CTM magnetics
Small. Quiet. Efficient. Reliable.

RSL Series

Liquid Cooled Reactors
High-Performance

Selection Brochure | RSL Reactors

Superior Cooling Technology
Highest Power Density
Ready for SiC Harmonics

Reactor Applications

- Specially Developed for SiC Switching Frequencies
- Perfect for High Frequency, High THD Applications
- Incredible Inductance Stability Up to 500% Rated Current

Liquid Cooled Advantages

- Highest Power Density
- Lowest Audible Noise
- Sealed Design for Harsh Conditions
- Thermally Isolated from Ambient

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Half the size. Half the weight. SiC Ready.

RSL Liquid Cooled Reactors are high performance filtering solutions designed for the next generation of drives. Whether it be a drive with silicon carbide components or a typical application with high switching frequencies and/or high THID, these high performance reactors will stand up in some of the most demanding applications. The largest companies in the world rely on CTM technology, with more than 200,000 installed units in some of the harshest environments on the planet.

PRODUCT HIGHLIGHTS

High Performance Solution

Our RSL Reactors are high performance, next-generation, liquid cooled reactors designed specifically for applications with high switching frequencies and high THID. Extremely low core losses enable these reactors to excel where other reactors fail.

Silicon Carbide Capable

This product line is designed specifically with SiC applications in mind. SiC switching devices are quickly being adopted in industry due to their fast switching speeds and low losses. While other reactors cannot handle the speed, RSL reactors are built for switching speeds up to 50 kHz.

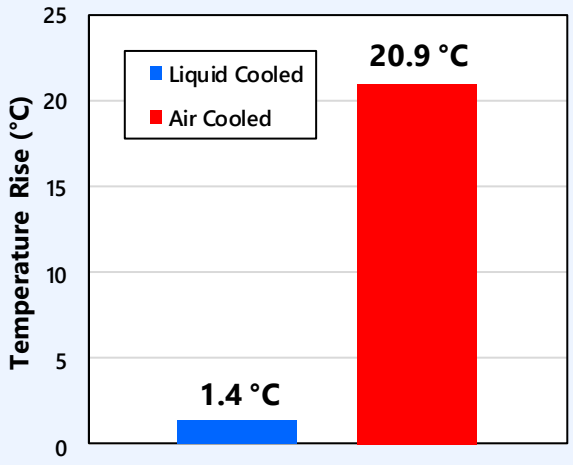
Inductance Stability

RSL reactors maintain their inductance over a wide frequency range. Inductance remains stable (<110% rated inductance) at low current levels, and drops off slowly at high current levels. At 200% rated current, 86% of the rated inductance is still available. At 500% reactors maintain and incredible 57% of their rated inductance.

Noisy Signals (high THID)

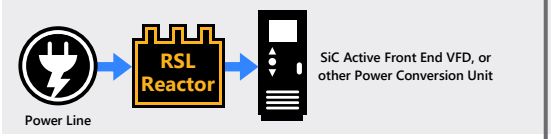
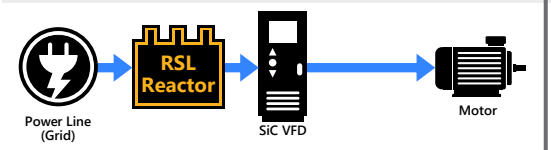
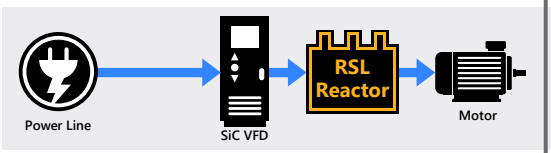
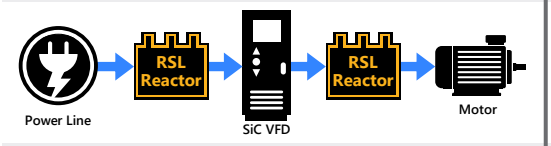
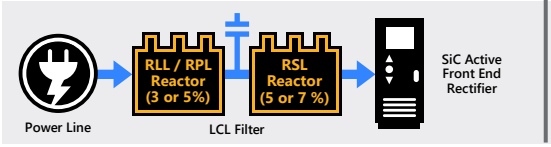
These reactors are the ideal for signals with very high current harmonics. With superior performance, these harmonics lead to minimal additional heat.

