

Enjopowers' Power Quality Solutions

# Static Var Generator



# Catalogue

## Power quality solutions——Static Var Generator



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# SinE-Series Static Var Generator



## General information

**SinE-Series Static Var Generator**, operates on the base of a three-level topology circuit, provide power quality solutions such as stepless power factor correction, eliminate harmonic and load balance. The capacity of SVG modular from 20kVar to 150kVar, and allows 20 modules to connect parallel, and users can easily get the target filter current capacity.

### Product value:

- Eliminate the harmonic current of nonlinear load
- Improve the operating efficiency of the power system and reduce the downtime of the power distribution system, especially for low-voltage systems with frequent load upgrades
- Meet the strict requirements of Utilities for electrical energy quality, avoid fines and power supply interruptions caused by electrical quality problems, and reduce carbon dioxide emissions



### Features

- The rate factor value can reach  $>0.99$ , and will not cause over-compensation and under-compensation
- Ultra-fast dynamic compensation, full response time less than 10ms
- Active compensation device to avoid resonance
- Can be combined with capacitors to form a hybrid compensation scheme
- Active power compensation equipment

### Typical applications

- Fast inductive and capacitive reactive power compensation, and can balance three-phase loads and eliminate harmonics
- Data Center and UPS system
  - New energy power generation, e.g. PV and wind power
  - Precision equipment manufacturing, e.g. single crystal silicon, semiconductor
  - Industrial production machine
  - Electrical welding system
  - Plastic industrial machinery, e.g. extrusion machines, injection molding machines, etc.
  - Office building and shopping mall

