



COMPLETE POWER QUALITY SOLUTIONS



ABOUT US



Activesine Electricals India Pvt Ltd was established in the year 2023 with the wide vision in Power Quality Solutions Industry with the technology driven we believe that the future of our industry lies in innovation and effective R&D, which in turn helps one to push boundaries and eliminate borders. We at Activesine Electricals believe in this and therefore are constantly emerging with new products focusing on quality, safety, and affordability.

A RAPIDLY EMERGING PURE POWER SUPPLY SOLUTIONS PROVIDER

Activesine Electricals India Pvt. Ltd., based in Bengaluru serves as an industry pioneer, reputed as a pure power quality solutions provider. The company delves into research about power consumption, wastage, and losses incurred in commercial, IT, factory, or residential, offering clients solutions for fixing these issues and reducing wastage of power. Catering to the distinctive needs of diverse clients from varied industries spread across India, the company is dedicated to drive client satisfaction and success through its comprehensive suite of solutions and services.

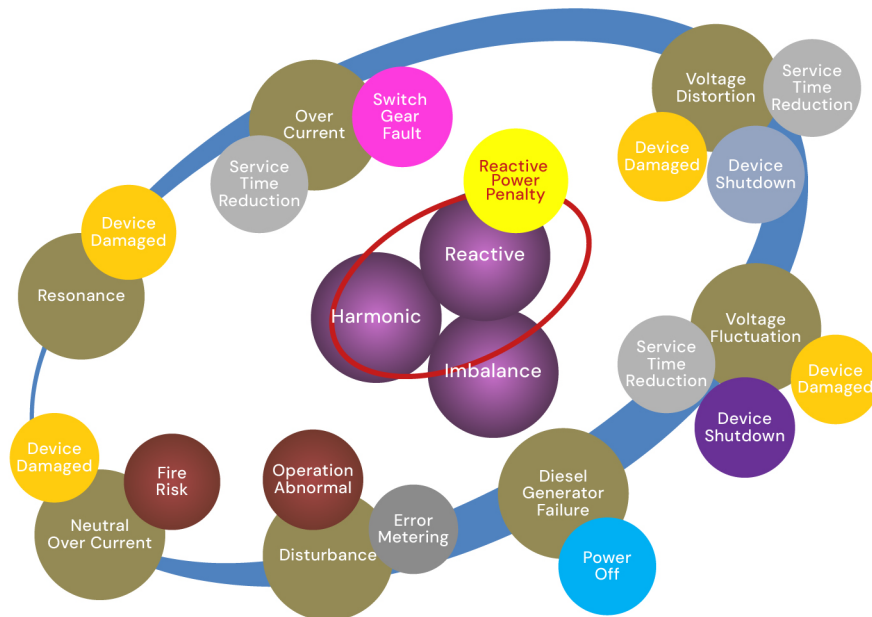
WORLD-CLASS MANUFACTURING CAPABILITIES

At Activesine, we understand that reliable power quality is the cornerstone of operational efficiency. Our team of seasoned experts utilizes state-of-the-art equipment to provide you with unparalleled accuracy and insights. Unleash the potential of your systems as we develop deep into the intricacies of power quality, uncovering anomalies, harmonics and disturbances that might be hindering your performance. Whether you're seeking to optimize production, reduce downtime or ensure compliance, Activesine Electricals is your trusted partner in achieving unrivaled power quality analysis to experience the difference of precision and reliability.

Our seasoned experts conduct in-depth assessments of your power systems, analyzing parameters such as harmonics, voltage fluctuations, transients and disturbances. Activesine's robust manufacturing capabilities are built into a state-of-the-art facility situated in Bengaluru. The company has been certified with the ISO 9001-2015 certification for panel manufacturing in India, demonstrating its expertise and dedication to excellence and quality. Moreover, the firm is equipped with seasoned engineers with advanced knowledge and extensive and diverse experience in manufacturing high-quality APFC/AHF/SVG/HYBRID panels to suit diverse client needs.

DEDICATED TO BECOMING AN INDUSTRY LEADER, ACTIVESINE PRIORITIZES ALIGNING IT'S PRACTICES, SERVICES AND SOLUTIONS WITH PREVALENT INDUSTRY STANDARDS.

IMPACTS OF POWER QUALITY:



POWER FACTOR:

Electrical loads are often composed of more than just pure resistance, the combination of resistance and reactance in an AC system is called the impedance. Reactance comes in two forms: inductive and capacitive, both of which do not contribute to “useful” work on the power system.

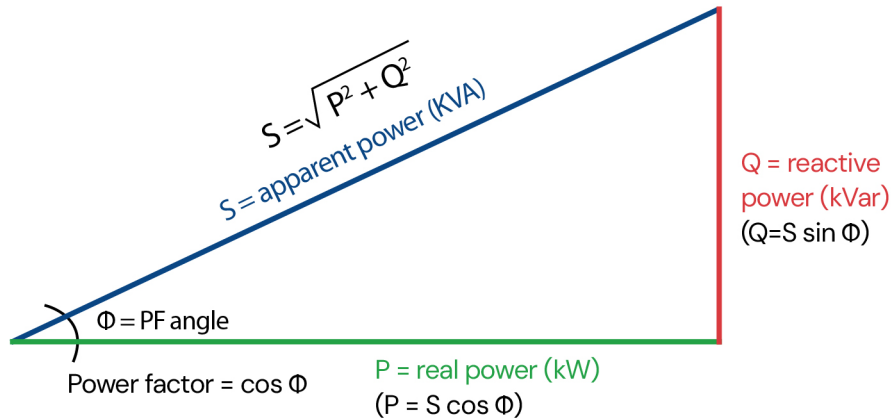
Power Factor is a measure of how effectively incoming power is used in your electrical system (energy efficiency) and is defined as the ratio of Real (working) power to Apparent (total) power.

Real Power (kW) is the power that actually powers the equipment and performs useful, productive work. It is also called Actual Power, Active Power or Working Power.

Reactive Power (kVAR) is the power required by some equipment (eg. transformers & motors) to produce a magnetic field to enable real work to be done. It's necessary to energise this equipment however it does not perform any productive work.

Apparent Power (kVA) is the vector sum of Real Power (kW) and Reactive Power (kVAR) and is the total power supplied through the mains that is required to produce the required amount of Real Power for the load. It is also known as the 'demand'.

Power factor is a way to characterize how much electrical power goes toward producing useful work such as light, heating, or machinery. Low power factor means a large amount of energy is being lost in the system in the form of wasted heat, which generally equates to higher energy bills and equipment degradation.



