



## SINE WAVE FILTER



Pulse width modulation (PWM), the output waveform of a VFD, can be used to control the amount of power delivered to the motor. The PWM waveform resembles a square wave form that is not ideal for operating motors. As the PWM increases so does the voltage causing voltage spikes in excess of 1,600 V. These high peak voltages will cause a rapid breakdown of motor insulation, leading to motor failure.

TCI's MotorShield (MSD) sine wave filters are used on the output of a VFD/drive to filter the PWM carrier frequency converting it into a clean voltage waveform. The MSD is suitable for carrier frequencies from 2 - 16 kHz. The MSD offers an added level of protection to your motor with minimal voltage drop.

### Features of MSD Sine Wave Filter:

- Strong durable components capable of handling harsh environments
- Suitable for lead lengths up to 15,000 ft.
- 240 - 600 VAC system compatibility
- 5 - 960 Amps range
- Cost effective, maintenance-free filter design - no mechanical adjustments needed
- cULus Listed

### Typical Applications

- Oil & Gas - hole pumps/deep well drilling
- HVAC Systems - fans and blowers
- Step up Transformers
- Mining Fields
- Material Handling



## Technical Specifications

Current Ratings	240 V: 5 - 248 Amps
	480 V: 5 - 1080 Amps
	600 V: 8 - 500 Amps
	Intermittent overload current of 150% for 1 minute out of every 60 minutes
VFD Output Voltage	240 V, 480 V and 600 V, 3-phase, at fundamental base frequency configured to Volts per Hz
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 models: 815 V, 600 V models: 1,018 V
	Maximum dV/dt of output waveform 480 V models: 5 V/ $\mu$ s, 600 V models: 6 V/ $\mu$ s
Environmental Conditions	
Maximum Elevation	6,600 ft (2,000 m), derating required for operation above this level
Operating Temp	-30 °C (-22 °F) to 40 °C (104 °F) Cooling provisions required for operation above this temperature
Ambient Storage Temp	-40 °C (-40 °F) to 50 °C (122 °F)
Maximum Humidity	95%, non-condensing
Reference Technical Standards	
Enclosure Options	UL Open and Type 1/3R enclosure
Voltage Drop	3% at nominal voltage, frequency and rated current
Capacitors	High endurance design (no PCBs)
Agency Approvals	UL & cULus Listed (up to 480 amps)

## Typical MSD Application



VFD



MOTOR



Please see web site for configuration guidelines.

## Part Numbering

Series: **MS** **D** **0160** **A** **3** **00**

UL Rating: \_\_\_\_\_  
MSD - UL 508  
MSN - Non-UL

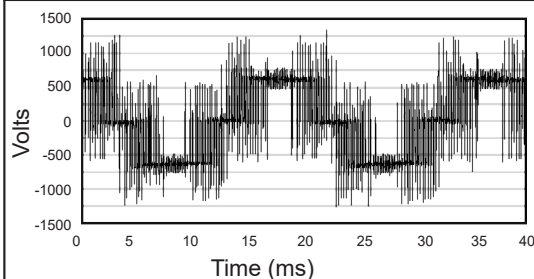
Current Rating: \_\_\_\_\_

Voltage Rating: \_\_\_\_\_  
A - 480 V  
B - 240 V  
C - 600 V

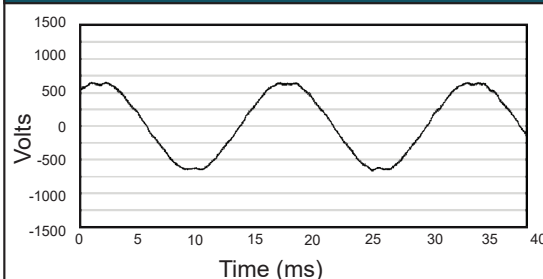
Enclosure: \_\_\_\_\_  
0 - Open  
3 - Type 1 / 3R

Option: \_\_\_\_\_  
00 - Default

## Motor Input Waveform Without MSD



## Motor Input Waveform With MSD



**Performance Guarantee** - Properly sized and applied, the addition of a MotorShield Sine Wave 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 MotorShield 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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