AXPERT- i-Sine MULTI-FUNCTIONAL ACTIVE HARMONIC FILTER



"True Harmonics Solution"

High harmonics escalate complications which affect all power distribution networks in industrial, commercial, telecom and medical applications.

Most of the power converting equipment or facilities can generate harmonic current. Axpert-i-Sine, the Multi-Functional Active Harmonic Filter, designed with intelligent control algorithm, dynamically changes the switching frequency to optimize the performance and efficiency of these equipments. The performance of Axpert-i-Sine AHF is less affected by supply voltage harmonic distortion and it provides selective harmonic attenuation up to 51st order.

Principle of Harmonics Suppression

Axpert-i-Sine AHF provides 3-Phase harmonic current compensation. Figs. 1 and 2 show the operational principle of the active filter, with which a rectifier load is connected.

As shown in Fig. 1, the active filter is inserted between the load and the source, in parallel to the load. For a six-pulse rectifier load, the load current I_L appears in a form of rectangular waves, as illustrated in Fig. 2. This can be considered a result of synthesis of the fundamental current I_F and the harmonic current I_F (Fig. 2). $(I_L = I_F + I_F)$

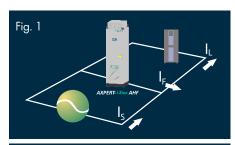
The compensation current I_C of the active filter is controlled, so that its intensity is the same as that of the above-mentioned I_{μ} and its polarity is just reversed ($I_C = -I_{\mu}$).

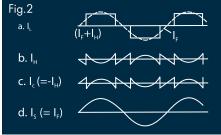
As a result, components of harmonic currents in the load current are cancelled by the effect of active filter and source current I_s remains only to I_F , which is a sinusoidal wave (Fig. 2).

This can be clearly explained by the expression below:

$$| I_L = | I_F + I_H, I_C = - I_H$$

 $| I_S = | I_I + I_C = (| I_F + I_H) + (- I_H) = | I_F$





Monitoring & Signaling

Standard Graphical LCD Display



Optional Touch Screen TFT Panel



Axpert-i-Sine AHF is equipped with a user-friendly control panel. Self-explanatory full parameter names, easy navigation of parameters through well organized parameter sets and functional keys with 8-selectable parameters on single screen make it easy to operate and program.

The optional TFT panel with special white back light offers access to all parameters, waveforms and spectrums for management of both AHF and system power quality. The graphics TFT display and control panel give easy access to:

- Load, source & Axpert-i-Sine AHF
- Monitoring of all metering parameters like V, I, F, kVA, PF, THD
- Control commands & settings
- Waveforms & harmonics spectrum (optional touch screen TFT panel)
- Status & alarms

Why Axpert-i-Sine Active Harmonic Filter?

FEATURES

- Fast Fourier transform based harmonic compensation
- Operates with closed loop control
- Reactive power compensation
- Ability of parallel operation to increase power capacity
- Voltage-independent harmonic current tracking
- Inherent current limiting
- Shunt connection
- Backlit user interface (optional TFT with touch screen)
- Modbus RTU communication compatible
- Advanced programmable digital I/O interface
- Intelligent control algorithm which dynamically changes the switching frequency to optimize the performance

BENEFITS

- Programmable selective harmonics elimination Prevents possible harmonic resonance
- Best accuracy. Does not require detailed network analysis
- Automatic PF compensation, leading as well as lagging, optimum utilization of power capacity and reduction in kVA demand
- Adaptive to increase in harmonics current due to additional loads being added
- More immunity to input voltage distortion
- Overload condition is prevented
- Easy maintenance
- User-friendly operation
- Facilitates networking ability and remote monitoring
- · Selective harmonics elimination by digital programming
- Minimum insertion loss resulting in efficient operation

Standard Specifications

AME-AHF-XXX-5/6	Input power source	-5: 440480 VAC, 3-φ, 3-Wire, 60 Hz (460 VAC Nominal) -6: 500600 VAC, 3-φ, 3-Wire, 60 Hz									
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	Safety	IEC 5017	8								

- 1. Above 240 A requirement, multiple units will be connected in parallel. Up to 40 units can be connected in parallel. Contact AMTECH for any other requirement and more details.
 2. Minimum 3 % line reactor is required in series with higher di/dt load.
 3. Panel plinth height is not included in above dimension table. Standard plinth height is 7.87 inch (200 mm) for A and 3.93 inch (100 mm) for B & C dimension.
 4. All models have bottom cable entry and front access.
 5. All performance specifications are valid at nominal ratings.
 6. Contact AMTECH for 3-phase, 4-wire requirements.

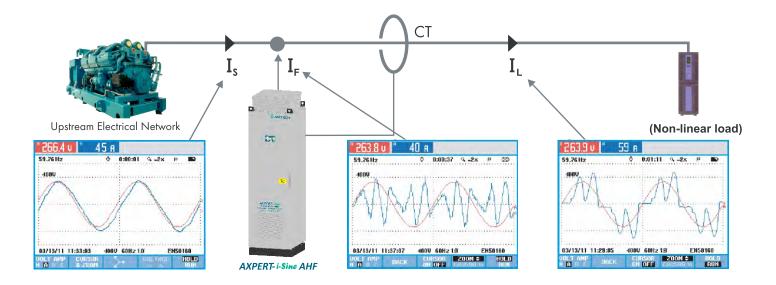
Applications

Amtech's Multi-Functional Active Harmonic Filter can compensate for reactive currents of fundamental waves, harmonic currents etc. It finds applications in various scenarios with combination of its multi functions.

- **Intelligent buildings:** Office Automation equipment, air conditioners, lighting, UPS, elevators, pumping facilities etc.
- **Factories:** Crane facilities, press machine, machine tools, high frequency induction heating equipment, inverter-incorporated facilities, printing machines, paper machines etc.
- **Public facilities and others:** City water and sewage pumping facilities, harbor cranes. facilities, crane facilities at waste incineration plants, ropeway hoisting machines, amusement parks etc.

Case Study

Normally 3-Phase large UPS with 6-Pulse rectifier feeds back heavy harmonics current of $30\%^{\sim}40\%$ THD into mains or emergency generator. It can cause line voltage distortion or generator malfunction. Axpert-i-Sine AHF is well adapted to operate with large UPS to perform very low harmonic feedback, generating less than 5% current THD.





We also offer following services related to Power Quality

- Detailed harmonic audit of plants
- Total solution for harmonic mitigation
- Design, supply & commissioning of harmonic filters
- Training on harmonic causes, effects and mitigation technique

Specifications in this catalog are subject to change without notice.



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