Stock Code：603859

Power Quality Products

APF · SVG · SVGC · SPC

NANCAL

Shanghai Nancal Electric Co., Ltd.

Address: B702, 699 Zhongke Rd., Pudong New District, Shanghai, China
Postcode: 201210
Tel: +86-21-50410009
Fax: +86-21-2042 2388
E-mail: sales.sh@nancal.com
Website: www.nancal.com
Customer service: +86 18217165478

Linkedin

Facebook

version number: 20200908

Power Quality Products

Shanghai Nancal Electric Co., Ltd.

Shanghai Nancal Electrical Co., Ltd. is the holding subsidiary of Nancal (stock code: 603859). The company is specialize in R&D, production and sale of power electronic products, such as APF (Active Power Filter), SVG (Static Var Generator), Medium Voltage AC Drives, Low Voltage Industrial AC Drives , Shore Power and so on.

Glories

High technology enterprise, software enterprise
Type test reports, CE certification, CCS certification
15 patents for invention
54 patents for utility models
61 software copyrights
Science and technology special award of Chinese Machinery Industry

High performance power quality technology

DSP+FPGA+ARM digital control
3-level topology structure
APF、 SVG、 SVGC、 SPC
Current harmonics compensation, reactive compensation, three-phase unbalance compensation
Harmonic elimination rate＞97%, PF=0.99, three-phase unbalance< 3%

Service

Technical proposal, project plan, on-site testing, data analysis, customized solution, construction guidance, regular inspection, quick maintenance
7x24 hours technical support
Offer module, cabinet and other customized products
For non-standard products, please contact us

Power Quality Products

APF — Active Power Filter

APF (Active Power Filter) is a new type power electronic product with functions of dynamic harmonic elimination (varying amplitude and frequency) and reactive power compensation (leading or lagging).

SVG — Static Var Generator

SVG (Static Var Generator) detects load current through external current transducer（CT）and analyzes reactive component of the load current by DSP controller, then control IGBT inverter to generate reactive current and compensates the load reactive current to meet the target of line power factor. It also has function of harmonic compensation.

SVGC — Hybrid Var Compensator

SVGC (Hybrid Var Compensator) integrate TSC (Thyristor Switched Capacitor) and SVG, with high cost performance.

SPC — Smart Power Quality Correct Device

SPC (Smart Power Quality Correct Device) specialize in improve power quality for distribution network, has the functions of three-phase unbalance compensation, fast regulation of reactive power and system voltage stabilization.

Keys to superior performance

Two Core Technologies of NANCAL Power Quality Products

Advanced Power Electronics Technology

Based on high-performance 3-level IGBT topology, using high efficiency IGBT drive circuit and safety protection mechanism.

Control Method
Intelligent closed-loop control algorithm

high speed semiconductor　　high speed data processor

High-Performance Control

On the strength of DSP+FPGA high speed control platform, achieving harmonic and reactive calculation, realizing closed-loop current control through advanced control algorithm.

- harmonic elimination: 2-61 order
- 97% elimination rate
- PF > 0.99
- three-phase balancing

NC AH
Active Power Filter

NC AH series Active Power Filter (APF) is a new type power electronic product with functions of dynamic harmonic elimination (varying amplitude and frequency) and reactive power compensation (leading or lagging).

APF

Technical Features

Abundant compensation functions:

- Whole compensation or selectable
- Reactive compensation (capacitive & inductive)
- Three-phase unbalance compensation
- Harmonic elimination rate＞97%
- PF>0.99

* Wall-mounted

Advanced system performance:

- 3-level topology structure
- DSP+FPGA, high speed digital control
- Automatic resonance avoiding, automatic lim iter without overload
- Protection: overvoltage, overcurrent, over tem perature. etc.
- Communication: Ethernet, RS485. etc.

