

Sinexcel

MH

Power Quality

IGBT based PFC solution

Static Var Generator

PF 0.99

Lagging
&
Leading
Compensation

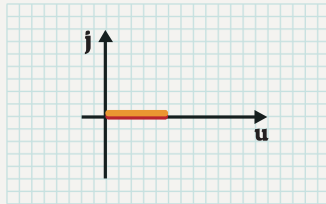
Stepless PFC



LEADING & LAGGING PF COMPENSATION

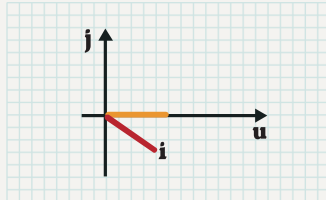
Modern industrial, data center & commercial buildings required a new approach in addressing power factor. The presence of harmonics, rapid PF swing and dynamic reactive load are beyond the capability of conventional capacitor bank system.

★ — Current
— Voltage
— Compensation Current



RESISTIVE LOAD

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

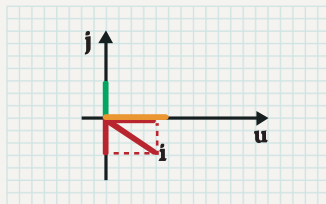


INDUCTIVE LOAD

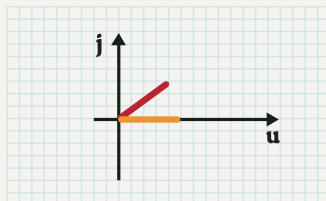
INDUCTIVE LOAD such as motor, compressor, relay and transformer.

1 - Current of inductors lags voltage

In phase diagram, anticlockwise direction is set to be positive direction and U direction as the 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.

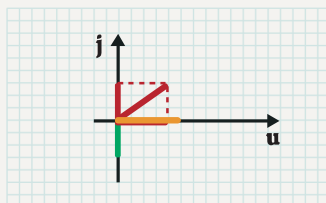


CAPACITIVE LOAD

CAPACITIVE LOAD such as capacitor bank

2 - Current of capacitors leads voltage

In phase diagram, anticlockwise direction is set to be positive and U direction as the horizontal direction. Load appears capacitive and resistive 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.

BENEFIT OF SVG



- ★ Suitable for use in Harmonics Loaded Network



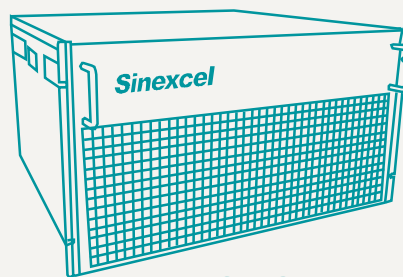
- ★ Avoid penalty for low PF by Utility Company



- ★ Reduce electric energy loss



- ★ Respond Dynamically to reactive power from Leading to Lagging condition
- ★ Stepless compensation
- ★ Fast response time 15ms to full compensation

