SANHE

POWER TECH



三和电力
SANHE POWER TECH

Address: Floor 1-3 Building 6,2nd Industrial Park,Guanlong Xili,Nanshan District,Shenzhen,PRC
Factory Address: Building 1, Zhonglian Sunshine Science&Technology Park, No.35, Gu'an South Road, Maxiang Town, Xiang'an District, Xiamen City ,China.
Website: //www.sanhenergy.com

三和电力
SANHE POWER TECH

Perfecting the Power, Ranking the Life.



Contents

01 Company Profile

03 HVC(HVCS,HVCA) Series High Voltage Shunt Capacitor device

05 HSVG Series High Voltage Static Var Generator

07 HVPF Series High Voltage
Passive Filter Compensation Device

09 LVAF(LSVG) Series Low Voltage Active Power Filter\Static
Var Generator

11 LVCM Series Low Voltage Module Type
Reactive Power Compensation Device

13 LVCT(A) Series Low Voltage Reactive Power Compensation device

15 LIMC Series Smart Low Voltage Filter And Reactive
Power Compensation

17 SHSVF Series High\low Voltage Soft Starter Device

19 DVR Series Dynamic voltage restorer solution

21 SUAR Series Three-phase Unbalance Load
Automatic Regulator Device

23 SUAR Series Power Quality Controller

25 SZPW Series High Frequency Switching DC Power Supply

27 APFM Series Active Power Filter Module

29 SVGM Series Static Var Generator Module

31 SLC Series power factor controller

33 BAM\SC Series High\Low Voltage Electrical Capacitor

35 CKSC\SR Series High\Low Voltage Reactor

37 SEK Series High Voltage Mono-stable Vacuum Contactor

39 STS Series Dynamic Reactive Power
Compensation Switching Regulator

41 SFM Series Fixed Compensation Module

43 SWCP Series Intelligent Reactive Compensation Monitoring Device

45 SLB Series Lithium Iron Phosphate Battery
(LifeP04 Battery)

Company Profile

In the past over 20 years,Sanhe got over 100 certificates in copyright,patents,standard etc.

National High-tech Enterprise Certificate

AAA Credit Certificate

28 Patents

24 Software Copyright

37 International and China standards

CE, CQC, SGS ,GOST,CNAS Certificates

Shenzhen SRDI Enterprise etc.

Sanhe Power Tech is a member of international committees such as:
the International Electrotechnical Commission (IEC),
the Institute of Electrical and Electronics Engineers (IEEE) etc,
The software development system has passed the CMMI evaluation of the American SEI.

There are three main business covering:
A full range of power quality testing and governance products and complete solutions,
Distributed new energy system products and advanced solutions,
Primary and secondary engineering based on "dual carbon" and energy management with standardized and professional engineering services.

















Power Quality - Power Factor Correction

- Self designed core measurement and control components
- More than 20 years OEM\DEM experience
- National standard product



HVC(HVCS,HVCA) Series
High Voltage Shunt Capacitor device

Introduction

The high voltage shunt capacitor device uses mechanical switching capacitors.It is installed in distribution system bus or electrical equipment side.HVC device can be used for central or local compensation of reactive power consumption and improving node power factor, which is an important solution to save energy, stabilize voltage and improve power quality.

Application

- Power generation
- PTD(power transmission and distribution)
- Power consumer

三和电力
SANHE POWER TECH

www.sanhenergy.com
yvonne.zhang@samwha-cn.com

Competitive Advantage

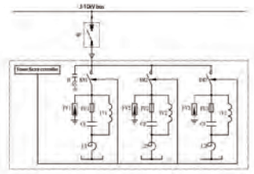
- Reasonable structure design
- Perfect protection function
- Flexible and customizable scheme
- Automatic tracking compensation
- Long design life

Design and Type-selection

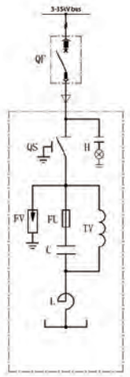
Device class	Device type	Installation places	Voltage level	Installation way	Switching type
Local Compensation	HVC(R)	Electric equipment side	3～10KV	Cabinet	Single set switching
Centralized compensation	HVCS	Power distribution system bus bar	3～110KV	Cabinet or frame type	Single set switching or multi-switching
Auto compensation	HVCA	Distribution system bus bar	3～35KV	Cabinet	Automatic single set or mullti-switching

- The order model showing present reactance rate,rated voltage,rated device capacity and capacitor capacity.
- Considering the rated capacitor voltage is slightly higher than the system voltage,and it may be equipped with series reactors,so please clarify whether the rated capacity is the installed capacity or the actual output capacity.

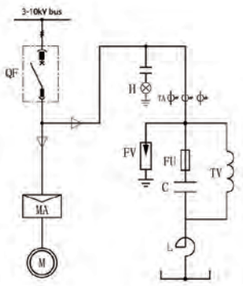
System Primary Single Line Diagram



HVCR Single-phase capacitor type wiring diagram



HVCS Single star wiring diagram



HVCA Typical wiring diagram



Power Quality - Power Factor Correction

Loss＜1%

Filter function

Overstep response time＜20ms

HSVG Series
High Voltage Static Var Generator

Introduction

HSVG series medium voltage static var generator was designed with instantaneous reactive power theory, pulse width modulation(PWM) technology, multi-core parallel processing technology etc, which can compensate capacitive and inductive reactive power with unlimited steps to enhance the stability of power grid, increase transmission capacity,reduce reactive power, filter harmonic current and balance three-phase power grid.

Application

- New energy power generation
- Power supply and distribution
- Power consumer

三和电力
SANHE POWER TECH

www.sanhenergy.com
Yvonne.zhang@samwha-cn.com

Competitive Advantage

- Flexible control method
- Wide range compensation
- Easy maintenance
- Perfect protection
- Low power consumption

Selection Guard

- System parameters, load characteristics, reactive power and harmonic parameters should be provided when ordering
- Determine the adoption of direct or step-down scheme, the main control target and operation mode
- Selection of cooling methods: water cooling, air cooling, air conditioning
- Determine whether to use indoor installation or outdoor container

Selection Example

A chemical plant system with rated voltage 10kV, needs a device which can compensate 5 Mvar reactive power,and filter out 13th or less harmonics,in this case,we adopt cabinet scheme,choose model HSVG-10-5 static var generator device.The cabinet size:4100×1400×2405mm(W×D×H).

Technology Parameter

Power net voltage	3-35kV
Output rated power	1-100Mvar
Power loss	Do not exceed 1% of the rated power of the control object under rated conditions
Control system	Full digital control system
Adjusting way	Three phase balance, phase-split regulation
Auxiliary power supply	380V\220V\110V AC/DC
Cooling way	Air cooling,water cooling, air conditioner

Average power factor	≥0.98
Valve bank structure	Chain H bridge voltage source inverter
Control mode and precision	Voltage control and reactive power control Combined voltage and reactive power control Control PCC point voltage, precision 0.5%
Overstep response time	＜20ms
Voltage flicker improvement rate	≥70%
Reactive power regulation range	-100%~+100%
Noise level	＜50dB



Power Quality - Power Factor Correction

- High order filter branch
- MathCAD simulation design
- 20+years design and operation experience

HVPF Series High Voltage Passive Filter Compensation Device

Introduction

HVPF High voltage passive filter compensation device adopts high performance filter capacitor and filter reactor,it uses software simulation to design a reasonable filter branch.The device is installed in the distribution system bus,it filters corresponding harmonic specifically.At the same time, the power factor of the node is improved.It realizes harmonic control, energy saving, and power quality improvement.