Flexible application:

- Modular design, small size, expandable, easy installation and maintenance, maximum 16 modules in parallel
- Multiple types: wall-mounted/cabinets
- Line structures: three-phase three-wire/t-hree-phase four-wire
- Maximum 10 cabinets in parallel

Safety and reliability:

- Advanced IGBT chip
- Texas Instrument DSP chip, high speed and reliable performance
- Perfect protection

User-friendly:

- Standard 7 inch colorized touch screen
- Graphic interface, display various power quality parameters
- Easy operation

* HMI on module (optional)

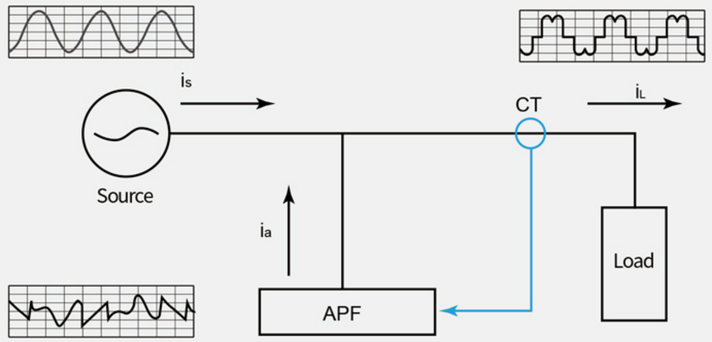
Energy saving:

- Low loss: automatic hibernation/ awakening
- Low noise: intelligent variable speed cooling fan

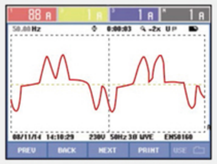
APF

Working Principles

APF detects load current through external current transducer（CT）on-line and analyzes harmonic component of the load current by DSP controller, then generates PWM signal to fire IGBT. Comparing to the load current harmonic, APF will inject a current with same amplitude and opposite direction to source, finally to eliminate current harmonics on line side.

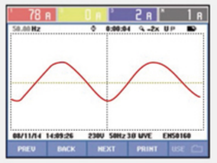


APF Working Principle Diagram



APF turn off ▲

APF turn on ▼



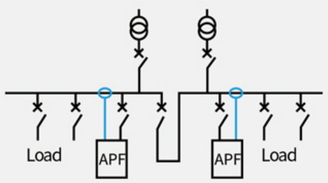
Source Current

Typical Electrical Design

NC AH series APF has different compensation method according to the power distribution system structure.
It can provide total compensation, local compensation or on-site compensation.

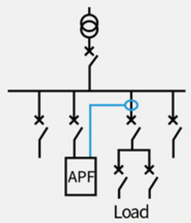
Total Compensation

In the mixed power distribution system, including large number of nonlinear loads, but capacity of single nonlinear load is small.



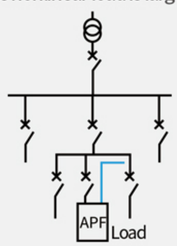
Local Compensation

When nonlinear loads concentrate upon some branches.



On-site Compensation

When nonlinear loads concentrate upon certain branch, and the capacity of single nonlinear load is large.



APF Product Model

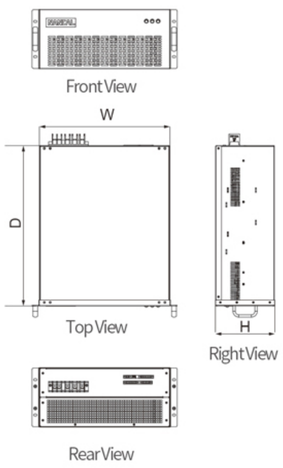
NC – AH – 4L – 400 – 300 / G

- NC: Enterprise Code
- AH: Active Power Filter
- 4L: 3L: three-wire; 4L: four-wire
- 400: Rated Voltage: 400VAC / 480VAC / 690VAC
- 300: Rated Current: 30~750A(400VAC) 100~600A(480VAC) 100~500A(690VAC)
- G: G: Cabinet; H: Wall-mounted; M: Module

