SinE-Series Active Harmonic Filter

PS POWER CONTROLS
Complete Power Factor & Harmonic Solutions

General information

SinE-Series Active Harmonic Filter, operates on the base of a three -level topology circuit, provide power quality solutions such as eliminate harmonic, stepless power factor correction, and load balance. The AHF module capacity of AHF modular from 15A to 150A, and allows 20 modules to connect parallel, and users can easily get the target filter current capacity.

Product value:

- Eliminate the harmonic current of nonlinear load
- Improve the operating efficiency of the power system and reduce the downtime of the power distribution system, especially for low-voltage systems with frequent load upgrades
- Meet the strict requirements of Utilities for electrical energy quality, avoid fines and power supply interruptions caused by electrical quality problems, and reduce carbon dioxide emissions

Typical applications

Fast harmonic and reactive power compensation, eliminating 3rd and multiples of 3rd harmonics, reducing neutral current

- Data Center and UPS system
- New energy power generation, e.g. PV and wind power
- Precision equipment manufacturing, e.g. single crystal silicon, semiconductor
- Industrial production machine
- Electrical welding system
- Plastic industrial machinery, e.g. extrusion machines, injection molding machines, molding machines
- Office building and shopping mall

Safety features

- Highest safety and reliability
- Overload protection
- Internal short-circuit protection
- Overheating protection
- Overvoltage and undervoltage protection
- Inverter bridge protection
- Resonance protection
- Fan fault alarm

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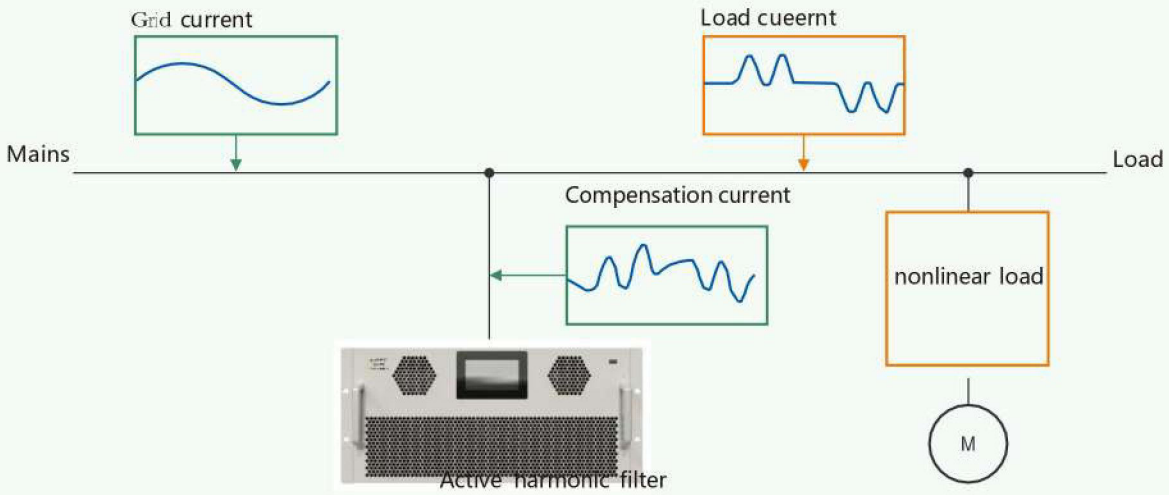
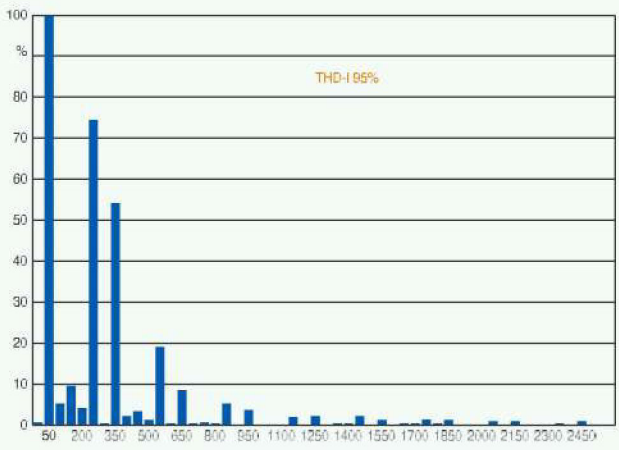
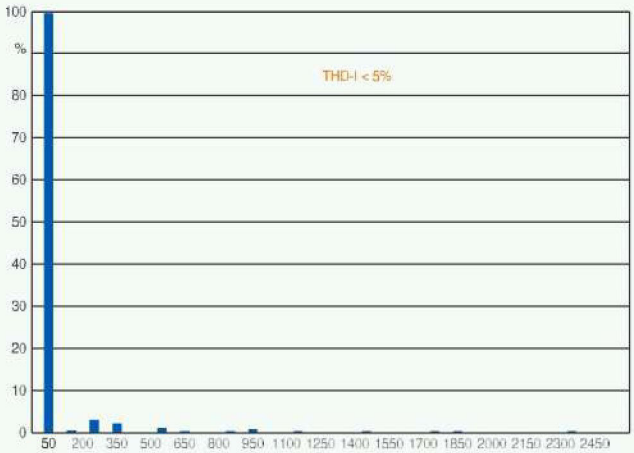
Active Harmonic Filter Working Principle



The THDi without AHF



The THDi with AHF

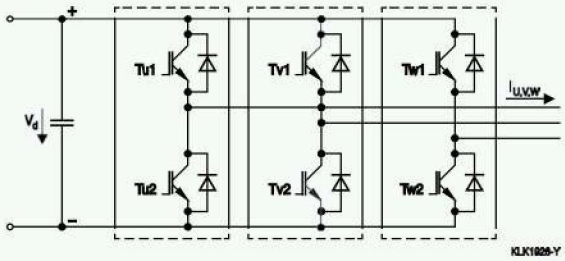


Advantages of 3-level topology

The active harmonic filter operates on a 3-level neutral point clamped (NPC) topology. As shown in the figure below, the traditional 2-level topology circuit structure consists of 6 IGBTs (2 IGBT power devices on each phase pin and current path), and in the 3-level topology, there are 12 IGBTs (in each phase 4 IGBT power devices on pins and current paths).

