



HIGHSINE™ FILTERS

Air & Liquid Cooled Sine Wave Filters
240 Hz | 333 Hz | 350 Hz | 500 Hz

Selection Brochure

Motor Protection for High Frequency PM Motors Up to 500 Hz



Stop Trying To Make Silicon Steel “Work”

- High frequency sine wave filter (up to 500 Hz)
- <5% THVD to motor
- Four different, frequency-tuned options (240 Hz, 333 Hz, 350 Hz, 500 Hz)
- No filter derating
- No capacitor maintenance
- Up to 15,000 ft motor lead lengths



ctmmagnetics.com

STOP SAYING, "WE MADE IT WORK". BETTER SOLUTIONS EXIST.

Solving The Distortion Problem:

High frequency PM motor applications lead to higher harmonic distortion for the entire motor drive system. To account for this you can either reduce the harmonics by derating your VFD, increasing the drive cost and size, or derate your PM motor so that it can absorb the elevated harmonics while maintaining the desired HP rating. Either way, the CAPEX of your system will increase substantially, figure 1 below.

Conventional sine wave filters can take 15% THID from the VFD and filter it to 5% THID. The problem with adding a contemporary sine wave filter is that the cost of the filter is often greater than the cost to derate the PM motor.

CTM sine wave filters are different. Due to superior filtering capabilities, **CTM FlexSine® and HighSine™ filters are able to reduce drive harmonics from 35% THID to 5% THID.** The 35% to 5% relationship of the VFD/SWF/Motor will Lower CAPEX (investment), OPEX, and reduce the system's overall size and weight without introducing additional common mode noise (figure 2 below). Optimize your motor drive system today by adding a CTM FlexSine® or HighSine™ filter.

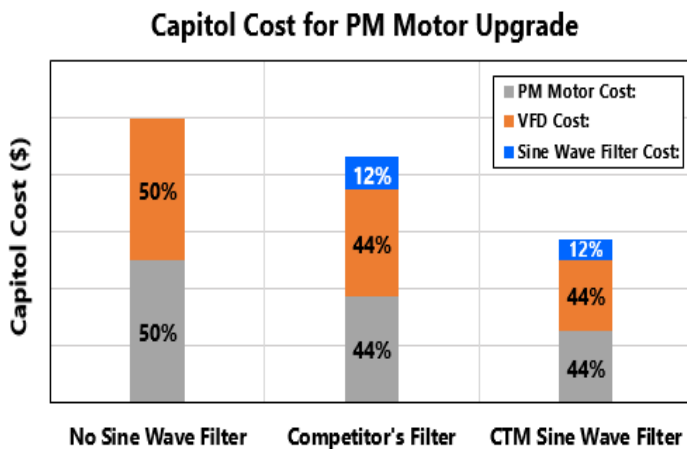


Figure 1. Cost Breakdown for PM Motor Upgrade

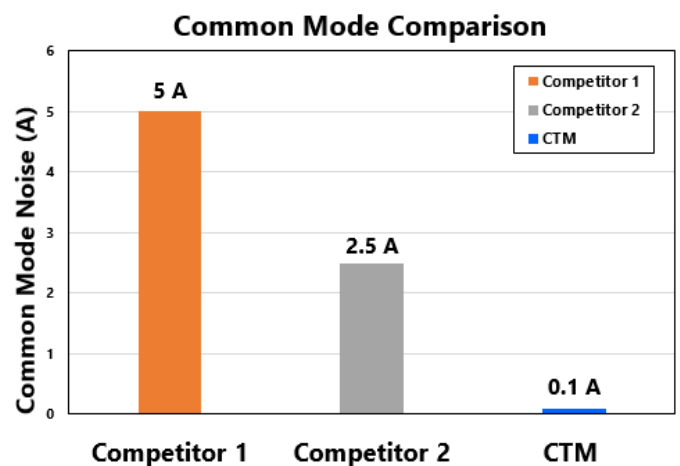



Figure 2. CTM vs. Competitors' Common Mode Noise

STOP TRYING TO MAKE SILICON STEEL “WORK”...

CTM's HighSine sine wave filters are specifically designed for optimal performance with high frequency induction and permanent magnet motors. HighSine filters provide industry leading filtering while allowing for minimal VFD derating. The HighSine series offers standard filters optimized for use at 240 Hz, 333 Hz, 350 Hz, and 500 Hz. Coupled with a liquid cooled option, CTM's patented liquid cooled technology traps and removes 97% of the filter's heat in the highest power density solution available to the market.

PERFORMANCE SPECIFICATIONS

Typical Applications	High Speed Motor Drives PMAC Motor Drives	
Harmonic Voltage Dist.	<5% THVD @ nominal switching frequency	
Voltage Range	480 V ±10%	
Voltage Insertion Loss	<3.3%	
Frequency Levels	<i>Fund. Frequency:</i>	<i>Switching Frequency:</i>
HighSine240:	Up to 240 Hz	4.0 kHz Nominal
HighSine333:	Up to 333 Hz	5.0 kHz Nominal
HighSine350:	Up to 350 Hz	5.0 kHz Nominal
HighSine500:	Up to 500 Hz	5.0 kHz Nominal (Thermal rating on back cover)
Current Range	<i>Air Cooled:</i>	<i>Liquid Cooled:</i>
HighSine240:	100 - 960 A	100 - 1560 A
HighSine333:	600 A	Contact CTM
HighSine350:	100 - 720 A	100 - 1440 A
HighSine500:	100 - 600 A	100 - 1320 A
Overload Capability	150% rated current for 1 minute (<i>Air</i>) 200% rated current for 1 minute (<i>Liquid</i>)	
Ambient Temperature Range	Maximum: 50 °C (122 °F)- <i>Air</i> 65 °C (149 °F)- <i>Liquid</i>	Minimum: -40 °C (-40 °F)- <i>Air</i> -40 °C (-40 °F)- <i>Liquid</i> ^A
Audible Noise	~40 dB (Air)	~0 dB (Liquid)
Relative Humidity	95% without condensation	
Enclosure Options	Modular Panel ^B NEMA 3R Cabinet	
Motor Cable Length	Up to 15,000 feet	
Maximum Altitude	3,300 ft (Air) ^C	No Limit (Liquid)
Agency Recognitions	c  US LISTED	

Liquid Cooled Options:

Maximum Coolant Temp.	50 °C (122 °F) (<i>Higher with de-rating</i>)
Approved Coolants	Drinking water Water-glycol mixture <i>For R134A, contact CTM</i>
Material Options	Aluminum (standard) Copper
Heat Removal	97% to Liquid Coolant 3% to Ambient Air

^A Preventative measures should be taken to ensure the coolant does not freeze in the system.

^B HighSine 333 Hz Filters (Modular Panel) come with dampening resistors.

^C Maximum Altitude rating is higher with derate.

