Elecnova

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Empower Your Success

POWER QUALITY

JIANGSU SFERE ELECTRIC CO., LTD.
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POWER QUALITY SOLUTION EXPERT

As the leading digital power distribution solution provider, Sfere Electric are dedicating on systematic solutions of energy management, power monitoring, power quality, electrical safety and intelligent switchgear to smart grid users. Our businesses focus on smart building, utility, large-scale industrial enterprise, renewable energy, semiconductor, IDC, advanced material, petrochemical, transportation infrastructure, education and health care industries.

Sfere Electric integrated R&D, manufacturing, marketing and service, and have a complete product ecosystem from digital measuring devices, intelligent switchgears, power quality mitigation solutions to IoT Cloud platform. We provide reliable data services for energy saving, electric safety, power quality improvement and comprehensive energy management to empower smart energy management by digitalization.

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CONTENTS

Power Quality Solution

PRODUCT OVERVIEW

High Performance PQ Modules

-Modular design
-Flexible installation and maintenance
-Wall/Rack mounting type
-Fast response with overall compensation

· Active Harmonic Filter
SFR-APF
· Static Var Generator
SFR-SVG
· Amplified Static Var Generator
SFR-ASVG

Reactive Power Compensation Components

-Dynamic/static switching
-Up to 24 channels control outputs
-Harmonic measurement
-LCD/TFT touch-screen display

PFC

WGK-31-700

WGK-31-605

WGK-31-603

Switching Unit

LBFK

LBT

Benefits

The benefits of SFR active harmonic filtering :

- Prolong the use life of the equipment and reduce the initial devices investment
- Maintain the normal operation of equipment and stable production
- Reduce energy consumption, pay contribute to the environment protection
- Reduce the harmonic pollution of the public grid and get rewards from the power supply department

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Smart Capacitor Power Bank

Intelligent-
Efficient-
Zero-crossing-

SFR-L

SFR-M

Power Quality Panels

Large capacity support-
Harmonic/reactive power/unbalance-
Flexible combination-
Hybrid compensation-

Active Harmonic Filter ·
SFR-APF
Static Var Generator ·
SFR-SVG
Hybrid Solution ·
SFR Series

The benefits of SFR series reactive power compensation equipments :

- Stabilize the voltage of the grid, enhance the power quality of the grid
- Improve the power factor of the power system and the load, reduce the capacity of the power system and the substation equipment investment
- Reduce line loss and improve the power transmission capacity of the grid
- Balancing the three-phase active power and reactive power of the grid
- Reduce the transformer losses and improve transformer utilized

TECHNICAL FEATURES

Fourier Algorithm

Adaptive system-
Effectively avoiding resonance-
Efficient and stable compensation-

IGBT Components

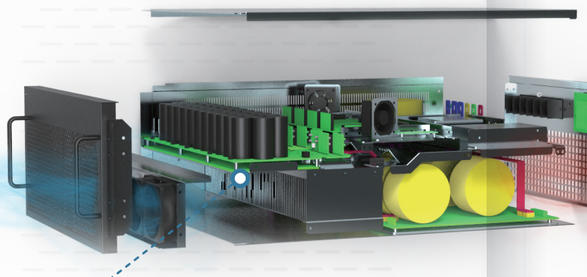
Quick response-
High tolerance performance-
Excellent thermal stability-

Complete Protection Features

Complete fault and off-limit protection functions-
Ensure the safe and stable operation of the system-

Efficient Heat Dissipation

Carefully designed cooling system-
Efficient thermal management-



DSP Extreme-speed Main Control Unit

-Full digital signal processing technology
-Fast and efficient implementation of complex algorithms

User Friendly HMI

-Full color touch screen
-Convenient parameter configuration
-Visualize system status and event recording

Remote Commissioning

-ELECNOVA cloud platform access
-Remote assistance to users for on-site commissioning

Modular Solution

-Compact modular design
-Higher energy density
-Easy maintenance

Active Harmonic Filter
SFR-APF

Various application

Excellent filtering performance

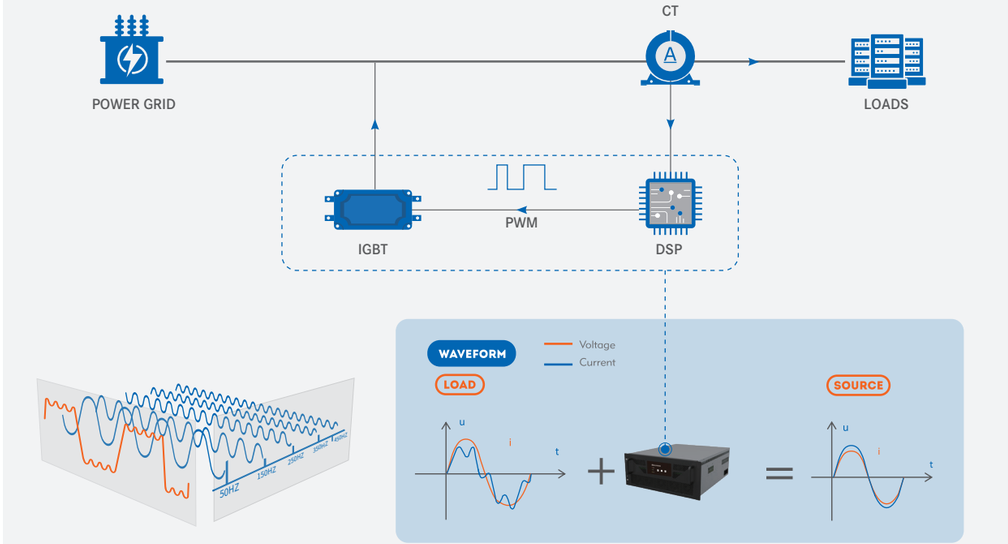
Excellent protection for equipment and system

User-friendly HMI

SFR-APF active harmonic filter is a new type of power quality improvement production for dynamically filtering harmonics and compensating reactive power. It can filtering and compensate harmonic (variable in orders and frequency) and dynamic reactive power in real time. It is used to overcome the shortcomings of conventional harmonic suppression and reactive power compensation methods such as passive harmonic filters, and achieve the harmonic filtering function and reactive power compensation function of the system. SFR-APF active harmonic filter is widely used in power, metallurgy, petroleum, port, chemical industry and mining enterprises.

