



HIGH SINE™ FILTERS
Air & Liquid Cooled Sine Wave Filters
240 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
- Three different, frequency-tuned options
(240 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.

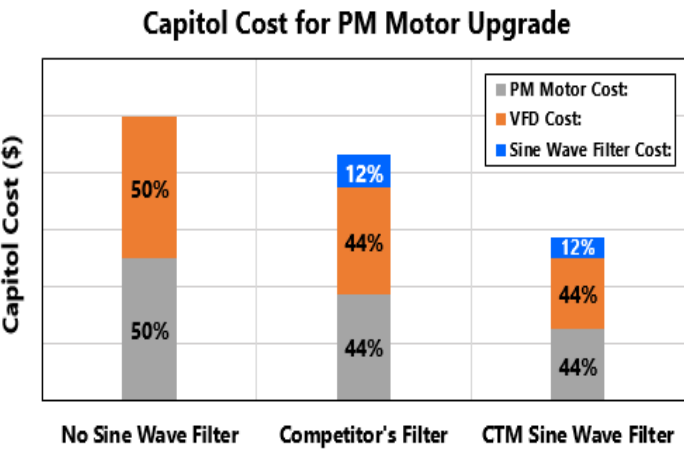


Figure 1. Cost Breakdown for PM Motor Upgrade

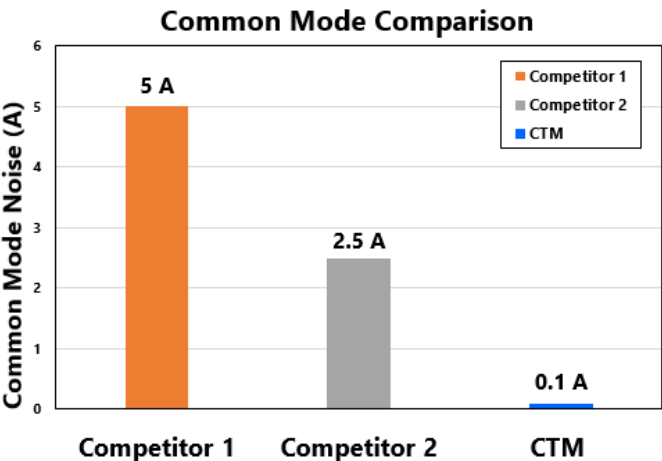



Figure 2. CTM vs. Competitors' Common Mode Noise

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, 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 \pm 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 |
| 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 |
| 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 Integrated Panel (<i>Air cooled only</i>) NEMA 3R Cabinet | |
| Motor Cable Length | Up to 15,000 feet | |
| Maximum Altitude | 3,300 ft (Air) <i>Higher with derate</i> | No Limit (Liquid) |
| Agency Recognitions |  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> |
| Plumbing 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.

HIGH SINE™ 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 (see next page for additional details).

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.

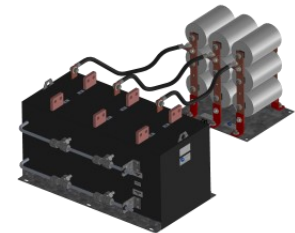
Extremely Low Audible Noise

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):

Size filter 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 | | | | | |

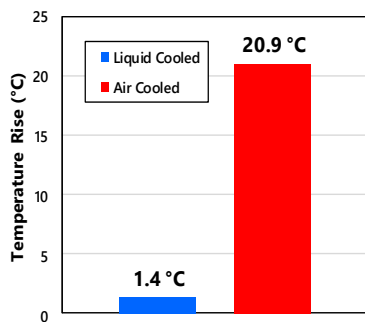


¹ Use part number table (bottom right) to select options. Unspecified options will be assumed to carry the default "-MA00" option number.