HIGHSINE™ HIGHLIGHTS

Optimized for High Frequency PM Motors

Designed specifically with high frequency PM motors in mind, CTM's HighSine filters incorporate features to address concerns unique to these applications.

For example, high frequency inverters often output higher harmonics than at line frequency. To address this issue, these filters are attenuated to remove a larger percentage of drive harmonics.

No Filter Derating

Competitors' solution to high frequency motors is to force you to buy a larger filter and derate. The HighSine series is different. Due to a unique patented design and proprietary materials, the HighSine filter is rated at full current up to 500 Hz.

Superior Materials

Thermally designed to withstand frequencies that would burn other inductors, HighSine filters utilize advanced, proprietary materials to minimize heating and high current saturation.

Multiple Designs for Enhanced Performance

Multiple filter designs are offered at each current level, so that filter performance, capacitor current percentage, and cost are optimized for your application's needs.

LIQUID COOLED ADVANTAGES

Highest Power Density

Superior heat removal technology enables smaller magnetics, yielding the highest power density reactors available. Low surface temperatures eliminate clearance requirements, further increasing "effective" power density.

Thermal Isolation

With up to 97% of heat removed through the coolant, liquid cooled reactors have negligible effects on cabinet air temperature. No climate control required.

Sealed Design for Harsh Environments

CTM inductors are environmentally sealed in potting, creating an extremely rugged and reliable design ideal for use in the harshest environments.

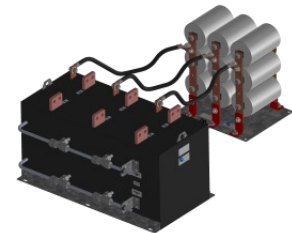
Extremely Low Audible Noise

Due to superior materials and geometric shapes, magnetostriction-induced noise is significantly lower in CTM filters. When combined with a sealed package, the result is a nearly silent solution.

ELECTRICAL SPECIFICATIONS (LIQUID):

Filter size based on the Full Load Amps (FLA) of the drive. The filter current rating must be greater than or equal to the FLA. Order filters by CTM Part Number online at ctmmagnetics.com/contact-us, or call us directly at [480.967.9447](tel:480.967.9447).

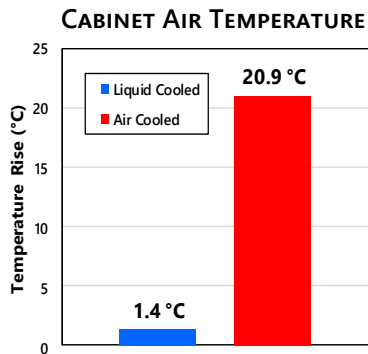
Rated Current (A _{RMS})	Rated Freq. (Hz)	Part Number ¹	Power Loss (Watts) ²		Rated Current (A _{RMS})	Rated Freq. (Hz)	Part Number ¹	Power Loss (Watts) ²		Rated Current (A _{RMS})	Rated Freq. (Hz)	Part Number ¹	Power Loss (Watts) ²	
			Liq.	Air				Liq.	Air				Liq.	Air
100	240	S240L100A40	378	12	420	240	S240L420A40	1,633	50	1080	240	S240L1K1A40	3,018	93
	350	S350L100A50	512	16		350	S350L420A50	1,699	53		350	S350L1K1A50	3,518	109
	500	S500L100A50	623	19		500	S500L420A50	1,976	61		500	S500L1K1A50	3,617	112
130	240	S240L130A40	701	22	480	240	S240L480A40	1,391	43	1200	240	S240L1K2A40	3,309	102
	350	S350L130A50	771	24		350	S350L480A50	1,918	59		350	S350L1K2A50	3,530	109
	500	S500L130A50	922	29		500	S500L480A50	2,421	75		500	S500L1K2A50	4,414	137
160	240	S240L160A40	631	20	540	240	S240L540A40	1,769	55	1320	240	S240L1K3A40	3,262	101
	350	S350L160A50	535	17		350	S350L540A50	1,915	59		350	S350L1K3A50	3,934	122
	500	S500L160A50	713	22		500	S500L540A50	2,409	75		500	S500L1K3A50	4,252	131
200	240	S240L200A40	841	26	600	240	S240L600A40	2,110	65	1440	240	S240L1K4A40	3,582	111
	350	S350L200A50	905	28		350	S350L600A50	2,081	64		350	S350L1K4A50	3,742	116
	500	S500L200A50	1,007	31		500	S500L600A50	2,610	81					
240	240	S240L240A40	1,016	31	720	240	S240L720A40	2,014	62	1560	240	S240L1K6A40	4,211	130
	350	S350L240A50	1,117	35		350	S350L720A50	2,424	75					
	500	S500L240A50	1,440	45		500	S500L720A50	3,044	94					
300	240	S240L300A40	1,106	34	840	240	S240L840A40	3,137	97					
	350	S350L300A50	1,251	39		350	S350L840A50	2,799	87					
	500	S500L300A50	1,525	47		500	S500L840A50	3,466	107					
360	240	S240L360A40	1,304	40	960	240	S240L960A40	2,814	87					
	350	S350L360A50	1,644	51		350	S350L960A50	3,332	103					
	500	S500L360A50	1,973	61		500	S500L960A50	3,492	108					



¹ Use part number table (bottom right) to select options. Unspecified options will be assumed to carry the default "-MA00" option number.

² Loss calculations performed at rated current, rated frequency with 5 kHz switching frequency, and 20 °C coolant. THD-i is 18.4% (200 Hz), 26.6% (320 Hz), and 31.5% (400 Hz).

LIQUID COOLED VS. AIR COOLED



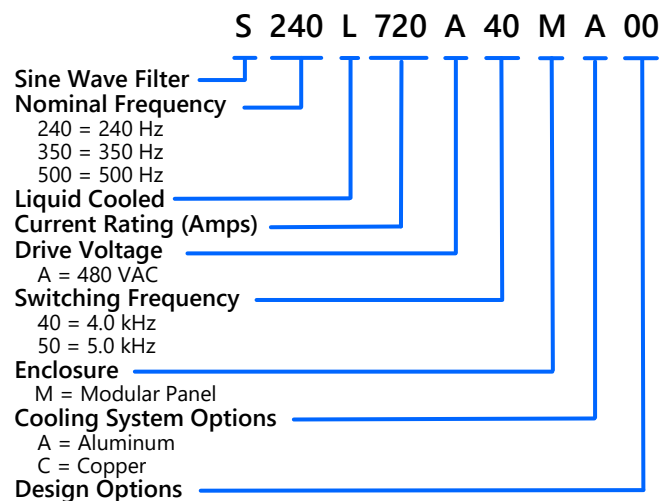
REDUCED CABINET TEMP:

CTM liquid cooled filters will have negligible temperature effects when installed in an existing cabinet. Liquid cooled

inductors are thermally isolated from their enclosures, meaning a majority (97%) of the heat is removed directly through the liquid coolant. This results in increased reliability for all electronics within the cabinet.

