Assemble by

engineer

PQS

Power Quality Solutions

SVG

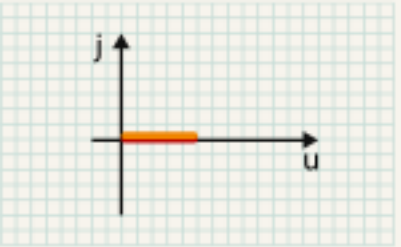
Static Var Generator

Active power compensation

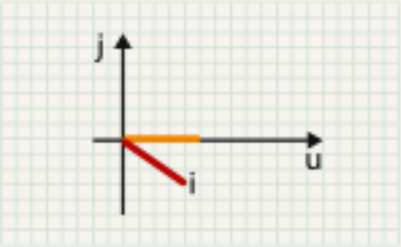
SVG, with the idea of using as a component, could compensate both inductive and capacitive loads to achieve **PF 0.99** and avoid under and over compensation.

Reactive Power Compensation

Different compensation model for different loads

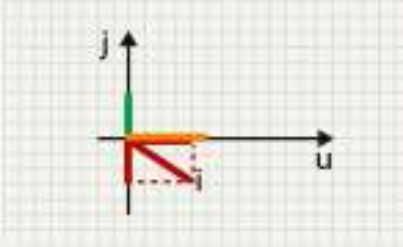


RESISTIVE LOAD such as filament lamp in vector gram,
load appears resistive when current and voltage are phase congruency.

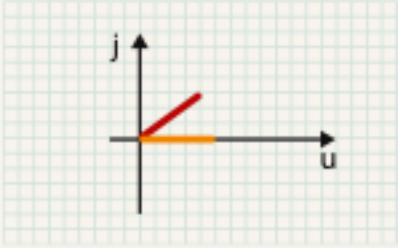


INDUCTIVE LOAD such as motor compressor relay and transformer.

Current of inductors lags voltage
In vector gram, anticlockwise direction is set to be positive direction and U direction as horizontal direction. Load appears inductive and resistive when I is within 0 to -90 degree.

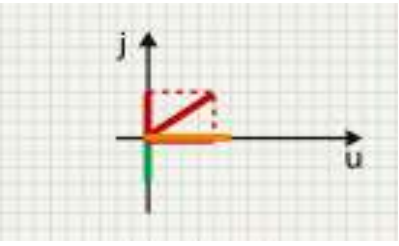


SVG generates capacitive current to neutralize inductive content of the load, achieving the performance for current and voltage phase congruency.



CAPACITIVE LOAD such as capacitor bank.

Current of capacitors leads voltage
In vector gram, anticlockwise direction is set to be positive and U direction as the horizontal direction. Load appears capacitive and when I is within 0 to 90 degree.



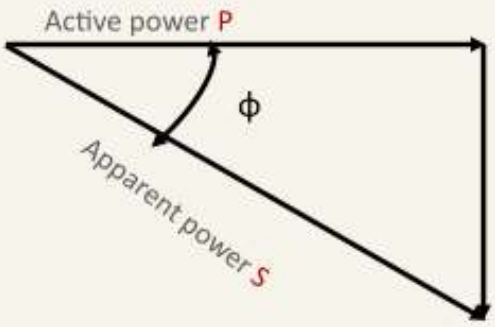
SVG generates inductive current to neutralize capacitive content of the load, achieving the performance for current and voltage phase congruency.

Current Voltage Compensation Current

POWER FACTOR

Optimize your reactive power compensation efficiency

Active power, Reactive power, Apparent power and Power factor



Reactive power Q

$P^2+Q^2=S^2$

Power factor Cos ϕ

$$\cos\phi = \frac{P}{S}$$

Benefit from PFC

Avoid penalty for low PF by Utility Company.

Reduce electric energy loss.

