

## ACTIVE HARMONIC FILTER

**Active** filter it self generates harmonic current in opposite phase & injects in electrical network to mitigate the harmonics. It is just like inverter but it generates disturbed waveforms with Control philosophy based on dominant Adaptive Artificial Neural Network (ANN) logic in closed loop manner.

### Features:

#### • Technology adaption:

Fully functional Power Analyzer with 15- channel real time Oscilloscope with 7" Multi Touch Capacitive TFT display, closed loop, 32 bit FPU DSP based fully digital control. Internal CAN BUS communication for increased reliability- Fast Computation.

#### • Harmonic Mitigation:

Unistar - AHF assures the plant current THD to stay below the limits specified by the IEEE 519-1992 with full dynamic compensation with Harmonic correction from 2<sup>nd</sup> order to 51<sup>st</sup> Order in 2 Level and up to 71<sup>st</sup> order in 3-Level design and all are selectable. Filters any individually selectable harmonics 0 to 100% simultaneously.

#### • Design:

Standalone design in 2 level Unistar AHF and modular design in 3 level topology & design temperature is 45Deg. Peak compensating current 2.25 times than RMS value with the state-of-the-art LCL based third order filters reduce the filtering losses as well to less than 2.5%.

#### • Current Balancing:

Unistar - AHF assures the plant current drawn from the EB to be balanced and sinusoidal, by compensating negative sequence unbalance component of load currents.

#### • Neutral Current Compensation:

A 3-Phase 4-Wire Unistar- AHF fully supports the load neutral current locally, and assures near zero neutral current on the source / EB side.

#### • Reactive Current Compensation:

Unistar - AHF dynamically support reactive current locally, even with highly fluctuating loads. PF compensation of any range inductive to capacitive with dynamic response time 100 micro second for 2 level and 60 micro second for 3 level design.

### Product Range:

- 1) 2-Level - 25A to 300A can be higher parallel to form any rating.
- 2) 3-level - 100A modular design can be parallel max. 50 numbers.

Hybrid facility with existing APFC is available

## STATIC VAR GENERATOR

**SVG** is a power electronics convertor / inverter based three level topology device connected in shunt with load for real time power factor correction. SVG detects the phase angle difference between voltage & current and injects depanamic per phase reactive current to make power factor almost unity.

### Features:

- Overall response time <100 microseconds.
- Per phase reactive power compensation.
- Excellent reactive compensation: High speed, Precise ( $-0.99 \leq \cos \phi \leq 0.99$ ), Step-less, Bi-directional (capacitive and inductance) compensation.
- Excellent unbalance correction.
- Low thermal loss ( $\leq 2\%$  of rated SVG capacity).
- High stability: Infinite impedance to grid, avoids harmonic resonance problem.
- Flexible application: Modular design, embedded in standard or customized cabinet.
- Easy installation and maintenance.
- Wide capacity range: 125kVAr for single cabinet, up to 5 cabinets in parallel.
- Environmental adaptability: 0~45°C temperature (non condensing).
- Light in weight, compact in size, quieter in operation while delivering best-in-class performance.
- Transformer no load / full load loss compensation facility.
- Rating - 125 kVAr @ 480V / 50 kVAr @ 415V.
- Topology - 3 level.

### Applications

Electric arc furnaces, Cranes, shredders, sawmill machinery, welding machines, Automobile Industry etc.

Correction of leading power factor like in Data centers / commercial complex, Wind mills.

UPS systems, solar substation, traction Loads, Turbs, Foundries, Chemical Industry, Pharmaceutical Industry.





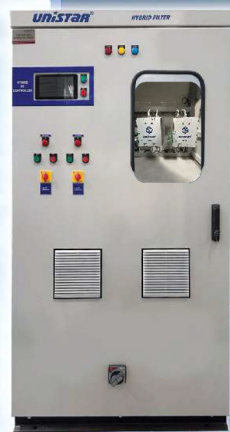
## HYBRID FILTER

**Hybrid filter** is combination of active technology (IGBT BASED step less compensation i.e. SVG, AHF/ SVG+) & Passive detuned APFC. Active section due to its fast response time starts compensation initially after that it starts to switch on APFC steps once PF reaches to desired level active section works as fine tuner lag & lead side. It is very economical power quality improvement solution now days for KWH & KVAH billing patterns.

### Features:

- **Type No.** : UNISTAR Hybrid filter.
- **Rating (Active + Passive)** : 50 kVar to 2000 kVar.
- **Nominal Voltage** : 415 / 440V volts (+/- 10%), 50Hz (+/- 5%), 3 phase, 3 wire & 3 phase, 4 wire.
- **P. F. Correction** : + 100% Lag to 90% Lead compensation with capacity possible with active part.
- **Harmonic mitigation** : Available up to 26<sup>th</sup> order with SVG+ and upto 50<sup>th</sup> order with AHF.
- **Communication** : CAN bus Wi-Fi, VNC.
- **Reaction Time** : <60  $\mu$ s.
- **Protection Class** : IP 30.
- **Ambient Time** : 0 to 45°C.

- Advanced DSP Technology with Artificial Neural network logic.
- Active Harmonic Filter / SVG combined with detuned passive APFC integrated to make Hybrid economical hybrid solution controlled by common controller.
- Hybrid controller with 7" touch screen display compatible to Harmonic analyzer & oscilloscope display feature.
- Subsidiary trend over APFC system.
- User-friendly system to commission it & to do maintenance.
- Optimum switching logic will improve life of contactors & capacitors.
- Power factor correction & harmonic mitigation in single product.
- Reaction time of <60 $\mu$ s.
- Facility to make hybrid with existing detuned APFC panel.



## AUTOMATIC POWER FACTOR CORRECTION PANELS

**APFC** is a shunt Capacitor assembly divided into various steps. Each step consists of a detuned reactor, protection devices & switching device controlled by a microprocessor-based APFC controller. The APFC controller takes feedback of line CT and calculates required kVar to achieve target power factor based on that it turns on capacitor steps to pump capacitive (leading) reactive power into the electrical network and thus mitigate lagging (Inductive) Inductive reactive power.

### Features:

- **Rated Voltage** : 440V / 575V / 750V.
- **Type of switching device** : Contactor / Thyristor.
- **Capacitors** : APP / MPP.
- **Reactor** : Copper / Aluminum wound.
- **Percentage of reactor** : 0.2%, 7%, 14%, 5.67%.
- **Type of assembly** : Compartmentalized / Non compartmentalized.
- **Protection Device** : MCB / MCCB / HRC / SEMICONDUCTOR fuses.
- **APFC controller** : 1CT sensing / 3CT sensing.
- **Standards** : IEC-61921 / IS-16636 / IEC-61439.



**Applications:**  
Textile, Sugar,  
Chemical, Steel  
and Cement  
Industry.



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