TRINITY

MAKING ENERGY MATTER

TRINITY SVG (SVC)

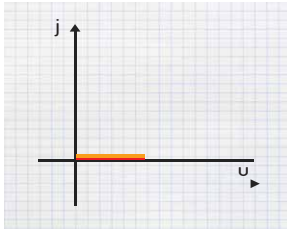## Static Var Generator/Controller
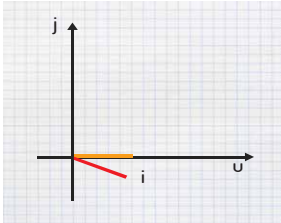
Static Var Generator

SVG 50

MAKE IN INDIA

Reactive Power Compensation

Different compensation model for different loads

Resistive Load
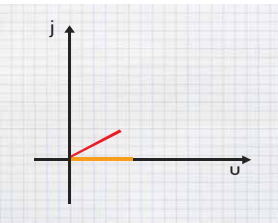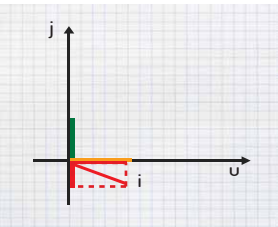
Resistive Load such as string lamp in vector gram,
load appears resistive when current and voltage are phase congruency.

Inductive Load

Inductive Load such as motor, relay, compressor and transformer.
In vector gram, anticlockwise direction is set to be positive direction and
u direction as the straight direction. Load appears inductive and resistive when
**i** is within 0 to -90 degree.

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

Capacitive Load

Capacitive load such as capacitor bank.
In Vector gram, anticlockwise direction is set to be positive and
u direction as the straight direction. Load appears capacitive and resistive when
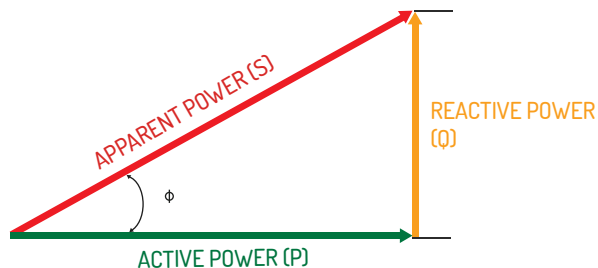**i** is within 0 to 90degree.

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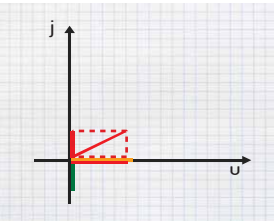
POWER FACTOR

Optimize your reactive power compensation efficiency.

APPARENT POWER (S)

REACTIVE POWER (Q)

ACTIVE POWER (P)

