ADVANCED STATIC VAR GENERATOR

THE .

SELEC

• 50 kVAr • 100 kVAr

SELEC

150 kVAr 🔸 300 kVAr 🔸 200 kVAr

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What is ASVG?

- ASVG stands for Advanced Static Var Generator.
- ASVG acts as a current source that generates a compensation current working as a dynamic current source. It
 monitors the current phase angle and generates real time compensation current to achieve the set displacement power factor.
- Advanced static var generator, additionally monitors harmonics up to order of 15th Level and compensates the same on real time basis, thus improving the power quality.
- A correctly sized ASVG can not only correct displacement Power factor, but also it can reduce harmonics to <5% THDi.
- Dealing in both can result in true unity power factor.

Working Principle of ASVG:

- When the load generates inductive or capacitive current, it makes load current lagging or leading the voltage.
- ASVG detects the phase angle difference and generates leading or lagging current into the grid, making the phase angle of current almost the same as that of voltage on the transformer side, which corrects the fundamental power factor to almost unity.
- ASVG draws the harmonic current from the supply grid in such a way that the magnitude of its current is same as that of the load side harmonic current, whereas its phase is opposite with respect to that of the load side harmonic current, which ensures that the effective value of the harmonic current on the supply side reduces to a negligible level.



Compensation of reactive power and harmonics with Selec ASVG



Compensation of series load balancing for 3P3W and 3P4W

- ASVG can correct unbalance between phase phase and phase to neutral
- Therefore, ASVG is a perfect solution to reactive power compensation with unbalanced load
- ASVG detect the current of each phase, Even if the current is different in each phase, it individually feeds compensation current to each phase to improve the power factor.



Advantages of using ASVG

Improves power factor

Continuous and step-less compensation of power to maintain power factor >0.99. The compensation performance is much better than a traditional compensation device (capacitor).



Works under unbalance grid condition

Output current is not affected by the mains voltage fluctuation, providing stable support for mains voltage.

Modular design, easy extension

It is easy to expand the system as 8 modules can be connected in parallel. ASVG can also be used as a hybrid solution in combination with conventional capacitor based system.

Highly reliable and safe

Robust design for power system eliminates resonance problems, with no more amplified harmonic current and voltage. It extends components life cycle and protects the system.

Control and monitoring through ASVG

User can monitor and control the system parameters via Ethernet or serial communication.

Data logging and alarm can also be done

User can monitor & control HMI screen using VNC software on PC or laptop.

Data can be monitored using selec IoT platform and can be accessed across the world.

Features of ASVG

- Controllable reactive current source
- Compensates current harmonics up to 15th order
- Stepless & precise control
- Compensates current unbalance created by the load
- Leading and lagging reactive power mitigation
- Individual correction of current on all three phases
- Instant response time of 50 µsec & full correction less than 1 cycle
- Modular arrangement Parallel operation up to 8 modules
- Can be installed along with conventional APFC panel

Advantage of using ASVG over conventional Power factor correction system

	Conventional APFC System	Advanced Static Var Generators
Response	 APFC take at least 30s to 40s to switch banks and thyristor- based solutions 20ms to 30ms 	 Real-time compensation of power quality problems as the overall response time is less than 100µs
Output	 Depends on step sizes, cannot match load demand in real time Depends on grid voltage as capacitor units & reactors are used 	 Instantaneous, continuous, stepless and seamless Grid voltage fluctuation has no influence on the output
Power factor correction	 Capacitor banks needed for inductive loads and reactor banks for capacitive loads. Problems in systems with mixed loads Not possible to guarantee unity power factor as they have steps, system will be having continuous over and under compensation 	 Corrects simultaneously from -1 to +1 power factor of lagging (inductive) and leading (capacitive) loads Guaranteed unity power factor always without any over or under compensation (stepless output)
Unbalance	Do not correct load unbalance	Can correct by selecting the amount of load balancing
Design & sizing	 Reactive power studies needed to size the proper solution Usually over-sized to better adjust to changing load demands Need to be designed considering system harmonics Custom-built for specific load and network conditions 	 Not required extensive studies as it is adjustable Mitigation capacity can be exactly what load demands Unaffected by harmonic distortion in the system. Can adapt to load and network conditions & changes
Resonance	Parallel or series resonance can amplify currents in the system	 No risk of harmonic resonance with the network
Transients	Caused by the switching of capacitor units or shunt reactors	
Installation	Not simple installation, especially if loads upgraded frequently	Simple installation as modules are compact in size
Expansion	 Limited and depends on load conditions and network topology 	 Simple (and not dependent) by adding modules
Maintenance	 Using components that need extensive maintenance like fuses, circuit breakers, contractors, reactors, and capacitor units 	 Simple maintenance and service life up to 15 years as there is no electro-mechanical switching and no risk of transients or resonance