WHY TO CARE FOR POWER FACTOR?

Sources of Low PF

- * Induction motors of all types, particularly, when they are operated at reduced/ light loads.
- * Power transformers and voltage regulators.
- * Arc welders.
- * Choke coils and magnetic systems.
- * Synchronous motors
- * Distribution Transformers: The PF depends on its design, loading and unloading.
Generally, the PF of an unloaded transformer is very low.
- * Fluorescent and discharge lamps, neon signs, etc

Effects of Low PF

- * Overloading of cables and transformer thus reducing the life of the Equipment.
- * Decreased/increased line and phase voltage at point of application on account of lagging/leading low power factor.
- * Inefficient operation of plant leading to power and energy loss.
- * Causes penalty charges if below some threshold.
- * Wastage of capital due to oversizing of cables transformers and switchgear
- * Reducing the power flow on transmission line.

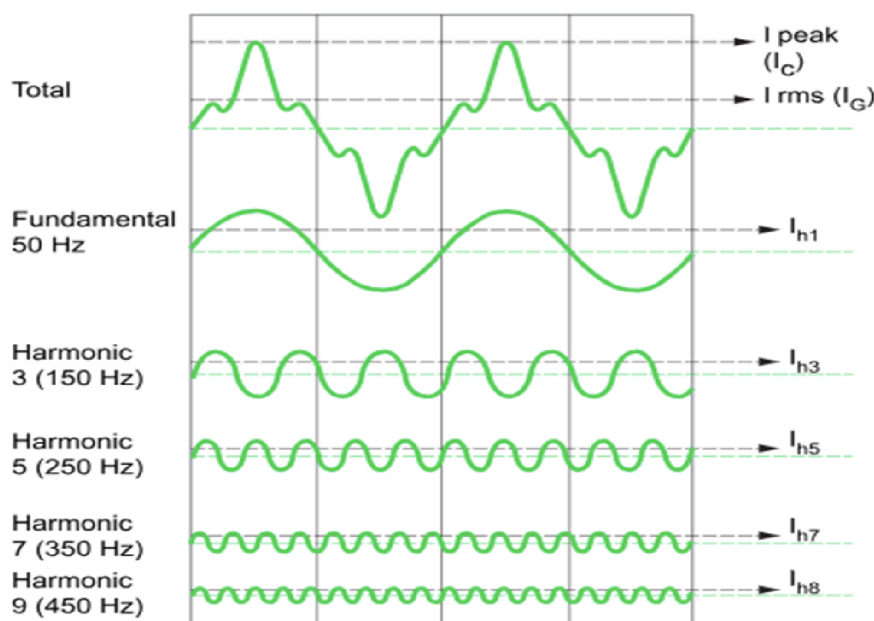
HARMONICS:

In an electric power system, a harmonic of a voltage or current waveform is a sinusoidal wave whose frequency is an integer multiple of the fundamental frequency. Harmonic frequencies are produced by the action of non-linear loads such as rectifiers, discharge lighting, or saturated electric machines. The fundamental frequency is also called the 1st harmonic. Harmonics are an increasing problem in today's modern electrical system. The rapid uptake of sophisticated power electronics devices and non-linear loads has resulted in electrical networks rich in harmonic currents and voltage distortion. Non-linear loads draw current from the electrical supply that is non-sinusoidal.

The excess heat produced by harmonics can have detrimental effects on a power system. Transformers are especially susceptible to damage caused by harmonics due to stray "eddy currents" which circulate in the iron core and produce excess heat.

Harmonics are identified by their frequency in multiples of the "fundamental" or main frequency (50Hz in the India). For example, the third harmonic in a 50 Hz system would be 150 Hz ($50\text{Hz} \times 3 = 150\text{Hz}$) and the 5th harmonic would be 250 Hz ($50\text{ Hz} \times 5 = 250\text{Hz}$).

The magnitude of each harmonic frequency can be measured using power quality meters and are generally displayed in the form of a harmonic spectrum. Total harmonic distortion (THD) and total demand distortion (TDD) are sometimes used with power quality meters to simplify harmonic distortion as a single measurement rather than an entire spectrum.



SOURCES OF HARMONICS:



- * Main sources are Non-Linear Loads given as under Electronic Switching Power Converters
 - Computers, Uninterruptible power supplies (UPS), Solid-state rectifiers
 - Electronic process control equipment, PLC's, etc
 - Electronic lighting ballasts, including light dimmer
 - Reduced voltage motor controllers
- * Power Converters.
 - Three-phase power converters
 - VFD
- * Arcing Devices
- * Discharge lighting, e.g. Fluorescent, Sodium and Mercury vapor
- * Arc furnaces, Welding equipment, Electrical traction system Ferromagnetic Devices
- * Transformers operating near saturation level
- * Magnetic ballasts (Saturated Iron core)
- * Induction heating equipment, Chokes, Motors
- * Appliances – TV sets, air conditioners, washing machines, microwave ovens, Fax machines, photocopiers, printers , etc.

EFFECTS OF HARMONICS:

- * Affect operation of sensitive equipment like control and monitoring devices
- * Overloading in Distribution System due to increase in RMS Current.
- * Harmonics cause additional losses (Joule effect) in conductors and equipment.
- * Derating of power sources (generators, transformers and UPSs) leading to over-sizing.
- * Oversizing of conductors on account of the flow of harmonic currents due to skin effect.
- * Reduced service life of equipment, Nuisance tripping of breakers and installation shutdown.
- * Higher neutral current

IEEE 519 STANDARD FOR VOLTAGE HARMONICS

Voltage Distortion Limits

Bus Voltage at PCC	Individual Voltage Distortion	Total Voltage Distortion THD (%)
69 kV and below	3.0	5.0
69.001 kV through 161 kV	1.5	2.5
161.001 kV and above	1.0	1.5
NOTE: High-voltage systems can have up to 2.0% THD where the cause is an HVDC terminal that will attenuate by the time it is tapped for a user.		