φ

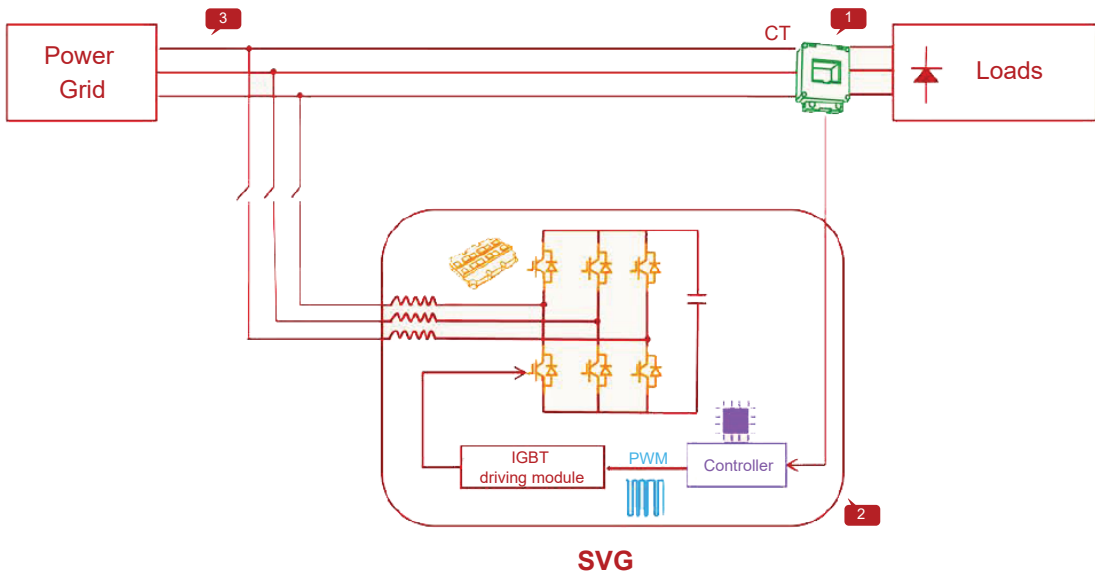$P^2 + Q^2 = S^2$

Power Factor Cos

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

Benefits of PFC

- Avoid penalty for low PF by user company.
- Reduce electric energy loss.
- Release system capacity occupied by Reactive Power.
- Increase usage effectiveness of system power capacity.
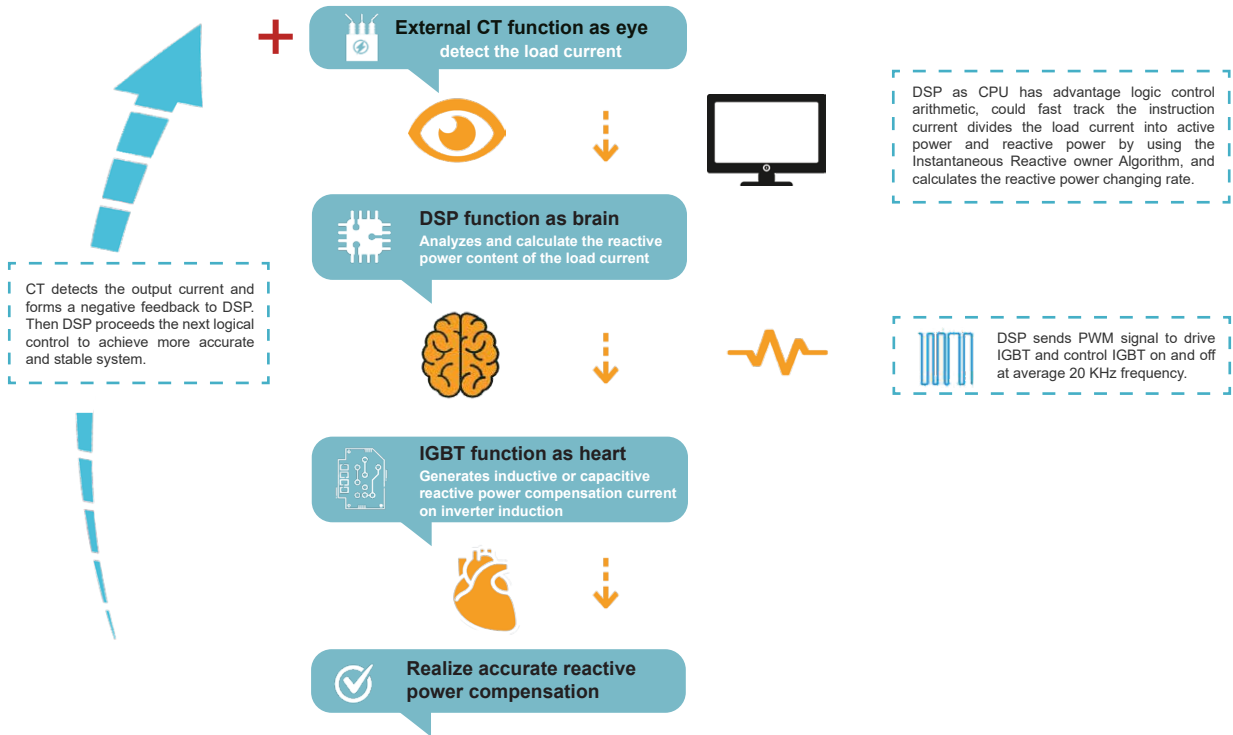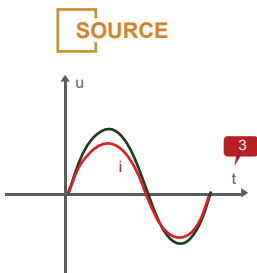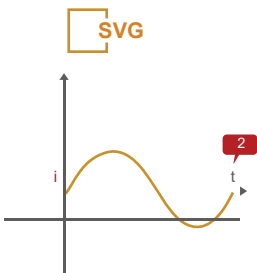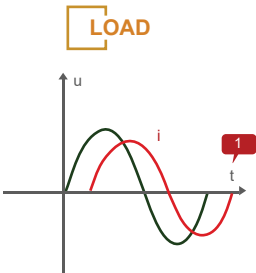
Principle of SVG