Suppresses harmonics

Configures the required amount of reactive current in realtime and compensates the harmonic current (up to 15^{th} order) drawn by the non linear loads.



SELEC

R

Y

B 2060

N 539

Main

Current (A)

Load

196,1

196, 1

<u>001 S</u>

SH F

Info

Grid

1870

1635

Fast response

Fast configuration capability provides fast response time as low as 50 μsec and full correction less than 1 cycle.



06:08:2021

17:14:22

Status

Power Factor

Load

0.958

0.938

0.950

Settings

Grid

0.999

0.994

0.998

or

TECHNICAL SPECIFICATION

System Parameter	15kVAr	50kVAr	100kVAr	150kVAr					
Operating voltage range (P-N)		178V to 262V							
Frequency		50 / 60 Hz (±2.5 Hz)							
Power efficiency		>97%							
Compensation efficiency		> 98%							
Power grid structure		3P3W/3P4W							
Cable entry	From Top Bottom (default)/ Top Entry								
Incomer protection	MCCB MCCB/ACB								
CT ratio	Settable through HMI up to 10000/5A								
CT location		Load side (de	fault)/ Grid side						
Rated RMS Current	20A	75A	150A	210A					
Reactive power compensation and load balancing		As Per Priority & bas	ed on site (Q+B,Q+H)						
Circuit topology		3 level Neutral	point clampped						
Performance	l								
Response time		< 50µsec and full response	e less than 1 Complete cycle						
Target power factor		Adjustable	from -1 to +1						
Cooling mode		Forced	air cooling						
Operating modes	Power Fa	ctor Correction, Harmonic Mi	tigation, Balancing Highly Fluct	uating Load					
Noise level		< 65 dB							
Normal spectrum of compensation		Up to 15 th order of Harmonics							
Harmonic mitigation	15A								
Protection type	15A 35A 75A 98A Comes with MCB Comes with Inbuilt Multi protection And Requires External MCCB								
Protection Functions	Over Current,Over Voltage,Over Temperature,IGBT Saturation, Grid Fault, Surge, DC Bus protection, EEPROM Fault, CT Detection fault								
Communications and Monitoring Capabilities	1								
Local monitoring	4.3" Monochrome Display	4.3"HMI Display	4.3"HMI Display	7" Touch Screen HI					
Digital Inputs		2 DI - Programm	hable for DG Input						
Digital Outputs		2 DO - Programn	nable for Capacitor						
Communication ports	RS485,Possible using LAN,WiFi(Paid Only)								
Communication protocols	MODBUS-RTU, Possible using LAN, WiFi(Paid Only)								
Software updates	Through RS485 port using Customised utility								
Mechanical Properties									
Mounting type	Wall Mount	Wall/Rad	ck mountable gets vary as per t	he Fitting					
Dimensions (W × D × H) mm	280*227*485	470*650*670	646*236*858	800*1100*1100					
MCCB	25A	100A	125A	200A					
Color	RAL 5026 / RAL 7035	RAL 5026 / RAL 7035 RAL9004							
Environment Conditions									
Altitude	<2000m								
Operating temperature		-10 to 45°C							
Relative humidity	95% RH; Non condensing								
Protection class	IP 20								
Certification and standard	EN 50178:1997/ IEC 50178:1997								
Certification	CL	EN 61000_6_2(2005) / EN55011, GROUP1, CLASS A IEC 61000_6_2(1999) / CISPR11, GROUP1, CLASS A							
ASVG Series performance requirement		EN 50091-3 / IEC 62040-3 / AS 62040-3 (VFI SS 111)							

