak voltage. As wire length or carrier frequency increases, the overshoot peak voltage also increases. V1K dV/dt filter reduces these peak voltages to prevent damage to motors and cables.

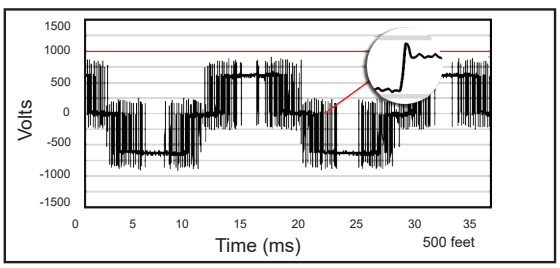
FEATURES:

- Limits voltage spikes to below 1,000 V for applications with lead lengths up to 1,000 ft on 480 V systems.
- Reduces motor heating, noise and vibration.
- Prevents motor failure with protection against motor insulation breakdown.
- Reduces Common Mode by a minimum of 30%.
- Improves system productivity by increasing motor bearing life.
- 208 - 600 VAC system compatibility.
- 2 - 750 Amps range.
- Heavy Duty model available for higher carrier frequency (6 kHz).
- Optional Thermal switch.

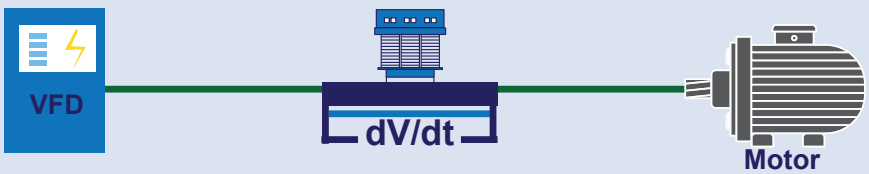
VOLTAGE WITHOUT V1K:



VOLTAGE WITH V1K:



OUTPUT PROTECTION OPTIONS:



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Technical Specifications

Current Rating	2 - 750 Amps; 208 - 600 VAC
Carrier Frequency	2 - 4 kHz (consult factory for applications over 8 kHz if the cable lengths exceed 400 ft)
Insulation Rating	600 V Class
Insulation Class	Class H (180°C) or better
Efficiency	≥ 98%
Lead Length	Up to 1,000 ft (consult factory for applications above 1,000 ft)
Fundamental Frequency	0 - 60 Hz (derating required for applications up to 120 Hz)
Over-Load Rating	200% rated current for 2 minutes per hour 150% rated current for 5 minutes per hour
Environmental Conditions	
Ambient Temperature	Enclosed: 40°C (104°F) without derating
Operating Altitude	2,000 m (6,600 ft) without derating
Reference Technical Standards	
Agency Approvals	cULus Listed
Enclosure Options	Open, UL Type 1, UL Type 3R
Warranty	One year of useful service, not to exceed 18 months from date of shipment.
Note: The V1K is classified as an UL 508 Auxiliary Device, not an industrial control panel. Under UL and NFPA/NEC guidelines, an SCCR rating or marking is not reuired.	

APPLICABLE ACROSS INDUSTRIES:



Submersible pumps



Wastewater



HVAC cooling systems



Process automation facilities



Irrigation systems

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Capacitor Bank Offerings

PFG Product Family



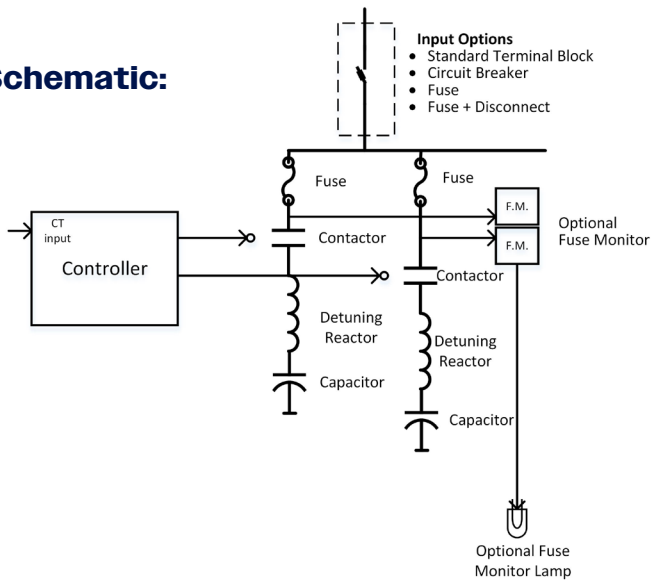
Avoid penalty fees and high utility bills with TCI's Power Factor Guard (PFG). By providing reactive power to your system, the PFG will improve your facility's power factor to near unity, thus reducing the amount of costly apparent power the utility must provide.

The PFG will reduce the demand on your electrical equipment, resulting in improved electrical system capacity and a more effective power supply.