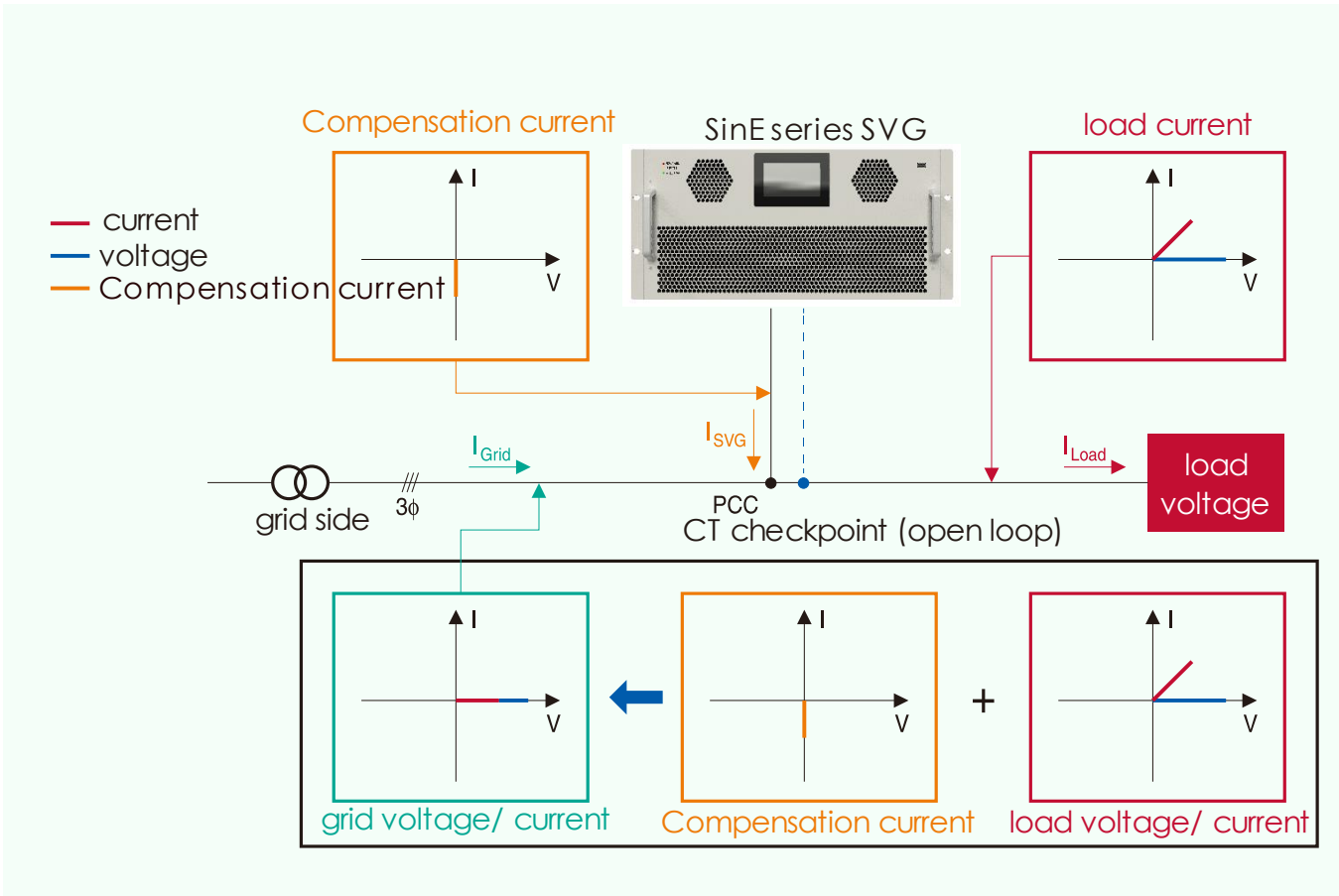
### Safety features

- Highest safety and reliability
  - Overload protection
  - Internal short-circuit protection
  - Overheating protection
  - Overvoltage and undervoltage protection
  - Inverter bridge protection
  - Resonance protection
- Fan fault alarm

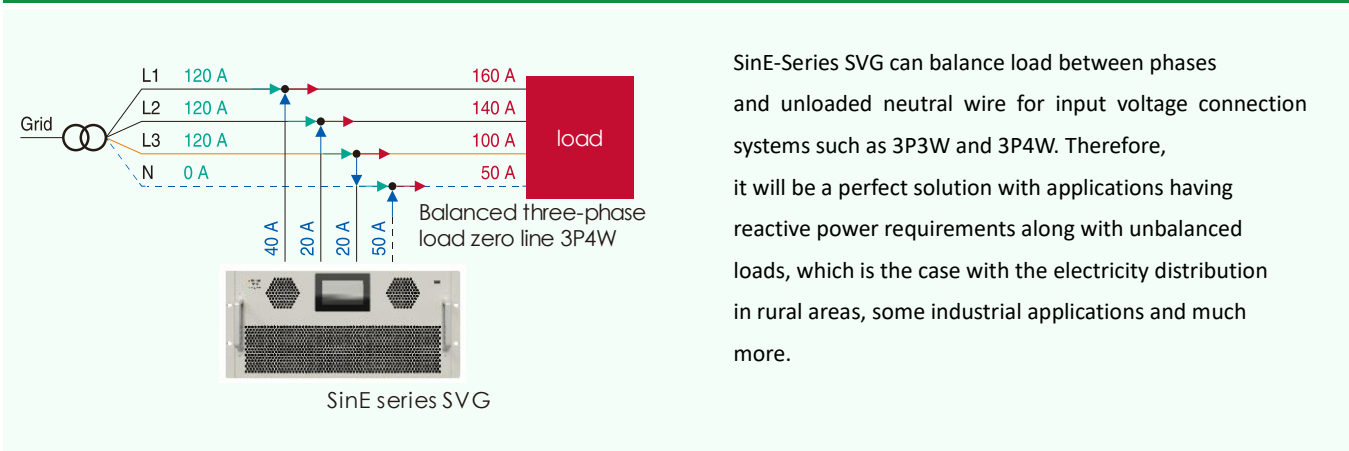
# SinE-Series Static Var Generator



## Static Var Generator Working principle



## SinE-Series SVG load balancing for 3P3W and 3P4W



SinE-Series SVG can balance load between phases and unloaded neutral wire for input voltage connection systems such as 3P3W and 3P4W. Therefore, it will be a perfect solution with applications having reactive power requirements along with unbalanced loads, which is the case with the electricity distribution in rural areas, some industrial applications and much more.

# SinE-Series Static Var Generator



Technical data and specifications				
Rated Voltage	200V	400V	480V	690V
Grid voltage range	-20%~+20%	20%~+20%	Max Voltage 500V	-20%~+10%
Individual module capacity (kVar)	25、 50、 75	35、 50、 75、 100、 150		120
Frequency	50/60Hz (-10%~+10%)			
Overall efficiency	>97%			
CT configuration	Closed or open loop (Open loop is recommended in case of parallel operation)			
Overall response time	<7.8ms			
Grid type	3P3W, 3P4W			
Overload capacity	110%-Continuous operation,120%-1min			
Circuit topology	3-level topology			
Switching frequency	20 kHz			
Modularity	Maximum 20 units can be combined			
Redundancy	Master/master or master/slave arrangement			
Typical power losses	< 2.5% (depending of the load)			
Target power factor	Adjustable from -1 to 1			
Harmonic compensation	Available			
Unbalance compensation	Available			
Display	1.8/4.3/7-inch HMI (Optional)			
Communication ports	RS485 Modbus (RTU)			
Noise level	< 69 dB (depending on the load and model)			
Altitude	Derating usage >2000m			
ambient temperature	Operating Temperature: -35°C~55°C, Derating usage above 55°C			
Humidity	Storage temperature: -45°C~70°C			
	5%~95%RH, non-condensing			
Protection class	IP20			
Design/Approvals	EN 62477-1(2012), EN 61439-1 (2011)			
EMC	EN/IEC 61000-6-4, Class A			
Certification	CE, CQC			

\*When the rated voltage is 200V, the reactive power compensation capacity is 50% of the compensation capacity of the rated voltage level of 400V.