TECHNICAL SPECIFICATION

System Parameter	200kVAr	250kVAr	300kVAr	350kVAr				
Operating voltage range (P-N)		178 V t	to 262V					
Frequency		50 / 60 Hz	z (±2.5 Hz)					
Power efficiency		>9	7%					
Compensation efficiency	> 98%							
Power grid structure	3P3W/3P4W							
Cable entry		Bottom (defa	ult)/ Top Entry					
Incomer protection	MCCB/ACB							
CT ratio	Settable through HMI up to 10000/5A							
CT location		Load side (def	ault)/ Grid side					
Rated RMS Current	280A	350A	420A	490A				
Reactive power compensation and load balancing		As Per Priority Based	d On Site (Q+B,Q+H)					
Circuit topology		3 level Neutral	point clampped					
Performance								
Response time		< 50µsec and full response	less than 1 Complete cycle					
Target power factor		Adjustable f	from -1 to +1					
Cooling mode		Forced a	ir cooling					
Operating modes	Power Fac	tor Correction, Harmonic Mitig	ation, Balancing Highly Fluctua	iting Load				
Noise level		< 65	5 dB					
Normal spectrum of compensation	Up to 15 th order of Harmonics							
Harmonic mitigation	130A	162A	194A	226A				
Protection type	Comes with Inbuilt Multi protection And Requires External MCCB							
Protection Functions	Over Current,Over Voltage,Over Temperature,IGBT Saturation, Grid Fault, Surge, DC Bus protection, EEPROM Fault, CT Detection fault							
Communications and Monitoring Capabilities								
Local monitoring	7" Touch Screen HMI							
Digital Inputs	2 DI - Programmable for DG Input							
Digital Outputs	2 DO - Programmable for Capacitor							
Communication ports	RS485,Possible using LAN,WiFi(Paid Only)							
Communication protocols	MODBUS-RTU, Possible using LAN, WiFi(Paid Only)							
Software updates	Through RS485 port using Customised utility							
Mechanical Properties								
Mounting type		Wall/Rack mountable ge	ets vary as per the Fitting					
Dimensions (W × D × H) mm	800*1100*1100	800*1100*1600	800*1100*1600	800*1100*1850				
MCCB	300A	400A	500A	600A				
Color	RAL9004							
Environment Conditions								
Altitude	<2000m							
Operating temperature	-10 to 45°C							
Relative humidity	95% RH; Non condensing							
Protection class	IP 20							
Certification and standard	EN 50178:1997/ IEC 50178:1997							
Certification	CL	EN 61000_6_2(2005) ASS A IEC 61000_6_2(1999)	/ EN55011, GROUP1, / CISPR11, GROUP1, CLASS	A				
ASVG Series performance requirement	EN 50091-3 / IEC 62040-3 / AS 62040-3 (VFI SS 111)							

TECHNICAL SPECIFICATION

System Parameter	400kVAr	450kVAr	500kVAr	700kVAr	800kVAr			
Operating voltage range (P-N)			178 V to 262V					
Frequency	50 / 60 Hz (±2.5 Hz)							
Power efficiency			>97%					
Compensation efficiency			> 98%					
Power grid structure			3P3W/3P4W					
Cable entry		E	ottom (default)/ Top enti	ry				
Incomer protection			MCCB/ACB					
CT ratio	Settable through HMI up to 10000/5A							
CT location		L	oad side (default)/ Grid sid	de				
Rated RMS Current	560A	630A	700A	980A	1028A			
Reactive power compensation and load balancing		As Per P	riority Based On Site (Q	⊥ !+B,Q+H)				
Circuit topology		3 1	evel Neutral point clamp	ped				
Performance								
Response time		< 50µsec and f	ull response less than 1	Complete cycle				
Target power factor			Adjustable from -1 to +1	1				
Cooling mode			Forced air cooling					
Operating modes	Pow	er Factor Correction, Ha	rmonic Mitigation, Balar	ncing Highly Fluctuating	Load			
Noise level		,	< 65 dB	5 5 7 5				
Normal spectrum of compensation	Up to 15 th order of Harmonics							
Harmonic mitigation	258A	290A	320A	448A	512A			
Protection type	Comes with Inbuilt Multi protection And Requires External MCCB							
Protection Functions	Over Current,Over Voltage,Over Temperature,IGBT Saturation, Grid Fault, Surge, DC Bus protection, EEPROM Fault, CT Detection fault							
Communications and Monitoring Capabilities	1							
Local monitoring			7" Touch Screen HMI					
Digital Inputs	2 DI - Programmable for DG Input							
Digital Outputs		2 DO	- Programmable for Cap	pacitor				
Communication ports	RS485,Possible using LAN,WiFi(Paid Only)							
Communication protocols	MODBUS-RTU, Possible using LAN, WiFi(Paid Only)							
Software updates	Through RS485 port using Customised utility							
Mechanical Properties								
Mounting type		Wall/Rack n	nountable gets vary as p	er the Fitting				
Dimensions (W × D × H) mm	800*1100*1850	800*1100*2150	800*1100*2150	1600*1900*1100	1600*2200*110			
МССВ	700A	800A	900A	1250A -ACB	1450A -ACB			
Color			RAL9004					
Environment Conditions	· · · · · · · · · · · · · · · · · · ·							
Altitude	<2000m							
Operating temperature	-10 to 45°C							
Relative humidity	95% RH; Non condensing							
Protection class	IP 20							
Certification and standard	EN 50178:1997/ IEC 50178:1997							
Certification	EN 61000_6_2(2005) / EN55011, GROUP1, CLASS A IEC 61000_6_2(1999) / CISPR11, GROUP1, CLASS A							
ASVG Series performance requirement			EC 62040-3 / AS 62040					