Note: Information is for reference only. Data subject to change without notice.

PART NUMBER SYSTEM



HIGH SINE™ 240F MECHANICAL SPECIFICATIONS:

Filter size based on the Full Load Amps (FLA) of the drive. The filter current rating must be greater than or equal to the FLA. Order filters by CTM Part Number online at ctmmagnetics.com/contact-us, or call us directly at [480.967.9447](tel:480.967.9447).

Rated Current (A _{RMS})	Est. Motor HP ¹	Rated Freq. (Hz)	Modular Panel				NEMA 3R Cabinet		
			Part Number ²	Size (W x D x H)		Weight (lb)	Part Number ²	Size (W x D x H) (in)	Weight (lb)
				Reactor (in)	Cap. Panel (in)				
100	75	240	S240F100A40M	9.6 x 16.0 x 12.3	11.0 x 8.9 x 5.9	84	S240F100A40R	25.3 x 36.4 x 44.5	209
130	100	240	S240F130A40M	9.6 x 16.0 x 12.3	11.0 x 8.9 x 5.9	91	S240F130A40R	25.3 x 36.4 x 44.5	214
160	125	240	S240F160A40M	9.6 x 16.0 x 12.3	11.0 x 8.9 x 5.9	90	S240F160A40R	25.3 x 36.4 x 44.5	214
200	150	240	S240F200A40M	9.6 x 21.6 x 12.3	11.0 x 8.9 x 5.9	107	S240F200A40R	25.3 x 36.4 x 44.5	228
240	200	240	S240F240A40M	9.6 x 21.6 x 12.3	11.0 x 8.9 x 8.6	115	S240F240A40R	25.3 x 36.4 x 44.5	236
300	250	240	S240F300A40M	9.6 x 21.6 x 12.3	11.0 x 8.9 x 8.6	116	S240F300A40R	25.3 x 36.4 x 44.5	237
360	300	240	S240F360A40M	12.4 x 27.3 x 16.0	11.0 x 8.9 x 8.6	168	S240F360A40R	25.3 x 36.4 x 44.5	280
420	350	240	S240F420A40M	12.4 x 27.3 x 16.0	11.0 x 8.9 x 8.6	171	S240F420A40R	25.3 x 36.4 x 44.5	283
480	400	240	S240F480A40M	12.4 x 27.3 x 16.0	11.0 x 8.9 x 12.1	176	S240F480A40R	25.3 x 36.4 x 44.5	289
540	450	240	S240F540A40M	12.4 x 27.3 x 16.0	11.0 x 8.9 x 12.1	180	S240F540A40R	25.3 x 36.4 x 44.5	294
600	500	240	S240F600A40M	12.4 x 27.3 x 16.0	11.0 x 8.9 x 12.1	222	S240F600A40R	30.5 x 41.9 x 49.5	402
720	600	240	S240F720A40M	12.4 x 27.3 x 16.0	21.5 x 8.9 x 8.6	249	S240F720A40R	30.5 x 41.9 x 49.5	432
840	700	240	S240F840A40M	14.0 x 29.8 x 17.9	21.5 x 8.9 x 8.6	285	S240F840A40R	30.5 x 41.9 x 49.5	471
960	800	240	S240F960A40M	14.0 x 29.8 x 17.9	21.5 x 8.9 x 12.1	300	S240F960A40R	30.5 x 41.9 x 49.5	486

¹ Motor HP estimated based on typical conditions. Actual HP will vary with application. Size filter based on drive FLA.

² Use part number table for additional options. Design options will be assumed to carry the default "-A00" option number.

HIGH SINE™ 240F:

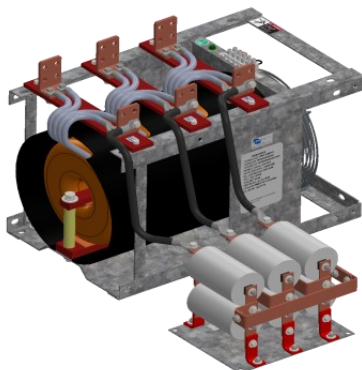
Fundamental Frequency: Up to 240 Hz

Nominal Switching Frequency: 4.0 kHz

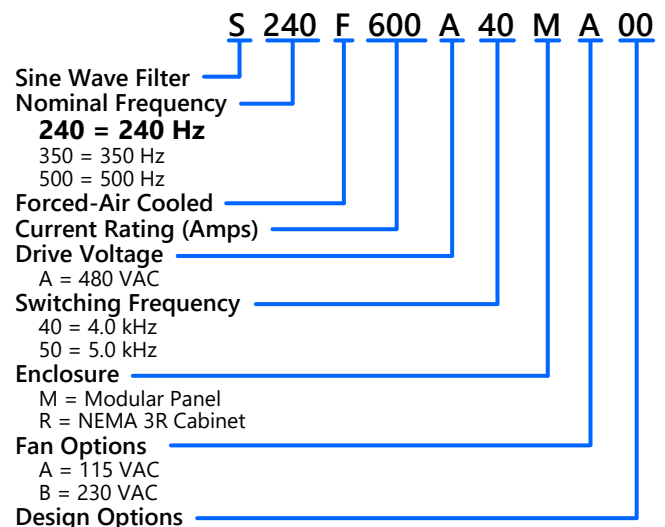
Thermal Switching Frequency: 3.6 kHz

Current Ratings: 100 A - 960 A

Harmonic Distortion: <5% THVD @ 4 kHz



PART NUMBER SYSTEM



Note: Information is for reference only. Data subject to change without notice.

HIGH SINE™ 240L MECHANICAL SPECIFICATIONS:

Filter size based on the Full Load Amps (FLA) of the drive. The filter current rating must be greater than or equal to the FLA. Order filters by CTM Part Number online at ctmmagnetics.com/contact-us, or call us directly at 480.967.9447.