IEEE 519 STANDARD FOR CURRENT HARMONICS

Current Distortion Limits for General Distribution Systems (120 V Through 69000 V)

Maximum Harmonic Current Distortion in Percent of I_L						
Individual Harmonic Order (Odd Harmonics)						
I_{sc}/I_L	<11	$11 \leq h < 17$	$17 \leq h < 23$	$23 \leq h < 35$	$35 \leq h$	TDD
<20*	4.0	2.0	1.5	0.6	0.3	5.0
20<50	7.0	3.5	2.5	1.0	0.5	8.0
50<100	10.0	4.5	4.0	1.5	0.7	12.0
100<1000	12.0	5.5	5.0	2.0	1.0	15.0
>1000	15.0	7.0	6.0	2.5	1.4	20.0
Even harmonics are limited to 25% of the odd harmonic limits above.						
Current distortions that result in a DC offset, e.g., half-wave converters, are not allowed.						
All power generation equipment is limited to these values of current distortion, regardless of actual I_{sc}/I_L						
Where:						
I_{sc} = maximum short-circuit current at PCC.						
I_L = maximum demand load current (fundamental frequency component) at PCC.						
TDD = Total demand distortion (RSS), harmonic current distortion in % of maximum demand load current (15 or 30 min demand).						
PCC = Point of common coupling.						

MULTIPLYING FACTOR TABLE FOR CAPACITOR CALCULATION:

Orig PF	Corrected Power Factor										
	0.80	0.82	0.84	0.86	0.88	0.90	0.92	0.94	0.96	0.98	1.00
0.50	0.982	1.034	1.086	1.139	1.192	1.248	1.306	1.369	1.440	1.529	1.732
0.52	0.893	0.945	0.997	1.049	1.103	1.158	1.217	1.280	1.351	1.440	1.643
0.54	0.809	0.861	0.913	0.965	1.019	1.074	1.133	1.196	1.267	1.356	1.559
0.56	0.729	0.781	0.834	0.886	0.940	0.995	1.053	1.116	1.188	1.276	1.479
0.58	0.655	0.707	0.759	0.811	0.865	0.920	0.979	1.042	1.113	1.201	1.405
0.60	0.583	0.635	0.687	0.740	0.794	0.849	0.907	0.970	1.042	1.130	1.333
0.62	0.515	0.567	0.620	0.672	0.726	0.781	0.839	0.903	0.974	1.062	1.265
0.64	0.451	0.503	0.555	0.607	0.661	0.716	0.775	0.838	0.909	0.998	1.201
0.66	0.388	0.440	0.492	0.545	0.599	0.654	0.712	0.775	0.847	0.935	1.138
0.68	0.328	0.380	0.432	0.485	0.539	0.594	0.652	0.715	0.787	0.875	1.078
0.70	0.270	0.322	0.374	0.427	0.480	0.536	0.594	0.657	0.729	0.817	1.020
0.72	0.214	0.266	0.318	0.370	0.424	0.480	0.538	0.601	0.672	0.761	0.964
0.74	0.159	0.211	0.263	0.316	0.369	0.425	0.483	0.546	0.617	0.706	0.909
0.76	0.105	0.157	0.209	0.262	0.315	0.371	0.429	0.492	0.563	0.652	0.855
0.78	0.052	0.104	0.156	0.209	0.263	0.318	0.376	0.439	0.511	0.599	0.802
0.80	0.000	0.052	0.104	0.157	0.210	0.266	0.324	0.387	0.458	0.547	0.750
0.82		0.000	0.052	0.105	0.158	0.214	0.272	0.335	0.406	0.495	0.698
0.84			0.000	0.053	0.106	0.162	0.220	0.283	0.354	0.443	0.646
0.86				0.000	0.054	0.109	0.167	0.230	0.302	0.390	0.593
0.88					0.000	0.055	0.114	0.177	0.248	0.337	0.540
0.90						0.000	0.058	0.121	0.193	0.281	0.484
0.92							0.000	0.063	0.134	0.223	0.426
0.94								0.000	0.071	0.160	0.363
0.96									0.000	0.089	0.292
0.98										0.000	0.203
1.00											0.000

$$\text{kVAR}_{\text{required}} = \text{kW} * (\tan(\cos^{-1}\Phi_{\text{original}}) - \tan(\cos^{-1}\Phi_{\text{desired}}))$$

$$\text{kVAR}_{\text{required}} = \text{multiplier} * \text{kW}$$

THDi: total harmonic distortion of current.

THDv: total harmonic distortion of voltage.

$$THDi = \frac{I_H}{I_1} \quad I_H = \sqrt{I_2^2 + I_3^2 + I_4^2 + \dots I_n^2 + \dots}$$

$$THDv = \frac{V_H}{V_1} \quad V_H = \sqrt{V_2^2 + V_3^2 + V_4^2 + \dots V_n^2 + \dots}$$

I_H is the RMS value of harmonic current,i.e the RMS value of nth order harmonic current WRT the fundamental current.

V_H is the RMS value of harmonic current,i.e the RMS value of nth order harmonic current WRT the fundamental current.

EXPECTED HARMONICS

<u>Source</u>	<u>Typical Harmonics*</u>
6 Pulse Drive/Rectifier	5, 7, 11, 13, 17, 19...
12 Pulse Drive/Rectifier	11, 13, 23, 25...
18 Pulse Drive	17, 19, 35, 37...
Switch-Mode Power Supply	3, 5, 7, 9, 11, 13...
Fluorescent Lights	3, 5, 7, 9, 11, 13...
Arcing Devices	2, 3, 4, 5, 7...
Transformer Energization	2, 3, 4

* Generally, magnitude decreases as harmonic order increases

H=NP+/-1
i.e. 6 Pulse Drive – 5, 7, 11, 13, 17, 19,....



POWER QUALITY SOLUTION COMPARISON

Comparison between Capacitor Bank, SVG and APF

Item	Capacitor Bank	SVG	APF
Harmonic Filtering	Unavailable	Upto 20% of rated capacity Eliminate 2 nd ~50 th harmonics	Eliminate 2 nd ~50 th harmonics (selectable)
Reactive Power Compensation	Discretely compensate inductive reactive power only	Steplessly compensate both inductive and capacitive reactive power	
Imbalance Correction	Unavailable	Available	
Response Speed	slow, can't track dynamic reactive power (20ms~5s)	fast, can track dynamic reactive power (<0.1ms)	
Harmonic Resonance Problem	Potential resonance between capacitor and transformer sabotages power system stability.	Active compensation technology avoids harmonic resonance from the principle.	
Output Ability	Actual output capacity is less than the rated capacity.	Actual output capacity is the same as rated capacity.	
Space	Consume larger space	Consume very less space	
Life span	Limited life span-Capacitor	Higher life span - IGBT	

INTRODUCTION:

Majority of the loads in the industries are highly inductive in nature such as induction motors, welding equipments, arc furnaces and fluorescent lightings. There may be a few resistive loads for heaters and incandescent bulbs. Very rarely industries may have capacitive loads such as synchronous motors. Net industrial load is highly inductive causing a lagging power factor. If this poor power factor is left uncorrected, the industry will require a high maximum demand from Electricity Board and also will suffer a penalty for poor power factor.

