

ACTIVE POWER FILTER - APF



OVERVIEW

Active Power/Harmonic Filter(APF/AHF) is a perfect comprehensive solution to power quality problems such as harmonic wave, reactive power, and 3 phase load unbalance. APF is connected in parallel in power grid, to detect the harmonic wave in real time, generate the reverse-phase compensation current through the converter, and dynamically filter the harmonic wave. The operation of APF is unaffected by power grid structure and load type, and it will not produce harmonic oscillation with the system, thus perfectly realizing harmonic wave control of various loads. APF can also realize dynamic reactive compensation, and control the capacitor switching, to improve the power factor. Meanwhile, APF has the function of controlling the 3 phase load current unbalance, thus comprehensively solving various power quality problems with power grid.

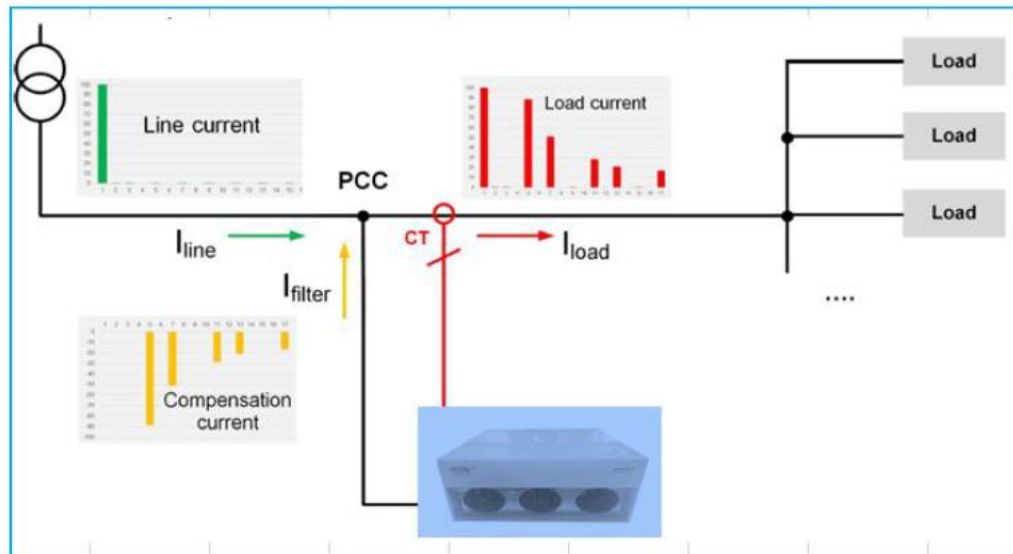
TYPICAL APPLICATIONS

- Harmonics occur usually as follows,
- Overheating of transformers and conductors
- Generator instability
- Capacitor failure
- Nuisance tripping of fuses and circuit breakers
- Damage to or failure of sensitive electronic equipment including drive failure
- Motor experiencing overheating, audible noise and reduced service life
- Telephone interferences
- High energy cost
- Downtime and loss of production due to equipment instability

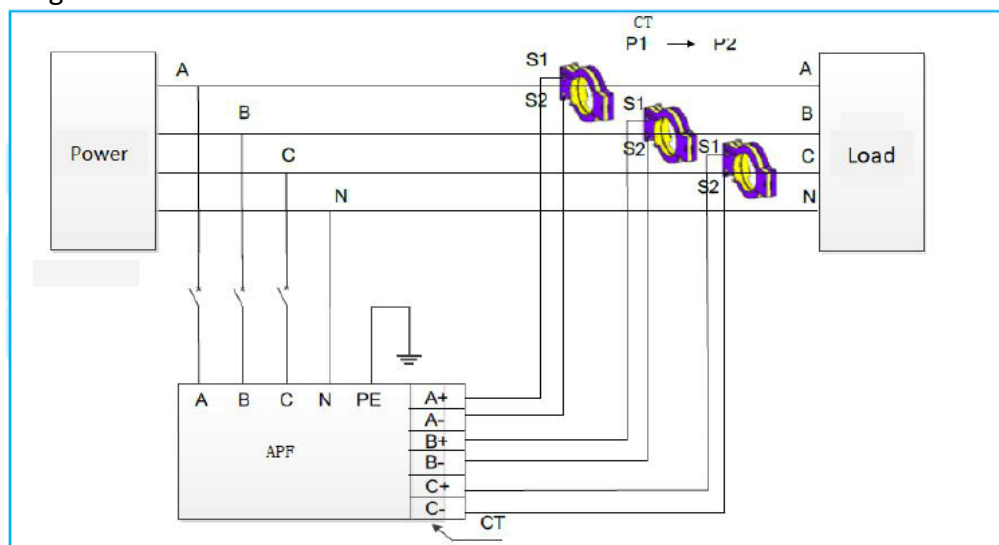


TYPICAL ELECTRICAL SCHEMATIC

- APF for central compensation



- Typical design scheme



- Working priciple



KEY FEATURES

- **EXCELLENT FILTERING PERFORMANCE**

- Filtering rate is greater than 97%
- Multiple compensation:
 - Harmonic filter, reactive compensation and 3 phase unbalance compensation

- **MULTIPLE PROTECTION**

Short circuit, over voltage, under voltage, over frequency, under frequency, phase sequence error and current inverted sequence protection.