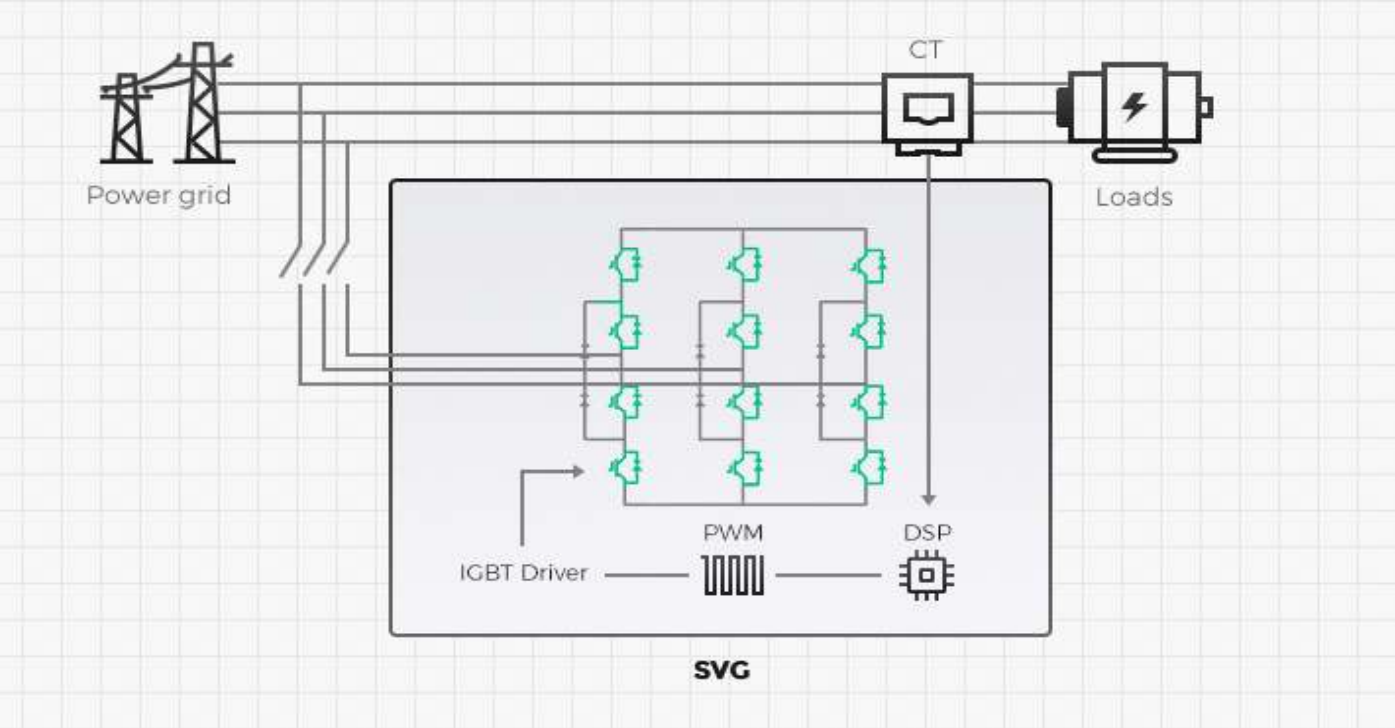
Release system capacity occupied by reactive power, increase usage effectiveness of system capacity.

STATIC VAR GENERATOR
TECHNOLOGY UPGRADATION OF POWER FACTOR CORRECTION

- 100% inverter based technology
- 100% digital & semiconductor control
- 100% intelligent compensation
- Reactive power compensation
- Three phase balancing
- Voltage stabilization

INVERTER BASED PFC

SVG works as a dynamic reactive power source, adopts high-speed computation components like DSP/IGBT, combining with super precise control program, following the grid current variation in real time, improving PF value to 0.99 within 15ms.