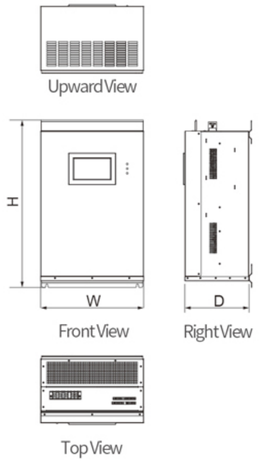
rated current	30/50/60A	100A	150A	100~750A	100~600A	100~500A
rated voltage	400V（239V~458V）				480V（383V~576V）	690V（483V~794V）
controller	DSP based full-digital control					
compensation current of neutral line	triple phase current					
filter capacity	2～61 order （selectable or whole compensation）					
harmonic elimination rate	>97%					
Line frequency	50Hz/60Hz ±5%					
line structure	three-phase three-wire /three-phase four-wire					
topology	three-level NPC					
three-phase unbalance compensation capacity	<3%					
reactive compensation	-1～1 (adjustable)					
response time	<5ms complete response ;<25us transient response					
automatic current limiting	yes					
switching frequency	20 kHz (adjustable)					
cooling method	air cooling, speed adjustable					
noise level	<60dBA					
efficiency	⩾97%					
protection function	overvoltage, undervoltage, overcurrent, over-temperature etc.					
HMI	standard 7 inch colorized touch screen or customized					
communication interface	RS485/CAN/internet access					
installation	wall-mounted/cabinet			cabinet		
color	RAL7032(optional)					
storage temperature	-40~70°C					
operation temperature	-10~50°C					
humidity	<95% non-condensing					
altitude	<1500m (derating when exceed 1500m)					
enclosure	IP21 or customized					

NC AH Outline

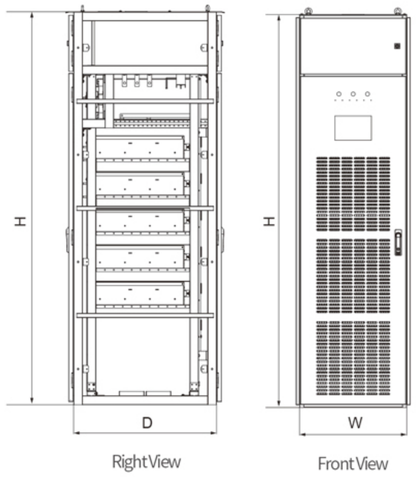
Module



Wall-mounted



Cabinet



Module & Wall-mounted	Module size (W*D*H mm)	Wall-mounted size (W*D*H mm)	Weight (kg)
30A/50A/60A (400V)	450*545*205	450*265*545	35
100A (400V)	450*645*230	450*290*645	45
150A (400V)	550*645*290	550*350*645	60

Cabinet	Size (W*D*H mm)	Weight (kg)
100-750A (400V)	600*800*2200	200-600
100-600A (480V)	800*1000*2200	200-600
100-500A (690V)	800*1000*2200	200-600

PF> 0.99

harmonic compensation

three-phase balancing

NC SVG
Static Var Generator

NC series Static Var Generator (SVG) detects load current through external current transducer (CT) and analyzes reactive component of the load current by DSP controller, then control IGBT inverter to generate reactive current and compensates the load reactive current to meet the target of line power factor. It also has function of harmonic compensation.

SVG

Technical Features

* Wall-mounted

Abundant compensation functions:

- Reactive compensation range: -1~1（adjustable）
  No overcompensation, undercompensation, resonance
- Three-phase unbalance compensation
- Harmonic compensation
- Reactive compensation cooperating with TSC
- Harmonic & reactive compensation cooperating with APF

Advanced system performance:

- 3-level topology structure
- DSP+FPGA, high speed digital control
- Automatic resonance avoiding, automatic limiter without overload
- Protection: overvoltage, overcurrent, over temperature. etc.
- Communication: Ethernet, RS485. etc.

Flexible application:

- Modular design, small size, expandable, easy installation and maintenance, maximum 16 modules in parallel
- Multiple types: wall-mounted/cabinets
- Line structures: three-phase three-wire/ three-phase four-wire
- Maximum 10 cabinets in parallel

Safety and reliability:

- Advanced IGBT chip
- Texas Instrument DSP chip, high speed and reliable performance
- Perfect protection

User-friendly:

- Standard 7 inch colorized touch screen
- Graphic interface, display various power quality parameters
- Easy operation