Rated Current (A _{RMS})	Est. Motor HP ¹	Modular Panel				Reference Figure	Flow Rate (GPM) ³
		Part Number ²	Size (W x D x H)		Weight (lb)		
			Reactor (in)	Cap Panel (in)			
100	75	S240L100A40MA00	9.7 x 9.3 x 9.6	11.0 x 8.9 x 5.9	70	F1	0.6
130	100	S240L130A40MA00	9.7 x 9.3 x 9.6	11.0 x 8.9 x 5.9	70	F1	0.6
160	125	S240L160A40MA00	9.7 x 9.3 x 9.6	11.0 x 8.9 x 5.9	71	F1	0.6
200	150	S240L200A40MA00	12.0 x 9.3 x 9.6	11.0 x 8.9 x 5.9	86	F1	0.7
240	200	S240L240A40MA00	12.0 x 9.3 x 9.6	11.0 x 8.9 x 8.6	94	F1	0.8
300	250	S240L300A40MA00	12.0 x 9.3 x 9.6	11.0 x 8.9 x 8.6	94	F1	0.9
360	300	S240L360A40MA00	12.6 x 10.1 x 10.3	11.0 x 8.9 x 8.6	115	F1	1.0
420	350	S240L420A40MA00	15.3 x 10.1 x 10.3	11.0 x 8.9 x 8.6	137	F1	1.3
480	400	S240L480A40MA00	15.3 x 10.1 x 10.3	11.0 x 8.9 x 12.1	144	F1	1.1
540	450	S240L540A40MA00	15.3 x 10.1 x 10.3	11.0 x 8.9 x 12.1	144	F1	1.4
600	500	S240L600A40MA00	17.0 x 11.3 x 11.7	11.0 x 8.9 x 12.1	201	F1	1.6
720	600	S240L720A40MA00	17.0 x 11.3 x 11.7	21.5 x 8.9 x 8.6	222	F1	1.5
840	700	S240L840A40MA00	17.0 x 11.3 x 11.7	21.5 x 8.9 x 8.6	252	F1	2.4
960	800	S240L960A40MA00	20.9 x 12.5 x 11.9	21.5 x 8.9 x 12.1	264	F2	2.1
1080	900	S240L1K1A40MA00	20.9 x 12.5 x 11.9	21.5 x 8.9 x 12.1	273	F2	2.4
1200	1000	S240L1K2A40MA00	22.0 x 14.0 x 13.3	21.5 x 8.9 x 12.1	351	F2	2.7
1320	1100	S240L1K3A40MA00	22.0 x 14.0 x 13.3	21.5 x 8.9 x 15.5	363	F2	2.4
1440	1200	S240L1K4A40MA00	23.1 x 15.5 x 15.1	21.5 x 8.9 x 15.5	474	F2	2.7
1560	1300	S240L1K6A40MA00	23.1 x 15.5 x 15.1	21.5 x 8.9 x 15.5	475	F2	3.3

¹ Motor HP estimated based on typical conditions. Actual HP will vary with application. Size filter based on drive FLA.

² Use part number table (bottom right) for additional options.

³ Recommended minimum flow rates. Customer must verify flow rate for each application. Contact CTM for operation at lower flow rates, pressure drop, or for R134A use.

HIGH SINE™ 240L:

Fundamental Frequency: Up to 240 Hz

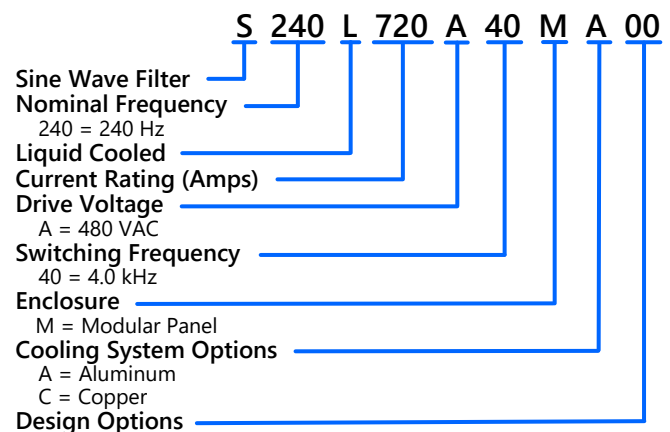
Nominal Switching Frequency: 4.0 kHz

Thermal Switching Frequency: 3.6 kHz

Current Ratings: 100 A - 1560 A

Harmonic Distortion: <5% THVD @ 4 kHz

PART NUMBER SYSTEM



Note: Information is for reference only. Data subject to change without notice.

HIGHSINE™ SD333F MECHANICAL SPECIFICATIONS:

Filter size based on the Full Load Amps (FLA) of the drive. The filter current rating must be greater than or equal to the FLA. Order filters by CTM Part Number online at ctmmagnetics.com/contact-us, or call us directly at [480.967.9447](tel:480.967.9447).

Damped Sine Wave Filters:

CTM Magnetics created the SD333F damped sine wave filter in response to a customer's need. The customer was looking at spinning a PM motor at 10,000 rpm or roughly 333 Hz. In order to prevent the sine wave filter from resonating, dampening resistors were added. CTM's SD333 filters offer superior filtering capabilities within a small package size. Due to our unique patented designs, CTM filters are capable of exhausting heat outside of the cabinet thereby reducing over all cabinet air temperature.

Modular Panel (Dampening Resistors)

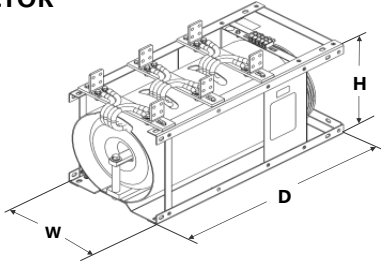
Rated Current (A_{RMS})	Est. Motor HP ¹	Rated Freq. (Hz)	Part Number ²	Size (W x D x H)		Weight (lb)
				Reactor (in)	Resistor Box (in)	
600	500	333	SD333F600A50MA00	14.0 x 29.8 x 17.9	10.6 x 28.7 x 15.7	264

¹ Motor HP estimated based on typical conditions. Actual HP will vary with application. Size filter based on drive FLA.

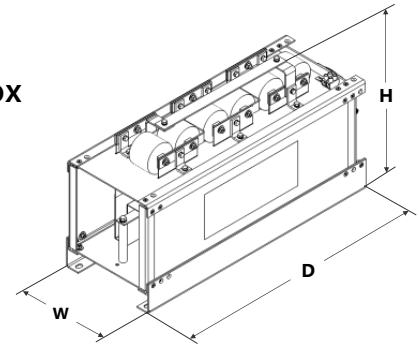
² Use part number table for additional options. Design options will be assumed to carry the default "-A00" option number.

DAMPED MODULAR PANEL: (2 PARTS)

REACTOR



RESISTOR BOX



HIGHSINE™ SD333F:

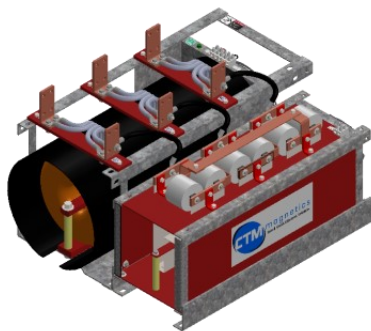
Fundamental Frequency: Up to 333 Hz

Nominal Switching Frequency: 5.0 kHz

Thermal Switching Frequency: 5.0 kHz

Current Ratings: 600 A

Harmonic Distortion: <5% THVD @ 5 kHz



PART NUMBER SYSTEM

	SD	333	F	600	A	50	M	A	00
Damped Sine Wave Filter									
Nominal Frequency									
333 = 333 Hz									
Forced-Air Cooled									
Current Rating (Amps)									
Drive Voltage									
A = 480 VAC									
Switching Frequency									
50 = 5.0 kHz									
Enclosure									
M = Modular Panel									
R = NEMA 3R Cabinet									
Fan Options									
A = 115 VAC									
B = 230 VAC									
Design Options									

Note: Information is for reference only. Data subject to change without notice.