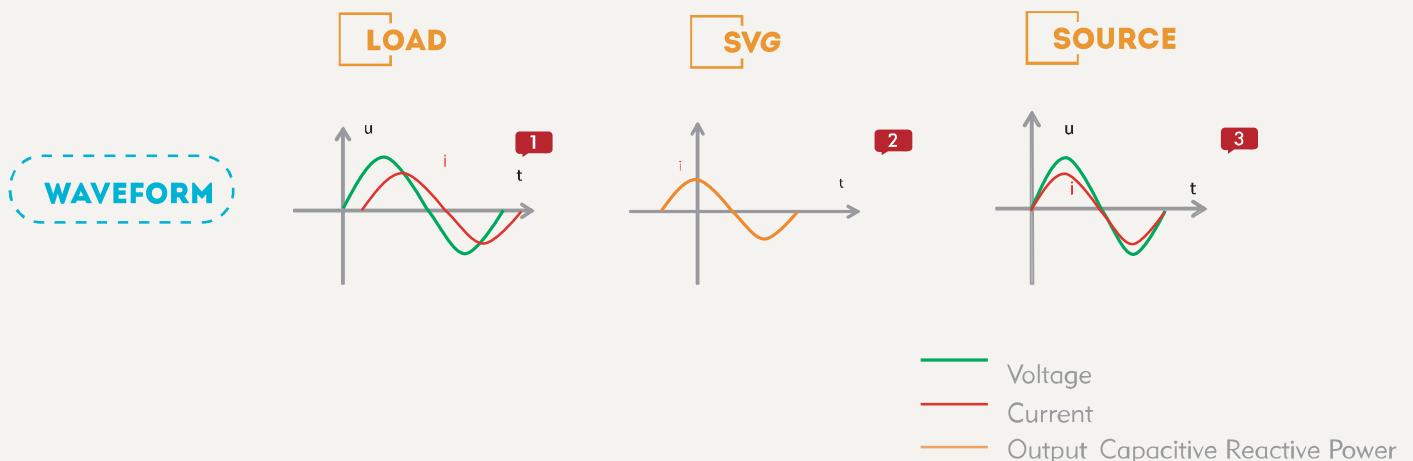
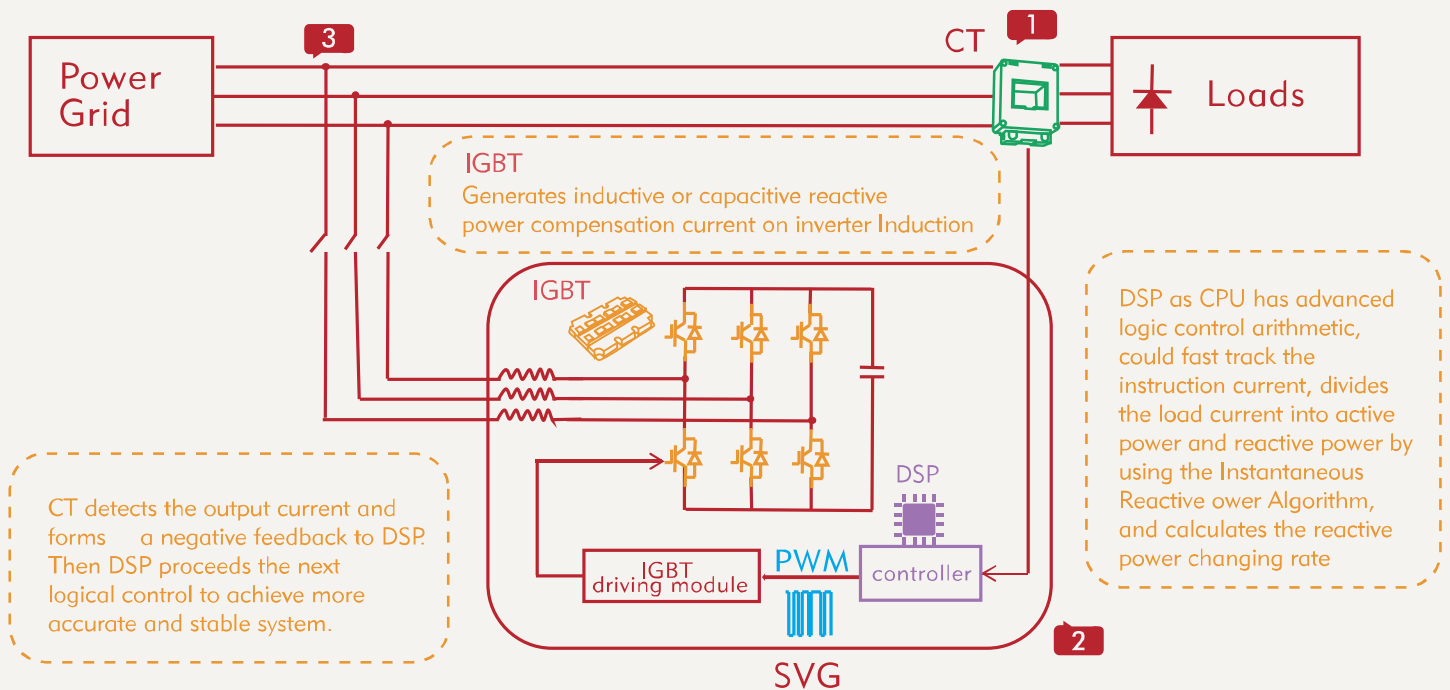