Application

- Electrolysis
- Metallurgy
- Light industry

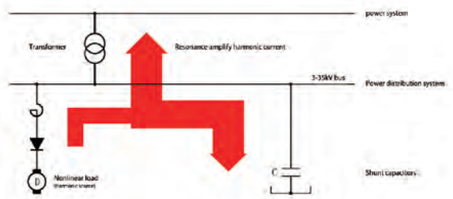
三和电力
SANHE POWER TECH

www.sanhienergy.com
yvonne.zhang@samwha-cn.com

Competitive Advantage

- Flexible structural style
- Safe, stable and reliable
- Effective management and energy saving
- Software simulation design
- High-performance component configuration

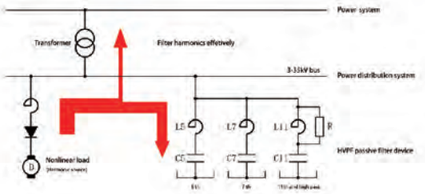
Operating Principle



Harmonic flow diagram after a capacitor and a grid form a parallel resonant circuit

When the system power factor is low, shunt capacitor banks are needed to compensate reactive power,if the inductance of the capacitor bank and the system itself form parallel resonant LC loop at some harmonic frequency,it might amplify the harmonics,so that the harmonic voltage exceeds the allowable value of the application field,which causes grid pollution.

According to the customer local situation, we provide targeted design and production of filter compensation device. The input data of the design process is from the local measurement values, and then the computer processes simulation model, in this way the filtering effect is ideal, most of the harmonic flow to filter, only a few (meeting the standard) harmonic flow to the grid.



Harmonic flow diagram with HVPF passive filter

Technology Parameter

Rated voltage	3～35kV
Rated frequency	50Hz
Mode of connection	Y
Structure style	Indoor cabinet type IP2X, indoor and outdoor frame type configuration security fence
Protection mode	Overvoltage,undervoltage,overcurrent,unbalance,fuse protection
Filter harmonic	3,5,7,11,13th (high-pass filter)



Power Quality - Harmonic Filtering

Loss<2.5%

DSP+FPGA control

Full band, full range filter compensation

LVAF(LSVG)Series Low Voltage Active Power Filter\Static Var Generator

Introduction

LVAF and LSVG are new power electronic devices that filter harmonics and compensate reactive power dynamically.Through real-time detection and extraction of load current harmonic component and fundamental reactive power component, each frequency harmonic current and fundamental reactive current with opposite phase are injected into the power supply system through PWM control, so as to filter harmonics and compensate reactive power and improve power quality dynamically .

Application

- Frequency converter, intermediate frequency furnace and UPS nonlinear load etc
- New energy, data center and other new industries
- Automobile, chemical, metallurgy, etc

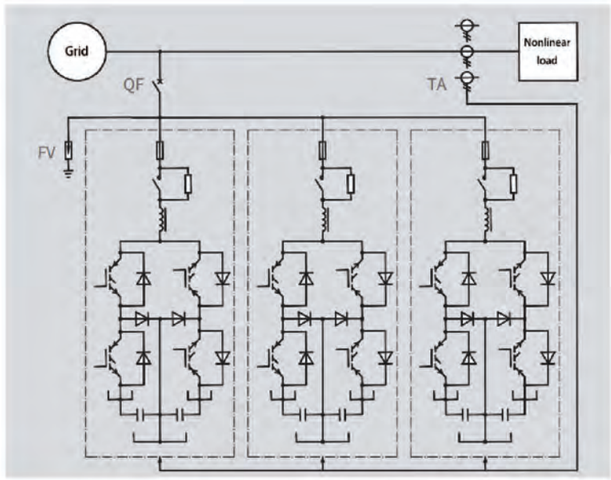
三和电力
SANHE POWER TECH

www.sanhenergy.com
yvonne.zhang@samwha-cn.com

Competitive Advantage

- Modular design
- Quick response
- Easy maintenance
- Comprehensive Power quality management
- Friendly human-machine interface

Typical Topology



LVAF/LSVG typical application topology

Technical Specification

Rated voltage	0.208~1.04kV
Rated frequency	50\60Hz±5%
Control system	DSP+FPGA
Machine efficiency	≥97.5%
Response time	≤5ms
Filtering and compensation range	2~51th-harmonic, -1~+1 full range reactive power compensation
Communication	RS485 interface, standard Modbus protocol
Device structure	Integrated cabinet, modular cabinet type
Type of cooling	Forced air cooling
Protection level	IP20,customizable
Noise level	≤60dB

Power Quality - Power Factor Correction

- Self-produced core measurement and control components
- 20years Design and operation experience
- National standard-setting unit



LVCM Series Low Voltage Module Type Reactive Power Compensation Device

Introduction

LVCM series low voltage module type reactive power compensation device adopts modular design, the device adopts compact fixed module structure, which is suitable for different profiles, different models cabinet ,it can effectively save electric energy, improve the load capacity of the equipment, improve the quality of the power grid, compensate the reactive power of the system, improve the power factor, reduce the reactive power loss of the power grid, and control the harmonic pollution.

Application

- Light\heavy industrial low-voltage power distribution
- Low-voltage distribution for commercial and residential buildings
- Schools, hospitals, water and other public utilities power distribution

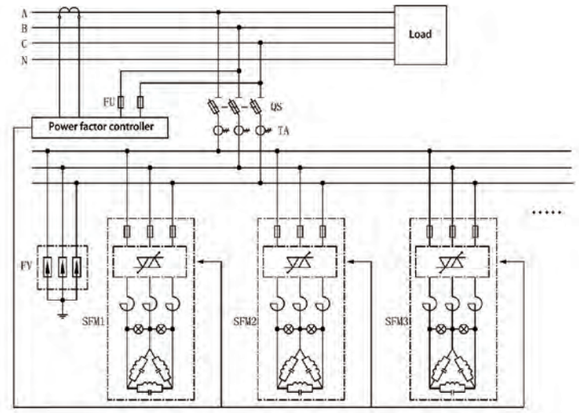
三和电力
SANHE POWER TECH

www.sanhenergy.com
yvonne.zhang@samwha-cn.com

Competitive Advantage

- Self-made core control components
- Modular compensation unit
- Multiple control mode selection
- Neat and simple structure
- Easy maintenance

Electrical Wiring



Electrical primary wiring diagram

Technical Parameters

Rated voltage	0.4kV 、 0.69kV
Single set capacity	50kvar(large capacity can be customized)
Response time	less than 15ms
Mode of connection	Δ
Step mode	Circulation\code
Device structure	Cabinet
Cooling solution	Air cooling
Control physical data	Power factor Reactive power

- The mode showing need device reactance rate,rated voltage,device extra capacity and condenser capacity.
- Considering the rated capacitor voltage is slightly higher than the system voltage,and it may be equipped with series reactors,so please clarify whether the rated capacity is the installed capacity or the actual output capacity.



Power Quality - Power Factor Correction

- Self-made central detective component
- 20+years OEM\ODM experience
- National standard-setting unit

LVCT(A) Series Low Voltage Reactive Power Compensation device

Introduction

LVCT(A)series low voltage reactive power compensation device adopts special switch(contactless dynamic regulator, special AC contactor) multi-step switching capacitors, it is installed in the power distribution system bus,the device compensate reactive power consumption according to system requirements,which helps to improve the system's power factor.It is a widely used as reactive power compensation solution at present.