Optimize reactive power compensation efficiency

External CT detects the current load. DSP as CPU has advanced logic control arithmetic, can track fast instruction of current, splits the load current into reactive power and active power by using the rapid Reactive Power Algorithm, and analyses the reactive power change that accurately and rapidly, then sends PWM signal to IGBT's driver board to control IGBT on and off at average 20 kHz frequency. Finally inductive or capacitive power compensation current is produced on inverter induction, at the same time CT also detects the output current and forms negative feedback to DSP. Then DSP proceeds the ensuing logical control to achieve more stable and accurate system.

SVG

WAVEFORM

VOLTAGE
OUTPUT CAPACITIVE REACTIVE POWER
CURRENT

LOAD

SVG

SOURCE

External CT function as eye
detect the load current

DSP function as brain
Analyzes and calculate the reactive power content of the load current

DSP as CPU has advantage logic control arithmetic, could fast track the instruction current divides the load current into active power and reactive power by using the Instantaneous Reactive owner Algorithm, and calculates the reactive power changing rate.

IGBT function as heart
Generates inductive or capacitive reactive power compensation current on inverter induction

DSP sends PWM signal to drive IGBT and control IGBT on and off at average 20 KHz frequency.

CT 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.
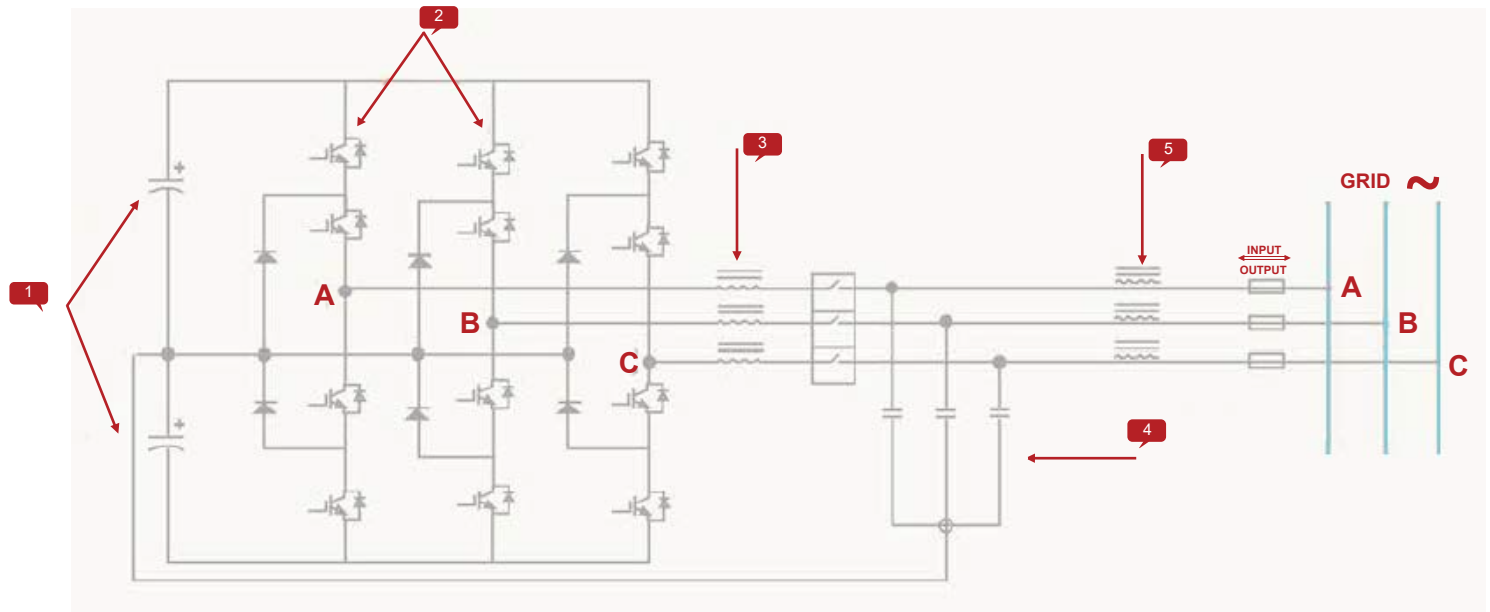
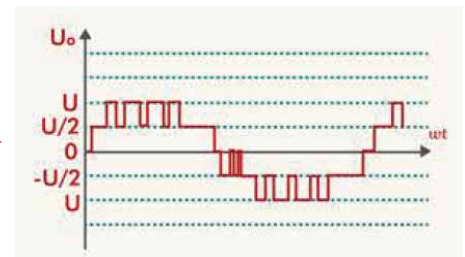**Realize accurate reactive power compensation**

