InPhase
The Power People®

TEKNOCRAT'S

Only technology which **guarantees full PF incentive** even with changed PF rules of MSEDCL...

SHAF

Smart Hybrid Active Filter

Cost effective advanced PF compensation...

The problem :

There is new challenge created by MSEDCL (Maharashtra State Electrical Distribution Co. Ltd) to all electrical managers. The challenge is , henceforth PF calculation will be based not only on lagging KVArh but also leading kVARh. What does this exactly mean ??

The distribution companies never consider the average power factor displayed by the energy meter. It calculates PF from kWh & kVArh values. Typically, till now the PF is calculated as :

$$PF = \frac{kWh}{\sqrt{(kWh)^2 + (kVArh\ Lag)^2}}$$

From September 2018, MSESDL has decided to calculate PF as

$$PF = \frac{kWh}{\sqrt{(kWh)^2 + (kVArh\ Lag + kVArh\ Lead)^2}}$$

Earlier, nobody looked at the kVArh (Lead) value as it was not considered before. So, it was a normal practice to connect more capacitors than needed (Over compensation). Even an APFC solution, being a stepwise compensation technique & with a sluggish response, toggles between lead & lag kVAr. Now onwards, as the lead kVAr is also going to be accounted for, present APFC system can not ensure a unity PF & so incentives.

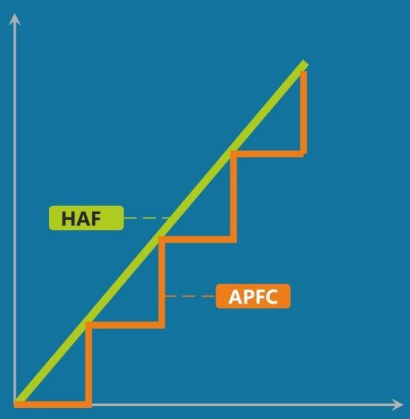
So, all HT consumers of MSEDCL who till now enjoyed incentives on energy charges, suddenly faced penalties due to reduced PF.

The solution :

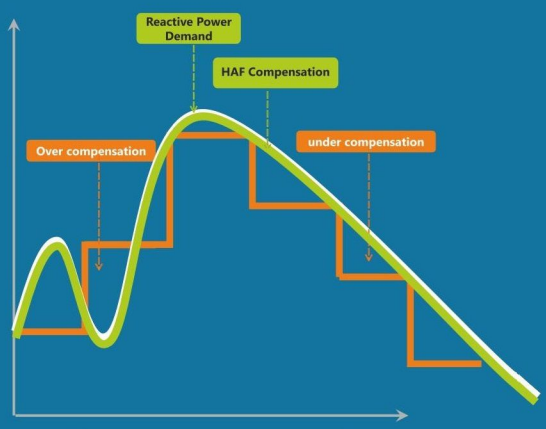
As the capacitor based PF compensation has limitations in the new scenario, there is a need for a different technology which is so fast in responding to the load changes that the compensation is done in milliseconds to ensure unity power factor. Presently Active Harmonic Filter (AHF) is a technology , which complies to the above mentioned requirement & is an ideal solution for the problem.

AHF technology senses the present waveform , injects a compensatory waveform of required magnitude to the electrical system, thereby ensuring unity power factor at all the times.

The difference in the performance can be understood from following diagrams...



HAF Vs APFC Compensation



Over/Under Compensation

However , higher price is a major deterrent for the use of technology. So, there is a need which calls for a technology which offers similar results as AHF but at a lesser price.

So, InPhase , a leader in Power Quality solutions in India has devised an innovative solution called SHAF (Smart Hybrid Active Filter) which delivers same results of HAF but at a lesser price by combining with a existing passive (capacitor based) systems.

The Product :

SHAF

Smart Hybrid Active Filter

Cost Effective

Since it uses a combination of Active and Passive it is more cost effective

High Efficiency

Offers efficiency of 98% over conventional system that has 94 to 95%

Less Maintenance

Avoid capacitor, contactor failures due to frequent switching that is prevented by the Active System

Monitor from Mobile

With a 7'inch HMI and ability to manage from cloud it offers more flexibility to monitor and control

Quick Reaction

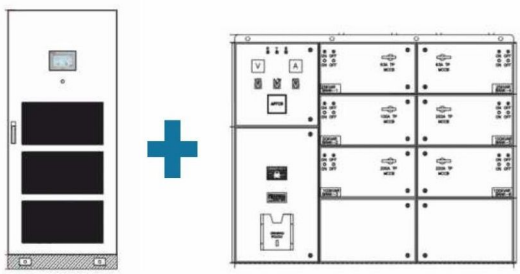
Since the Active system handles fine correction response and reaction is much faster

Smoother Voltage

Provides smooth voltage profile due to quick reaction time and avoids flicker.