Application

- Light and heavy industrial low-voltage power distribution
- Low-voltage distribution for commercial and residential buildings
- Schools, hospitals, water and other public utilities power distribution

三和电力
SANHE POWER TECH

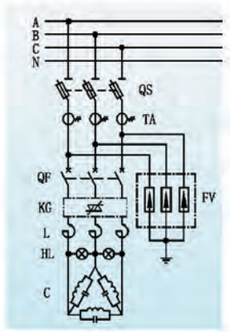
www.sanhenergy.com
yvonne.zhang@samwha-cn.com

Competitive Advantage

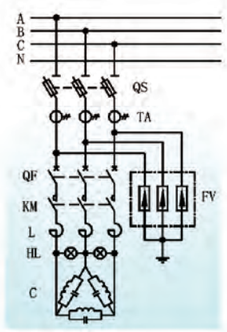
- Self-made core control components
- Self-made non-contact switching regulator
- Multi-control mode selection
- 20 years design operating experience
- Intelligent switching ways

Technology Description

Device type	Model	Switching type	Control way	Method of connecting wire	Switching way
Non-contact	LVCT	Dynamic reactive power compensation regulator	Cycle/code	△(three-phase compensation) Y(phase-split compensation)	Manual/auto multi-step switching
Contact	LVCA	AC contactor for capacitors		△(three-phase compensation)	



LVCT



LVCA

Product Formal Size

Model No.	Cabinet size (W×D×H mm)	Maximum capacity(kvar)		Maximum steps	
		No reactor	7% reactor	No reactor	7% reactor
LVCT	800X800X2200	300	200	6	4
	1000X800X2200	450	300	9	6
	1000X1000X2200	600	400	12	8
LVCA	800X800X2200	300	200	6	4
	1000X800X2200	600	400	12	8
	1000X1000X2200	750	500	15	10

- The order model showing present device reactance rate,rated voltage,device extra capacity and condenser capacity.
- Considering the rated capacitor voltage is slightly higher than the system voltage,and it may be equipped with series reactors,so please clarify whether the rated capacity is the installed capacity or the actual output capacity .



Power Quality - Power Factor Correction

- Higher cost performance
- Comprehensive power quality management
- Active and passive hybrid control

LIMC series Smart Low Voltage Filter And Reactive Power Compensation

Introduction

LIMC series smart low voltage filter and reactive power compensation device organically combines passive capacitor switching, active SVGM and APFM module , the device uses intelligent hybrid control to achieve the comprehensive power quality optimization of reactive power compensation, harmonic control,adjustment of three-phase unbalance,and also has passive low cost,active fast response and stepless compensation advantages.

Application

- Power generation
- Power supply and distribution
- Power consumer

三和电力
SANHE POWER TECH

www.sanhenergy.com
yvonne.zhang@samwha-cn.com

Competitive Advantage

- Low investment
- Easy maintenance
- Good compensation effect
- Multi group
- Intelligent control

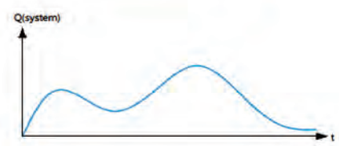
Typical Application

Application	Characteristics	Analysis
Commercial centers, automobile manufacturing,ports, etc	Changeable load change and unbalance three-phase voltage	1. Compensating system reactive power quickly; 2. Resolving unbalance reactive power quickly;
Data centers, large performance venues, hospitals, nonferrous metals,metallurgy, government schools, etc	Big harmonic content, poor anti-harmonic ability, the traditional passive filtering compensation is ineffective,sensitive power quality	1. Reactive power required by quick compensation system; 2. Filtering real-time dynamic harmonic current from non-linear loads quickly;
Other industries	The traditional passive filter compensation device widely used	1. Solving the blind area of traditional reactive power compensation; 2. Filtering out the low harmonic current; 3. Reducing active filter use cost; 4. Solving the defect of poor compensation effect of passive filtering.

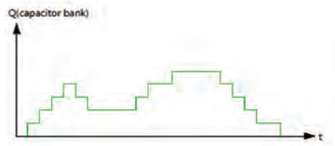
Contrast With Traditional Dynamic Compensation

Functional performance	Traditional dynamic compensation	Intelligent filter compensation
Control mode	Separate controller, multi-switching	Intelligent control, stepless regulation
Reactive power output	Multi-output, with a compensation blind area	Linear adjustment, no blind area
Compensation effect	Around 0.95	Close to 1
Filter capacity	Characteristic harmonic filtering is not effective	Characteristic harmonic filtering and total filtering in a certain range with good results
Response time	Less than 20ms	Less than 5ms
Three-phase balance effect	The special design may satisfy,but with blind area	Phase-split regulation,significantly effective

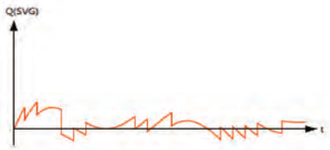
Oscillogram Explain



System reactive power curve



Capacitor compensation reactive power curve



Static var generator compensation curve

Fewer Quality-Voltage Control

- 30%-70%Un adjustable
- 0-60S times adjustable
- More than 4 start-up ways
- More than 5 protected function



High\low Voltage Soft Starter

Introduction

The high\low voltage soft stater device mainly adopt the thyristor phase-shifting control principle, which helps to reduce the starting current of the motor and the system voltage drop when the motor starts and extend the service life of the motor as well.

Application

- Air blower
- Water pump
- Other motor

三和电力
SANHE POWER TECH

www.sanhenergy.com
yvonne.zhang@samwha-cn.com

Competitive Advantage

Current limiting ramp voltage ramp constant current start jump start

30%-70% Un The initial voltage can be set

+

0-605 Starting time can be set

Overcurrent protection undervoltage,overvoltage, voltage imbalance, overtemperature protection

Design Selection

System voltage	Motor rated power	Cabinet size
0.38kV	≤315kW	600×600×1800mm(W*D*H)
	≤630kW	800×800×2000mm(W*D*H)
6kV	≤2100kW	1000×1500×2300mm(W*D*H)
	≥2400kW	Can be customized
10kV	≤3500kW	1000×1500×2300mm(W*D*H)
	≥4000kW	Can be customized

Technology Specification

System voltage<1kV,technology parameter of soft start		System voltage>1kV,technology parameter of soft start	
System voltage:	Un ±10%	System voltage:	Un±10%
Rated frequency	50Hz or 60Hz	Rated frequency	50Hz or 60Hz
Load type	Asynchronous motor	Load type	Asynchronous motor or rsynchronous motor (additional excitation device)
Cabinet material:	Aluminumzinc or cold - rolled steel sheets	Cabinet material:	Aluminumzinc or cold - rolled steel sheets
By-pass switch:	Contactor	By-pass switch:	Contactor or breaker
Cooling ways:	Self-cooling or forced-air cooling	Cooling ways:	Self-cooling or forced-air cooling
Excutive standard:	IEC60947	Excutive standard:	IEC62271-200

Special requirement can be customized!



Power Quality-Voltage Control

- Fast response time
- Accurate compensation
- Wide compensation
- Hot backup state running

Dynamic voltage restorer solution

Introduction

Sanhe Power dynamic voltage recovery solution is committed to solving the voltage drop, swell, short-term interruption problems, DVR provides bus side or single load flexible access mode to ensure the load terminal voltage stability and continuous production work, avoid equipment outage or damage, and major economic losses. DVR has fast response, high reliability, maintenance-free operation characteristics etc.