ORDERING INFORMATION

Eg: ASVG-050-WLL-4P-04

ASVG	050	WLL	4P	04
Advanced Static	050 - 50 kVAr	WLL - Wall Mount	3P - 3P3W	XX - No Display
VAr Generator	100 - 100 kVAr	RCK - Rack Type	4P - 3P4W	04 - 4.3" HMI

HYASVG PANEL BOARD 150KVAR-500KVAR SPECIFIACTIONS

Sr No.	KVAR	ASVG		Pannel	Contactor		Detuned Filter		Capacitor		Fuse		HMI Control
			QTY	МССВ		QTY		QTY		QTY		QTY	
1	150	50KVAR	1	250	50KVAR Cap Duty Contactor	2	50 KVAR/70A/ 440V/50Hz/7%Du	2	50 KVAR/70A/ 525V/50Hz	2	80A FUSE	2	Common Controller
2	200	50KVAR	1	350	50KVAR Cap Duty Contactor	3	50 KVAR/70A/ 440V/50Hz/7%Du	3	50 KVAR/70A/ 525V/50Hz	3	80A FUSE	3	Common Controller
3	250	50KVAR	1	450	50KVAR Cap Duty Contactor	4	50 KVAR/70A/ 440V/50Hz/7%Du	4	50 KVAR/70A/ 525V/50Hz	4	80A FUSE	3	Common Controller
4	300	100KVAR	1	550	50KVAR Cap Duty Contactor	4	50 KVAR/70A/ 440V/50Hz/7%Du	4	50 KVAR/70A/ 525V/50Hz	4	250A FUSE	3	Common Controller
4	350	100KVAR	1	630	50KVAR Cap Duty Contactor	5	50 KVAR/70A/ 440V/50Hz/7%Du	5	50 KVAR/70A/ 525V/50Hz	5	250A FUSE	3	Common Controller
6	400	100KVAR	1	700	50KVAR Cap Duty Contactor	6	50 KVAR/70A/ 440V/50Hz/7%Du	6	50 KVAR/70A/ 525V/50Hz	6	250A FUSE	3	Common Controller
7	450	100KVAR	1	800	50KVAR Cap Duty Contactor	7	50 KVAR/70A/ 440V/50Hz/7%Du	7	50 KVAR/70A/ 525V/50Hz	7	250A FUSE	3	Common Controller
8	550	100KVAR	1	900	50KVAR Cap Duty Contactor	8	50 KVAR/70A/ 440V/50Hz/7%Du	8	50 KVAR/70A/ 525V/50Hz	8	250A FUSE	3	Common Controller

Applications



AVIATION INDUSTRY



TEXTILE



ARC FURNANCE



AUTOMOBILE INDUSTRY



FOOD INDUSTRY



FURNACE



WELDING



AIRPORT

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