These two factors of high kVA demand and penalty for poor factor will inflate the monthly Electricity Bill. Since Power Factor can be corrected to near unity there can be huge saving from the Electricity Bills. Standard practice is to connect power capacitors in the electrical network at appropriate places to compensate the inductive nature of the load.

BENEFITS OF POWER FACTOR IMPROVEMENT

- Substantial reduction in kVA demand and avoids penalty for low Power Factor
- Additional loads may be added for improved productivity without need for increased demand
- Considerable reduction of Transformer and line losses Reduction in voltage drop resulting in better system voltage regulation
- Reduction in maintenance, capital cost and longer life of distribution equipment due to lesser current in the system
- Reduction in voltage fluctuation and circuit reactance
- Reduction in reactive power demand from the supply system since PFC Panel compensates the reactive power of inductive loads
- Payback for the PF Panel is normally within 8 –12 months

ACTIVE SINE SOLUTION:

- Calculated fixed capacitor banks with manual ON/OFF switch with or without de-tuned reactor
- Automatic Power Factor correction takes place with respect to load requirements through PF Controller and contactor Thyristor switching.
- Use of Capacitor duty contactors limit the inrush current during switching and enhance the life of the capacitor
- Intelligent Relay with Programmable 6/8/12 Stages
- Compartmentalised and Non – Compartmentalised Design
- Specially designed harmonic filter APFC & RTPFC panels
- Can be designed as per Customer Requirements

BENEFITS OF APFC(RTPFC) SYSTEMS :

- Reduction of harmonic currents in the electrical network
- Eliminates resonance condition
- Improvement of True Power Factor
- Better voltage stability and regulation
- No derations of the transformers and motors due to harmonic losses
- Better utilisation of the electrical system
- Good life expectancy for all the electrical and electronic components
- Reduced downtime and hence higher productivity of the plant and system
- efficiency at its best
- Penalty by EB authorities for poor PF is avoided and hence reduced electricity bills

ACTIVESINE LV APFC/RTPFC Power Quality Solutions



FEATURES

*Type Tested as per latest standard

- * Flexible Step Rating
- * Compartmentalized & Modular Compact Design
- * Inbuilt Intelligent Controller for Power Factor (PF) Improvement
- * Perfect Solution for Non-Linear Loads
- * IoT-Based Technology
- * Designed for Capacitor Duty Contactor | Thyristor Switching
- * Lower Power Consumption Due to Minimal Capacitor Losses
- * Solution Available with MPP | APP Capacitors
- * Optimized and Customized Design
- * Suitably Designed to Mitigate Harmonic Resonance & Amplification

ACTIVESINE AHF/SVG PANEL-HARMONIC MITIGATION & PF CORRECTION



FEATURES

* IoT based monitoring and smart Panel

- * Featured with 3 level Topology
- * Ultra fast compensation
- * Proven performance on welding
- * Step-less Reactive Power Compensation
- * 7/10" touch screen display
- * Harmonic current capacity for SVG: 20% of the rated current from H2 to H25
- * Multifunctional: Harmonic, reactive power and imbalance compensation
- * Harmonic Elimination Range: 2nd~50th order (Selectable)
- * High harmonic filtering rate: Upto 98%
- * Excellent reactive compensation: Highspeed, Precise ($-0.99 \leq \text{PF} \leq 0.99$), Step-less, Bi-directional (capacitive and inductance) compensation
- * Excellent imbalance correction: Both negative and zero sequence, mitigates neutral current
- * Wide input voltage & frequency range, adapts to tough electrical environments
- * Low thermal loss ($\leq 3\%$ of rated APF kVA), efficiency $\geq 97\%$
- * High stability: Infinite impedance to grid, avoids harmonic resonance problems
- * Flexible application: Modular design, embedded in standard or customized cabinet
- * Easy installation and maintenance: Plug-in installation for APF module replacement and expansion
- * Wide capacity range: 30~750A for a single cabinet, up to 10 cabinets in parallel
- * Environmental adaptability: $-10 \sim 55^\circ$ Ambient temperature, compatible with diesel generator
- * Complete protection: Grid Over/Undervoltage, APF over current, over temperature, and more. All faults are recorded in the event log, which is convenient for failure analysis
- * Waveform display function on HMI: Display wave form of input Voltage, Grid current, Load current and APF current
- * Display Harmonic current Histogram on HMI: Grid harmonic current and load harmonic current
- * CTs' reversal auto correction can be set on HMI, support grid side or load side current detection



TECHNICAL DATA SHEET

DETAILS	UNIT	
GENERAL		
APPLICATION	NA	AUTOMATIC POWER FACTOR IMPROVEMENT
AMBIENT TEMPERATURE	DEG. C	40 Degree
SWITCHGEAR & BUS BAR RATING		
RATED VOLTAGE	VOLT	415±10%
FREQUENCY	Hz..	50 ± 5%
NO. OF PHASES	NA	3
BUS BAR RATED CURRENT	AMP.	As per Rated KVAR
ONE MINUTE POWER FREQUENCY VOLTAGE	kV	3
EXPECTED POWER FACTOR	PF	As per Designed KVAR
QUANTITY OF BANKS	NA	As per desined
CONSTRUCTION REQUIREMENT		
TYPE OF MOUNTING	NA	FLOOR
LOCATION	NA	INDOOR OUTDOOR
MOC FOR OFFERED ENCLOSURE	NA	MOC-CRCA
MOC THICKNESS	NA	FRAME-2.5 GLAND PLATE-3 DOOR -2 FOR LOAD BEARING MEMBER COVER-1.6 PARTITION PLATE-1.6
FORM OF SEPARATION	NA	3B - compartmentalized for front swgr section & non compartmentalized for rear Capacitor/Reactor section.
PROVISION OF BASE FRAME	NA	yes
PAINT BOTH INSIDE AND OUTSIDE	NA	RAL 7032/RAL7035
TYPE OF PAINT	NA	EPOXY Power Coating
CABLE ENTRY	NA	BOTTOM/TOP
FEEDER TYPE	NA	As Required ACB/MCCB
BUS BAR SIZE	NA	AS per Current Rating.
BUS BAR MATERIAL	NA	ALUMINIUM/COPPER
EARTH BUS	MM	MATERIAL OF CONSTRUCTION-ALUMINIUM
IP RATING	NA	IP-4X/IP5X
BUSBAR INSULATING MATERIAL	NA	HEAT SHRINKABLE PVC SLEEVES AND SHROUDS
INDICATION AND ALARM	NA	AS PER SLD, ON/OFF/ TRIP/Incoming Power RYB/Auto-Manual/Trip circuit Healthy
CLEARANCES IN AIR OF LIVE PARTS	MM	PHASE TO PHASE : 25.4 PHASE TO EARTH : 19.4
PANEL DIMENSIONS (L X D X H) IN MM	MM	AS PER RATING OF THE PANEL
OPERATING HEIGHT	MM	A) MINIMUM (300mm) B) MAXIMUM (2200mm)
COOLING	AIR NATURAL	Cooling fans with louvers & mechanical mesh with Air filter
SWITCHING		
RATED VOLTAGE	VOLT	415
RATED CURRENT	AMP	AS PER THE SLD
RATED FAULT LEVEL	kA FOR 1 SEC	50
TYPE OF SWITCHING	NA	AUTOMATIC WITH MANUAL OVERRIDE & PUSH BUTTONS
SERIES REACTOR		
APPLICATION	NA	TO MINIMIZE INRUSH AND TO RESTRICT IMPACT OF HARMONICS UPTO FIXED LEVEL.
VOLTAGE, FREQUENCY AND PHASE	VOLT HZ.	A) VOLTAGE-415 B) FREQUENCY-50 C) PHASE-3