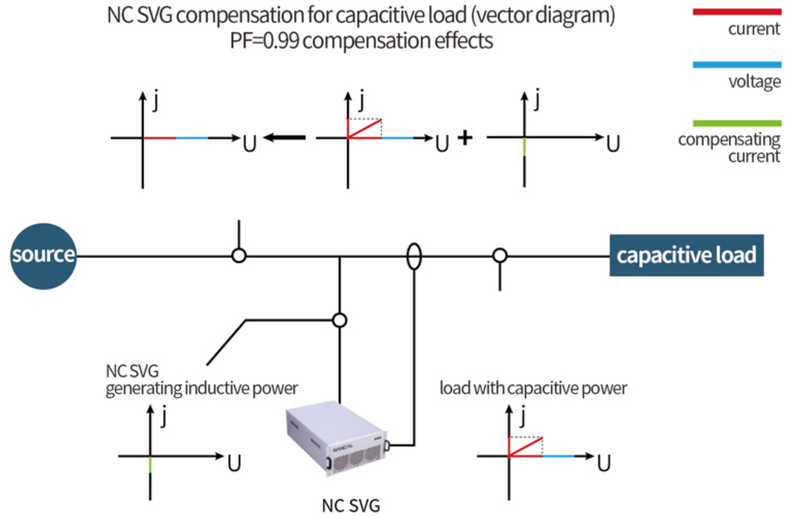
* HMI on module (optional)

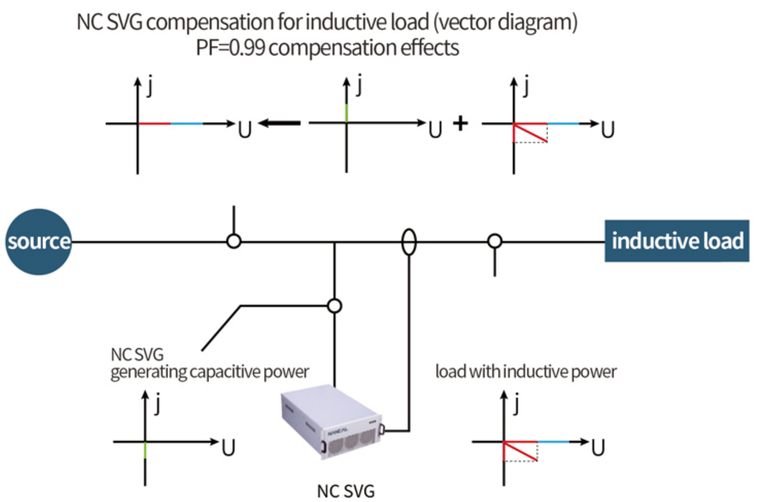
Energy saving:

- Low loss: automatic hibernation/ awakening
- Low noise: intelligent variable speed cooling fan

Working Principles

Static Var Generator（SVG）detects load current through external current transducer（CT）and analyzes reactive component of the load current by DSP controller, then generates PWM signal to IGBT inverter to produce reactive current, compensates the load reactive current to meet the target of line power factor.





SVG Product Model

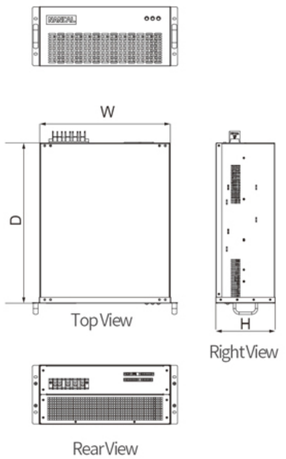
NC – SVG – 4L – 400 – 300 / G

- NC: Enterprise Code
- SVG: Static Var Generator
- 4L: 3L: three-wire; 4L: four-wire
- 400: Rated Voltage: 400VAC / 480VAC / 690VAC
- 300: Rated Capacity: 30~500A(400VAC) / 80~500A(480VAC) / 120~600A(690VAC)
- G: G: Cabinet; H: Wall-mounted; M: Module