HIGH SINE™ 350F MECHANICAL SPECIFICATIONS:

Filter size based on the Full Load Amps (FLA) of the drive. The filter current rating must be greater than or equal to the FLA. Order filters by CTM Part Number online at ctmmagnetics.com/contact-us, or call us directly at [480.967.9447](tel:480.967.9447).

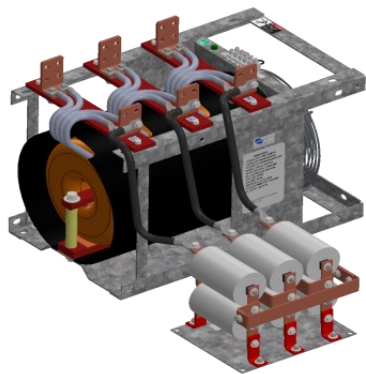
Rated Current (A _{RMS})	Est. Motor HP ¹	Rated Freq. (Hz)	Modular Panel				NEMA 3R Cabinet		
			Part Number ²	Size (W x D x H)		Weight (lb)	Part Number ²	Size (W x D x H) (in)	Weight (lb)
				Reactor (in)	Cap. Panel (in)				
100	75	350	S350F100A50M	9.6 x 16.0 x 12.3	11.0 x 8.9 x 5.9	80	S350F100A50R	25.3 x 36.4 x 44.5	205
130	100	350	S350F130A50M	9.6 x 21.6 x 12.3	11.0 x 8.9 x 5.9	100	S350F130A50R	25.3 x 36.4 x 44.5	222
160	125	350	S350F160A50M	9.6 x 16.0 x 12.3	11.0 x 8.9 x 8.6	96	S350F160A50R	25.3 x 36.4 x 44.5	219
200	150	350	S350F200A50M	9.6 x 21.6 x 12.3	11.0 x 8.9 x 8.6	112	S350F200A50R	25.3 x 36.4 x 44.5	233
240	200	350	S350F240A50M	9.6 x 21.6 x 12.3	11.0 x 8.9 x 8.6	126	S350F240A50R	25.3 x 36.4 x 44.5	247
300	250	350	S350F300A50M	12.4 x 27.3 x 16.0	11.0 x 8.9 x 12.1	171	S350F300A50R	25.3 x 36.4 x 44.5	283
360	300	350	S350F360A50M	12.4 x 27.3 x 16.0	11.0 x 8.9 x 12.1	213	S350F360A50R	30.5 x 41.9 x 49.5	391
420	350	350	S350F420A50M	12.4 x 27.3 x 16.0	21.5 x 8.9 x 8.6	231	S350F420A50R	30.5 x 41.9 x 49.5	409
480	400	350	S350F480A50M	14.0 x 29.8 x 17.9	21.5 x 8.9 x 8.6	257	S350F480A50R	30.5 x 41.9 x 49.5	438
540	450	350	S350F540A50M	14.0 x 29.8 x 17.9	21.5 x 8.9 x 12.1	268	S350F540A50R	30.5 x 41.9 x 49.5	449
600	500	350	S350F600A50M	14.0 x 29.8 x 17.9	21.5 x 8.9 x 12.1	279	S350F600A50R	30.5 x 41.9 x 49.5	460
720	600	350	S350F720A50M	14.0 x 29.8 x 17.9	21.5 x 8.9 x 15.5	295	S350F720A50R	30.5 x 41.9 x 49.5	478

¹ Motor HP estimated based on typical conditions. Actual HP will vary with application. Size filter based on drive FLA.

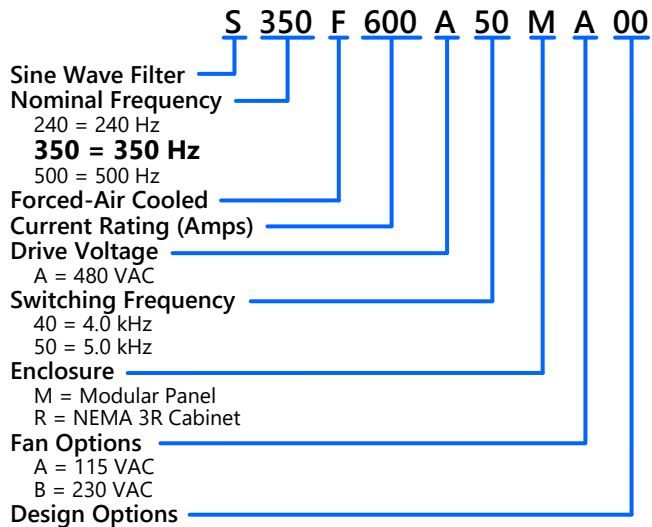
² Use part number table for additional options. Design options will be assumed to carry the default "-00" option number.

HIGH SINE™ 350F:

- Fundamental Frequency:** Up to 350 Hz
- Nominal Switching Frequency:** 5.0 kHz
- Thermal Switching Frequency:** 4.0 kHz
- Current Ratings:** 100 A - 720 A
- Harmonic Distortion:** <5% THVD @ 5 kHz



PART NUMBER SYSTEM



Note: Information is for reference only. Data subject to change without notice.

HIGH SINE™ 350L MECHANICAL SPECIFICATIONS:

Filter size based on the Full Load Amps (FLA) of the drive. The filter current rating must be greater than or equal to the FLA. Order filters by CTM Part Number online at ctmmagnetics.com/contact-us, or call us directly at 480.967.9447.