Application

- Lightning, heavy rain, typhoon area
- Large load system
- System power switching or reclosing
- Power distribution area

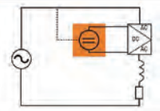
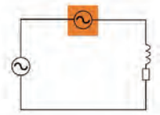
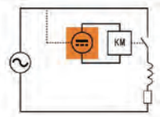
三和电力
SANHE POWER TECH

www.sanhenergy.com
yvonne-zhang@samwha-cn.com

Competitive Advantage

- High performance power device
- DSP+FPGA Frame-work
- Adaptive symmetric component voltage detection
- Overcapacity management system
- Natural air cooling, no air conditioning

Application Scenarios

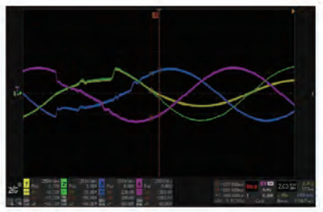
Type	diagram	Voltage range	Load type
DC shunt compensation		0.2 - 1.8p.u.	With DC bus link
AC series compensation		0.6 -1.4p.u.	Heavy load fluctuation equipment
AC shunt compensation		0–0.8p.u. and 1.2–1.8p.u.	Sensitive load
Second compensation		0–0. 8p.u.	AC contactor

Application Industry

Semiconductor industry, petrochemical industry, iron and steel manufacturing industry, military manufacturing industry, real estate industry and industrial and commercial industry, hospital and pharmaceutical industry, automobile manufacturing industry, chemical fiber printing and etc industry.

Technology Specification

Type	Response time	Compensation time
DC shunt compensation	<200us	1-3s
AC series compensation	<2ms	20% long running
AC shunt compensation	<1ms	1-3s



Power Quality-Three Phase Unbalance Regulator

- Multiple structure forms
- Comprehensive power quality management
- Fully controlled power electronic equipment



SUAR Series Three-phase Unbalance Load Automatic Regulator Device

Introduction

SUAR series Three-phase unbalance load automatic regulator device uses active power electronics technology to adjust the three-phase load imbalance at the end of the distribution network through linear output, the device solve the problems such as undervoltage and three-phase reactive power imbalance caused by it,at the same time, reactive power compensation and harmonic control functions can be selected according to the needs,which helps to achieve comprehensive control and optimization of power quality.

Application

- Power supply and distribution platform area and cable distribution box
- Construction industry low voltage bus and distribution box
- Battery, automobile and other industrial users

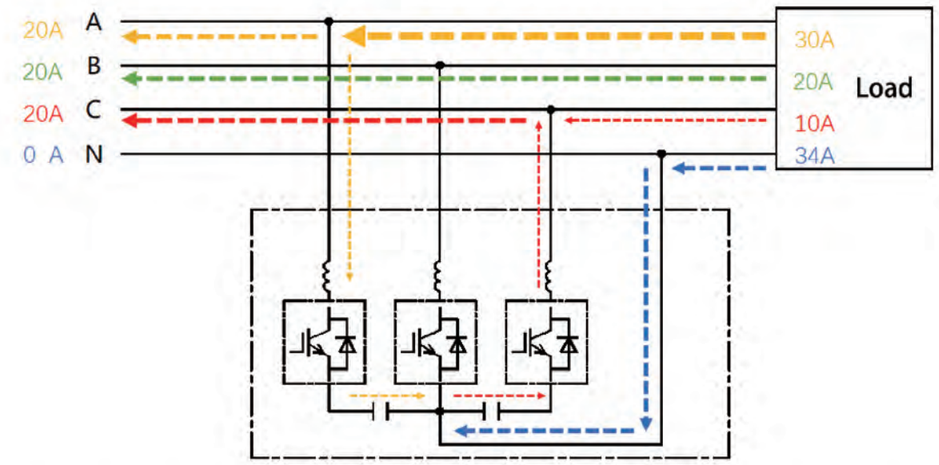
三和电力
SANHE POWER TECH

www.sanhenergy.com
yvonne.zhang@samwha-cn.com

Competitive Advantage

- Flexible control mode
- Multi-installation
- Wireless distant connection
- Wireless control
- Prefect protection

Working Topology Diagram



SUAR monitors the load side current in real time through the current transformer, and calculates the compensation current required by each phase to reach the balance state through the internal DSP processing and analysis, and then drives the IGBT output to achieve the three-phase current balance.

Technology Specification

Nominal voltage	0.22kV-0.69kV	Rated capacity	50kvar	75kvar	100kvar
Input voltage range	80%~120%	Reactive power compensation output	Capacitive output or perceptual output		
Power system frequency	50\60Hz	Compensating current	75A	100A	150A
Efficiency	＞97.5%	Response time	＜5ms		
Wiring Method	Three-phase four-wire	Protection function	Output overcurrent, grid overvoltage, system overtemperature, phase sequence derangement, resonance protection,synchronization failure, frequency deviation, short circuit protection, etc		
Circuit topology	Three-level	Size	850×335×850mm	850×345×1000mm	880×365×1086mm
Three-phase balance compensation capability	unbalancedness＜5%	Weight	60kg	70kg	120kg

System Integration

- Filtering harmonic
- Reactive power compensation
- Three-phase unbalance regulation
- Voltage adjustment



SUAR Series Power Quality controller

Introduction

Sanhe Power SUAR series three-phase unbalance load automatic regulator are specialized in dealing with power quality problems presented by distributed generation of new power systems. The device integrates harmonic filtering, reactive power compensation, three-phase unbalanced regulation and voltage adjustment into one, in this way,the device realizes closed-loop control, improve the acceptance capacity of the system,so as to improve the comprehensive utilization efficiency of the system and ensure the safe, stable and efficient operation of the system.

Application

- Photovoltaic power generation
- Photovoltaic power
- Other New energy industries

三和电力
SANHE POWER TECH

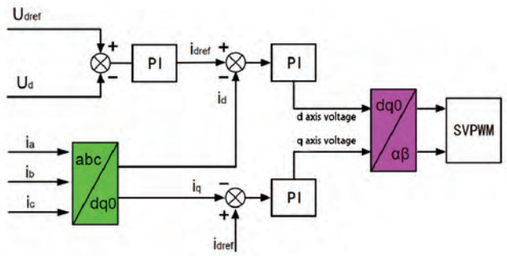
www.sanhenergy.com
yvonne.zhang@samwha-cn.com

Competitive Advantage

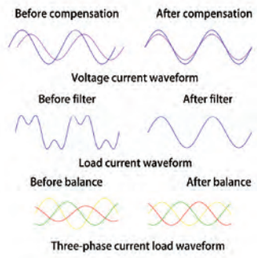
- Strong Comprehensive compensation capacity
- DSP+FPGA frame
- Modular design
- High antijamming capability

Technology Description

Improved IP-IQ detection method



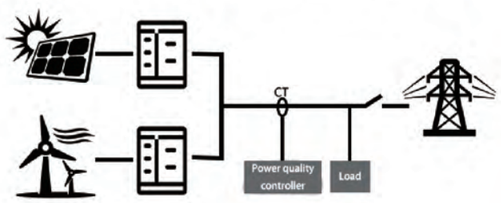
Multi-functional machine,multi-mode group,dynamic regulation



Fusion of subjects



Constant reactive power,constant power factor, constant voltage,round-the-clock running mode



Technology Specification

Rated voltage	208V-800V	Communication port	RS485
Rated frequency	50Hz/60Hz±5%	Communication protocol	Modbus protocol
Rated capability	35kvar/75kvar/100kvar	Protection level	IP20
Electrical wiring	Three-phase three-wire\four-wire	Noise	≤60dB
Efficiency	≥97.5%	Output current limit	Limiting current in rated capacity automatically
Harmonic compensation times	2-13 times	Protection function	AC\DC bus voltage,current and temperature
Targeted power factor	≥0.99	Installation method	Rack-mounted or wall-mounted
Phase-split compensation capability	30%-100%	Environment temperature	-20-50℃
Controller	DSP+FPGA	Humidity	Maximum 95%,no condensation
Full response time	≤5ms	Installation height	≤2000m,lower capacity in high altitude

Special requirement can be customized!