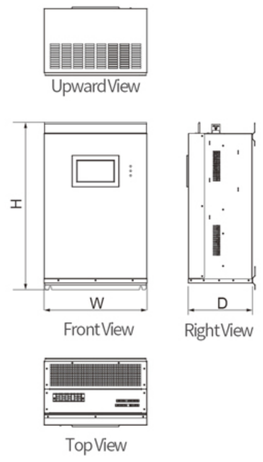
rated capacity	30/50kVar	75kVar	100kVar	75-500kVar	80-500kVar	120-600kVar
rated voltage	400V（239V～458V）				480V（383V～576V）	690V（483V～794V）
controller	DSP based full-digital control					
line frequency	50Hz/60Hz ±5%					
line structure	three-phase three-wire/three-phase four-wire					
topology	three-level NPC					
three-phase unbalance compensation capacity	<3%					
reactive compensation range	-1～1 (adjustable)					
compensation method	target power factor/fixed reactive power/constant voltage					
reactive compensation rate	>99%					
harmonic compensation	yes					
response time	<5ms complete response ;<25us transient response					
automatic current limiting	yes					
switching frequency	20kHz (adjustable)					
cooling method	air cooling, speed adjustable					
noise level	<60dBA					
efficiency	⩾97.5%					
protection function	overvoltage, undervoltage, overcurrent, over-temperature etc.					
HMI	standard 7 inch colorized touch screen or customized					
communication interface	RS485/CAN/internet access					
installation	wall-mounted/cabinet			cabinet		
Color	RAL7032 (optional)					
storage temperature	-40~70℃					
operation temperature	-10~50℃					
humidity	<95% non-condensing					
altitude	<1500m(derating when exceed 1500m)					
enclosure	IP21 or customized					

SVG Outline

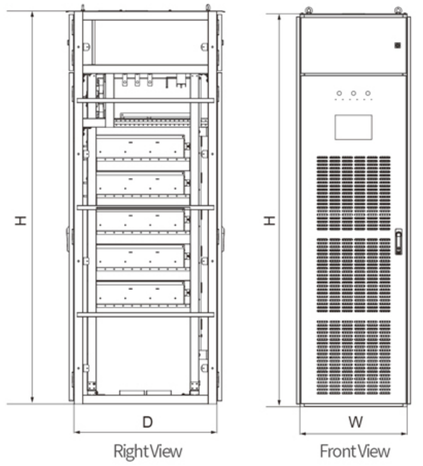
Module



Wall-mounted



Cabinet



Module & Wall-mounted	Module size (W*D*H mm)	Wall-mounted size (W*D*H mm)	Weight (kg)
30kVar/50kVar（400V）	450*545*205	450*265*545	35
75kVar（400V）	450*645*230	450*290*645	45
100kVar（400V）	550*645*290	550*350*645	60

Cabinet	Size (W*D*H mm)	Weight (kg)
75-500kVar（400V）	600*800*2200	200-600
80-500kVar（480V）	800*1000*2200	200-600
120-600kVar（690V）	800*1000*2200	200-600

PF> 0.99

harmonic compensation

three-phase balancing

NC SVGC
Hybrid Var Compensator

NC SVGC (Hybrid Var Compensator) integrate TSC (Thyristor Switched Capacitor) and SVG, modular design, with dynamic compensation functions of reactive power compensation, harmonics compensation, voltage fluctuation, load unbalance. Also SVGC has high cost performance, and without overcompensation or undercompensation.