Liquid Cooled vs. Air Cooled



Due to superior heat removal technology, CTM Liquid Cooled products are thermally isolated from their

Reactor Applications

	General Drive Protection from Voltage Spikes and Transients
	Plant / Grid Protection from Harmonic Distortion
	General Motor Protection as Load (Output) Reactor
	High Switching Frequency Drive with SiC Components
	Line-Side Filtering for SiC Active Front End Rectifier

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.

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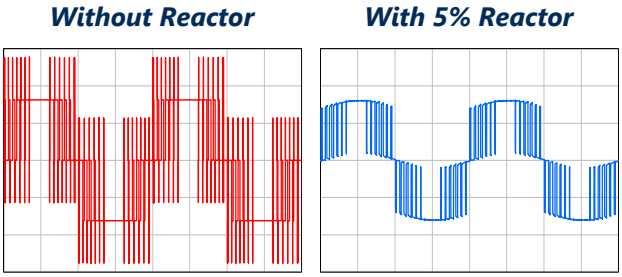
Performance Specifications

Impedance Levels *	3% and 5%
Typical Applications	Line Reactors (bridge rectifiers) Line Reactors (active front ends) Load Reactors SiC Switching Frequencies
Voltage Range *	Up to 690 V
Fundamental Frequency	Up to 200 Hz (in most applications)
Maximum Switching Frequency	Up to 50 kHz
Current Range	130 - 1,440 A
Overload Capability	200% rated current for 1 minute
Maximum Coolant Temperature	50 °C (122 °F) (higher with de-rating)
Approved Coolants	Drinking water Water-glycol mixture *For R134A, contact CTM*
Plumbing Material Options	Aluminum (standard) Copper
Heat Removal	97% to Liquid Coolant 3% to Ambient Air
Maximum Ambient Temperature	65 °C (149 °F)
Maximum Altitude	No Limit
Inductance Curve	93% at 150% load 86% at 200% load 57% at 500% load
Agency Recognitions	c UL us LISTED

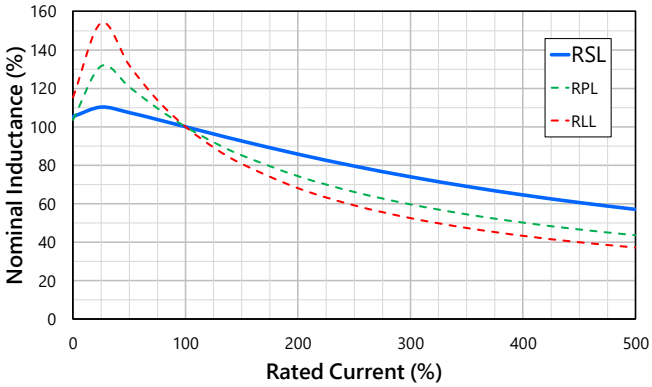
* *Impedance calculations assume 480 V and 60 Hz. Use formula below to calculate impedance at other conditions.*

$$\%Z_{imp} = 2\pi\sqrt{3}\,\frac{I_{RMS} \cdot f_{Hz} \cdot L_{ind}}{V_{L-L}}$$

Inverter Output Voltage Waveform



Loaded Inductance Curve



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

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Electrical Specifications:

Size reactors based on the Full Load Amps (FLA) of the drive. The reactor current rating must be greater than or equal to the FLA. Order reactors 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	3% Impedance				5% Impedance			
		Part Number [1]	Inductance (µH)	Power Loss [2] (Watts)		Part Number [1]	Inductance (µH)	Power Loss [2] (Watts)	
				Liquid	*Air*			*Liquid*	*Air*
130	100	**RSL0130AB00**	174	562	17	**RSL0130AC00**	286	745	23
160	125	**RSL0160AB00**	141	605	19	**RSL0160AC00**	226	789	24
200	150	**RSL0200AB00**	111	658	20	**RSL0200AC00**	183	896	28
240	200	**RSL0240AB00**	90	879	27	**RSL0240AC00**	152	1030	32
300	250	**RSL0300AB00**	74	1053	33	**RSL0300AC00**	122	1470	45
360	300	**RSL0360AB00**	60	1065	33	**RSL0360AC00**	101	1461	45
420	350	**RSL0420AB00**	51	1243	38	**RSL0420AC00**	86	1697	52
480	400	**RSL0480AB00**	47	1414	44	**RSL0480AC00**	75	1723	53
540	450	**RSL0540AB00**	42	1464	45	**RSL0540AC00**	68	1830	57
600	500	**RSL0600AB00**	37	1557	48	**RSL0600AC00**	62	2217	69
720	600	**RSL0720AB00**	30	1667	52	**RSL0720AC00**	50	2468	76
840	700	**RSL0840AB00**	26	1851	57	**RSL0840AC00**	46	2750	85
960	800	**RSL0960AB00**	22	1912	59	**RSL0960AC00**	39	2767	86
1080	900	**RSL1080AB00**	21	2174	67	**RSL1080AC00**	33	2837	88
1200	1000	**RSL1200AB00**	18.2	2328	72	**RSL1200AC00**	29	2884	89
1320	1100	**RSL1320AB00**	17.4	2718	84	**RSL1320AC00**	28	3195	99
1440	1200	**RSL1440AB00**	15.5	2590	80	**RSL1440AC00**	24	3195	99