Power Quality-Voltage Control

- Efficiency≥93%
- Output voltage±15%
- Stabilized voltage precision≤±0.5%
- Stabilized current precision≤±0.5%

High Frequency Switching DC Power Supply

Introduction

SZPW8 series high-frequency switch DC power supply mainly provides power for power load, control load and DC accident lighting load, which is the basis of power system control and protection.It is suitable for breaker opening and closing, instruments, meter, relay protection, DC motor start-up, fault lighting and other power demand.

Application

- Power station
- Transformer substation
- Power consumer

三和电力
SANHE POWER TECH

www.sanhenergy.com
yvonne.zhang@samwha-cn.com

Competitive Advantage



Color screen 7-inches interface



Voltage-reducing silicon chain
5/7groups votage regulation



Integrated monitoring unit
Current, voltage and temperature collection



Insulation monitoring unit,
30 outputs Insulation monitoring



Battery checking unit,
24 batteries check

Technology Description/Design Selection

Device	Output voltage	Capacity range	Feeding-out loop	Cabinet size(W*D*H)
SZPW8-F wall-mounted DC power supply	Double lines AC220V or single line AC220V	38Ah\DC220V or below 65Ah\DC110V	Control power bus 2lines\ Closing power bus 2 lines	Customized size
SZPW8-U Integrated DC power supply	Double lines AC380V or double line AC220V	40Ah\DC220V or below 65Ah\DC110V	Control power bus 4lines\ Closing power bus 4 lines	Single cabinet 800*600*2260mm consists of 1 cabinet
SZPW8-C Combined DC power supply	Double lines AC380V or double lines AC220V	100Ah\DC220V or below 200Ah\DC110V	Control power bus 5lines\ Closing power bus 4 lines	Single cabinet 800*600*2260mm consists of 2 cabinets
SZPW8-L large capacity DC power supply	Double lines AC380V or double lines AC220V	120Ah\DC220V or below 200Ah\DC110V	Control power bus >5lines+ Closing power bus >4 lines	Single cabinet 800*600*2260mm consists of more than 2 cabinets

Basic function:Intelligent battery management, AC/DC parameter detection,system fault audible and visual alarm, real-time detection of bus insulation resistance, automatic voltage control bus.
Optional function:Battery inspection, branch insulation detection, feeding-out switch status detection,DC/AC inverter output, DC/DC step-down output, and AC power distribution output.

Technology Specification

Input voltage:	220\380V±15%	Output voltage:	DC110V,DC220V
Rated frequency:	50Hz\60Hz	Altitude:	<2500m
Cabinet material:	Cold roll steel sheets	Evironment temperature:	-10℃～+45℃
Output current:	5A～640A	Battery capacity:	7～2000Ah
Rated current regulation range:	0～100%	Noise:	<55dB(Environment noise<40dB)
Floating charge voltage range:	DC98V～DC130V,DC198V-DC260V		
Even charge voltage	DC98V～DC140V,DC198V-DC280V		
Excutive standard	GB\T 19826,DL\T 459		



Power Quality - Harmonic Filtering

- Three-level topology technology
- Filter rate 98%
- Full response time 5ms

APFM Series
Active Power Filter Module

Introduction

The APFM series active power filter module of Sanhe Power detects the load current through the current transformer and calculates by the internal adaptive control algorithm to extract the harmonic components of the load current, and then sends PWM signal to the internal IGBT to control the converter to generate an opposite direction harmonic current equal to the load harmonic current into the power grid,which helps to achieve the purpose of filtering.

Application

- Power consumers
- New energy generation
- Power distribution network

三和电力
SANHE POWER TECH

www.sanhenergy.com
yvonne.zhang@samwha-cn.com

Competitive Advantage

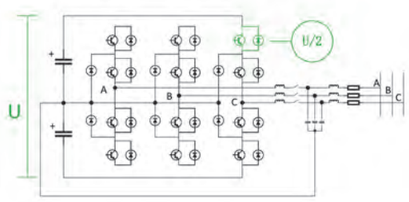
Independent air duct design, intelligent air cooling, fast heat dissipation

DSP+FPGA framework, adopt vector screening technique

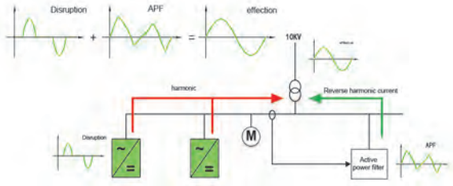
Manage reactive power compensation and three - phase unbalance

Technology Description

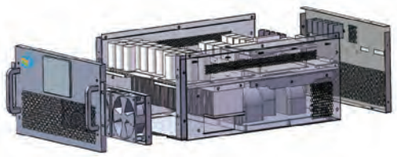
Three-level topology technology, precise control, safety and stability



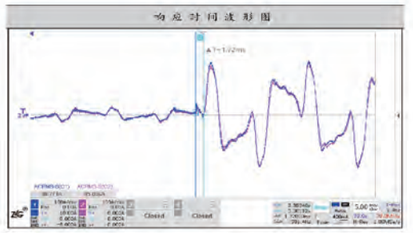
Adaptive algorithm, filtering efficiency >98%



Modular design, more flexible installation



Full response time ≤5ms



Technology Specification

Rated voltage	208V-800V
Rated frequency	50Hz\60Hz±5%
Rated current	50A/100A/150A
Electrical wiring	3-phase 3-wire\3-phase 4-wire system
Efficiency	≥97.5%
Filter capacity	THDi<2%
Filter times	2-51th
Controller	DSP+FPGA
Full response time	≤5ms

Communication port	RS485
Communication protocol	Modbus protocol
Protection level	IP20
Noise	≤60dB
Protection function	AC/DC bus voltage current and temperature
Parallel capacity	Multi-capacity machine, strong expansibility
Environment temperature	-20-50℃
Relative humidity	Maximum 95%, no condensation
Installation elevation	≤2000m, lower capacity at higher altitude

Special requirements can be customized!



Power Quality - Power Factor Correction

±100% full compensation

Full response time≤5ms

Power factor up to 1

SVGM Series
Static Var Generator Module

Introduction

Sanhe power SVGM series static var generator module is mainly used for reactive power compensation,three-phase unbalance compensation ,improving power factor and optimizing power quality. The product has two-direction smooth reactive power output, which solves the step compensation shortcoming of the traditional reactive power compensation device.

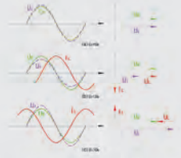
Application

- Power consumer
- New power generation
- Power distribution network

三和电力
SANHE POWER TECH

www.sanhenergy.com
yvonne.zhang@samwha-cn.com

Comepetitive Advantage



Continuous and accurate reactive power compensation



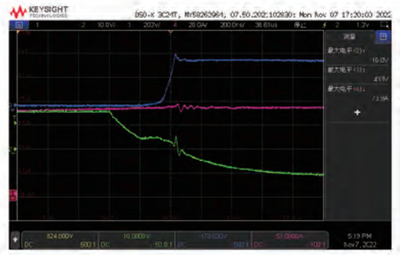
DSP+FPGA architecture, using vector screening technology



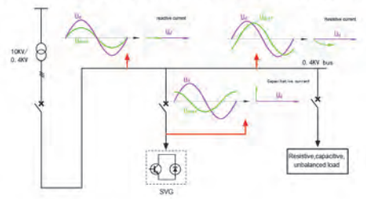
Integrated machine, centralized panel monitoring