CE

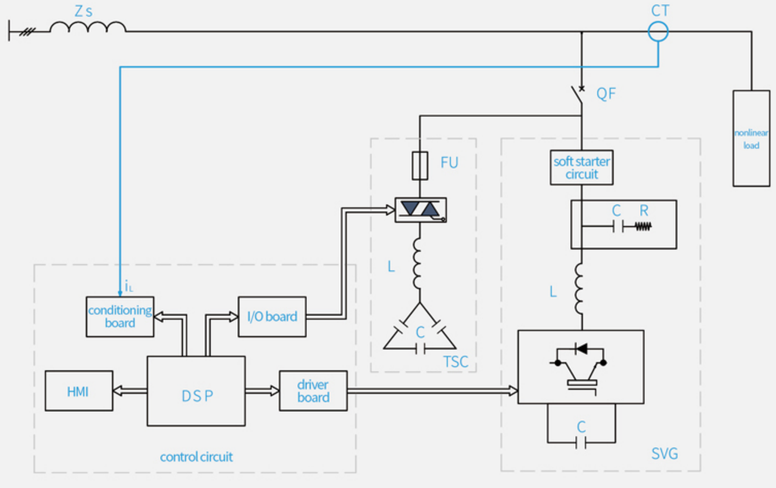
SVGC

Technical Features

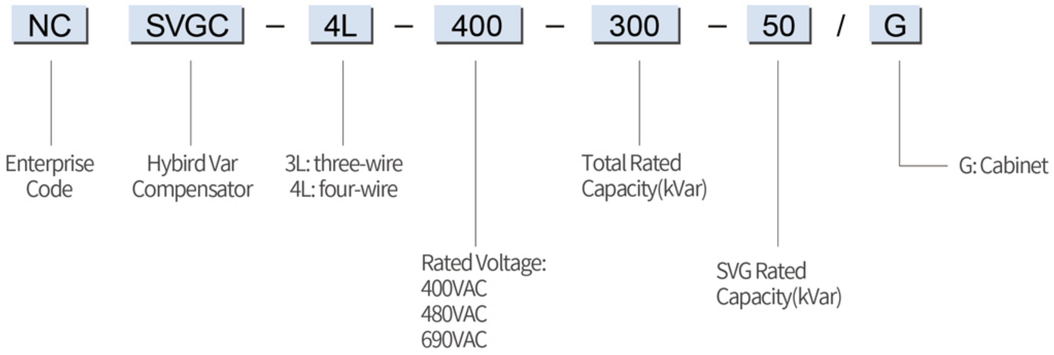
Comparing to traditional SVC from economic, technical and performance perspectives, NC SVGC use passive capacitor modules coarse tuning firstly, then fine tuning by active SVG module. SVGC has high reliability, safety and economic, TSC module can continue working when SVG module fail.

- Rapid stepless compensation
- High precision reactive compensation, PF>0.99
- Reactive compensation range: -1~1（adjustable）
  No overcompensation, undercompensation, resonance, capacity fading
- Current harmonics compensation
- DSP+FPGA, high speed digital control
- Response time<10ms
- Protection: overvoltage, overcurrent, over temperature
- Communication: Ethernet, RS485.etc
- Low loss: hibernation/ awakening
- Low noise: intelligent variable speed cooling fan
- Advanced IGBT chip
- Texas Instrument DSP chip, high speed and reliable performance
- Auto-redundancy
- Auto fault reset
- Modular design, maximum 16 modules in parallel, easy maintenance
- Maximum 10 cabinets in parallel
- Three-phase three-wire/three-phase four-wire compatible

SVG+TSC Principle Diagram



SVGC Product Model



rated capacity	100~600kVar
rated voltage	400V (304V ~ 458V) / 480V (383V ~ 576V) / 690V (552V ~ 794V)
controller	DSP based full-digital control
power grid frequency	50Hz/60Hz±5%
line structure	three-phase three-wire/three-phase four-wire
reactive compensation rate	>99%
response time	<10ms
automatic current limiting	yes
cooling method	air cooling, speed adjustable
noise level	<60dBA
efficiency	⩾98%
protection function	overvoltage, undervoltage, overcurrent, over-temperature etc.
HMI	standard 7 inch colorized touch screen or customized
communication interface	RS485/CAN/ Internet access
installation	cabinet
size (W*D*H mm)	600*800*2200
weight (Kg)	100~600
color	RAL7032(optional)
storage temperature	-40~70℃
operation temperature	-10~50℃
humidity	<95% non-condensing
altitude	<1500m (derating when exceed 1500m)
enclosure	IP21 or customized

three-phase balancing

reactive compensation

voltage support

NC SPC
Smart Power Quality Correct Device

Based on SVG, NC series Smart Power Quality Correct Device (SPC) specialize in improve power quality for distribution network, has the functions of three-phase unbalance compensation, fast regulation of reactive power and system voltage stabilization.