[1] *Use part number table (bottom right) to select options. Unspecified options will be assumed to carry the default "-000" option number.*

[2] *Loss calculations performed at rated current, 60 Hz fundamental frequency with 2 kHz switching frequency, and 20 °C coolant. THID is 14.7%.*

With extremely compact designs and superior thermal management, CTM liquid cooled products offer advanced cooling in a reliable and economical package.

- **Highest Power Density** available, especially when considering total design envelope and clearances
- **Extremely Low Audible Noise**
- **Minimal Heat Rejection to Ambient Air** with up to 97% of heat removed directly by coolant
- **No Clearance Requirements** between components due to heat isolation
- **Reliable and Efficient Solution** enabled through advanced heat removal system
- **Compact Form Factor** fits easily into existing cabinets

Part Number System

RSL 0720 A B 00 - 0 00

RSL SERIES

Product Type..... *Reactor*
Line Frequency..... *50/60 Hz*
Cooling Type..... *Liquid Cooled*

Current Rating (Amps)

Line Voltage
A = 480 VAC *(for impedance calculations)*

Impedance
B = 3%
C = 5%

Enclosure
00 = Panel

OPTIONS:

Cooling System
0 = Aluminum
C = Copper

Unspecified Options

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Mechanical Specifications:

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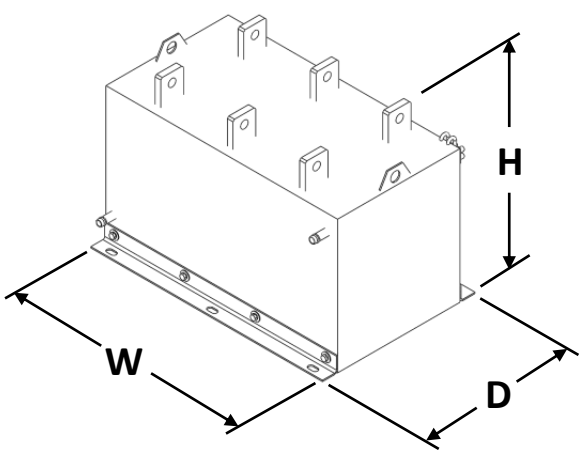
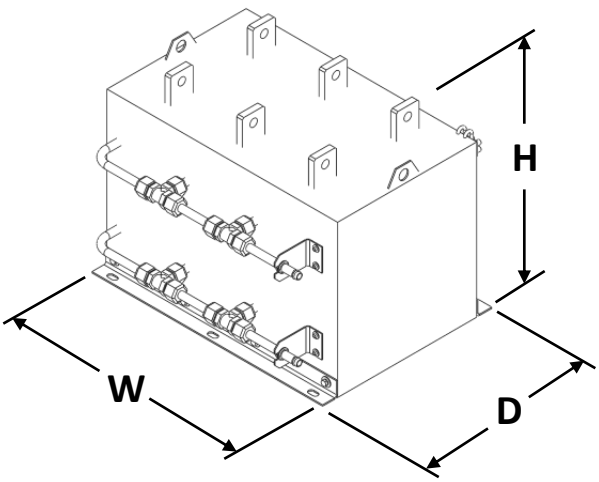
3% Impedance				5% Impedance			
Part Number	Size (in) (W x D x H)	Weight (lb)	Coolant Flow Rate [1] (GPM)	Part Number	Size (in) (W x D x H)	Weight (lb)	Coolant Flow Rate [1] (GPM)
RSL0130AB00	9.7 x 9.3 x 9.6	59	0.5	RSL0130AC00	12.0 x 9.3 x 9.6	74	0.7
RSL0160AB00	9.7 x 9.3 x 9.6	60	0.5	RSL0160AC00	12.0 x 9.3 x 9.6	76	0.7
RSL0200AB00	12.0 x 9.3 x 9.6	75	0.6	RSL0200AC00	12.6 x 10.1 x 10.3	96	0.8
RSL0240AB00	12.0 x 9.3 x 9.6	74	0.8	RSL0240AC00	12.6 x 10.1 x 10.3	97	0.9