Technology Description

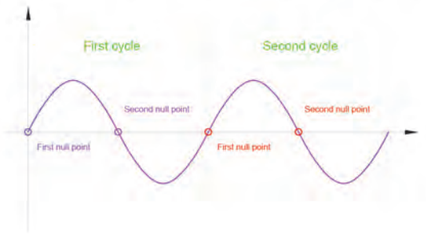
Advanced drive,Absorption design,Low cut-off peak



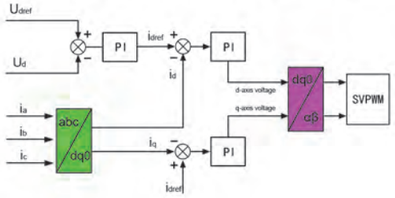
Fast recognition, calculate system reactive power, no undercompensation and overcompensation



Constant reactive power control mode, smooth output



Advanced control algorithm and high software reliability



Technology Specification

Rated voltage	208V-800V
Rated frequency	50Hz/60Hz±5%
Rated capacity	35kvar/75kvar/100kvar
Electrical wiring	three-phase three-wire/four-wire
efficiency	≥97.5%
Target power factor	-1.0 to +1.0
Installtion	Rack or wall mounted
Controller	DSP+FPGA
Full response time	≤5ms

Communication port	RS485
Communication protocol	Modbus protocol
Protection level	IP20
Noise	≤60dB
Output current limitation	Automatically limit to rated capacity
Protection function	AC/DC bus voltage current and temperature
Environment temperature	-20-50℃
Relative humidity	Maximum 95%,no condensation
Installation height	≤2000m,lower capacity at higher altitude

Special requirements can be customized!

Power Quality - Power Factor Correction

- Measurement accuracy 0.2level
- 4.3 inch color touch screen
- Supports any grouping mode
- Harmonic voltage and current spectrum and protection



SLC series power factor controller

Introduction

Sanhe power SLC series power factor controller is a control device suitable for high and low voltage reactive power compensation systems. SLC adopts a 4.3-inch color touch screen and Chinese\English\French language display, it integrates with power measurement, harmonic analysis, alarm control, event recording and communication. SLC controls shunt capacitor bank to switch automatically and reasonably, so that the system power factor is within the setting range.

Application

- High voltage automatic compensation device
- Low voltage automatic compensation device
- Power distribution area of JP cabinet

三和电力
SANHE POWER TECH

www.sanhenergy.com
yvonne.zhang@samwha-cn.com

Competitive Advantage

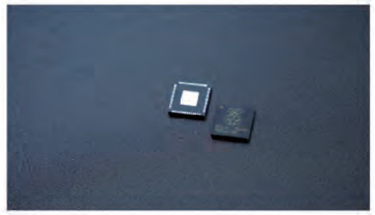
4.3inch color touch screen
rich human-machine interaction

32-bit ARM processor
fast computing speed

Advanced algorithm
and control logic

Technology Description

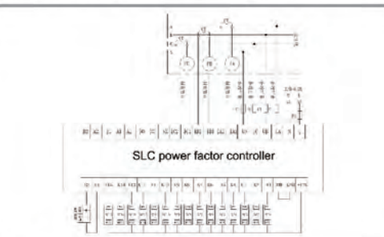
0.2 level professional power core sampling,
high measurement accuracy



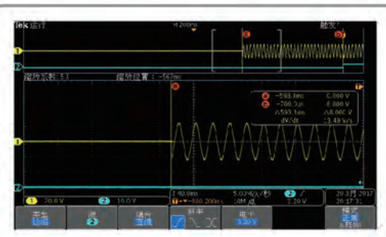
Powerful recording function,
Clock-based alarm information to be recorded



Advanced algorithm control logic to achieve
three-phase compensation and hybrid compensation



Millisecond dynamic response time



Technology Specification

Power supply	100~260V AC/DC
AC voltage sampling	Line voltage: 100/380VAC
AC current sampling	5A/1A
Maximum number of output channels	Three-phase compensation:12 channels/Phase-split compensation:15 channels
Output passive contact capacity	250VAC,5A
Dynamic output capacity	12VDC,50mA
Communication port	RS485
Communication protocol	Modbus protocol
Overall power consumption	≤15VA
Environment temperature	-20℃~50℃



Power Quality - Power Factor Correction

Overcurrent capacity
1.37In

Overvoltage capability
1.1Un

Design life>25years

High\Low Voltage Electrical Capacitor

Introduction

Shunt capacitors are mainly used to compensate reactive power, increase power factor and improve power quality. The internal structure of capacitor is made of high quality polypropylene film or metallized film medium,the capacitors has built-in discharge and protection devices.

Application

- Power generation
- Power transmission and distribution
- Power consumer

三和电力
SANHE POWER TECH

www.sanhenergy.com
yvonne.zhang@samwha-cn.com

Competitive Advantage



Overvoltage capability
1.1Un

Overcurrent capability
1.37In

Temperature range
-40℃-+55℃

Design life>25years

Design Selection

System voltage	System harmonics	Resistance	Rated line voltage	Electrical wiring	Single Capacitor capability
0.38kV	No harmonic	-	0.45kV	Three-phase compensation △ wiring	Cylinder≤40kvar square≤50kvar
	5 times or more	7%	0.48kV		
	3 times or more	14%	0.525kV		
	5 times or more	7%	0.28kV	Phase-split compensation Y wiring	Single-phase≤20kvar Three-phase≤30kvar
	3 times or more	14%	0.3kV		
0.66kV	5 times or more	7%	0.815kV	Three-phase compensation △ wiring	Cylinder≤30kvar square≤50kvar
	3 times or more	14%	0.88kV		
6kV	No harmonic	1%	6.3kV	Three-phase compensation Y wiring	25kvar-500kvar
	5 times or more	6%	6.6kV		
	3 times or more	12%	7.2kV		
10kV	No harmonic	1%	10.5kV		
	5 times or more	6%	11kV		
	3 times or more	12%	12kV		

Special requirement can be customized!

Technology Specification

System voltage≤1000V, technology parameter of capacitor	
Rated capacity:	5kvar-50kvar
Rated frequency:	50Hz or 60Hz
Average medium loss power:	≤1W/kvar
Work temperature:	-40/D(+55℃)
Capacitor structure:	One-phase or three-phase
Shell material:	One-phase or three-phase
Executive standard:	IEC 60831

System voltage≤1000V, technology parameter of capacitor	
Rated capacity:	25kvar-500kvar
Rated frequency:	50Hz or 60Hz
Average medium loss power:	≤0.2W/kvar
Work temperature:	-40/D(+55℃)
Capacitor structure:	One-phase or three-phase
Shell material:	One-phase or three-phase
Executive standard:	IEC 60871-1:2014

Special requirement can be customized!



Power Quality - Power Factor Correction

- Maximum temperature≤70K
- At least F level temperature classification
- 120℃ Over temperature contact output
- 1.8In degree of linearity

High\Low Voltage Reactor

Introduction

Reactor can be used to compensate capacitive reactive power, limit short circuit current, reduce voltage to start motor. High\low voltage reactor cooperates with capacitor to inhibit or filter harmonic, limit capacitor closing inrush current etc.