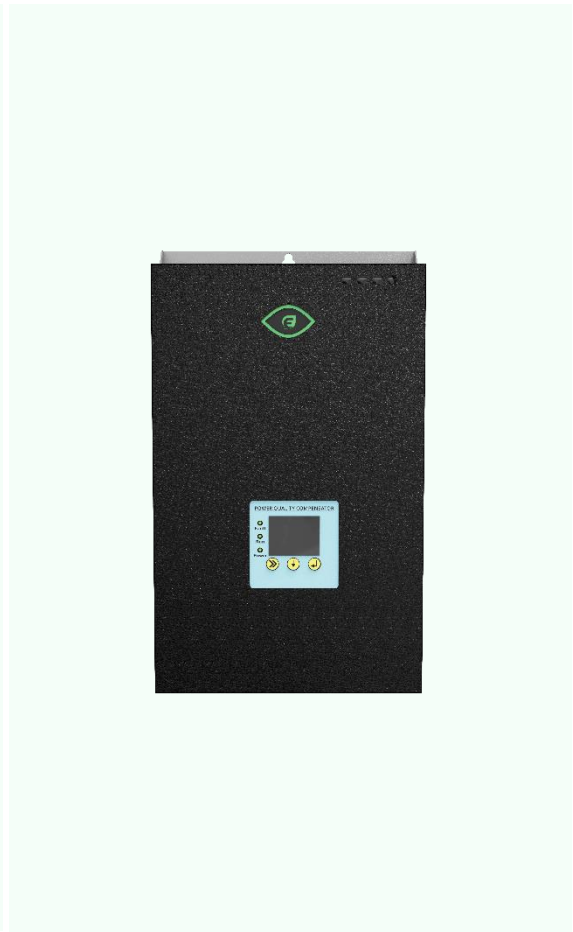
# SinE-Series Static Var Generator



Wall mounted SVG



Mini Wall mounted SVG



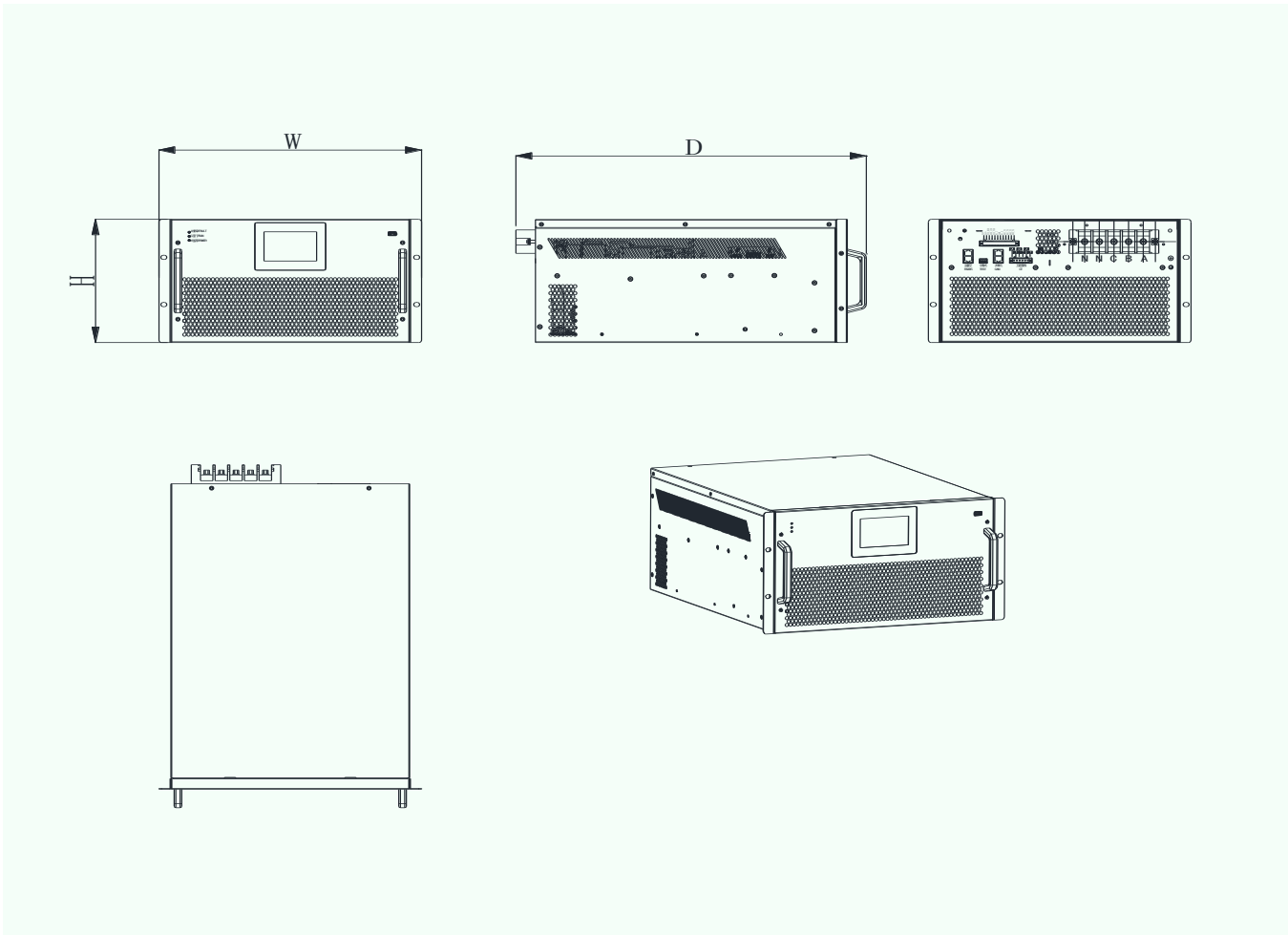
Rack mounted SVG



# SinE-Series Static Var Generator



## Rack-mounted SVG module

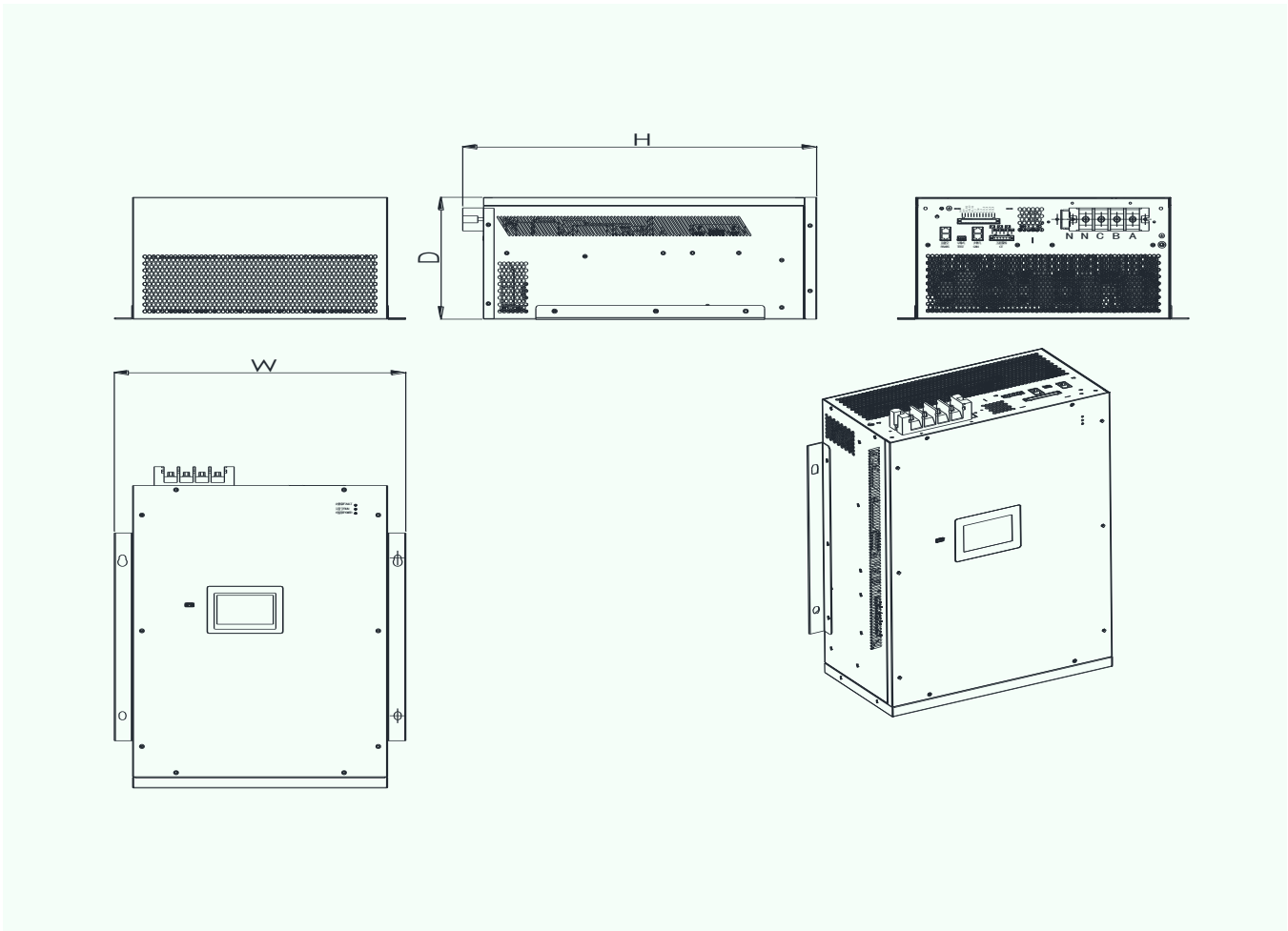


SVG modules		Approx. dimensions(W×D×H,mm)	Approx. weight(kg)