GENERAL TECHNICAL PARTICULAR OF SVG



Electrical Specification	Rated Voltage	AC 208 V		AC 400 V		
	Input Voltage Range	AC 166~250 V	AC 166~250 V	AC 228~456 V	AC 228~480 V	
	Electric Connection	3P4W	3P3W	3P4W	3P3W	
	Rated Capacity per Module	25 kvar / 50 kvar		50 kvar / 100 kvar		
	Rated Current per Cabinet	25~350 kvar (Module combination)		50~700 kvar (Module combination)		
	Rated Frequency	50(60) Hz ± 10%				
	Input Voltage THD Range	≤ 15%				
	Redundancy	Each module is an independent reactive compensation system				
	Reactive Power Compensation Capability	Both inductive and capacitive reactive power				
	Reactive Power Compensation Performance	Cosφ ≥ 0.99 after compensation (If the SVG capacity is sufficient)				
	Imbalance Correction Capability	Mitigate negative and zero sequence				
	Harmonic Elimination Range	2 nd ~25 th order (Selectable)				
	Harmonic Current Capacity	20% of rated current				
	Full Response Time	< 10 ms				
	Instant Response Time	< 100 us				
	Thermal Loss	≤ 3% of SVG rated capacity				
	Output Current Limitation	Automatic (100% rated capacity)				
	Parallel Expansion (System)	Up to 10 Racks (7 modules per cabinet)				
	MTBF	> 100,000 hours				
	Control Technology	Control Frequency	30 kHz			
		Controller	DSP + FPGA			
CT Position		Grid side or Load side				
Waveform Display		Input Voltage waveform, Grid current waveform, Load current waveform and SVG current waveform				
Harmonic Current Histogram Display		Grid harmonic current and load harmonic current				
Communication		Modbus RTU (RS-485), Modbus TCP/IP (Ethernet)				
Physical Specification	IP Grade of Cabinet	IP20, IP30, IP54, IP55 or customization				
	Cooling Method	Intelligent forced air cooling				
	Noise Level	< 65 dB(A) @ 1 m (Module)				
	Dust Filter	Optional				
	Dimension	Refer to SVG model table				
	Weight	Refer to SVG model table				
Environmental Requirement	Ambient Temperature	-10~55°C				
	Relative Humidity	0~95% (No condensation)				
	Altitude	≤ 1000 m (Rated capacity), 1000~3000 m (Derating 1% per 100 m)				

GENERAL TECHNICAL PARTICULAR OF AHF



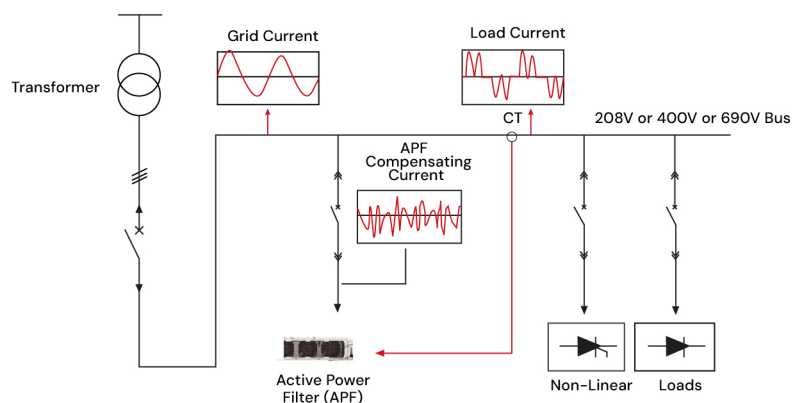
Electrical Specification	Rated Voltage	AC 208 V				AC 400 V				AC 690 V
	Input Voltage Range	AC 166~250 V		AC 166~250 V		AC 228~456 V		AC 228~480 V		AC 384~880 V
	Electric Connection	3P4W		3P3W		3P4W		3P3W		3P3W
	Rated Current per Module	50 A	75 A	100 A	150 A	30 A	50 A	75 A	100 A	150 A
	Rated Current per Cabinet	50~750 A (Module combination)				30~750 A (Module combination)				100~500 A (Module combination)
	Rated Frequency	50(60) Hz ± 10%								
	Input Voltage THD Range	≤ 15%								
	Redundancy	Each module is an independent filtering system								
	Harmonic Elimination Range	2 nd ~50 th order (Selectable)								
	Harmonic Filtering Degree	0~100% programmable per harmonic in Ampere value								
	Harmonic Filtering Performance	Filter up to 98% harmonics at rated load, THDv < 3%, THDi < 5% after filtering (Precondition: The grid background THDv shall be less than 1% under no-load condition.)								
	Reactive Power Compensation Capability	Both inductive and capacitive reactive power								
	Reactive Power Compensation Performance	Cosφ ≥ 0.99 after compensation (If the APF capacity is sufficient)								
	Imbalance Correction Capability	Mitigate negative and zero sequence								
	Full Response Time	< 10 ms								
	Instant Response Time	< 100 us								
	Thermal Loss	≤ 3% of APF rated capacity								
	Output Current Limitation	Automatic (100% rated capacity)								
	Parallel Expansion (System)	Up to 10 Racks (7 modules per cabinet)								
	MTBF	> 100,000 hours								
	Control Technology	Control Frequency	30 kHz							
Controller		DSP + FPGA								
CT Position		Grid side or Load side								
Waveform Display		Input Voltage waveform, Grid current waveform, Load current waveform and APF current waveform								
Harmonic Current Histogram Display		Grid harmonic current and load harmonic current								
Communication		Modbus RTU (RS-485), Modbus TCP/IP (Ethernet)								
Physical Specification	IP Grade of Cabinet	IP20, IP30, IP54, IP55 or customization								
	Cooling Method	Intelligent forced air cooling								
	Noise Level	< 65 dB(A) @ 1 m (Module)							< 70 dB(A) @ 1 m (Module)	
	Dust Filter	Optional								
	Dimension	Refer to APF model table								
	Weight	Refer to APF model table								
Environmental Requirement	Ambient Temperature	-10~55°C								
	Relative Humidity	0~95% (No condensation)								
	Altitude	≤ 1000 m (Rated capacity), 1000~3000 m (De-rating 1% per 100 m)								