SVG

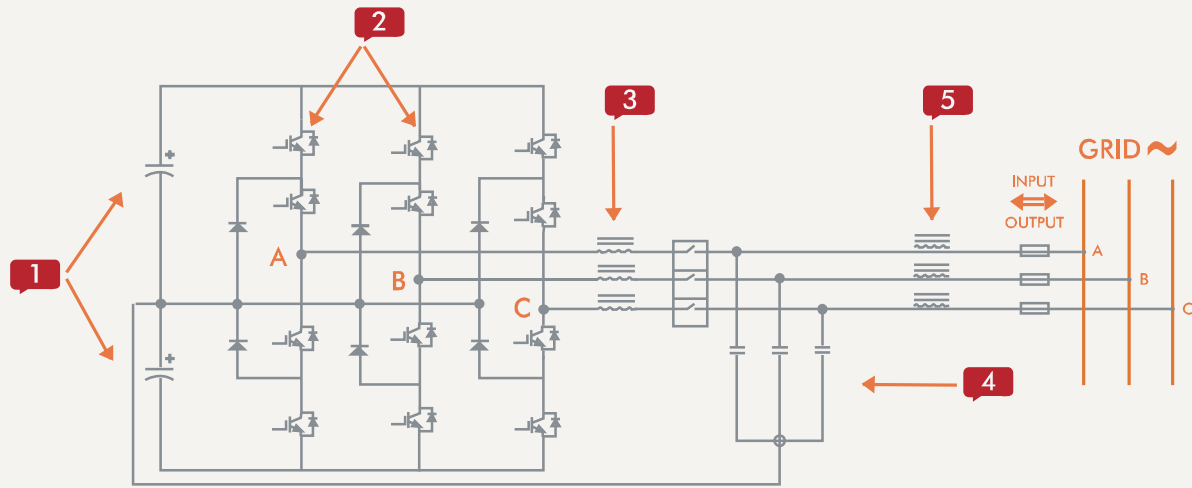
SVG WORKING PRINCIPLE



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 change rate rapidly and accurately, then sends 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.



UNDERSTAND HOW SVG COMPENSATE REACTIVE POWER

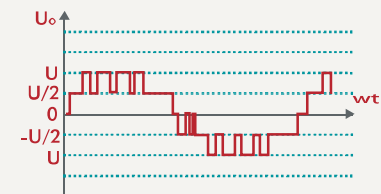


DC BUS CAPACITOR

DC bus capacitor , AC to DC rectifier storage

IGBT

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



INVERTER INDUCTION

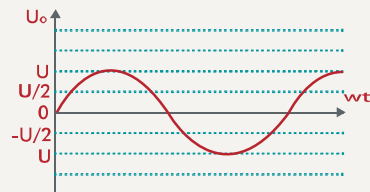
IGBT Compensating inductive reactive power or capacitive reactive power by controlling inverter induction to generate a capacitive current or inductive current to achieve bidirectional reactive power compensation.



LC FILTER CIRCUIT

HIGH FREQUENCY INDUCTOR

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



KEY FEATURES AND BENEFITS

PFC PERFORMANCE

PFC performance 0.99

Stepless compensation without over-compensation and under-compensation, compensate specific capacity that system needs.

Full PFC process within 15ms and maintain at PF0.99 no matter how the system reactive power changes.

Compensation with inductive reactive power and capacitive reactive power.

The voltage of the grid has little influence on SVG compensation capacity as SVG is a current source.

MAINTENANCE FREE, SAFE AND EASY TO USE

Could work under high THDv up to 15%, no capacitor explosion risk and no safety accident .

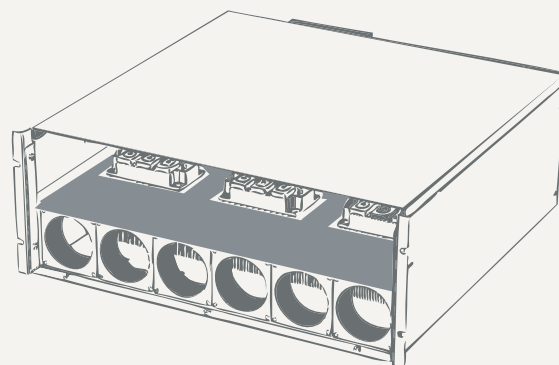
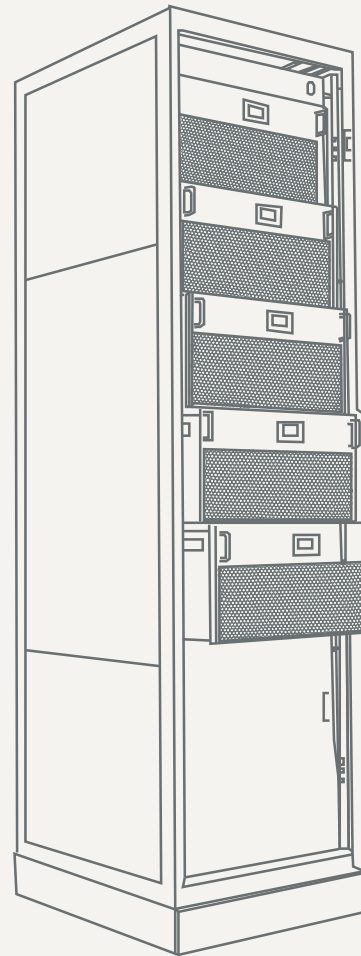
Minimal loss, maintenance-free and no need to replace capacitor bank every certain time.