Application

- Power generation
- Power transmission and distribution
- Power consumer

三和电力
SANHE POWER TECH

www.sanhenergy.com
yvonne.zhang@samwha-cn.com

Competitive Advantage

- ≤70K Maximum temperature
- At least F level temperature classification
- 120℃ over temperature contact output
- 1.35In continuous running
- 1.8In degree of linearity

Design selection

System Voltage	System harmonics	Resistance	Rated voltage	Structure form	Electrical wiring
0.22kV-1.14kV	5 times or more	7%	Be consistent with the rated voltage of the capacitor	Single-phase iron core \three-phase iron core	△type or Y type
	3 times or more	14%			
3kV-35kV	No harmonic	1%		Single-phase empty core \three-phase iron core	Y type
	5 times or more	6%			
	3 times or more	12%			

Technology Specification

System voltage≤1000V，reactor technology parameter	
Rated capacity:	0.5kvar～100kvar
Rated frequency:	50Hz or 60Hz
Overheat protection:	Overheat disconnect(normally closed contact)
Temperature classification:	F level or H level
Noise level:	<50dB(1 meter distance)
Winding material:	Aluminum or copper
Executive standard:	IEC60076-6:2007

System voltage≤1000V，reactor technology parameter	
Rated capacity:	1kvar～3150kvar
Rated frequency:	50Hz or 60Hz
Overheat protection:	The setting value is adjustable(optional)
Temperature classification:	F level or H level
Noise level:	<65dB(1 meter distance)
Winding material:	Aluminum or copper
Executive standard:	IEC60076-6:2007

Special requirements can be customized!



Power Quality - Power Factor Correction

- Monostable permanent magnet operating mechanism
- Closing time≤30ms
- Closing circuit resistance≤80μΩ
- Control loop energy saving 99%

SEK High Voltage Mono-stable Vacuum Contactor

Introduction

As a new generation of high-voltage vacuum contactor , Sanhe SEK series adopts a wide voltage electronic module to control the monostable permanent magnet mechanism to move straight up and down.Such, it can switch on and off normal working current frequently, which is suitable for the control and protection of motor, transformer, reactive power compensator and other equipment.

Application

- Motor control
- Power electronic bypass
- Capacitor switching

三和电力
SANHE POWER TECH

www.sanhenergy.com
yvonne.zhang@samwha-cn.com

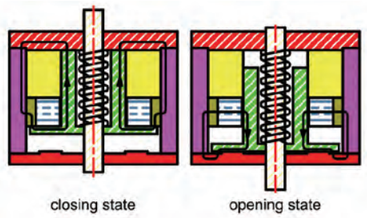
Competitive Advantage

- Permanent magnet latched mode
- Noiseless operation
- No heat source
- Long life
- Strong anti-interference capability

Technology Description

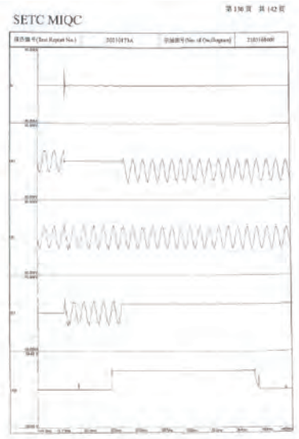


Closing time≤30ms,corresponding period≤2ms

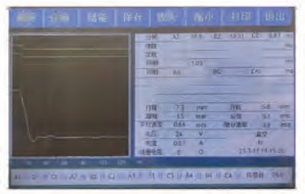


closing state opening state

Non-critical state,stable and reliable
Closing latch not requiring coil continuous power, saving energy



Support back-to-back switch capacitor



Opening time≤20ms,overshoot0.2mm

Technology Specification

Electrical parameter	
Rated voltage	12kV
Rated current	630A
Rated frequency	50/60Hz
Power frequency withstand voltage(1min)	42kV
lightning impulse withstand voltage	75kV
Rated short-time withstand current	6.3kA/4s
Rated peak withstand current	16kA
Rated making current	6.3 kA
Rated breaking current	5.04 kA
Contactor mechanical life	30×10^4 times
Contactor electrical life	AC-3:25×10^4 times
	AC-4:10×10^4 times
Standard:	IEC 62271-106:2011, IEC60282-1:2020 etc.

Characteristic parameter	
Clearance between open contacts	6.0±1.0mm
Over travel	1.0±0.5mm
Closing time	≤30ms
Opening time	≤20ms
Closing Synchronization	≤2.0ms
Max bouncing duration	≤5.0ms
Main loop resistance (20℃)	≤80μΩ

Control loop parameter	
Rated operational voltage	AC/DC110V/220V
Number of auxiliary contacts	4 open and 4 close



Power Quality - Power Factor Correction

- Response times≤15ms
- Smallest size in similar products
- Complete protection and high reliability
- Strong compatibility of control signals

STS Series Dynamic Reactive Power Compensation Switching Regulator

Introduction

STS series dynamic reactive power compensation switching regulator is a kind of electronic power device which can switch shunt capacitor quickly. The main circuit adopts anti-parallel thyristor module, which has the advantages of no spark, no inrush current, no impact and long service life.

Application

- Three-phase compensation
- Phase-split compensation
- Fast load change occasion

三和电力
SANHE POWER TECH

Competitive Advantage

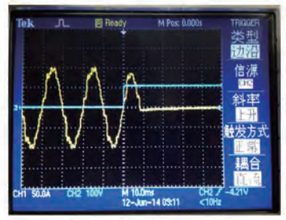
High temperature resistance

Warning function of fan blocked rotation and fan disconnection line

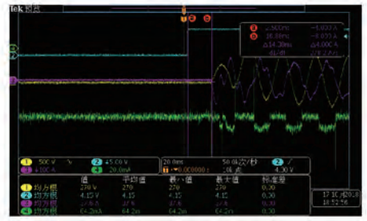
Multiple capacity modules to meet large capacity requirements

Technology Description

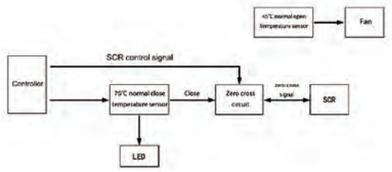
Zero-crossing chip switching, no inrush current.



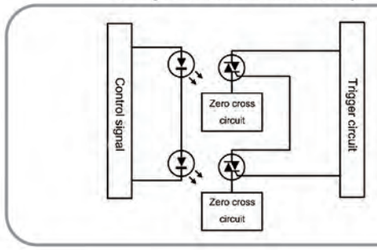
Fast switching, extremely short switching time ≤15ms



Temperature control technology is adopted to ensure the normal operation of solid state switch



Photoelectric isolation, strong anti-interference ability



Technology Specification

Rated voltage	400V,690V±15%
Rated frequency	50\60Hz±5%
Control mode	Phase-split compensation/Three-phase compensation
Control capacity	Three-phase compensation:5-80kvar,Phase-split compensation:5-68 kvar
Control terminal voltage	DC12V
Control terminal current	Three-phase compensation:≤5mA,Phase-split compensation:≤15mA
Reactive response time	≤15ms
Surge disturbance	Input loop:±12kV,Control loop:±1kV

Power Quality - Power Factor Correction

- Independent compensation branch
- Compact structure
- Convenient operation and maintenance



SFM Series Fixed Compensation

Introduction

Sanhe power SFM series fixed compensation module is consists of protection device, switch, series reactor and shunt capacitor components,which constitutes an independent branch, all parts selection are optimized by calculation, design, production and experiment. It is suitable for all low voltage mainstream fixed cabinet structure.The device is able to effectively compensate reactive power and improve power quality.