APF Principle

Active Sine's PQC Series APF is connected in parallel with non-linear loads, & uses one set of current transformers (CT) to detect the load current. It calculates each order harmonic current by FFT algorithms in its DSP microchips, and then generates a compensating current with the same amplitude but opposite phase angles to the detected harmonic current, which cancels out the original load harmonics.

The PQC series APF not only eliminates harmonic current from the load side, but it also mitigates harmonic voltage caused by harmonic currents. The APF system can also improve power factor (PF) and correct load imbalances in the power system.

Note: CT is a critical part of the APF system, and it can be purchased by users themselves, following Active Sine's suggestions on CT specification.



APF Module and Cabinet Solutions

According to cable terminal type, a modular APF can be divided into two types:

- Drawer type modular APF (adding pluggable accessories on power cable terminals)
- Mixed fixed type modular APF (Power cables are fixed from rear side, Signal cables are fixed from front side)

HMI has two types:

- 7" HMI
- 10" HMI

APF modules and HMI panel can be embedded in Active Sine's standard APF cabinet or a customized cabinet. There are breakers, cable terminals and Surge Protection Device (SPD) in the APF cabinet. Active Sine can supply IP30, IP42, IP54 or customized solutions.



Wall-mounted APF Solutions

Active Sine's Wall-mounted APF can be installed on a wall, which is suitable for low rating applications, and wall-mounted type HMI can be installed on the wall-mounted APF module, along with a mounting bracket to provide support and protection. Active Sine can supply IP30, IP42, IP54 or customized solutions.



Combined wall-mounted IP30 APF system



Integrated wall-mounted IP30 APF system



Wall-mounted IP54 APF system

1. Breaker & cable selection for AHF & SVG

50A AHF PM QUANTITY	AHF Rated Current(A)	MCCB Rated Current(A)	Wirediameter of R-,S-,T-,N-phase	PE wire diameter	Endurable Temperature
1	50	80A	35mm ²	25mm ²	70° C
2	100	160A	70mm ²	35mm ²	70° C
3	150	250A	95mm ²	50mm ²	70° C
4	200	315A	150mm ²	70mm ²	70° C
5	250	400A	2x95mm ²	95mm ²	70° C
6	300	500A	2x120mm ²	120mm ²	70° C
7	350	630A	2x150mm ²	150mm ²	70° C
75A AHF PM QUANTITY	AHF Rated Current(A)	MCCB Rated Current(A)	Wirediameter of R-,S-,T-,N-phase	PE wire diameter	Endurable Temperature
1	75	125A	50mm ²	35mm ²	70° C
2	150	250A	95mm ²	50mm ²	70° C
3	225	400A	185mm ²	95mm ²	70° C
4	300	500A	2x120mm ²	120mm ²	70° C
5	375	630A	2x150mm ²	150mm ²	70° C
6	450	800A	2x185mm ²	185mm ²	70° C
7	525	900A	2x240mm ²	240mm ²	70° C
100A AHF PM QUANTITY	AHF Rated Current(A)	MCCB Rated Current(A)	Wire diameter of R-,S-,T-,N-phase	PE wire diameter	Endurable Temperature
1	100	160A	70mm ²	35mm ²	70° C
2	200	315A	150mm ²	70mm ²	70° C
3	300	500A	2x120mm ²	120mm ²	70° C
4	400	800A	2x150mm ²	150mm ²	70° C
5	500	800A	2x240mm ²	240mm ²	70° C
QUANTITY	SVG Rated Capacity (kvar)	MCCB Rated Current(A)	Wire diameter of R-,S-,T-,N-phase	PE wire diameter	Endurable Temperature
1	50 kvar	100A	35mm ²	16mm ²	70° C
2	100 kvar	200A	70mm ²	35mm ²	70° C
3	150 kvar	315A	150mm ²	70mm ²	70° C

NOTE:

For 3P3W APF, there're cooling fans in the cabinet, and rated voltage of these fans is AC220V, so a 1.5 mm² cables should be connected to 3P3W APF cabinet's Neutral terminal powering AC220V fans in the cabinet.

2. CT Selection

CT Ratio	xxx:5A,xxx>1.7*load current(RMS)
CT accuracy	0.5 class
CT burden	1~2 modules>=10VA 3~4 modules>=15VA 5~7 modules=20VA

Reactive Energy APFC Panel Monitoring and Power Quality

Demand and Supply Analysis

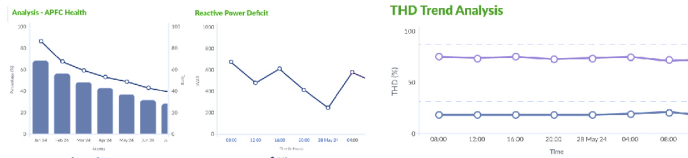
- Know whether the current APFC panel can meet the required reactive power (kVAR) demand.
- Track reactive power demand pattern to match it with capacitor step sizes.
- Get visibility of the actual capacity of the APFC panel, factoring in loss of capacitance due to aging.
- Prevent premature loss of capacitance through proactive temperature management.

Ensuring APFC panel is always healthy and Power factor is maintained.

3 10% improvement in efficiency | 6 Months payback

Power Quality Analysis

- Perform granular Total Harmonic Distortion [THD] analysis.
 - Time series analysis.
 - Spectrum analysis.
 - VTHD, I THD analysis.
- Identify key loads contributing to the THD.
- Identify filter requirements.
- Monitor performance before and after filter installation.