1
DC bus capacitor

DC bus capacitor, AC to DC rectifier storage

2
IGBT

controlled by DSP software algorithm, IGBT on-off timing selection and length could control inverter to generate an accurate reactive power compensation current.

3
Inverter Induction

IGBT compensating inductive reactive power or capacitive reactive power by controlling inverter induction to generate a capacitive current or inductive current to achieve bidirectional reactive power compensation.

4
LC filter circuit

5
High frequency indicator

Both are for filtering.
The combination of LC filter circuit and high frequency inductor are called LCL filter circuit
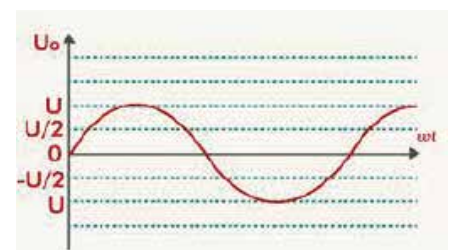
PFC Performance

- PFC performance 0.99
- Compensate capacity - Stage less compensation without over compensation and below compensation with specific system requirements.
- The voltage of grid has little effect on SVG compensation capacity as SVG is like a current source.
- System reactive power changes with full PFC process within 15minutes and maintain it at PF0.99.
- Compensation with capacitive reactive power and inductive reactive power.
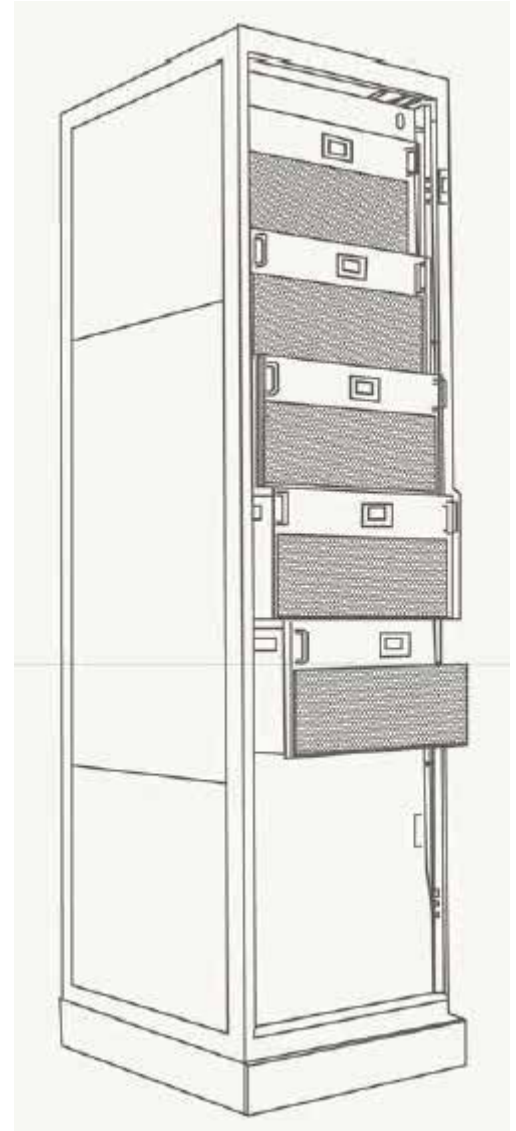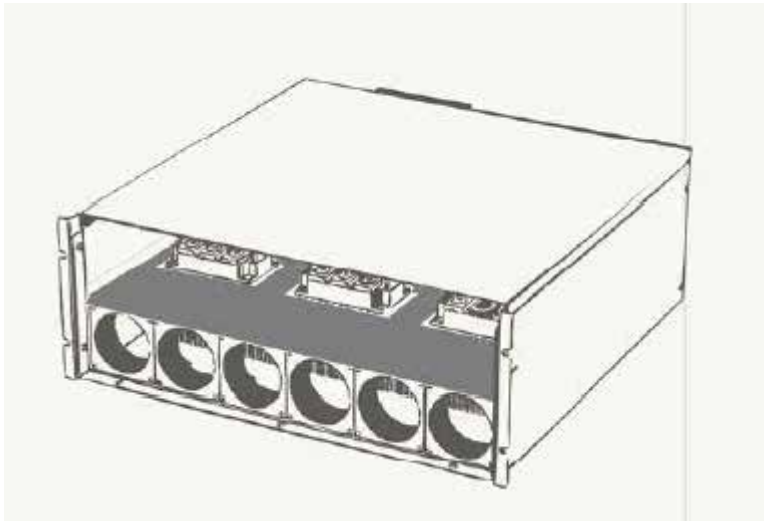
Maintenance Free, safe and Easy to use.

- Can work under high THDu upto 15%
- Advance technology and easy to use with HMI monitor.
- MTBF (Mean Time Between Failures) upto 100,000 hours, helps consumers lower the cost.