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

CABINET AIR TEMPERATURE RISE



REDUCED CABINET TEMP:

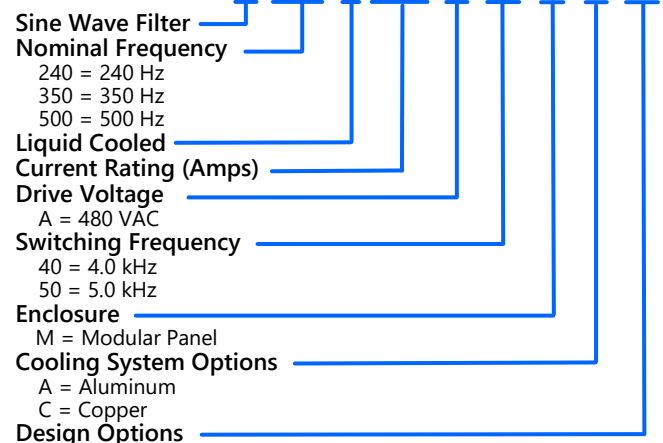
CTM liquid cooled filters will have negligible temperature effects when installed in an existing cabinet. Liquid cooled

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

S 240 L 720 A 40 M A 00



HIGH SINE™ 240F MECHANICAL SPECIFICATIONS:

Size filter 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 (ARMS) | Est. Motor HP ¹ | Rated Freq. (Hz) | Modular Panel | | | | Integrated 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) | Part Number ² | Size (W x D x H) (in) | Weight (lb) |
| | | | | Reactor (in) | Cap. Panel (in) | | | | | | | |
| 100 | 75 | 240 | S240F100A40M | 18.3 x 18.3 x 18.0 | 11.0 x 8.9 x 5.9 | 82 | S240F100A40P | 18.3 x 18.3 x 19.4 | 82 | S240F100A40R | 25.3 x 36.4 x 44.5 | 209 |
| 130 | 100 | 240 | S240F130A40M | 18.3 x 18.3 x 18.0 | 11.0 x 8.9 x 5.9 | 88 | S240F130A40P | 18.3 x 18.3 x 19.4 | 88 | S240F130A40R | 25.3 x 36.4 x 44.5 | 214 |
| 160 | 125 | 240 | S240F160A40M | 18.3 x 18.3 x 18.0 | 11.0 x 8.9 x 5.9 | 87 | S240F160A40P | 18.3 x 18.3 x 19.4 | 87 | S240F160A40R | 25.3 x 36.4 x 44.5 | 214 |
| 200 | 150 | 240 | S240F200A40M | 18.3 x 18.3 x 18.0 | 11.0 x 8.9 x 5.9 | 101 | S240F200A40P | 18.3 x 18.3 x 19.4 | 101 | S240F200A40R | 25.3 x 36.4 x 44.5 | 228 |
| 240 | 200 | 240 | S240F240A40M | 18.3 x 18.3 x 18.0 | 11.0 x 8.9 x 8.6 | 110 | S240F240A40P | 18.3 x 18.3 x 20.3 | 110 | S240F240A40R | 25.3 x 36.4 x 44.5 | 236 |
| 300 | 250 | 240 | S240F300A40M | 18.3 x 18.3 x 18.0 | 11.0 x 8.9 x 8.6 | 110 | S240F300A40P | 18.3 x 18.3 x 20.3 | 110 | S240F300A40R | 25.3 x 36.4 x 44.5 | 237 |
| 360 | 300 | 240 | S240F360A40M | 20.8 x 20.8 x 18.3 | 11.0 x 8.9 x 8.6 | 158 | S240F360A40P | 20.8 x 20.8 x 20.8 | 158 | S240F360A40R | 25.3 x 36.4 x 44.5 | 280 |
| 420 | 350 | 240 | S240F420A40M | 20.8 x 20.8 x 18.3 | 11.0 x 8.9 x 8.6 | 161 | S240F420A40P | 20.8 x 20.8 x 20.8 | 161 | S240F420A40R | 25.3 x 36.4 x 44.5 | 283 |
| 480 | 400 | 240 | S240F480A40M | 20.8 x 20.8 x 18.3 | 11.0 x 8.9 x 12.1 | 168 | S240F480A40P | 20.8 x 20.8 x 21.8 | 168 | S240F480A40R | 25.3 x 36.4 x 44.5 | 289 |
| 540 | 450 | 240 | S240F540A40M | 20.8 x 20.8 x 18.3 | 11.0 x 8.9 x 12.1 | 172 | S240F540A40P | 20.8 x 20.8 x 21.8 | 172 | S240F540A40R | 25.3 x 36.4 x 44.5 | 294 |
| 600 | 500 | 240 | S240F600A40M | 24.8 x 24.8 x 20.5 | 11.0 x 8.9 x 12.1 | 236 | S240F600A40P | 24.8 x 24.8 x 23.6 | 236 | S240F600A40R | 30.5 x 41.9 x 49.5 | 402 |
| 720 | 600 | 240 | S240F720A40M | 24.8 x 24.8 x 20.5 | 21.5 x 8.9 x 8.6 | 266 | S240F720A40P | 24.8 x 24.8 x 23.6 | 266 | S240F720A40R | 30.5 x 41.9 x 49.5 | 432 |
| 840 | 700 | 240 | S240F840A40M | 26.0 x 26.0 x 21.6 | 21.5 x 8.9 x 8.6 | 310 | S240F840A40P | 26.0 x 26.0 x 24.4 | 310 | S240F840A40R | 30.5 x 41.9 x 49.5 | 471 |
| 960 | 800 | 240 | S240F960A40M | 26.0 x 26.0 x 21.6 | 21.5 x 8.9 x 12.1 | 324 | S240F960A40P | 26.0 x 26.0 x 25.4 | 324 | 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:

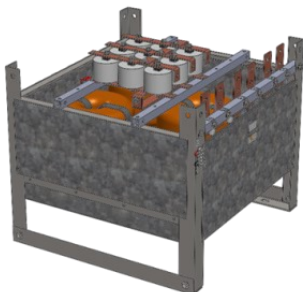
Fundamental Frequency: Up to 240 Hz

Nominal Switching Frequency: 4.0 kHz

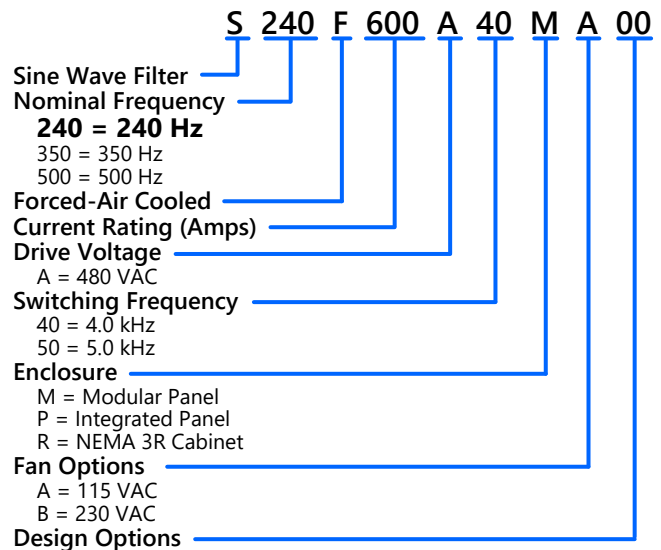
Thermal Switching Frequency: 3.6 kHz

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:

Size filter 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

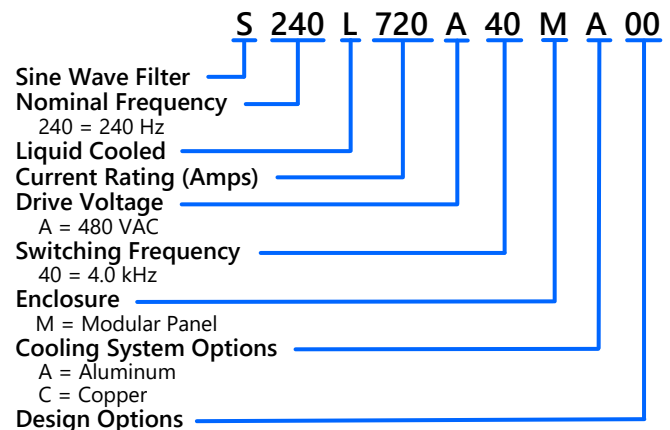
Nominal Switching Frequency: 4.0 kHz

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.