- **MODULAR DESIGN**

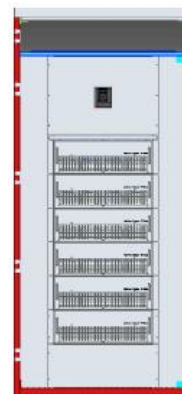
- Ultra-compact design, wall and rack mount installation, easy to use in new or existed switch room upgraded.
- Modular structure with highest reliability of system.
- 3P3W and 3P4W adapted by same modules and same capacity

- **INTELLIGENT FFT**

Unique intelligent FFT algorithm automatically study the electrical system impedance, to prevent from resonance, high system reliability

- **GRAPHIC USER INTERFACE**

- Cabinet: 7" central HMI w. touchscreen
- Display electrical parameters: voltage, current, frequency, harmonics before and after APF, apparent power, active power, reactive power etc.

**APF Panel****APF Modular**

DATA SHEET APF MODULAR

Number of phases (system input)	3-phase 3-wire or 3-phase 4-wire
Mains frequency	50/60Hz
Mains voltage	400 V $\pm$ 20%
Response time	<5ms
Harmonic mitigation performance	2nd to 50th harmonic
Filter Efficiency	>97%
Total harmonic current distortion THDi	<5%
Reactive power compensation Rate	>0.98(inductive and capacitive compensation)
3 phase unbalance compensation effect	<5%
Active Loss of system	<3%
Inverter topology	IGBT
Controller	DSP+FPGA
Current transformer placement	Mains side or load side
Communication interface	Modbus Protocol,RS485
Rated current of Modular	30A
Weight	30kg
Self-protection	Yes
Over heat protection	Yes
	Over/under voltage
Over/under frequency protection	Yes
Noise level	<60 dB (depending on load situation)
Relative humidity	
Temperature	-20 ~70°C
Cooling type	Air cooling
Dimensions cabinet	440 mm $\times$ 641 mm $\times$ 230.5mm (w $\times$ d $\times$ h)
Mounting	Wall-mounted or Rack mounted
Ambient conditions	<1000m; Up to 4000m with derating 1% per 100m
Protection class	IP20
Certification	ISO9001,Type Test Report
	EN 50178:1997/IEC50178:1997
Design standards	EN61000_6_2(2005)/EN55011, Grupa 1, Clasa A
	IEC61000_6_2(1999)/CISPR11,Grupa 1, Clasa A
	EN50091-3/IEC62040-3/AS62040-3(VFI SS 111)



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Inverter topology	IGBT
Controller	DSP+FPGA
Communication interface	Modbus Protocol,RS485
Rated current of Panel	150 200 250 300 400 450 500 600
Self-protection	Yes
Over heat protection	Yes
Over and under voltage protection	Yes
Noise level	<60 dB (depending on load situation)
Relative humidity	<95% non-condensing
Temperature	-20 ~70°C
Cooling type	
Dimensions cabinet	800/1000 mm $\times$ 1000/800 mm $\times$ 2200mm (w $\times$ d $\times$ h)
Mounting	Free standing
Ambient conditions	<1000 m without derating; Up to 4000m with derating 1% per 100m
Protection class	IP20
Certification	ISO9001,Type Test Report
	EN 50178:1997/IEC50178:1997
Design standards	EN61000_6_6(2005)/EN55011,Group1,ClassA
	IEC61000_6_2(1999)/CISPR11,Group1,GlassA
	EN50091-3/IEC62040-3/AS62040-3(VF1 SS 111)



REFERENCE TABLE FOR CENTRAL MANAGEMENT

Following are Experienced Values of Distortion Factors of Harmonic Currents in Industries.

Transformer capacity / KVA	Capacity of APF (A)				
	Building Subway	Medical / Tire / Metallurgy	Manufacture factory / New energy / Automobile	Performing arts center / Silicon manufacture / Oil exploitation	Chemical industry
THDi	10%	15%	20%	25%	30%
200	35	50	50	60	100
250	35	50	75	75	100
315	50	60	100	100	125
400	50	75	100	125	150
500	60	100	125	150	180
630	100	125	160	200	250
800	100	150	200	250	300
1000	125	200	250	300	350
1200	160	250	300	400	450
1600	200	300	400	500	550
2000	250	360	500	600	700
2500	300	450	600	700	850