MTBF (mean time between failures) up to 100,000 hours, helps consumers lower the cost .

Advanced technology and easy to use with HMI monitor

SPACE AND CAPACITY

Minimal footprint to save more than 70% space compared with cap bank.



SVG**SPECIFICATION 400V NETWORK TYPE**

Item	400V			480~690V(large capacity)		
	Sinexcel SVG 030	Sinexcel SVG 050	Sinexcel SVG 100	480~1920	600~2400	690~2760
System parameters						
Rated input line voltage	400V			480V	600V	690V
Input phase voltage range	228~456V			384V~576V	480V~720V	552V~759V
Power grid frequency	50Hz/60Hz (range : 45Hz ~ 62.5Hz)			50Hz/60Hz (range : 45Hz ~ 62Hz)		
Parallel operation	Unlimited			4		
Overall efficiency	> 97%			>99% (at 50% inductive load)		
Power grid structure	3P3W / 3P4W			3P3W		
CT	150/5 ~ 10,000/5			800/5~10000/5		
Circuit topology	3-level					
Performance indicators						
Single-module compensation capacity	30kvar	50kvar	100kvar	480/960/1440/1920kvar	600/1200/1800/2400kvar	690/1380/2070/2760kvar
Response time	< 15ms			< 40ms		
Target power factor	Adjustable from -1 to +1					
Cooling mode	Smart air cooling: 220 L/sec		Smart air cooling: 405 L/sec	Smart air cooling: 875 L/sec		
Noise level per module	< 65dB			< 70dB		
Communications and monitoring capabilities						
Communications ports	RS485 and Ethernet port (RJ45)			RS485 and Ethernet port (RJ45)		
Communications protocols	Modbus					
Alarm	Available					
Monitoring display	No monitor	2,2-inch or 4,3-inch touch screen monitor and optional 7inch touch screen centralized monitor		7-inch touch screen centralized monitor		
Mechanical properties						
Mounting type	Rack-mounted, wall-mounted, and cabinet			cabinet		
Cable entry mode	Rear entry for rack-mounted type; top entry for wall-mounted type; top or bottom entry for cabinet			bottom entry		
Dimensions (W x D x H) mm ²	440*445*150	500*557*190	500×520×269	600*800*2200/1200*800*2200/1800*800*2200/2400*800*2200		
	(Rack-mounted)	(Rack-mounted)	(Rack-mounted)			
	440*160*481	500*191*582	500×271×553			
	(Wall-mounted)	(Wall-mounted)	(Wall-mounted)			
Module net weight	21kg	35kg	48kg	500kg(One cabinet)		
Color	RAL7035					
Environment requirement						
Altitude	1500 m. Between 1500 m and 4000 m, according to GB/T3859.2, the power decreases by 1% for every additional 100 m.					
Ambient temperature	-10℃~40℃ （may derate capacity if ambient temperature exceeds 45℃）					
Relative humidity	5%~95%, non-condensing					
Protection grade	IP20 (other IP degrees are customizable)					
Related qualifications and standards						
Qualifications	CE					
Standards compliance	IEEE519, ER G5/4					

SVG**SPECIFICATION 480V / 690V / 600V**

Item	480~690V		
	Sinexcel SVG 30/40/65/ 75	Sinexcel SVG 40/50/80/95	Sinexcel SVG 40/60/90/110
System parameters			
Rated input line voltage	480V	600V	690V
Input phase voltage range	384V~552V	420V~690V	483V~793V
Power grid frequency	50Hz/60Hz (range : 45Hz ~ 62Hz)		
Parallel operation	Unlimited		
Overall efficiency	>97%		
Power grid structure	3P3W / 3P4W		
CT	150/5~10,000/5		
Circuit topology	3-level		
Performance indicators			
Single-module compensation capacity	30/40/65/75kvar	40/50/80/95kvar	40/60/90/110kvar
Response time	< 15ms		
Target power factor	Adjustable from -1 to +1		
Cooling mode	Smart air cooling 190 L/sec		
Noise level per module	<65dB		
Communications and monitoring capabilities			
Communications ports	RS485 and Ethernet port (RJ45)		
Communications protocols	Modbus		
Alarm	Available		
Monitoring	7-inch touch screen centralized monitor (rack - mount) or 4.3 inch touch screen monitor(wall-mount)		
Mechanical properties			
Mounting type	Rack-mounted, wall-mounted,		
Cable entry mode	Top and bottom entry for cabinet		
Dimensions (W x D x H) mm ²	544*640*250(Rack-mounted) 504*253*640(Wall-mounted)		
Module net weight	66kg		
Color	RAL7035		
Environment requirement			
Altitude	1500 m, Between 1500 m and 4000 m, according to GB/T3859.2, the power decreases by 1% for every additional 100 m.		
Ambient temperature	-20℃~40℃ (may derate capacity if ambient temperature exceeds 45℃)		
Relative humidity	5%~95%, non-condensing		
Protection grade	IP20 (other IP degrees are customizable)		
Related qualifications and standards			
Qualifications	CE ,ETL(UL508)		
Standards compliance	IEEE519,ER G5/4		