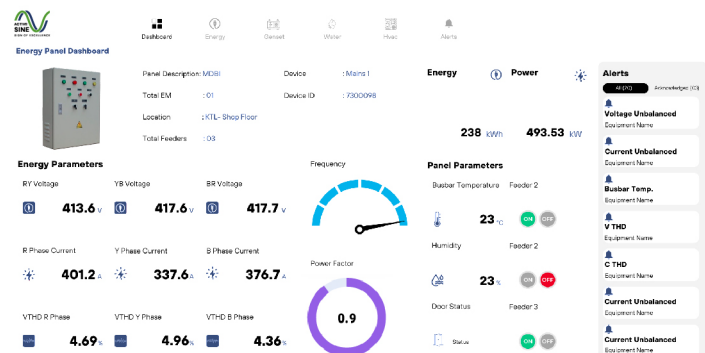
LT Panel Monitoring

Remote Monitoring of LT panels

- Remotely monitor essential performance and safety-related parameters of LT panels.
 - Electrical parameters e.g.
 - Safety-related parameters e.g. Busbar temperature, Humidity & Panel door status
- Multi-site multi-panel hierarchy.
- Proactively prevent:
 - Severe casualties, e.g., short circuit or loose connections.
 - Rust and dust accumulation.

Effective manpower utilization, reliable operations and reduced breakdowns

95% reduction in unplanned downtime | 15 Months payback



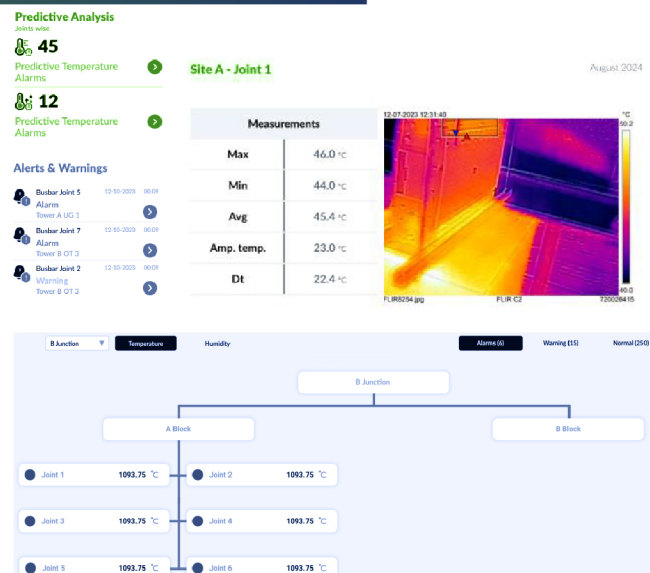
Busbar Temperature and Humidity

Proactive busbar monitoring

- Realtime busbar joint temperature and humidity monitoring.
- Monitor multiple sites in a single dashboard.
- Drilldown view of every level with live parameters.
- Color coding to identify abnormalities.
- Alerts and Warnings.
- Thermography analysis and predictive analysis.

Insights for proactive maintenance resulting in no breakdowns, no SLA penalties, and manpower saving

95% reduction in unplanned downtime, no need to conduct thermographic analysis | 12 Months payback



Power factor (PF) is a measure of how effectively electrical power is being converted into useful work output. A power factor below 0.90 can lead to penalties from electricity companies because it indicates inefficient use of electrical power.

Here's how these penalties are typically calculated:

Steps to Calculate Power Factor Penalty

1.Determine Actual Power Usage: Identify the total kWh (kilowatt-hours) consumed during the billing period.

2.Calculate Apparent Power: Calculate the apparent power (kVA) using the formula:

$$\text{Apparent Power (kVA)} = \frac{\text{Real Power (kW)}}{\text{Power Factor (PF)}}$$

3.Identify the Contractual Power Factor: Most electricity companies have a specified contractual power factor, often 0.90. If the actual power factor is below this, penalties may apply.

4.Calculate the Penalty:

– **Determine the kVA Demand:** This is often the maximum apparent power used during the billing period.

– **Calculate the Adjusted kVA Demand** based on the contractual power factor:

$$\text{Adjusted kVA} = \frac{\text{Real Power (kW)}}{0.90}$$

– **Calculate the Penalty:** Some companies charge a penalty based on the difference between the actual kVA and the adjusted kVA. The formula may look like this:

$$\text{Penalty} = (\text{Adjusted kVA} - \text{Actual kVA}) \times \text{Penalty Rate}$$

– The penalty rate is specified in the utility's tariff schedule.

Example Calculation

•**Real Power (kW):** 100 kW

•**Actual Power Factor:** 0.80

•**Contractual Power Factor:** 0.90

•**Penalty Rate:** ₹10 per kVA

1.Calculate Apparent Power:

$$\text{Apparent Power} = \frac{100\text{kW}}{0.80} = 125\text{kVA}$$

2.Calculate Adjusted kVA:

$$\text{Adjusted kVA} = \frac{100\text{kW}}{0.90} \approx 111.11\text{kVA}$$

3.Calculate the Penalty:

$$\text{Penalty} = (111.11\text{ kVA} - 125\text{ kVA}) \times 10 = -138.89 \text{ (No penalty since actual is higher)}$$

If the actual kVA was lower, then you would calculate the penalty accordingly.

Note***

Electricity companies typically have specific formulas and rates for calculating power factor penalties, so it's important to refer to the utility's tariff schedule for exact rates and conditions. Regular monitoring and adjustment of power factor can help avoid these penalties.

ISO 9001 ISO 9001 ISO 9001 ISO 9001 ISO 9001 ISO 9001 ISO 9001 ISO 9001 ISO 9001 ISO 9001

Certificate of Registration

This is to certify that Quality Management System of

ACTIVESINE ELECTRICALS INDIA PRIVATE LIMITED

30/66, THIRUPALYA VILLAGE, ELECTRONIC CITY PHASE - 1, BOMMASANDRA
INDUSTRIAL ESTATE, BENGALURU, 560099, KARNATAKA, INDIA

Is in accordance with the requirements of the following standard

ISO 9001:2015 **(Quality Management System)**

for the following scope

MANUFACTURING OF POWER QUALITY SOLUTION PRODUCT i.e AUTOMATIC/REAL TIME
POWER FACTOR CORRECTION PANEL , ACTIVE HARMONIC FILTER, STATIC VAR GENERATOR
PANEL , HYBRID PANEL (PFC+AHF, PFC+SVG , PFC+AHF+SVG, AHF+SVG) , SERVO STABILIZERS,
ISOLATION TRANSFORMER.