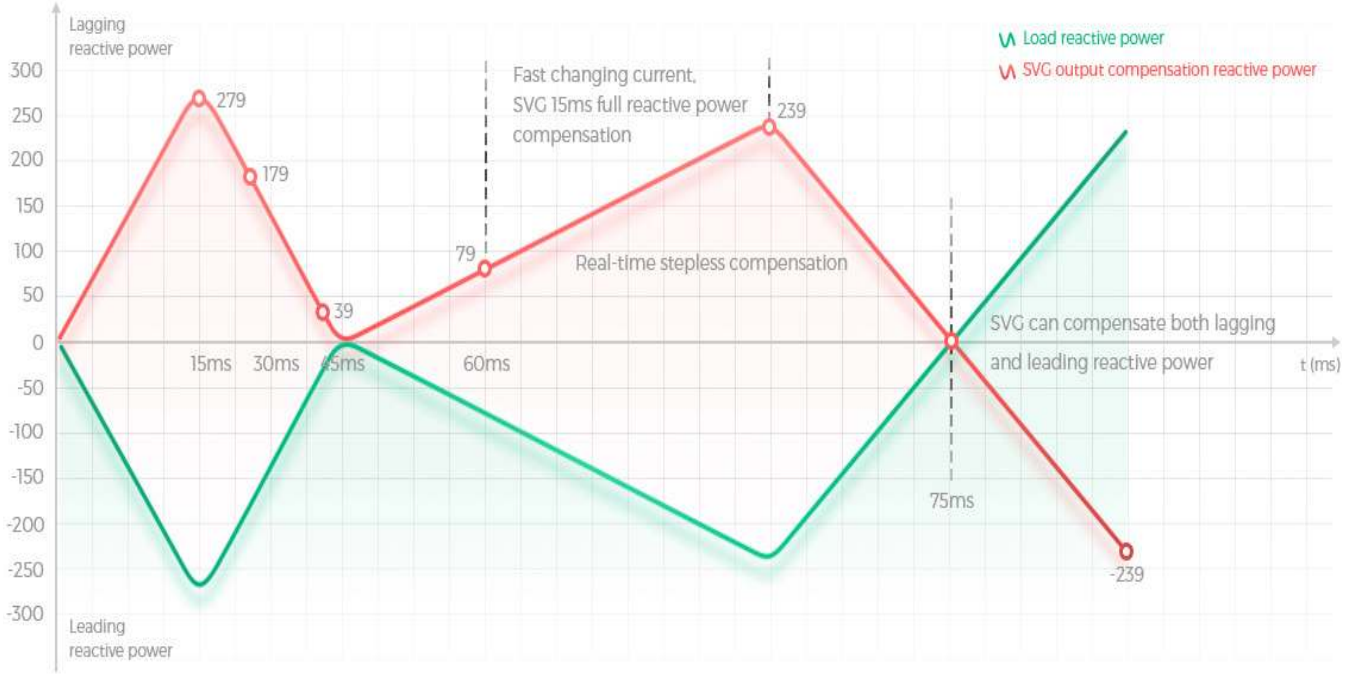


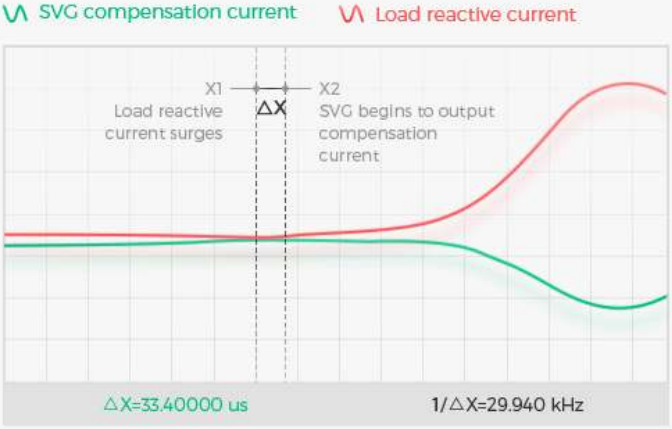
SVG WORKING

External CT detects the load current. **DSP** as CPU has advanced logic control arithmetic, could fast track the instruction current, divides the load current into active power and reactive power by using **the Instantaneous Reactive Power Algorithm**, and calculates the reactive power compensation current based on inverse PWM signal to IGBT's driver board to control **IGBT** on and off at average 20kHz frequency. Finally inductive or capacitive power compensation current is generated on inverter induction, at the same time CT also detects the output current and forms a negative feedback to DSP. Then DSP proceeds the next logical control to achieve more accurate and stable system.

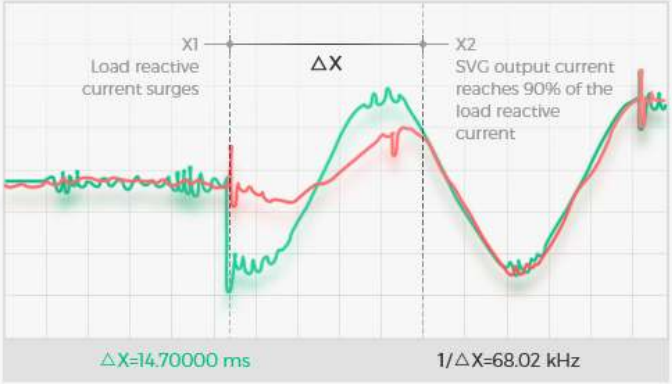
STEP-LESS PFC

Started from 0.1 kvar for step-less compensation fully realized accurate compensation
Fast changing SVG 15ms full power factor correction.





Fast response time: 33.4us



Full response time:14.7ms

BEST STRATEGY FOR DYNAMIC CHANGING REACTIVE POWER

Ultrafast 15ms full compensation

Fulloperationprocessincludingloadcurrent detection, reactive power calculation, SVG real time outputs compensation current

Super stable

Less likely to be influenced by the changes of system impedance and voltage, not afraid of high THDI systems

Great performance

PF value up to 0.99

STANDARD SVG

Capacity:
400V (228V~456V): 100kvar/150 kvar/200 kvar
690V(483V~793V): 100kvar

Efficiency: ≥99%

Type: rack-mounted, wall-mounted

Wiring method: 3P4W

Rated frequency: 50Hz/60Hz

Function: Reactive power compensation. Three phase balancing, Voltage regulation

Operation mode: 6 operation modes can be set according to different needs. Eg. "Q+B": reactive power compensation first, then three phase balancing.