400V/480V	35kVar	355×538×200	22
	50kVar	399×626×200	27
	75kVar	484×646×232	38
	100kVar	554×656×250	47
	150kVar	674×715×250	56
200V	25kVar	399×626×200	27
	50kVar	554×656×250	47
	75kVar	674×715×250	56
690V	120kVa	569×697×250	50

# SinE-Series Static Var Generator



## Wall-mounted SVG modules



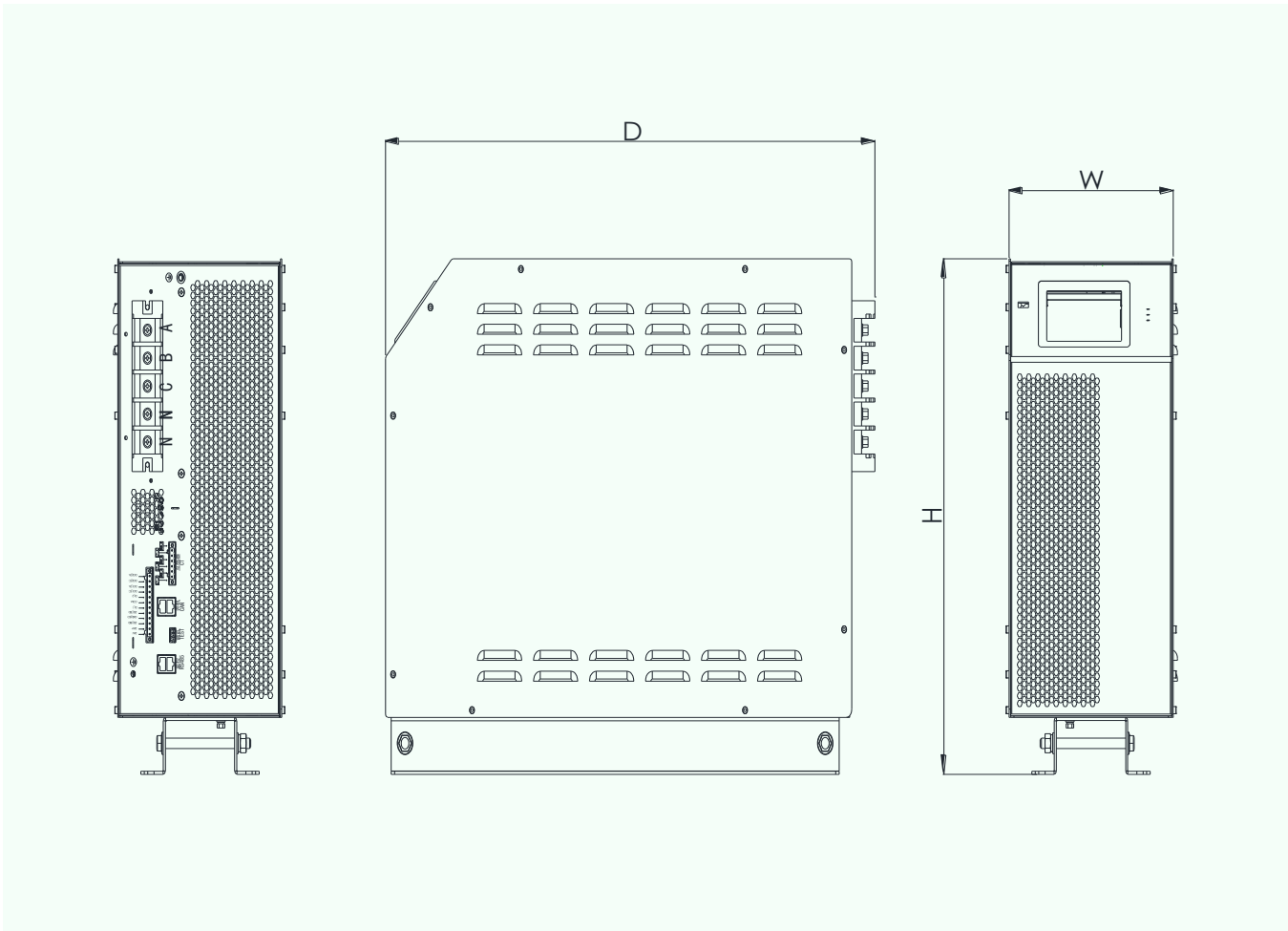
SVG modules		Approx. dimensions(W×D×H,mm)	Approx. weight(kg)
400V/480V	35kVar	378×200×525	22
	50kVar	418×200×556	27
	75kVar	503×232×611	38
	100kVar	573×250×621	47
	150kVar	694×250×680	56
200V	25kVar	418×200×556	27
	50kVar	573×250×621	47
	75kVar	694×250×680	56
690V	120kVar	588×250×662	50