(IAF CODE 19 NACE CODE 33.13, 33.14)

KSRQA2501258530
Certificate Number

Initial Registration Date : 30-01-2025 Certificate Expiry Date : 29-12-2027
1st Surveillance Date : 30-12-2025 2nd Surveillance Date : 30-12-2026



Authorized Signatory
KSR Certification LLP



This certificate remains the property of KSR and must be returned to KSR on Cancellation or Suspension of the certificate. Validity of the certificate is subject to successful completion of surveillance audits.

Further clarification regarding the scope of this certificate and the applicability of standard may be obtained by consulting the Organization

To verify certificate, visit at : www.ksrcertification.in

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Our Achievement



The Economic Times | Dated 31st Oct 2024

Activesine Electricals, Empowering Energy Efficiency



Activesine Electricals India is transforming the way we think about power in our everyday lives. Based in Bengaluru, this dynamic young startup specialises in creating advanced electrical solutions that ensure businesses and homes use energy efficiently and effectively. From reducing electricity wastage to providing smart systems that optimise power quality, Activesine offers a range of products including power factor correction panels and active harmonic filters. As the demand for reliable electrical services continues to soar, Activesine stands out not only for its innovative solutions but also for its commitment to enhancing the sustainability of India's energy landscape.

The electrical services and products industry in India is on the cusp of a significant transformation, projected to grow at an estimated CAGR of 41 percent by FY 2026. This growth is fuelled by several factors including increasing electricity demand driven by rising temperatures, government initiatives aimed at promoting energy efficiency and the need for India to reduce its reliance on foreign semiconductor chips.

Activesine is well-positioned to capitalise on this booming market, especially as businesses seek solutions to mitigate power consumption and losses in various sectors, including commercial, IT and residential. The company's innovative approach not only addresses immediate energy concerns but also contributes to a sustainable future. Activesine is paving the way for smart

With its modern manufacturing facility in Bengaluru, the company has secured ISO 9001:2015 certification for panel manufacturing, showcasing its commitment to delivering high-quality products that meet international standards.

Ambitions that Light the Way Forward

Activesine is not just focused on meeting current market needs, they have a larger interest in mind, which is about anticipating the future of energy solutions. The company aims to scale its operations significantly. This ambitious growth plan aligns with the increasing demand for energy-efficient solutions, reinforcing their reputation as a forward-thinking brand in the electrical sector.

As a young and vibrant player in the electrical solutions market, Activesine Electricals embodies the spirit of innovation and sustainability. With a clear vision and a focus on expanding its capabilities, it is set to illuminate the path forward, attracting attention and admiration from all corners of the industry, including government stakeholders.

For more information, contact:
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www.activesine.com

ACTIVESINE ELECTRICALS

A RAPIDLY EMERGING PURE POWER SUPPLY SOLUTIONS PROVIDER



Rajeev Ranjan, Head of Sales

The electrical services and products industry in India is poised to grow exponentially, registering a CAGR of 41 percent by FY 2026. A blend of favorable conditions including rise in demand for electricity, driven by households, government initiatives, global manufacturing trends, the immense expansion potential of India's manufacturing industry, and the need to reduce reliance on foreign semiconductor chips, are presenting a fertile

ground for the sector's blossoming. Nevertheless, there are several challenges and roadblocks to be made as the industry to enable it to grow at its full potential, keeping up with global standards.

Activesine Electricals India Pvt Ltd, based in Bengaluru, serves as an industry pioneer, regarded as a pure power quality solutions provider. The company dives into research about power consumption, wastage, and losses incurred in commercial, IT, factory, or residential settings, offering clients solutions for fixing these issues and reducing wastage of power. Catering to the distinctive needs of diverse clients from varied industries spread across India, the company is dedicated to driving client satisfaction and success through its comprehensive suite of solutions and services.

World-Class Manufacturing Capabilities

Activesine's robust manufacturing capabilities are built into a state-of-the-art facility situated in Bengaluru. The company has been certified with the ISO 9001:2015 certification for panel manufacturing in India, demonstrating its expertise and dedication to excellence and quality. Moreover, the firm is equipped with seasoned engineers equipped with advanced knowledge and extensive and diverse experience in manufacturing high-quality panels to suit diverse client needs.

Dedicated to becoming an industry leader, Activesine prioritizes aligning its practices, services, and solutions with prevalent industry standards.

The company's range of services including manufacturing of Power Quality Solutions that is Automatic Power Factor Correction Panel, Active Harmonic Filter and Hybrid Panel (APFC + AHF or SVG + AHF or KPTFC + AHF Panels) and also having capabilities for erection, installation, and maintenance of Active harmonic filter, PFC/KCC panel, surge voltage stabilizer, HT/LT cable termination, HT/LT cable splicing, internal building wiring, industrial electrification, retrofitting services, equipment erection services, and more importantly, manufacturing world class PQS panels. Leveraging its world-class manufacturing facilities, the firm excels in developing top-notch solutions.

The manufacturing facility boasts all the advanced machinery and equipment including all kinds of electrical machinery tools that deliver speedy and precise

production capabilities. The firm's focus on maintaining its raw material stock reserves also enables it to offer the shortest lead times for its clients, without compromising on quality.

"We are a technology-driven and customer-centric company wherein we always try to enhance the technology as per the market demand. Also we have IoT-based power quality solution panels where customers can monitor real-time parameters on their smartphones to get the data anywhere across India. Our commitment with clients is also backed up by extensive technical support, after sales service and comprehensive level of stock for immediate response to customers' requirements," shares Rajeev Ranjan, Head of sales.

A Future-Ready Approach

Dedicated to becoming an industry leader, Activesine prioritizes aligning its practices, services, and solutions with prevalent industry standards. Adherence to these has not only enabled the firm to develop cutting-edge solutions but to grow as a reliable partner, a strategy which has enabled the company to develop a robust future-ready approach to fulfilling client demands.

In terms of expansion, the company has ambitious goals for its future such as expanding its reach further. With growing awareness of these products, growing government initiatives to enhance awareness and incentivizing consumers, the demand is rising steadily. As the demands continue to rise for PQS panels, we plan to produce 100,000 units of 12000Ampere per annum and SVG and APFC 96000 KVAR by FY 2025-26.

Following emerging trends and staying dynamic and agile in its production, Activesine is on the path of becoming the industry leader, recognized across the nation for its dependable products and services. E



OUR SOLUTIONS:

- ✓ Load study & Harmonic analysis
- ✓ Capacitor health checkup
- ✓ Automatic Power Factor Correction Panel (APFC)
- ✓ Real Time Power Factor Correction Panel (RTPFC)
- ✓ Active Harmonic Filter Panel (AHF)
- ✓ Static VAR Generator Panel (SVG)
- ✓ Hybrid Panel (COMBINATION)

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