SVG CABINET SOLUTION

SVG modules can be integrated into a fully equipped electrical cabinet, designed according to the specific site voltage, load and required reactive power compensation capacity.

The cabinet can accommodate one or several SVG modules operating in parallel. This modular design allows the required system capacity to be selected and expanded in the future as the site load changes.

The SVG cabinet compensates both inductive and capacitive reactive power in real time, helps maintain a power factor of up to 0.99, and prevents both undercompensation and overcompensation.

PRECISE REACTIVE POWER CONTROL IN ONE INTELLIGENT CABINET

ULTRA SVG

Ultra Series Static Var Generator

The revolutionary **SiC Mosfet technology** has driven the design optimization of power quality products, which delivering unparalleled improvements in performance and application of Ultra Series. This transformation has reshaped the business model for power quality solutions, setting a new industry benchmark for excellence.

SILICON CARBIDE MOSFET

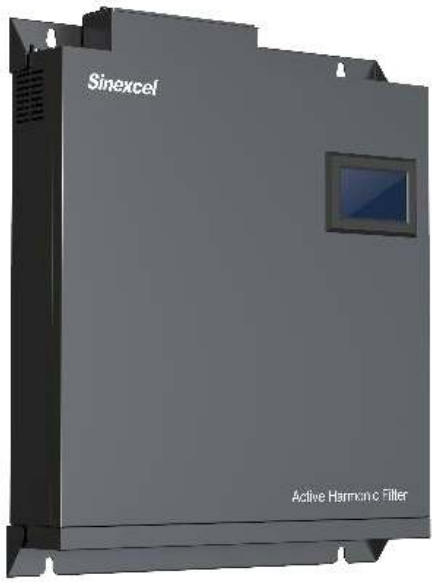
- Ultra-Low Loss
- High Withstand Voltage
- High Power Density
- High Heat Conduction Rate
- High Switching Frequency

Power electronics, every 0.5% increase in efficiency, is a great technological improvement. Silicon carbide mosfet, a new and high efficient power component, replaces ordinary silicon devices.

Peak Efficiency 99%

TINY DIMENSION BUT HUGE CAPACITY

High heat resistance, high thermal conductivity, and high switching frequency, these advantages of SiC bring lower heat dissipation and less ripple current output to Ultra Series SVG.



400V Ultra SVG 100 kVar (Wall)
Size: 500x88x520mm (WxDxH)

400V Ultra SVG 100 kVar (Rack)
Size: 500x520x100mm (WxDxH)

LESS VENTILATION REQUIREMENT

The drift region of SiC can be made thinner so it has high heat resistance and high thermal conductivity. This advantage make the Ultra Series SVG produce less heat so the heat dissipation is lower.

The low thermal demands of these SiC active filter modules make them particularly suitable for use in high IP-rated cabinets. Since they require less cooling airflow, they can operate effectively within the confined and sealed environment of these cabinets without the risk of overheating.

TECHNOLOGY OVERVIEW

Items	Ultra series SVG	
Rating	100 kvar/ 150 kvar/ 200 kvar	
Function	reactive power compensation and three-phase unbalance compensation	
System Parameters		
Nominal Voltage	380~480V (-10%~10%)	
L-N Voltage	220~278V (-10%~10%)	
Supply Frequency	50/60Hz, auto sensing(Range : 45Hz~62.5Hz)	
Parallel Units	Unlimited	
Efficiency	99%	
Electrical System	3Ph 3wire	
CT Location	Load / Supply side	
Performance Indicators		
Control Algorithm	FFT, intelligent FFT, and instantaneous reactive power	
Reaction Time	<50us	
Overall Response Time	<15ms	
Target Power Factor	Adjustable -1 to +1	
Switching Frequency	Average 40kHz,up to 95kHz	
Communication Ports	RS485,Ethernet (Rj45)	
Communication Protocol	Modbus RTU, TCP/IP	
Module Display Interface	4.3-inch HMI(module), 7-inch HMI(central monitor) and LED	
Protection Functions	Over-voltage,under-voltage,short circuit inverterbridge, over compensation and so on	
Mounting Type	Wall-mounted, Rack-mounted and Cabinet	
Dimensions	19.7"W*20.9"D*3.5"H	19.7"W*24.4"D*3.9"H
Net Weight	27kg	35kg
Storage Temperature	-40°C to +70°C	
Operating Temperature	-10°C to +40°C(may derate capacity if operating temperature exceeds 40)	
Relative Humidity	5% to 95% Non Condensing	
Operating Altitude	<1500m, 1500 to 4000m, capacity is derating 1% for every 100m altitude increased	
Protection Class	NEMA1	

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