Application

- Reactive power compensation for low-voltage commercial users
- Reactive power compensation for low-voltage industrial users

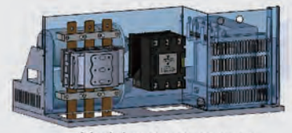
三和电力
SANHE POWER TECH

www.sanhenergy.com
yvonne.zhang@samwha-cn.com

Competitive Advantage



Small volume, simple interface



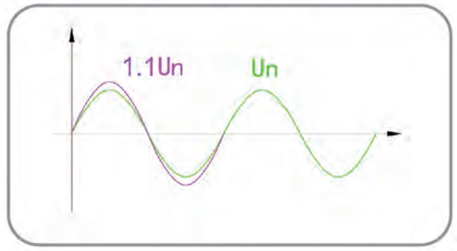
Modular structure,easy installation and maintenance



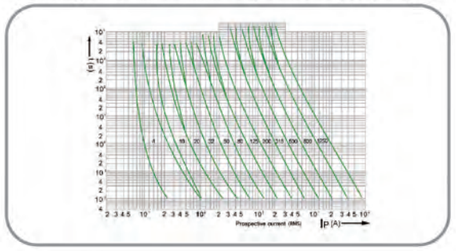
It can be easily matched with various cabinet types at domestic and abroad

Technology Desicription

Maximum allowable overvoltage is 1.1Un(8 hours every 24 hours)



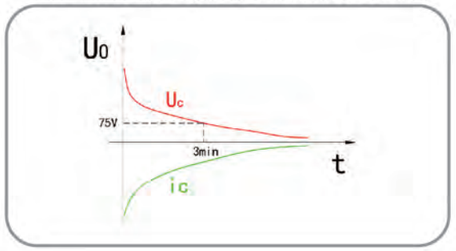
Each compensation branch is isolated from each other, and the busbar type fuse has a short circuit protection capacity of up to 50kA



Easy to expand, you can add modules at any time for expansion



With self-discharge characteristic, the remaining voltage is less than 75V after the power is disconnected for 3 minutes



Technology Specification

Rated voltage	400～690V
Rated frequency	50\60Hz
Control terminal voltage	DC12V/AC220V
Control capacity	Three-phase compensation≤80kvar,Phase-split compensation≤68kvar
Reactance ratio	7%/14%
Response time	≤15ms
Environment temperature	-25℃-45℃
Relative humidity	≤95%
Altitude	≤2000m,reducing capacity at higher altitude
Switching	Dynamic reactive power compensation switch regulator

Power Quality - Power Factor Correction

- High voltage shunt capacitor bank special protection
- Compatible with external fuse/internal fuse capacitor
- High sampling accuracy
- Fast computing speed



SWCP Series Intelligent Reactive Compensation Monitoring Device

Introduction

Sanhe power SWCP series intelligent reactive power compensation monitoring device is suitable for the protection of shunt capacitor devices in 35KV and under 35KV voltage systems. It has the characteristics of high measurement accuracy, accurate and reliable fault analysis, complete protection functions, intuitive parameter display, SWCP has real-time collection of power grid data to achieve a variety of protection and control functions.

Application

- High voltage shunt capacitor device

三和电力
SANHE POWER TECH

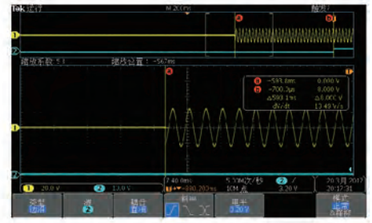
www.sanhenergy.com
yvonne.zhang@samwha-cn.com

Competitive Advantage

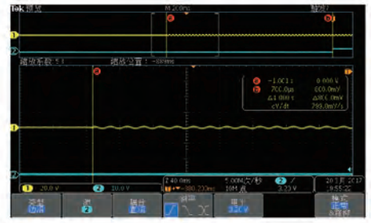
- 32 bit ARM core,rapid computing speed
- HD LCD display
- Multi-functional

Technology Description

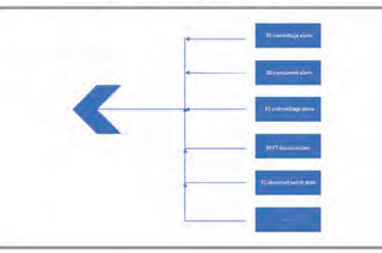
Pre-set value 17V,delay time 0.6s,
detecting value 17.1V,actual response time 593.1ms



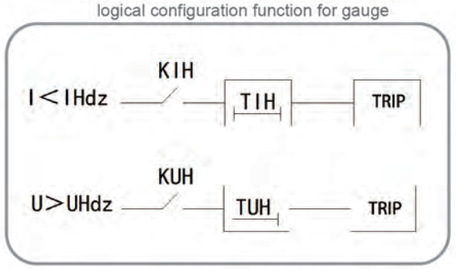
Pre-set point 1V,delay time 1s,
detecting value 1.1V,actual response time 1.000s



Full self-check capacity



Each protection function, relay and opening logical configuration function for gauge



Technology Specification

Working power	100-260VAC/DC
Rated frequency	50\60Hz
Input three-phase voltage	100/√3V
Input three-phase current	5A/1A
Open triangle voltage output	0.1-100V
Output contact capacity	AC250V/5A,DC30V/5A
Time range	0.1-999.9s
Communication port	RS485
Communication protocol	Modbus
Protection function	Prefect various protection mechanism
Relative humidity	Maximum 95%,no condensation
Environment temperature	-20-+50℃

Distributed New Energy

- Design life up to 15years
- Decrease 70% volume
- Decrease 60% weight
- Green, environmental protection and pollution-free



SLB Lithium Iron Phosphate Battery(LifeP04 Battery)

Introdction

Sanhe Power SLB series Lithium iron phosphate battery has the advantages of safety and reliability, long service life, small volume, light weight, simple operation and maintenance.Comparing with the traditional lead-acid battery,SLB greatly increases the system performance.

Application

- UPS/EPS/HVDC/Communication power supply
- Large capacity energy storage system
- Traditional lead-acid battery replacement,update

三和电力
SANHE POWER TECH

www.sanhenergy.com
yvonne.zhang@samwha-cn.com

Lithium batteries advantages compares to lead-acid batteries



longer life | lighter weight | More charge times cycle | Smaller volume | less heat | Internal battery monitoring | Friendly environmental | Memoryless effect

Monitoring and Intelligence

SLB series lithium iron phosphate battery with integrating built-in BMS,communication and management

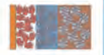
- Single battery voltage/current/temperature detection
- Internal redundant power supply system, external power supply not required
- Battery balance management
- Module temperature, charging and discharging management
- Alarm fault detection and processing
- Battery remaining Capacity,life management(SOC\SOH)
- UPS\Monitor terminal communication
- Data storage, analysis and statistical management

Cell Selection

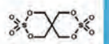
- The energy density up to 175Wh/kg
- The cell passes CE, TUV (IEC62619)UL, RoHS, UN38.3
- Conform to GB/T 31484, 5, 6-2015 test standard

Battery Technology

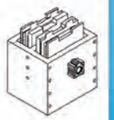
Material system
- Battery material chemical system optimization
- (Positive, negative and electrolyte matching) Amorphous carbon coated graphite



Cell design
- Electric nano-coating
- Porous electrode design
- Development of functional electrolyte
- Failure mechanism analysis and improvement



Process technology
- Ensuring pole piece smooth
- Removing diaphragm folds
- Promoting electrolyte infiltration
- Improving interface reaction



Technical Specification

Module voltage	32v	38.4v	48v	64v
Module capacity	148AH	148AH	50AH/74AH	240AH
PACK design	Modular,rack type			
Cell material	lithium iron phosphate(LFP)			
Cycle life	4000-6000times(depends on environment and service condition)			
Design life	15 years			
Transfer efficiency	96%			
Discharge depth	90%			
Self-discharge rate	＜5%(0-30℃\3 months)			
Communication mode	Modbus RTU\CAN			
Protection function	Over temperature, over current, over charge, over connected,etc			
Work temperature	0-50℃			
Storage temperature	-20-60℃			
Humidity	0-95%RH			