Rated Current (A _{RMS})	Est. Motor HP ¹	Modular Panel				Reference Figure	Flow Rate (GPM) ³
		Part Number ²	Size (W x D x H)		Weight (lb)		
			Reactor (in)	Cap Panel (in)			
100	75	S350L100A50MA00	9.7 x 9.3 x 9.6	11.0 x 8.9 x 5.9	69	F1	0.6
130	100	S350L130A50MA00	10.4 x 10.1 x 10.3	11.0 x 8.9 x 5.9	86	F1	0.6
160	125	S350L160A50MA00	9.7 x 9.3 x 9.6	11.0 x 8.9 x 8.6	77	F1	0.6
200	150	S350L200A50MA00	10.4 x 10.1 x 10.3	11.0 x 8.9 x 8.6	94	F1	0.7
240	200	S350L240A50MA00	12.6 x 10.1 x 10.3	11.0 x 8.9 x 8.6	112	F1	0.9
300	250	S350L300A50MA00	12.6 x 10.1 x 10.3	11.0 x 8.9 x 12.1	119	F1	1.0
360	300	S350L360A50MA00	15.3 x 10.1 x 10.3	11.0 x 8.9 x 12.1	144	F1	1.3
420	350	S350L420A50MA00	15.3 x 10.1 x 10.3	21.5 x 8.9 x 8.6	164	F1	1.3
480	400	S350L480A50MA00	17.0 x 11.3 x 11.7	21.5 x 8.9 x 8.6	219	F1	1.5
540	450	S350L540A50MA00	17.0 x 11.3 x 11.7	21.5 x 8.9 x 12.1	230	F1	1.5
600	500	S350L600A50MA00	17.0 x 11.3 x 11.7	21.5 x 8.9 x 12.1	240	F1	1.6
720	600	S350L720A50MA00	20.9 x 12.5 x 11.9	21.5 x 8.9 x 15.5	278	F2	2.1
840	700	S350L840A50MA00	20.9 x 12.5 x 11.9	21.5 x 8.9 x 15.5	290	F2	2.1
960	800	S350L960A50MA00	22.0 x 14.0 x 13.3	21.5 x 17.8 x 12.1	386	F2	2.7
1080	900	S350L1K1A50MA00	22.0 x 14.0 x 13.3	21.5 x 17.8 x 12.1	395	F2	2.7
1200	1000	S350L1K2A50MA00	22.0 x 14.0 x 13.3	21.5 x 17.8 x 12.1	416	F2	2.7
1320	1100	S350L1K3A50MA00	23.1 x 15.5 x 15.1	21.5 x 17.8 x 15.5	524	F2	3.0
1440	1200	S350L1K4A50MA00	23.1 x 15.5 x 15.1	21.5 x 17.8 x 15.5	532	F2	3.0

¹ Motor HP estimated based on typical conditions. Actual HP will vary with application. Size filter based on drive FLA.

² Use part number table (bottom right) for additional options.

³ Recommended minimum flow rates. Customer must verify flow rate for each application. Contact CTM for operation at lower flow rates, pressure drop, or for R134A use.

HIGH SINE™ 350L:

Fundamental Frequency: Up to 350 Hz

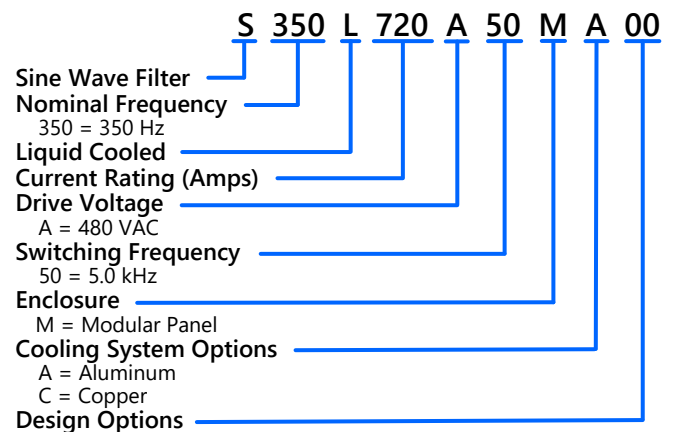
Nominal Switching Frequency: 5.0 kHz

Thermal Switching Frequency: 4.0 kHz

Current Ratings: 100 A - 1440 A

Harmonic Distortion: <5% THVD @ 5 kHz

PART NUMBER SYSTEM



Note: Information is for reference only. Data subject to change without notice.

HIGHSINE™ 500F MECHANICAL SPECIFICATIONS:

Filter size based on the Full Load Amps (FLA) of the drive. The filter current rating must be greater than or equal to the FLA. Order filters by CTM Part Number online at ctmmagnetics.com/contact-us, or call us directly at [480.967.9447](tel:480.967.9447).

Rated Current (A _{RMS})	Est. Motor HP ¹	Rated Freq. (Hz)	Modular Panel				NEMA 3R Cabinet		
			Part Number ²	Size (W x D x H)		Weight (lb)	Part Number ²	Size (W x D x H) (in)	Weight (lb)
				Reactor (in)	Cap. Panel (in)				
100	75	500	S500F100A50M	9.6 x 16.0 x 12.3	11.0 x 8.9 x 5.9	90	S500F100A50R	25.3 x 36.4 x 44.5	214
130	100	500	S500F130A50M	9.6 x 21.6 x 12.3	11.0 x 8.9 x 5.9	104	S500F130A50R	25.3 x 36.4 x 44.5	226
160	125	500	S500F160A50M	9.6 x 21.6 x 12.3	11.0 x 8.9 x 8.6	99	S500F160A50R	25.3 x 36.4 x 44.5	227
200	150	500	S500F200A50M	9.6 x 21.6 x 12.3	11.0 x 8.9 x 8.6	123	S500F200A50R	25.3 x 36.4 x 44.5	244
240	200	500	S500F240A50M	12.4 x 27.3 x 16.0	11.0 x 8.9 x 8.6	162	S500F240A50R	25.3 x 36.4 x 44.5	274
300	250	500	S500F300A50M	12.4 x 27.3 x 16.0	11.0 x 8.9 x 12.1	170	S500F300A50R	25.3 x 36.4 x 44.5	282
360	300	500	S500F360A50M	14.0 x 29.8 x 17.9	11.0 x 8.9 x 12.1	233	S500F360A50R	30.5 x 41.9 x 49.5	412
420	350	500	S500F420A50M	14.0 x 29.8 x 17.9	21.5 x 8.9 x 8.6	253	S500F420A50R	30.5 x 41.9 x 49.5	432
480	400	500	S500F480A50M	14.0 x 29.8 x 17.9	21.5 x 8.9 x 8.6	270	S500F480A50R	30.5 x 41.9 x 49.5	449
540	450	500	S500F540A50M	14.0 x 29.8 x 17.9	21.5 x 8.9 x 12.1	283	S500F540A50R	30.5 x 41.9 x 49.5	462
600	500	500	S500F600A50M	14.0 x 29.8 x 17.9	21.5 x 8.9 x 12.1	294	S500F600A50R	30.5 x 41.9 x 49.5	473

¹ Motor HP estimated based on typical conditions. Actual HP will vary with application. Size filter based on drive FLA.

² Use part number table for additional options. Design options will be assumed to carry the default "-00" option number.