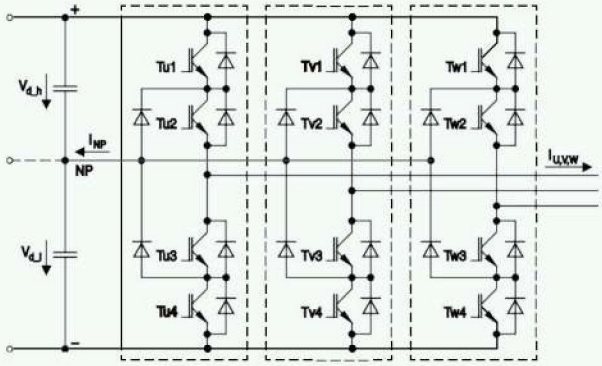
The 3-level topology circuit can generate three voltage levels at the output, including DC bus positive voltage, zero voltage and DC bus negative voltage. Two-level topology circuits can only output positive and negative voltages. At the same time, the three-level topology circuit also ensures higher quality and better harmonic output voltage, thereby reducing output filter requirements and associated costs.

2-level topology circuit

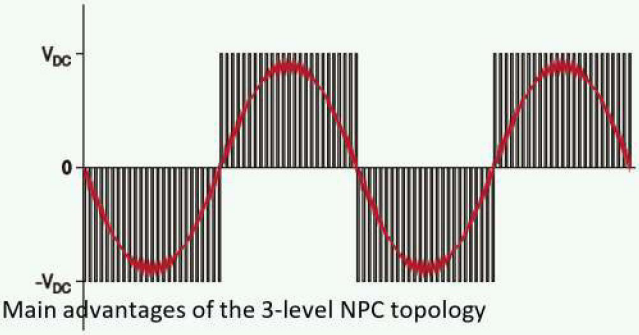


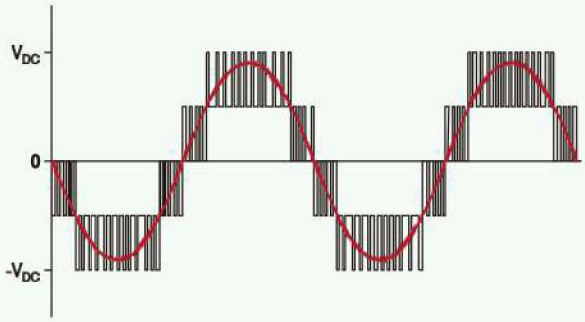
Current and switched output voltage for a 2-level topology

3-level topology circuit



Current and switched output voltage for a 3-level NPC topology





Main advantages of the 3-level NPC topology

- Lower losses: only half of the voltage has to be switched, thus reducing the switching losses in the transistor. Three-level solutions are characterized by reduced circuit losses and higher efficiency, thus supporting energy-saving concepts.
- Smaller output current ripple: the NPC three-level topology has a lower ripple in the output current and half of the output voltage transient thanks to a higher quality output voltage. This improves performance and reduces the internal filter requirement.

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Technical data and specifications			
Rated Voltage	200/400	480V	690V
Grid voltage range	-20%~+20%	Max Voltage 500v	-20%~+10%
Rated Current	15、30、45、50、75、100、150、200	45、50、75、100、150、200	75、100
Frequency	50/60Hz (-10%~+10%)		
Harmonic current compensation range	2nd to 50th harmonic order		
Rate of harmonic reduction	>97%		
CT configuration	Closed or open loop（Open loop is recommended in case of parallel operation）		
Overall response time	≤10ms		
Grid type	3P3W, 3P4W		
Overload capacity	110%-Continuous operation,120%-1min		
Circuit topology	3-level topology		
Switching frequency	20 kHz		
Modularity	Maximum 20 units can be combined		
Redundancy	Master/master or master/slave arrangement		
Typical power losses	< 2.5% (depending of the load)		
Target power factor	Adjustable from –1 to 1		
Harmonic compensation	Available		
Reactive power compensation	Available		
Unbalance compensation	Available		
Display	1.8/4.3/7-inch HMI（Optional）		
Communication ports	RS485		
	Modbus (RTU)		
Noise level	< 69 dB (depending on the load and model)		
Altitude	Derating usage >2000m		
Humidity	Operating Temperature：-35°C~55°C，Derating usage above 55℃		
	Storage temperature：-45°C~70°C		
Humidity	5%~95%RH，non-condensing		
Protection class	IP20		
Design/Approvals	EN 62477-1(2012)，EN 61439-1 (2011)		
EMC	EN/IEC 61000-6-4，Class A		
Certification	CE，CQC		

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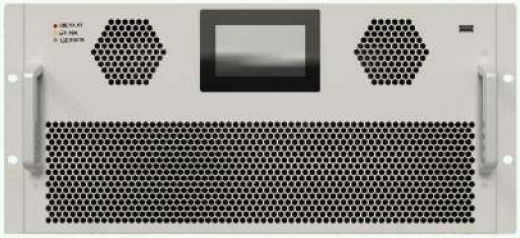
Wall mounted APF

Industrial APF

Rack mounted APF



Mini Wall mounted APF

Mini Rack mounted APF