# SinE-Series Static Var Generator



## Vertical-mounted SVG modules

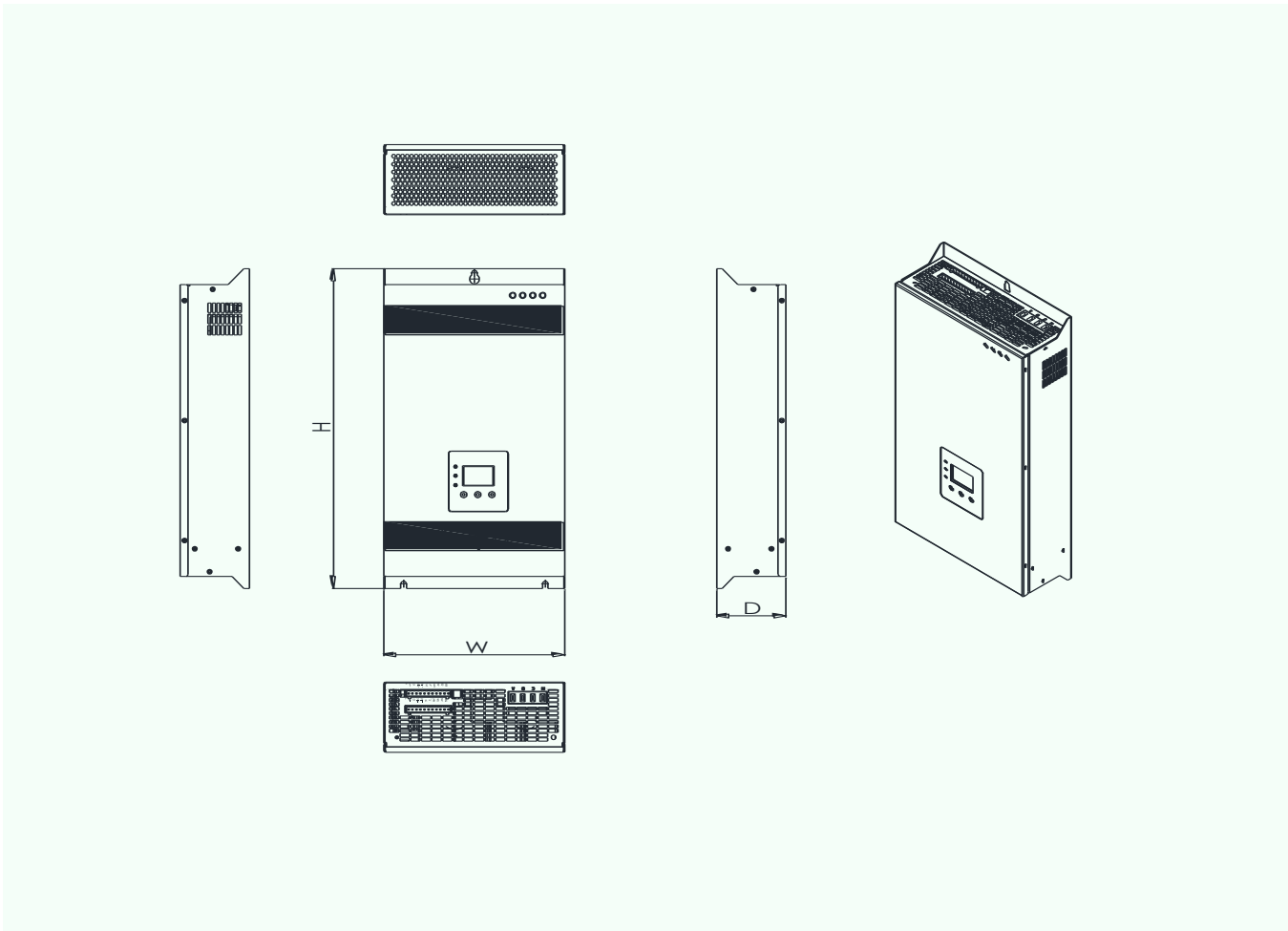


SVG modules		Approx. dimensions(W×D×H,mm)	Approx. weight(kg)
400V/480V	35kVar	202.2×575×372.4	22
	50kVar	202.5×638×418	27
	75kVar	234.5×699×498	38
	100kVar	251.5×689×568	47
	150kVar	251.5×748×688	56