HIGHSINE™ 500F:

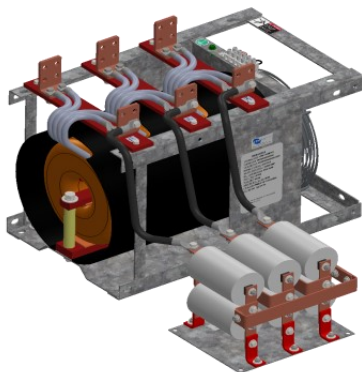
Fundamental Frequency: Up to 500 Hz

Nominal Switching Frequency: 5.0 kHz

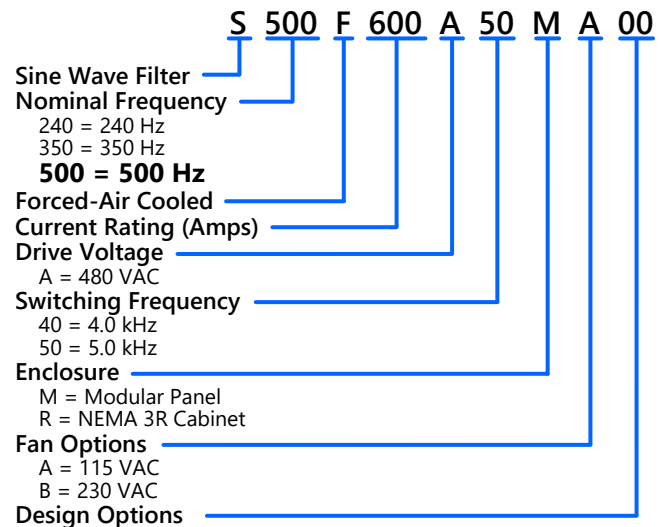
Thermal Switching Frequency: 4.5 kHz

Current Ratings: 100 A - 600 A

Harmonic Distortion: <5% THVD @ 5 kHz



PART NUMBER SYSTEM



Note: Information is for reference only. Data subject to change without notice.

HIGH SINE™ 500L MECHANICAL SPECIFICATIONS:

Filter size based on the Full Load Amps (FLA) of the drive. The filter current rating must be greater than or equal to the FLA. Order filters by CTM Part Number online at ctmmagnetics.com/contact-us, or call us directly at 480.967.9447.

Rated Current (A _{RMS})	Est. Motor HP ¹	Modular Panel				Reference Figure	Flow Rate (GPM) ³
		Part Number ²	Size (W x D x H)		Weight (lb)		
			Reactor (in)	Cap Panel (in)			
100	75	S500L100A50MA00	9.7 x 9.3 x 9.6	11.0 x 8.9 x 5.9	69	F1	0.6
130	100	S500L130A50MA00	12.0 x 9.3 x 9.6	11.0 x 8.9 x 5.9	86	F1	0.8
160	125	S500L160A50MA00	10.4 x 10.1 x 10.3	11.0 x 8.9 x 8.6	77	F1	0.6
200	150	S500L200A50MA00	12.6 x 10.1 x 10.3	11.0 x 8.9 x 8.6	94	F1	0.8
240	200	S500L240A50MA00	15.3 x 10.1 x 10.3	11.0 x 8.9 x 8.6	112	F1	1.1
300	250	S500L300A50MA00	15.3 x 10.1 x 10.3	11.0 x 8.9 x 12.1	119	F1	1.2
360	300	S500L360A50MA00	17.0 x 11.3 x 11.7	11.0 x 8.9 x 12.1	144	F1	1.5
420	350	S500L420A50MA00	17.0 x 11.3 x 11.7	21.5 x 8.9 x 8.6	164	F1	1.5
480	400	S500L480A50MA00	20.9 x 12.5 x 11.9	21.5 x 8.9 x 8.6	219	F2	2.1
540	450	S500L540A50MA00	20.9 x 12.5 x 11.9	21.5 x 8.9 x 12.1	230	F2	2.1
600	500	S500L600A50MA00	20.9 x 12.5 x 11.9	21.5 x 8.9 x 12.1	240	F2	2.1
720	600	S500L720A50MA00	22.0 x 14.0 x 13.3	21.5 x 8.9 x 15.5	278	F2	2.4
840	700	S500L840A50MA00	22.0 x 14.0 x 13.3	21.5 x 8.9 x 15.5	290	F2	2.7
960	800	S500L960A50MA00	23.1 x 15.5 x 15.1	21.5 x 17.8 x 12.1	478	F2	2.7
1080	900	S500L1K1A50MA00	23.1 x 15.5 x 15.1	21.5 x 17.8 x 12.1	498	F2	3.0
1200	1000	S500L1K2A50MA00	23.1 x 15.5 x 15.1	21.5 x 17.8 x 12.1	510	F2	3.3
1320	1100	S500L1K3A50MA00	23.1 x 15.5 x 15.1	21.5 x 17.8 x 15.5	531	F2	3.3

¹ Motor HP estimated based on typical conditions. Actual HP will vary with application. Size filter based on drive FLA.

² Use part number table (bottom right) for additional options.

³ Recommended minimum flow rates. Customer must verify flow rate for each application. Contact CTM for operation at lower flow rates, pressure drop, or for R134A use.

HIGH SINE™ 500L:

Fundamental Frequency: Up to 500 Hz

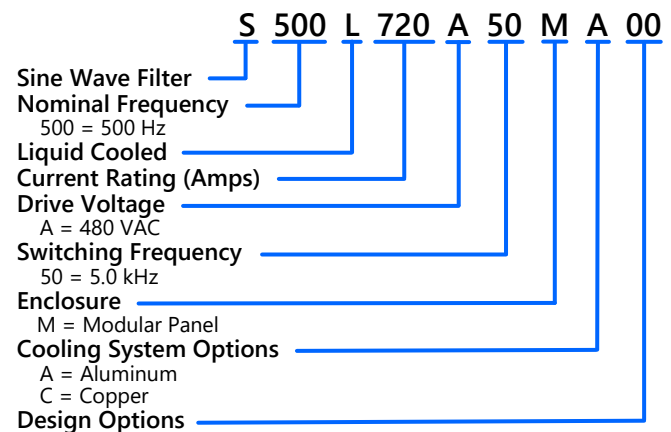
Nominal Switching Frequency: 5.0 kHz

Thermal Switching Frequency: 4.5 kHz

Current Ratings: 100 A - 1320 A

Harmonic Distortion: <5% THVD @ 5 kHz

PART NUMBER SYSTEM



Note: Information is for reference only. Data subject to change without notice.