PF & Harmonics

SHAF can manage both PF and Harmonics simultaneously



Active + Passive

SHAF Configurations

Reactive Power Compensation Redefined

Possible Configurations of SHAF

- SHAF + New APFC/TSC ✓
- SHAF + Existing TSC ✓
- SHAF + Existing APFC *(Detuned)* ✓
- SHAF + Capacitor Bank (Detuned) ✓
- SHAF + Plain Capacitor ✗
- SHAF + APFC with no reactors ✗

SHAF works with all capacitor voltages – 415V/525V/690V

Inexpensive Dynamic Stepless Compensation

- SHAF at a fraction of the price of a full active solution provides dynamic compensation
- Realizes stepless and high speed compensation at a lower price point
- Achieves True PF with options to control harmonics and unbalance
- SHAF avoids leading compensation there by helping achieving unity PF under KVAH billing
- Precise Kvar delivery helps to avoid over compensation
- Over compensation leads to variations in voltage
- SHAF delivers precise Kvar to ensure Smooth Voltage profile
- SHAF can do both Leading and Lagging compensation

Works with existing APFC

- SHAF can work with existing APFC/TSC
- If APFC/TSC is detuned, then SHAF can work along with it
- APFC/TSC controller becomes redundant and can be turned off as SHAF will control and monitor the APFC/TSC system.

Buy SHAF get a EMS Free!!!

- SHAF comes with inbuilt EMS that helps to monitor the whole system at the comfort of your mobile
- Key information like kWh, kVAr, PF, HDi, are displayed every few minutes in realtime
- Stores all key data up to 3 months and fault logs for ever
- Automatically sends SMS during faults

Different Types Power Quality Products Vs Features					
	Fixed Capacitor	**Automatic Power Factor Capacitor (APFC)**	**Thyristor Switched Capacitor (TSC)/ RTPFC**	**Smart Hybrid Active Filter (SHAF)**	**Active Harmonic Filter - ASTRA**
Technology	100% Passive	100% Passive	100% Passive	Active & Passive	100% Active
Type of Technology	Capacitor with Series Reactor Fixed	Contactor switched detuned Capacitor Banks	Thristor switched detuned Capacitor Banks	**combination of detuned capacitor bank along with Smart ASTRA Active Filter**	
Step compensation / Smooth stepless compensation	Step compensation	Step compensation	Step compensation	**smooth stepless compensation**	**smooth stepless compensation**
Harmonics Filtering capability	Mostly Not available	Mostly Not available	Mostly Not available	**By Active Filter**	**By Active Filter**
Unbalance load compensation	Mostly Not available	Mostly Not available	Mostly Not available	**By Active Filter**	**By Active Filter**
Realtime Power parameters monitering- Mobile/ computers	Mostly Not available	Mostly Not available	Mostly Not available	**Available**	**Available**
Realtime Panel status monitering- Mobile/ computers	Mostly Not available	Mostly Not available	Mostly Not available	**Available**	**Available**
Parallel Resonace risk	High	High	High	**No**	**No**
Individual Harmonics Selection	Not possible	Not possible	Not possible	**Available**	**Available**
Harmonics compensation capacity	Not possible	Not possible	Not possible	**2nd to 61st order of Harmonics**	**3rd to 61st order of Harmonics**
Temperature derating capability	Not possible	Not possible	Not possible	**Available**	**Available**
Reaction time	slow	slow	Faster than APFC	**in mSec**	**Less than 1 mSec**
Achieving Fine correction of Power Factor	Not possible	Not possible	Not possible	**Yes because stepless**	**Yes because stepless**
Captive Power Plant (CPP) application	No	No	No	**Yes**	**Yes**
Economical aspects	Very less	less	Moderate	**Moderate**	**High**
Pre-mature Failure indication	NO	NO	NO	**Yes**	**Yes**
Life time because of frequent switching	High	Very less	Moderate	**High**	**Very High**

About Inphase:

Inphase Power Technologies Pvt. Ltd is a Banglore based company, founded by technocrats of more than 100 years of collective experience in power quality, power electronics & software solutions. The team held senior positions in power technology companies before starting the company. Supported by deep understanding of system knowledge & application engineering, Inphase team could create a product which surpasses the global standards. To know more about the company, kindly visit **www.inphase.in**

About Teknocrat's group

Founded in 1993, Teknocrat's Control Systems (I) Pvt. Ltd. is an experienced Indian industry in the field of Industrial Automation, Energy Conservation & Power quality. Enriched with a long association with global players like Siemens, Schneider, KSB, Emerson, Philips; TCSIPL has a vast domain knowledge about the technologies. It is supported by strong culture of customer focus & process management . Strong installation & after sales support team distinguishes TCSIPL from other players in the field . To know more about Teknocrat's group, kindly visit **www.teknocrats.com**

Few of the customers of solutions from Inphase...

BHEL, Power Grid Corporation of India Ltd, NMDC, Chennai Metro Rail Limited, TATA, THERMAX, JOHN DEERE, DUPONT, Whirlpool, MURUGAPPA GROUP, ACC cement, Shree Cement, ADITYA BIRLA UltraTech, SAGAR CEMENT, ITC Limited, Coca-Cola, INDUS 555 TMT, swelect, SAINT-GOBAIN, weg

For enquiries contact us on : **marketing@teknocrats.com**

TEKNOCRAT'S

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