400V



SVG 30kvar (wall mount)



SVG 30 / 50kvar (rack mount)

400V



SVG 100kvar (wall mount)



SVG 100kvar (rack mount)

400V



400V



400V SVG PLUG TYPE CABINET

One plug type cabinet could hold five 100kvar modules to achieve 500kvar .
The plug type cabinet has built-in module which can be easily removed
and added.

The dimension of plug type cabinet: 600*800*2200mm.

SVG Project Reference

- Petrochina Bohai Oil Drilling, China
- LiaoYang Huitong Street Rolling, China
- State Grid of China – Jiangsu Province, China
- Shanghai Pufeng Harbour, China
- Far East Financial Centre, Admiralty, Hong Kong
- NTT Data Centre, Tseung Kwan O, Hong Kong
- Perodua Car Manufacturing Plant, Malaysia
- PTP Johor, Malaysia
- Prima Flour Mill Factory, Singapore
- Mitrphol Sugar Mill Factory, Thailand
- TexHong Textile Factory, Vietnam

Singapore

MUN HEAN SINGAPORE PTE LTD
51 Kim Keat Road, Unit 05-01/02
Mun Hean Industrial Building
Singapore 328821
Tel: +65-6250 0522
Fax: +65-6253 6885 / +65-6253 5879
Email: munheansing@munhean.com.sg

China

MUN HEAN HONG FEI (BEIJING) TECHNOLOGY CO., LTD
Room 3-2223, Gold Spring Times
No. 317, Datun Li, Chaoyang District,
Beijing 100101, China
Tel: +86 10-8483 9722
Fax: +86 10-8483 9721
Email: mhhf@munhean.com.cn

Hong Kong

MUN HEAN ELECTRICAL ENGINEERING (HK) CO., LTD
Unit 801-802, 8/F, Westlands Centre
20 Westlands Road, Quarry Bay, Hong Kong
Tel: +852-2873 1711
Fax: +852-2518 7013
Email: munheanhk@munhean.com.hk

Indonesia

PT MUNHEAN PUMA PERKASA
Jl. Tanjung Duren Barat No. 27-27A
Tanjung Duren Utara, Grogol, Pelamburan
Jakarta Barat 11470, Indonesia
Tel: +62 21-5695 8826
Fax: +62 21-567 3671
Email: munheanindo@mhpp-electric.com

Malaysia

MUN HEAN (MALAYSIA) SDN BHD
No. 15, Jalan SS26/6 Taman Mayang Jaya
47301 Petaling Jaya, Selangor Darul Ehsan
Malaysia
Tel: +603-7804 2288
Fax: +603-7803 1185
Email: munheanmy@munhean.com.my

Myanmar

MH POWER MYANMAR CO., LTD
No. 96 Yadanar Myaing Street
Off Yagon-Insein Road (West Side)
Kamaryut Township, Yangon, Myanmar
Tel: +95-1-505364
Fax: +95-1-505364
Email: mhmyanmar@munhean.com

Taiwan

MH POWER CO., LTD
4th Fl. No. 5 Alley 11,
Lane 327, Chunghe District
New Taipei City, Taiwan R.O.C.
Tel: +886 2-2242 5501
Fax: +886 2-2246 1694
Email: mhp@mhpowers.com.tw

Philippines

MH POLY-ELECTROMECHS, INC.
No. 15 N. Domingo St. Brgy. Valencia Hills
Quezon City, 1112 Philippines
Tel: +632-722 1493 / +632-727 8544.
Fax: +632-725 3770
Email: mhpoly@munhean.com.ph

Vietnam

MUN HEAN VIETNAM CO., LTD
68 Nguyen Quy Duc Street,
Ah Phu Ward, District 2,
Ho Chi Minh City, Vietnam
Tel: +84 8-6281 0819
Fax: +84 8-6281 0815
Email: munheanvn@munhean.com.vn