CE

SPC

Working Principles

Reactive Compensation

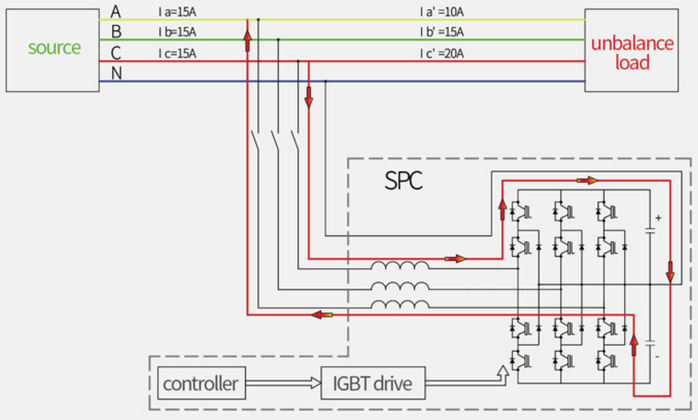
NC SPC detects load current through external current transducer (CT) and analyzes reactive component of the load current by DSP controller, then control IGBT inverter to produce reactive current, compensates the load reactive current to meet the target of line power factor.

Three-phase Balancing

NC SPC detects load current through external current transduce (CT) and analyzes whether the system is balance or not, meantime calculate required SPC current, and send the signal to IGBT, then transfer unbalance current from phase with high current to phase with low current, finally balance three phase current on source side.

Voltage Support

NC SPC samples compensation point voltage, then sends the voltage signal to DSP controller to be compared with the set value. When voltage over the Umax value, NC SPC generate inductive current to decrease voltage; when voltage under the Umin value, NC SPC output capacitive current to increase voltage. At last, NC SPC stabilize the voltage in normal range.



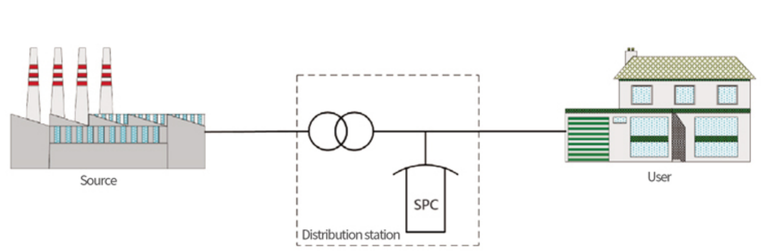
Technical Features

- Three-phase unbalance< 3% (after compensation)
- Voltage regulation
- PF>0.99, efficiency>97.5%
- Advanced IGBT chip
- Texas Instrument DSP chip, high speed and reliable performance
- Modular design, easy installation and maintenance
- Small size, high efficiency
- Enclosure: IP44
- Safety protection mechanism
- Fault self-diagnosis, self-recovery
- Stable and reliable operation
- Friendly human-machine interface
- Remote monitoring and control
- Nancal Cloud

SPC Application

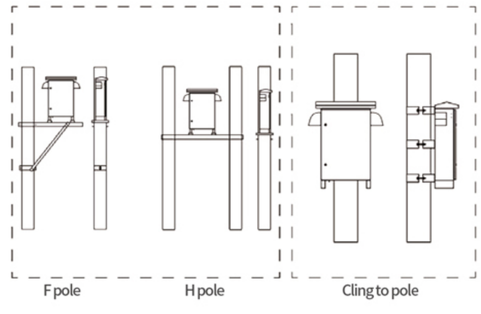
Installation Diagram

In general, SPC is installed in the low voltage side of transformer in distribution station, between transformer and user loads.