FEATURES:

- Atuomatic switching design
- Controller interface to set desired power factor
- Built-in, detuned, anti-resonance reactor for an extra layer of protection from harmonics and equipment failure
- Half-Step switching to allow for finer Power Factor control
- cULus Listed

Typical PFG Schematic:



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Technical Specifications

Voltage Rating	480 VAC
Phase	3-Phase
Operating Frequency	60 Hz
Fuse Interrupt Rating	200 kA
SCCR Rating	5 kA: Circuit breaker only
Voltage Unbalance	1% maximum
Continuous Overvoltage	110%
Capacitor Tolerance	±5%
Expected Life	Over 130,000 operating hours
Maximum Harmonic Voltage	5%
Discharge Time	Less than 1 minute
Environmental Conditions	
Operating Temperature	Enclosed: -10°C (14°F) to 40°C (104°F)
Storage Temperature	-30°C (-22°F) to 60°C (140°F)
Relative Humidity	95% non-condensing
Operating Altitude	Up to 1,000 m without derating
Cooling Method	Forced Air Convection
Reference Technical Standards	
Agency Approvals	cULus Listed
Enclosure Options	Type 1

APPLICABLE ACROSS INDUSTRIES:



Large Industrial & Heavy Manufacturing



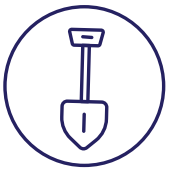
Wood Processing



Tire/Rubber



Refineries



Mining

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High Frequency Noise Offerings

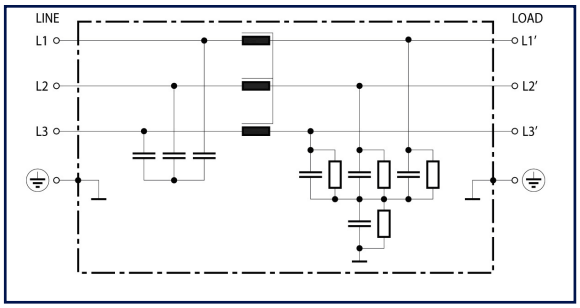
KRF Product Family



KRF 3-phase EMC Power Line 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.

Typical Circuit Diagram:



EQUIPMENT INTERFERENCE & FAILURE:

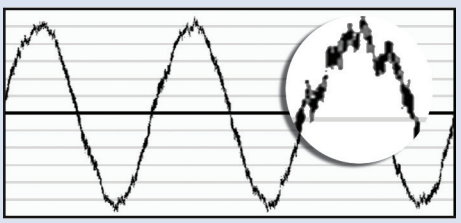
The power line noise emissions associated with variable frequency drives can cause disturbances in nearby equipment. Typical disturbances include:

- 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

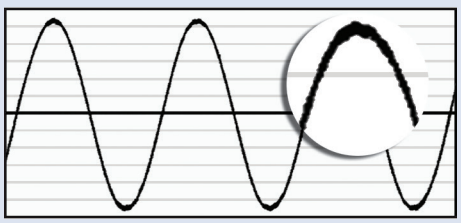
FEATURES:

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

Before KRF:



After KRF:



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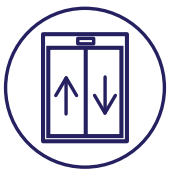
Technical Specifications

System Voltage	480 VAC (applied to 240 VAC - 520 VAC)
	690 VAC (applied to 600 VAC - 760 VAC)
Amp Ratings	480 V: 8 - 2500
	690 V: 25 - 2500
Number of Phases	3-Phase
Short Term Overload Rating	150% rated I for 3 minutes/60 minutes or 250% for 3 seconds/60 minutes
Tested Value	100% tested for Hipot, ground continuity, input-output continuity and insertion loss characteristic
Fundamental Frequency	50/60 Hz
Warranty	1 year
Environmental Conditions	
Ambient Temperature	-25°C (-13°F) to 100°C (212°F)
Maximum Altitude	Up to 1,000 m (3,300 ft) without derating
Reference Technical Standards	
Agency Approvals	ENEC, UL Recognized

APPLICABLE ACROSS INDUSTRIES:


Motor drives/ VFDs


Elevators


Wind Farms


Data Centers


Photovoltaics

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FILTRO ARMÓNICO PASIVO AL 5%



Las armónicas producidas en un sistema de energía eléctrica debidas a cargas no lineales pueden afectar de manera adversa la infraestructura y las cargas del sistema. El filtro HarmonicShield™ (HSD) de TCI es un filtro armónico pasivo de conexión en serie que limita la distorsión armónica de la corriente a menos del 5% en un amplio rango de cargas. Debido a los efectos de la distorsión armónica de los variadores de frecuencia (VFD), los estándares IEEE 519-2014 requieren varios niveles de mitigación de armónicas. El HSD reduce la THD (distorsión armónica total) de la corriente a menos del 5%.