- Maintenance free, minimum loss, and no need to replace capacitor bank every time.

Space and Capacity

- To save at least 70% space compared with capacitor bank.

STATIC VAR GENERATOR

50kvar/100kvar Wall-mounted

50kvar/100kvar Rack-mounted

SVG 50

200kvar Wall/Rack-mounted

SPECIFICATION

ITEM	400V		
	TRINITY SVG 050	**TRINITY SVG 100**	**TRINITY SVG 200**
	SYSTEM PARAMETER		
Rated input line voltage	400V		
Input phase voltage ange	228V~1456V		
Power grid frequency	50Hz/60Hz (range:45Hz~62Hz)		
Parallel efficiency	Unlimited		
Overall efficiency	>97%		
Power grid structure	3P3W/3P4W		
CT	150/5~30,000/5 600/5~10000/5		
Circuit topology	2-Level (3-Level Optional)		
	PERFORMANCE INDICATOR		
Single module compensation capacity	50 kvar	100 kvar	200 kvar
Response time	<15ms		
Target power factor	Adjustable from 1 to +1		
	PERFORMANCE INDICATOR		
Communications ports	RS485		
Communications protocols	Modbus		
Protection functions	Abnormal frequency and voltage protection, Abnormal output current protection, Inverter short-circuit protection,Over temperature protection, Inverter over loaded protection etc.		
Alarm	Available		
Monitoring	Touch screen		
	MECHNICAL PROPERTIES		
Mounting type	Wall-mounted/Rack-mounted/Cabinet		
Cable entry mode	Rear entry for rack-mounted type Top entry for wall-mounted type, Top or bottom entry for cabinet		

TRINITY

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* Specifications are subject to change without notice due to continuous improvement.