200V	25kVar	202.5×638×418	27
	50kVar	251.5×689×568	47
	75kVar	251.5×748×688	56
690V	120kVa	251.5×755×583	50

# SinE-Series Static Var Generator



## Mini wall-mounted SVG modules



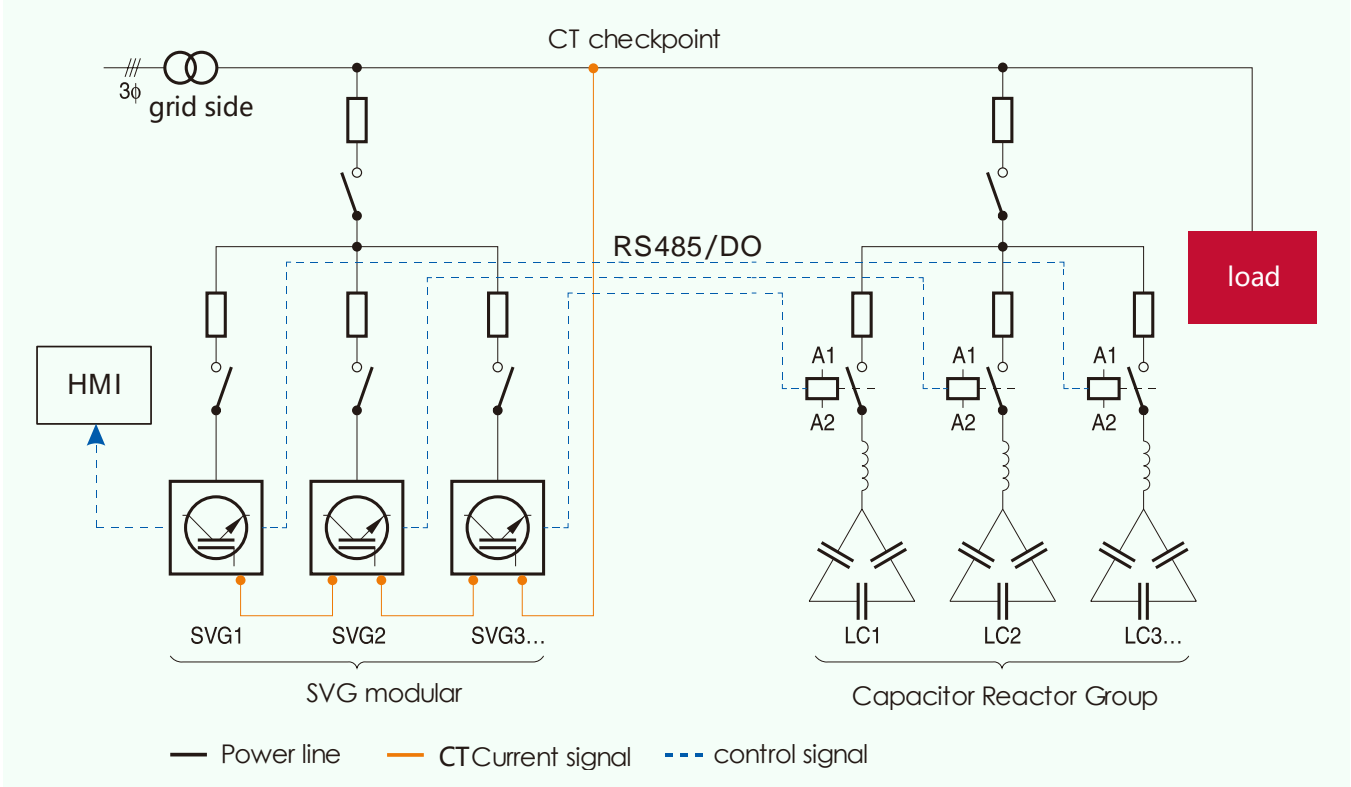
SVG modules		Approx. dimensions(W×D×H, mm)	Approx. weight (kg)
400V	20kVar	230×88×400	8
200V	10kVar	230×88×400	8