LIQUID COOLED MECHANICAL FIGURES

FIGURE F1:

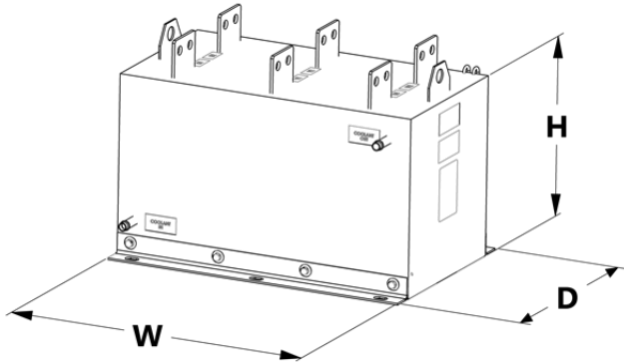
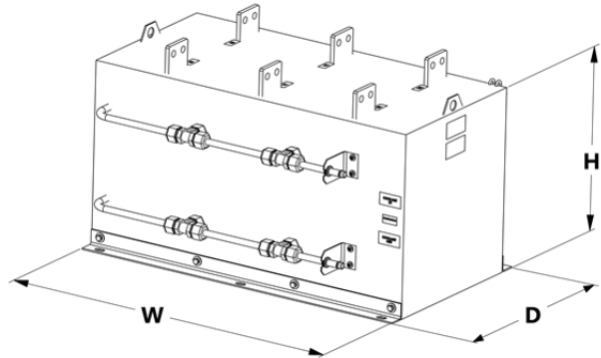


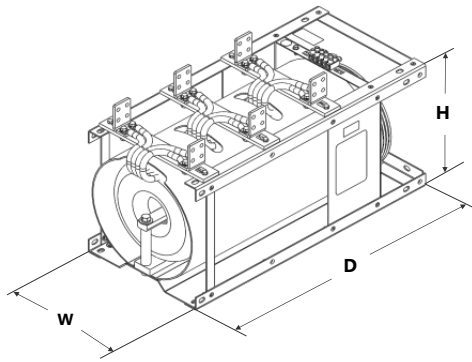
FIGURE F2:



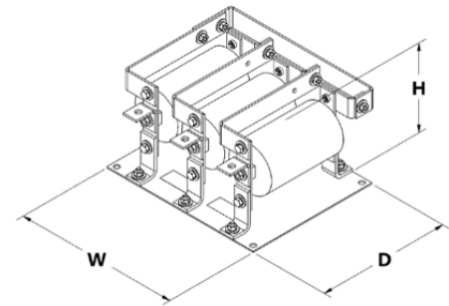
AIR COOLED ENCLOSURE OPTIONS:

MODULAR PANEL: (2 PARTS)

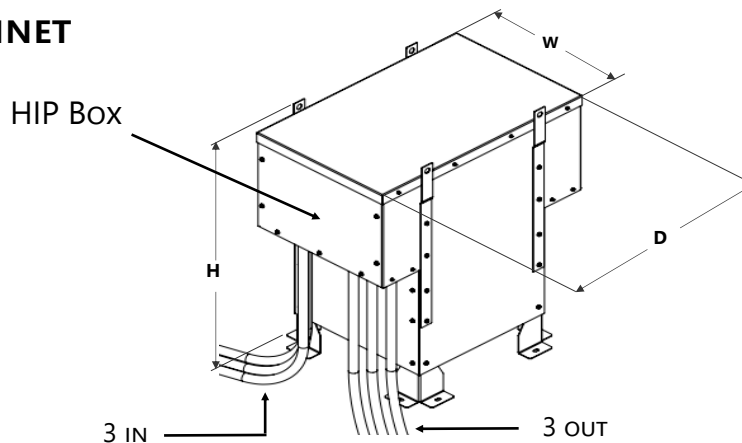
REACTOR



CAPACITOR PANEL



NEMA 3R CABINET



Note: Information is for reference only. Data subject to change without notice.

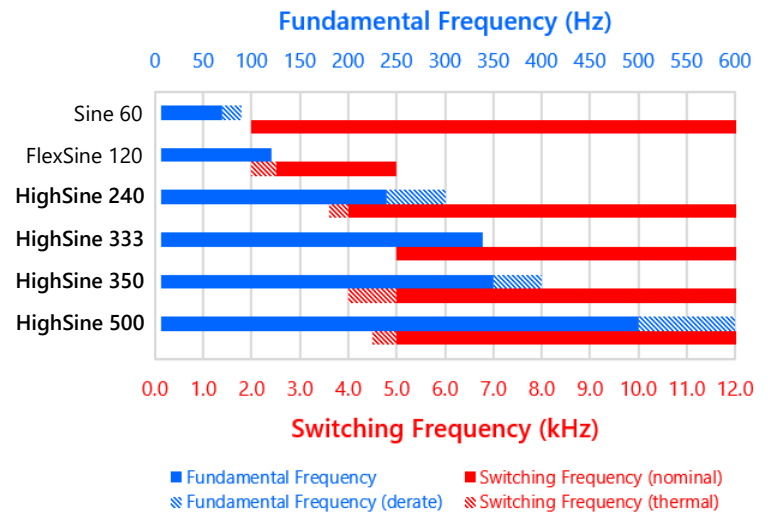
THE IDEAL FILTER FOR EVERY APPLICATION

SINE WAVE FILTERS

CTM Magnetics offers a broad portfolio of sine wave filters to meet all your motor filtering needs.

- **Sine 60** - The optimal choice for 60 Hz motor protection. Designed for up to 70 Hz fundamental and 2+ kHz switching frequency.
- **FlexSine 120** - For both induction and PM motor applications. Designed for up to 120 Hz fundamental and 2.5+ kHz switching frequency. Contact CTM for operating unit above 120 Hz.
- **HighSine 240** - Perfect for high-speed, PM motor applications (240 Hz). Designed for up to 240 Hz fundamental and 4+ kHz switching frequency.
- **HighSine 333** - Perfect for high-speed, PM motor applications (333 Hz). Designed for up to 333 Hz fundamental and 5+ kHz switching frequency.
- **HighSine 350** - Perfect for high-speed, PM motor applications (350 Hz). Designed for up to 350 Hz fundamental and 5+ kHz switching frequency.
- **HighSine 500** - Perfect for high-speed, PM motor applications (500 Hz). Designed for up to 500 Hz fundamental and 5+ kHz switching frequency.

Filter Operating Ranges



GRIDHAWK[®] FILTERS

CTM Magnetics offers cutting edge GridHawk Harmonic filters to meet all your front end needs. CTM also provides a 5 year capacitor warranty on all GridHawk products.

- **GridHawk** - The optimal choice for grid protection. Designed to handle input voltage distortion of $\leq 5\%$ THVD.
- **GridHawk HD** - For applications where the voltage distortion is $\leq 15\%$ THVD, GridHawk HD is your choice for grid protection. GridHawk HD beats any other passive harmonic filter, AFE (Active front end), or 18 pulse drive available on the market. Where everyone else fails, we succeed.
- **GridHawk XD** - For applications where the voltage distortion is $\leq 25\%$ THVD, contact CTM for XD solutions.

LIQUID COOLED REACTORS

CTM Magnetics offers unique liquid cooled reactors for both line and load side applications. CTM Liquid cooled reactors offer the highest power density, lowest audible noise, are environmentally sealed, and thermally isolated from ambient.

- **RLL** - The optimal choice for standard line side protection.
- **RPL** - For line and load side protection. Designed to handle higher drive produced harmonics.
- **RSL** - Specifically designed for silicon carbide switching applications.
- **R4L** - Designed for high frequency applications up to 400 Hz.



Additional information is available online:

ctmmagnetics.com

Contact us online at:

ctmmagnetics.com/contact-us



Scan for CTM Contact Information:



Final product specifications subject to change