HIGH SINE™ 350F MECHANICAL SPECIFICATIONS:

Size filter 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 | | | | Integrated 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) | Part Number ² | Size (W x D x H) (in) | Weight (lb) |
| | | | | Reactor (in) | Cap. Panel (in) | | | | | | | |
| 100 | 75 | 350 | S350F100A50M | 18.3 x 18.3 x 18.0 | 11.0 x 8.9 x 5.9 | 78 | S350F100A50P | 18.3 x 18.3 x 19.4 | 78 | S350F100A50R | 25.3 x 36.4 x 44.5 | 205 |
| 130 | 100 | 350 | S350F130A50M | 18.3 x 18.3 x 18.0 | 11.0 x 8.9 x 5.9 | 95 | S350F130A50P | 18.3 x 18.3 x 19.4 | 95 | S350F130A50R | 25.3 x 36.4 x 44.5 | 222 |
| 160 | 125 | 350 | S350F160A50M | 18.3 x 18.3 x 18.0 | 11.0 x 8.9 x 8.6 | 93 | S350F160A50P | 18.3 x 18.3 x 20.3 | 93 | S350F160A50R | 25.3 x 36.4 x 44.5 | 219 |
| 200 | 150 | 350 | S350F200A50M | 18.3 x 18.3 x 18.0 | 11.0 x 8.9 x 8.6 | 107 | S350F200A50P | 18.3 x 18.3 x 20.3 | 107 | S350F200A50R | 25.3 x 36.4 x 44.5 | 233 |
| 240 | 200 | 350 | S350F240A50M | 18.3 x 18.3 x 18.0 | 11.0 x 8.9 x 8.6 | 120 | S350F240A50P | 18.3 x 18.3 x 20.3 | 120 | S350F240A50R | 25.3 x 36.4 x 44.5 | 247 |
| 300 | 250 | 350 | S350F300A50M | 20.8 x 20.8 x 18.3 | 11.0 x 8.9 x 12.1 | 161 | S350F300A50P | 20.8 x 20.8 x 21.8 | 161 | S350F300A50R | 25.3 x 36.4 x 44.5 | 283 |
| 360 | 300 | 350 | S350F360A50M | 24.8 x 24.8 x 20.5 | 11.0 x 8.9 x 12.1 | 225 | S350F360A50P | 24.8 x 24.8 x 23.6 | 225 | S350F360A50R | 30.5 x 41.9 x 49.5 | 391 |
| 420 | 350 | 350 | S350F420A50M | 24.8 x 24.8 x 20.5 | 21.5 x 8.9 x 8.6 | 244 | S350F420A50P | 24.8 x 24.8 x 23.6 | 244 | S350F420A50R | 30.5 x 41.9 x 49.5 | 409 |
| 480 | 400 | 350 | S350F480A50M | 26.0 x 26.0 x 21.6 | 21.5 x 8.9 x 8.6 | 277 | S350F480A50P | 26.0 x 26.0 x 24.4 | 277 | S350F480A50R | 30.5 x 41.9 x 49.5 | 438 |
| 540 | 450 | 350 | S350F540A50M | 26.0 x 26.0 x 21.6 | 21.5 x 8.9 x 12.1 | 288 | S350F540A50P | 26.0 x 26.0 x 25.4 | 288 | S350F540A50R | 30.5 x 41.9 x 49.5 | 449 |
| 600 | 500 | 350 | S350F600A50M | 26.0 x 26.0 x 21.6 | 21.5 x 8.9 x 12.1 | 298 | S350F600A50P | 26.0 x 26.0 x 25.4 | 298 | S350F600A50R | 30.5 x 41.9 x 49.5 | 460 |
| 720 | 600 | 350 | S350F720A50M | 26.0 x 26.0 x 21.6 | 21.5 x 8.9 x 15.5 | 317 | S350F720A50P | 26.0 x 26.0 x 26.4 | 317 | 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:

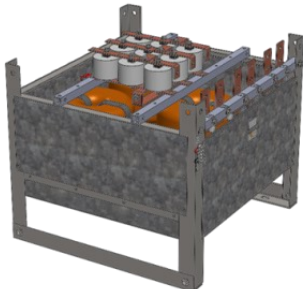
Fundamental Frequency: Up to 350 Hz

Nominal Switching Frequency: 5.0 kHz

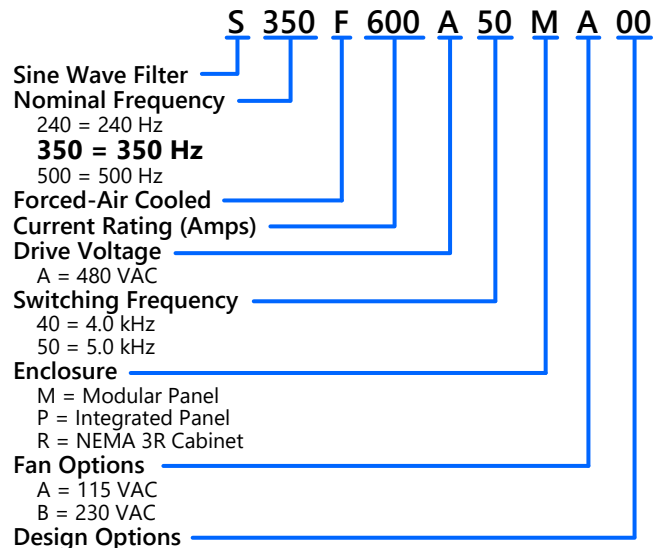
Thermal Switching Frequency: 4.0 kHz

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:

Size filter 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.

HIGH SINE™ 350L:

Fundamental Frequency: Up to 350 Hz

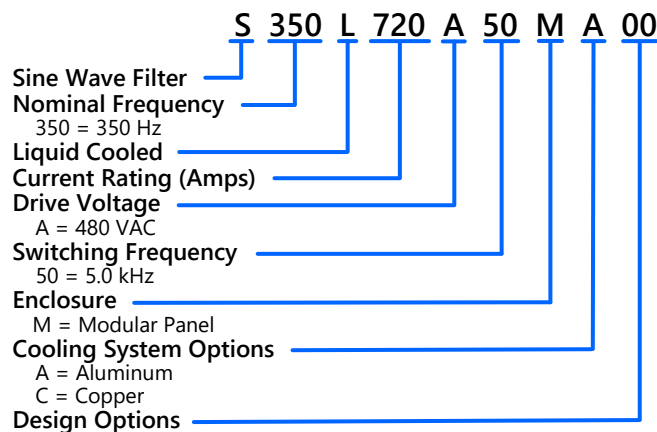
Nominal Switching Frequency: 5.0 kHz

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.

HIGH SINE™ 500F MECHANICAL SPECIFICATIONS:

Size filter 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 | | | | Integrated 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) | Part Number ² | Size (W x D x H) (in) | Weight (lb) |
| | | | | Reactor (in) | Cap. Panel (in) | | | | | | | |
| 100 | 75 | 500 | S500F100A50M | 18.3 x 18.3 x 18.0 | 11.0 x 8.9 x 5.9 | 87 | S500F100A50P | 18.3 x 18.3 x 19.4 | 87 | S500F100A50R | 25.3 x 36.4 x 44.5 | 214 |
| 130 | 100 | 500 | S500F130A50M | 18.3 x 18.3 x 18.0 | 11.0 x 8.9 x 5.9 | 99 | S500F130A50P | 18.3 x 18.3 x 19.4 | 99 | S500F130A50R | 25.3 x 36.4 x 44.5 | 226 |
| 160 | 125 | 500 | S500F160A50M | 18.3 x 18.3 x 18.0 | 11.0 x 8.9 x 8.6 | 100 | S500F160A50P | 18.3 x 18.3 x 19.4 | 100 | S500F160A50R | 25.3 x 36.4 x 44.5 | 227 |
| 200 | 150 | 500 | S500F200A50M | 18.3 x 18.3 x 18.0 | 11.0 x 8.9 x 8.6 | 117 | S500F200A50P | 18.3 x 18.3 x 20.3 | 117 | S500F200A50R | 25.3 x 36.4 x 44.5 | 244 |
| 240 | 200 | 500 | S500F240A50M | 20.8 x 20.8 x 18.3 | 11.0 x 8.9 x 8.6 | 153 | S500F240A50P | 20.8 x 20.8 x 20.8 | 153 | S500F240A50R | 25.3 x 36.4 x 44.5 | 274 |
| 300 | 250 | 500 | S500F300A50M | 20.8 x 20.8 x 18.3 | 11.0 x 8.9 x 12.1 | 160 | S500F300A50P | 20.8 x 20.8 x 21.8 | 160 | S500F300A50R | 25.3 x 36.4 x 44.5 | 282 |
| 360 | 300 | 500 | S500F360A50M | 26.0 x 26.0 x 21.6 | 11.0 x 8.9 x 12.1 | 250 | S500F360A50P | 26.0 x 26.0 x 24.4 | 250 | S500F360A50R | 30.5 x 41.9 x 49.5 | 412 |
| 420 | 350 | 500 | S500F420A50M | 26.0 x 26.0 x 21.6 | 21.5 x 8.9 x 8.6 | 270 | S500F420A50P | 26.0 x 26.0 x 24.4 | 270 | S500F420A50R | 30.5 x 41.9 x 49.5 | 432 |
| 480 | 400 | 500 | S500F480A50M | 26.0 x 26.0 x 21.6 | 21.5 x 8.9 x 8.6 | 287 | S500F480A50P | 26.0 x 26.0 x 24.4 | 287 | S500F480A50R | 30.5 x 41.9 x 49.5 | 449 |
| 540 | 450 | 500 | S500F540A50M | 26.0 x 26.0 x 21.6 | 21.5 x 8.9 x 12.1 | 300 | S500F540A50P | 26.0 x 26.0 x 25.4 | 300 | S500F540A50R | 30.5 x 41.9 x 49.5 | 462 |
| 600 | 500 | 500 | S500F600A50M | 26.0 x 26.0 x 21.6 | 21.5 x 8.9 x 12.1 | 311 | S500F600A50P | 26.0 x 26.0 x 25.4 | 311 | 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.

HIGH SINE™ 500F:

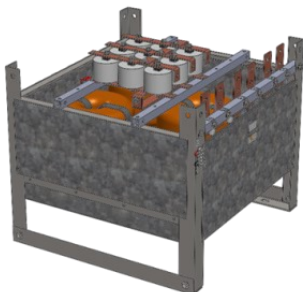
Fundamental Frequency: Up to 500 Hz

Nominal Switching Frequency: 5.0 kHz

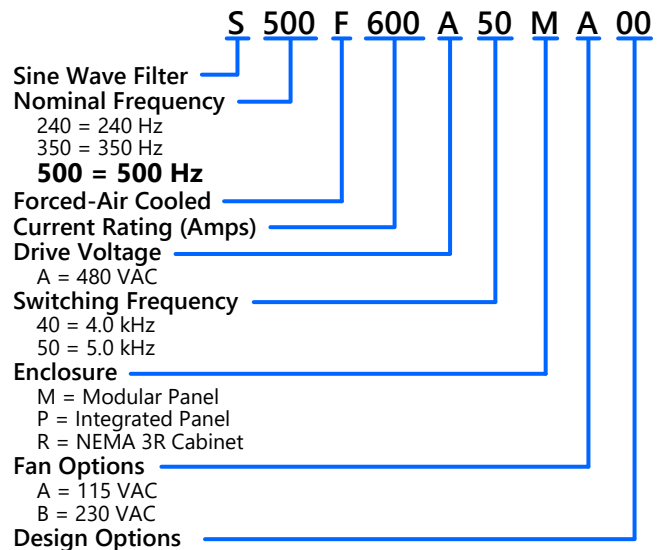
Thermal Switching Frequency: 4.5 kHz

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:

Size filter 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 x13.3 | 21.5 x 8.9 x 15.5 | 278 | F2 | 2.4 |
| 840 | 700 | S500L840A50MA00 | 22.0 x 14.0 x13.3 | 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

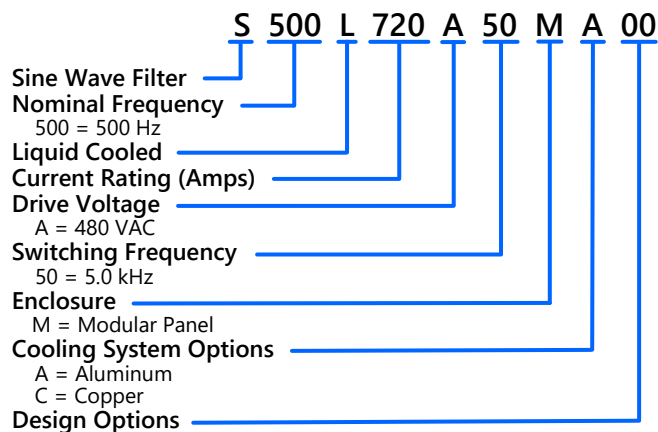
Nominal Switching Frequency: 5.0 kHz

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:

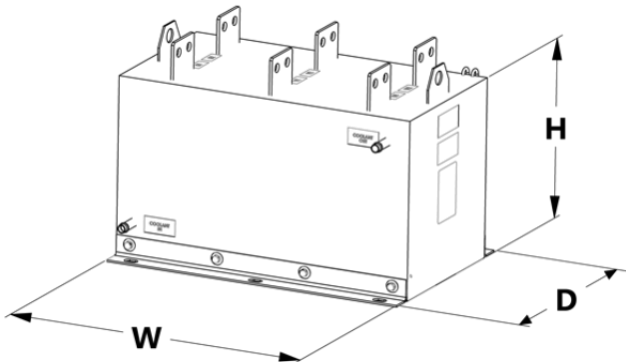
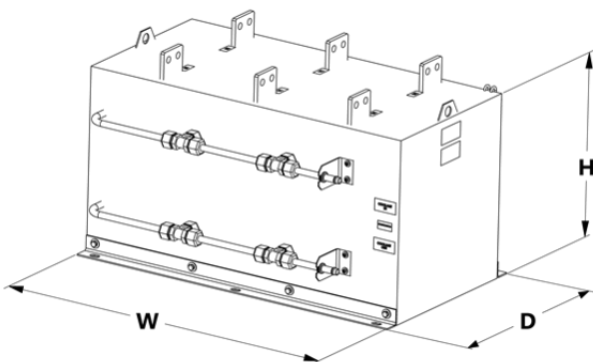


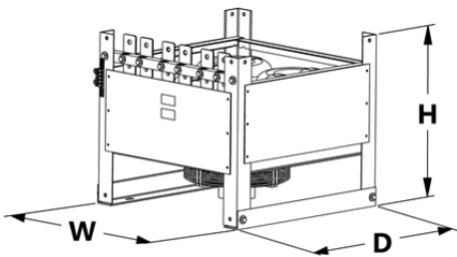
FIGURE F2:



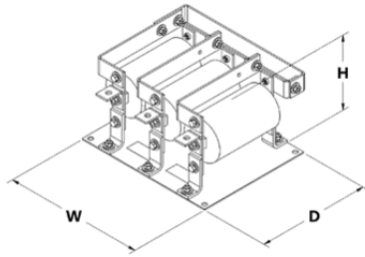
AIR COOLED ENCLOSURE OPTIONS:

MODULAR PANEL: (2 PARTS)

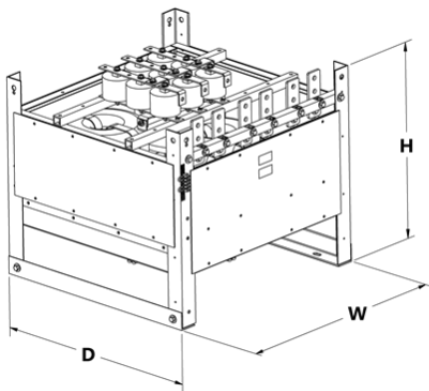
REACTOR



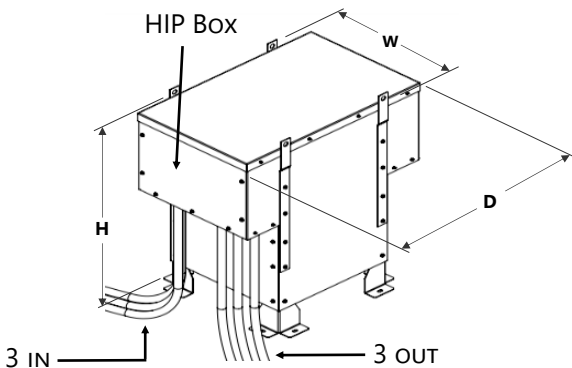
CAPACITOR PANEL



INTEGRATED PANEL



NEMA 3R CABINET



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

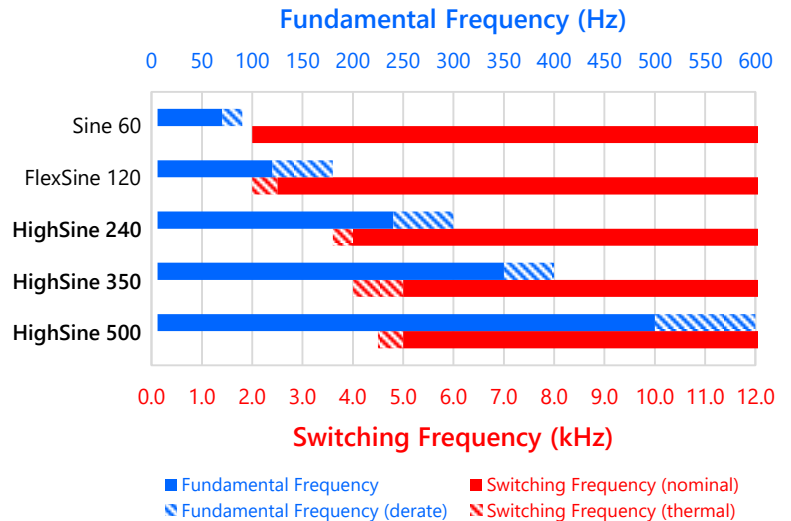
THE IDEAL FILTER FOR EVERY APPLICATION

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 (180 Hz with derate) and 2.5+ kHz switching frequency.
- **HighSine 240** - Perfect for high-speed, PM motor applications (240 Hz). Designed for up to 240 Hz fundamental and 4+ 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.

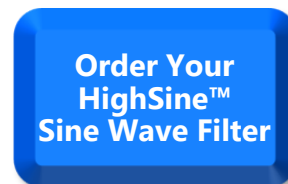


Additional information is available online:

ctmmagnetics.com

Contact us online at:

ctmmagnetics.com/contact-us



Scan for CTM
Contact Information:



Final product specifications subject to change