\*4.3-inch HMI is optional

# Hybrid Var compensation (SVG + Capacitor)



## Hybrid var compensation working principle



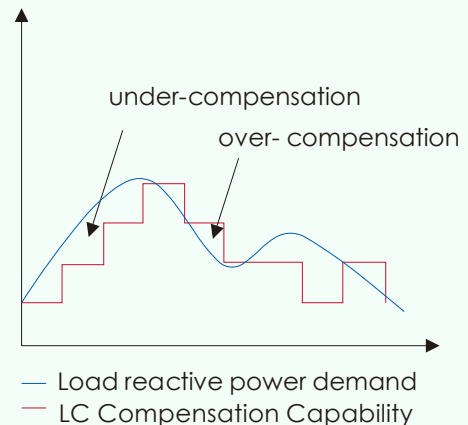
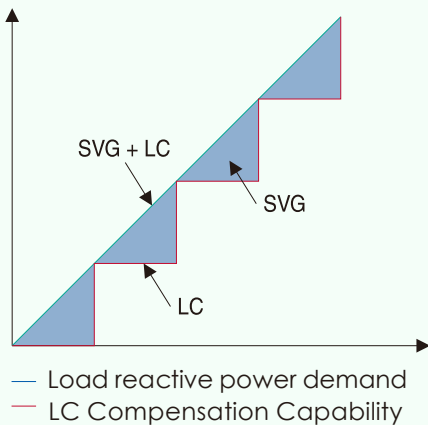
## Comparison of capacitance compensation and hybrid var compensation

### SVG+LC hybrid compensation

- Capacitor reactor group realizes stepless switching compensation
- SVG module can cover all blind spots

### Traditional capacitor reactive power compensation

- May lead to over- and under-compensation



# SinE-Series Static Var Generator



SVG module capacity configuration recommendation				
Transformer capacity (KVA)	Reactive demand (kVar)	Recommended capacity (kVar)	SVG (kVar)	capacitance (kVar)
125	37	40	15	25
160	48	50	15	35
200	60	60	35	25
250	75	75	35	40
315	94	100	35	65
400	120	120	50	85
500	150	150	50	100
630	200	200	50	150
800	240	250	100	200
1000	300	300	100	200
1250	375	400	100	300
1600	480	500	200	300
2000	600	600	200	400
2500	750	750	200	550
3150	945	950	300	650

SVG module capacity configuration recommendation

# Recommended reference value



Cable cross-section and fuses				
AHF Current	A/B/C (L1/L2/L3) mm <sup>2</sup>	N mm <sup>2</sup>	PE mm <sup>2</sup>	Fuse A
35kVar	16	16	16	80
50kVar	25	25	16	125
75kVar	35	35	16	160
100kVar	50	50	25	250
150kVar	70	70	25	400

\* It is recommended to use copper core wire;

CT			
CT Ratio	50/5~10000/5. Choose according to 1.2~1.5 times of grid current, or choose according to transformer capacity		
CT cable	CT rated power	Conductor cross-sectional	Wire length m
	5VA	2.5	≤10
		4.0	10~20
	10VA	2.5	≤20
		4.0	20~40
	15VA	2.5	≤30
4.0		30~60	

\*CT rated secondary power is greater than 1VA;

\*CT accuracy is required to be above 0.5;

\*The secondary side of the CT must be reliably grounded (only one end needs to be grounded);

\*CT cable is recommended to use shielded twisted pair cable (RVVP)

Cooling Requirements for Active Harmonic Filter Cabinets				
Module current		Demand of air volume (L/Sec)	Minimum air inlet area mm <sup>2</sup>	Minimum opening size of front and rear door panels mm <sup>2</sup>
400V	35kVar	150	26000	383×87
	50kVar	225	30000	383×100
	75kVar	300	35000	383×120
	100kVar	450	55000	430×140
	150kVar	525	63000	520×160
690V	120kVar	500	60000	460×140

\* Example: 400kVar SVG cabinet, the air volume requirement is 1400L/Sec, the minimum air inlet area is 220000 mm<sup>2</sup>, and the minimum opening area is 430×140×4 mm<sup>2</sup>



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