RSL0300AB00	12.6 x 10.1 x 10.3	93	0.9	RSL0300AC00	15.3 x 10.1 x 10.3	117	1.3
RSL0360AB00	12.6 x 10.1 x 10.3	96	0.9	RSL0360AC00	17.0 x 11.3 x 11.7	167	1.3
RSL0420AB00	12.6 x 10.1 x 10.3	96	1.1	RSL0420AC00	17.0 x 11.3 x 11.7	168	1.5
RSL0480AB00	15.3 x 10.1 x 10.3	118	1.2	RSL0480AC00	17.0 x 11.3 x 11.7	176	1.5
RSL0540AB00	15.3 x 10.1 x 10.3	120	1.3	RSL0540AC00	17.0 x 11.3 x 11.7	179	1.6
RSL0600AB00	17.0 x 11.3 x 11.7	168	1.4	RSL0600AC00	20.9 x 12.5 x 11.9	203	1.8
RSL0720AB00	17.0 x 11.3 x 11.7	176	1.5	RSL0720AC00	20.3 x 12.9 x 11.9	206	2.0
RSL0840AB00	17.0 x 11.3 x 11.7	179	1.6	RSL0840AC00	22.0 x 14.0 x 13.3	277	2.2
RSL0960AB00	17.0 x 11.3 x 11.7	183	1.7	RSL0960AC00	22.0 x 14.0 x 13.3	288	2.2
RSL1080AB00	20.9 x 12.5 x 11.9	209	1.9	RSL1080AC00	23.1 x 15.5 x 15.1	383	2.5
RSL1200AB00	20.9 x 12.5 x 11.9	210	2.0	RSL1200AC00	23.1 x 15.5 x 15.1	387	2.5
RSL1320AB00	22.0 x 14.0 x 13.3	279	2.2	RSL1320AC00	23.1 x 15.5 x 15.1	391	2.8
RSL1440AB00	22.0 x 14.0 x 13.3	293	2.3	RSL1440AC00	23.1 x 15.5 x 15.1	399	2.8

[1] *Recommended minimum flow rates. Customer must verify flow rate for each application. Contact CTM for operation at lower flow rates, or for R134A use.*

3%: 65-960 A
5%: 65-540 A



3%: 1080-1440 A
5%: 600-1440 A



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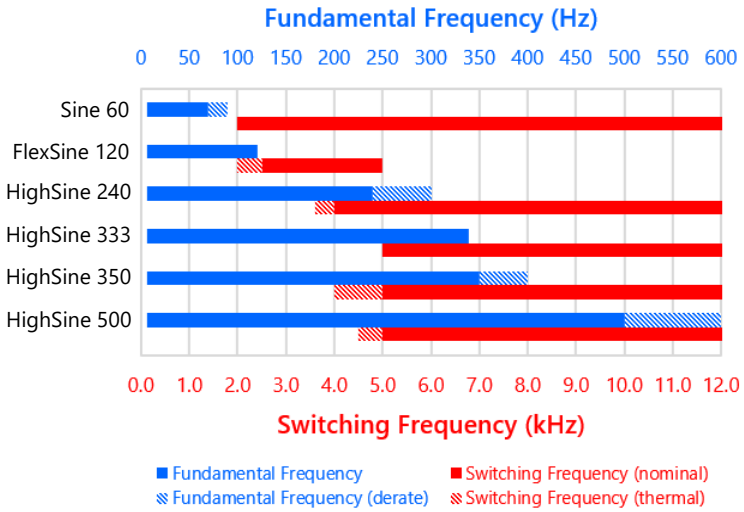
The Ideal Filter for Every Application

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 ≤5% THVD.
- **GridHawk HD** - For applications where the voltage distortion is ≤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 ≤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.

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Small. Quiet. Efficient. Reliable.

Additional information is available online:
ctmmagnetics.com

Contact us online at:
ctmmagnetics.com/contact-us

Order Your RSL Liquid Cooled Reactor

Scan for CTM Contact Information:

Final product specifications subject to change

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