Installation Method

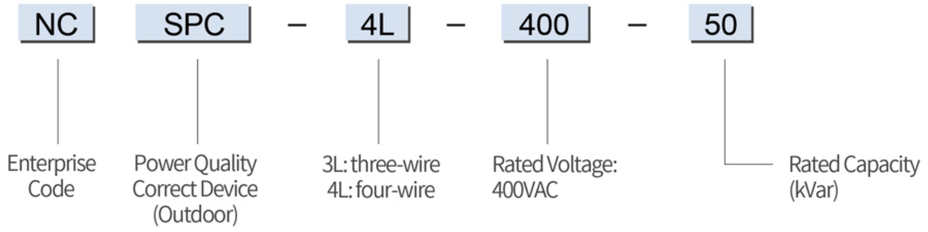
Cling to pole, H pole and F pole



Site Picture

outdoor type

SPC Product Model



rated capacity	30kVar	50kVar	75kVar	100kVar
rated voltage	400V（239V～458V）			
controller	DSP based full-digital control			
line frequency	50Hz/60Hz ±5%			
line structure	three-phase three-wire/three-phase four-wire			
topology	three-level NPC			
three-phase unbalance compensation capacity	< 3%			
reactive compensation range	-1～1 (adjustable)			
reactive compensation rate	>99%			
harmonic compensation	yes			
response time	<5ms complete response ; <25us transient response			
automatic current limiting	yes			
switching frequency	20kHz (adjustable)			
cooling method	air cooling, speed adjustable			
noise level	<60dBA			
efficiency	⩾97.5%			
protection function	overvoltage, undervoltage, overcurrent, over-temperature etc.			
anti-thunder	grade C			
display contents	voltage, current, frequency, power factor, operation temperature etc.			
communication interface	RS485/CAN/ / internet access			
communication protocol	Modbus protocol/ PMBus			
angle of inclination	<5 degree			
installation	Cling to pole，H pole，F pole			
size (W*D*H mm)	600*350*1000		800*500*1100	800*600*1100
weight (Kg)	53	70	90	135
color	Stainless steel (optional)			
storage temperature	-40~70℃			
operation temperature	-10~50℃			
humidity	<95% non-condensing			
altitude	<1500m (derating when exceed 1500m)			
enclosure	IP44			
anti-seismic	level 8			

Applications

- hospital
- school
- bank
- rail transportation
- cable car
- building
- communication
- data center
- power system
- HVAC
- auto industry
- semiconductor manufacturing
- offshore
- shipping
- oil
- metallurgy
- mining
- chemical
- sewage
- water

Certifications

- Certifications
- ISO 9001/ISO 14001/OHSAS 18001
- CE certification
- ETL certification
- Type test reports
- CCS certification


Certificate – Сертификат – 證明書 – Certificat – 증명서 – شهادة

Certificate of Compliance

No. 4Q2200623.3NEQ097

Certificate's Holder: Shanghai Nancal Electric Co., Ltd. Unit 5,1881 Zhengbo Rd., Lin-gang Special Area of the Shanghai Pilot Free Trade Zone, Shanghai 201413, China

Certification ECM Mark:

Product: Active Power Filter

Model(s): (see the following annex)

Verification to: Standard: EN 61010-1:2010, EN IEC 61000-6-2:2019, EN IEC 61000-6-4:2019

related to CE Directive(s): 2014/35/EU (Low Voltage) 2014/30/EU (Electromagnetic Compatibility)

Issuance date: 23 June 2020

Expiry date: 22 June 2025


intertek

AUTHORIZATION TO MARK

Applicant: Shanghai Nancal Electric Co., Ltd.

Address: Unit 5, 1881 Zhengbo Rd, Fengxian District, Shanghai, 201413

Country: China

Contact: Honguan Pan

Phone: 8621-57541550

FAX: –

Email: panhj@nancal.com

Manufacturer: Shanghai Nancal Electric Co., Ltd.

Address: Unit 5, 1881 Zhengbo Rd, Fengxian District, Shanghai, 201413

Country: China

Contact: Honguan Pan

Phone: 8621-57541550

FAX: –

Email: panhj@nancal.com

Party Authorized To Apply Mark: Same as Manufacturer

Report Issuing Office: Intertek Testing Services Shenzhen Ltd. Guangzhou Branch

Control Number: 5015159 Authorized by:

for L. Matthew Snyder, Certification Manager

Standard(s): Adjustable Speed Electrical Power Drive Systems - Part 5-1: Safety Requirements - Electrical, Thermal and Energy [UL 61800-5-1:2012 Ed.1+R:20Jun2018]

Industrial Control Equipment [CSA C22.2#14:2018 Ed.13.]

Product: Active Power Filter Module; Static Var Generator module

Models: NC AH-3L-480-100/M, NC AH-4L-480-100/M, NC SVG-3L-480-85/M, NC SVG-4L-480-85/M