El HSD ofrece el mejor desempeño de la industria aun con cargas ligeras y en las condiciones más difíciles. El filtro HSD es un dispositivo de entrada independiente que se suministra en su propio gabinete y que se monta adyacente al variador/VFD. Está diseñado para reducir las armónicas causadas por los variadores y por los VFD.

Características del filtro HarmonicShield:

- Limita la distorsión armónica de la corriente a menos del 5% en un rango amplio de cargas
- Cumple con IEEE 519-2014
- Diseño de filtro rentable y libre de mantenimiento - no requiere ajustes mecánicos
- Gabinete enfriado por convección
- Rango de 3 HP a 600 HP
- 480 VCA; 600 VCA

Aplicaciones típicas del VFD

- Bombas de petróleo y gas
- Sistemas de bombeo de agua y aguas residuales
- Compresores y sopladores de aire acondicionado y refrigeración
- Bombas de riego
- Extrusoras

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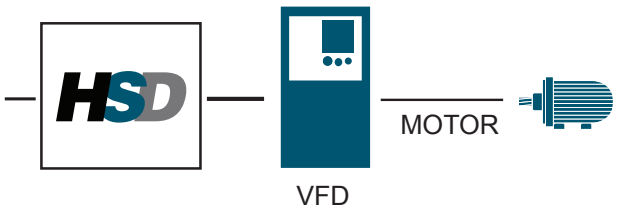
Especificaciones técnicas

Voltaje	480 VCA; 600 VCA
Frecuencia	60 Hz
Potencia nominal	3 - 600 HP
Tipos de carga	Cargas de rectificadores trifásicos de puente de diodos, como variadores de CA PWM (modulación de ancho de pulso)
Inmunidad de distorsión del voltaje	Menos del 5% de THID a plena carga con una THVD tan alta como el 0.5%
Capacidad de sobrecarga	200% de la capacidad de la corriente hasta durante 3 minutos/hora
Condiciones ambientales	
Temperatura ambiente máxima	40°C (104°F)
Temperatura ambiente máxima de almacena-miento	60°C (140°F)
Elevación máxima	Hasta 1,000 m (3,300 pies) sin derrateo. Consulte a la fábrica para elevaciones mayores.
Humedad	95% sin condensación
Normas técnicas de referencia	
Opciones de gabinete	UL Tipo 1 o UL Tipo 3R
Aprobaciones de agencias reguladoras	Listado en cULus

NOTA: HSD está clasificado como dispositivo auxiliar, no como panel de control industrial. Conforme las directivas de UL y de NFPA NEC, no se requiere clasificación o marcado de SCCR.

Aplicaciones típicas del HSD



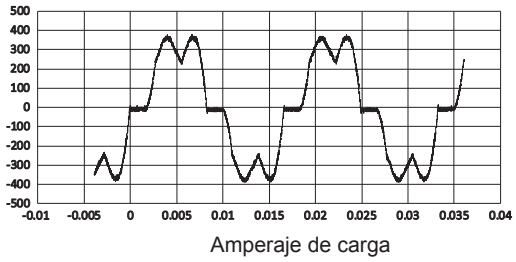
Consulte el sitio web para conocer las pautas de configuración.

Número de parte

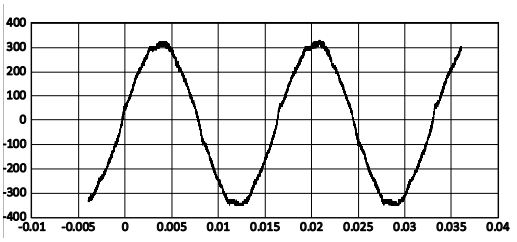
HSD 0150 A W 3 0 0 0 0

- Serie
- Caballos de fuerza
- Capacidad de voltaje
  - A - 480 V
  - C - 600 V
- Frecuencia
  - W - 60 Hz
- Gabinete
  - 1 - UL Tipo 1
  - 3 - UL Tipo 3R
- Opción
  - 0- sin contactor
  - 1- con contactor
- Opción
  - 0 - Estándar, sin zapatas
  - 1 - Zapatas
- Opción
  - 0 - Estándar
- Opción
  - 0 - Estándar

Forma de onda de corriente sin HSD



Forma de onda de corriente con HSD



Garantía de desempeño - *Seleccione e instale el filtro de armónicas HarmonicShield® apropiado en una aplicación de variador de frecuencia de CA de par variable y de frecuencia variable, dentro de nuestras especificaciones técnicas publicadas y le garantizamos que la distorsión de la corriente de entrada será menor o igual al 5% de THID para la serie de filtros HSD estándar a plena carga y menos del 8% al 30% de carga. Si el filtro que instale de manera apropiada y con el tamaño adecuado no cumple con su nivel de THID especificado, TCI proporcionará material para las modificaciones necesarias o un filtro de reemplazo sin cargo.*

TCI, LLC
W132 N10611 Grant Drive
Germantown, WI 53022
800-824-8282 | www.transcoil.com

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