Overview

The increase in power energy productivity has improved the standard of living, and most of the electrical loads used in the intelligent power consumption are nonlinear nowadays. Harmonic current is generated by these nonlinear loads, and is formed by the superposition of countless sinusoidal currents whose frequencies are integer multiples of the fundamental current. When all the waveforms are superimposed, they will become distorted waveform.



Model Description

SFR-APF ① 4 ② – 100 ③ / 0.4 ④ B ⑤

Annotation:

1. Model of the manufacturer
2. Wiring mode:
   3-Three-phase three-wire
   4-Three-phase four-wire
3. Compensation capacity(A):
   15A/30A/50A/75A/100A/125A/150A
4. Voltage level(kV)
5. Installation mode:
   M-Rack-mounted type, B-Wall-mounted type

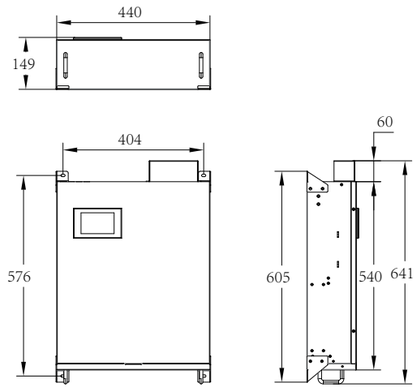
Technical Parameter

Item		Parameter		
SFR-APF	Grid	208V, 400V 3P3W/3P4W*		690V 3P3W
	Mounting Type	Wall-mounted	Rack-mounted	Floor model
System	Rated Input	208V, 400V ±10%		690V ±10%
	Power Grid Frequency	50/60Hz ±5%		
	Parallel Operation	8 modules, customizable		
	Overall Efficiency	≥97%(laboratory data)		
	Circuit Topology	3-level		
Performance Indicators	Rated Capacity	15-150A		100A/125A/150A
	Compensation Mode	Harmonic, reactive power, unbalance		
	Filtering Range	2 to 51 orders		
	Filtering Order	Selectable from 2 to 51		
	Filtering Degree	Adjustable from 2 to 51		
	Reaction Time	<100μs		
	Response Time	<5ms		
	Target Power Factor	Adjustable from -1 to +1		
	Control Algorithm	FFT, Intelligent FFT and instantaneous reactive power		
	Switching Frequency	20kHz		
	Cooling Mode	Forced air cooling		
	Noise Level	≤65dB (A)		
Communications & Display	Communications Port	RS485		
	Communications Protocol	Modbus-RTU		
	Module Display Interface	4.3in LCD	LED indicator	LED indicator
	Protection Function	Automatic current limit protection for power grid over-voltage and under-voltage,power gridoxer-frequency and under-frequency,inverted sequence of input voltage, over-current,over-heating and over-load, and busbar short-circuit.		
	Monitoring Alarm	Available		
	Monitoring	Independent monitoring and centralized monitoring		
Ambient Standards	Altitude	1,000m, for every increased 100m, the power is reduced by 1%.		
	Operating Temperature	-20°C-45°C		
	Relative Humidity	5% to 95%,non-condensing		
	Protection Class	IP20		
Related Standards	Directive	2014/30/EU 2014/35/EU		
	Standards Compliance	EN 61000-6-2:2005+AC:2005 EN 61000-6-4:2007+A1:2011 EN 50178:1997 IEEE519		

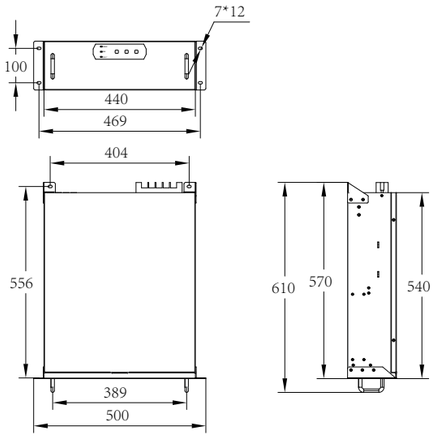
*: Please check other voltage levels, such as 480V, in the specifications of user manual.

Dimension

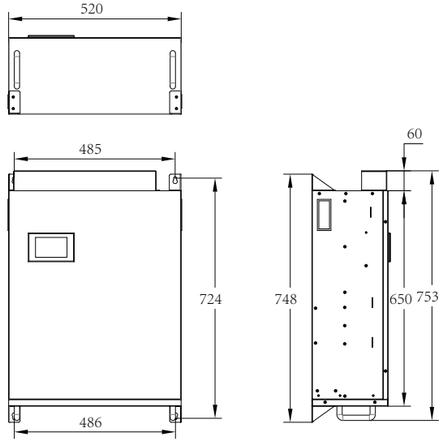
50A 75A Wall-mounted



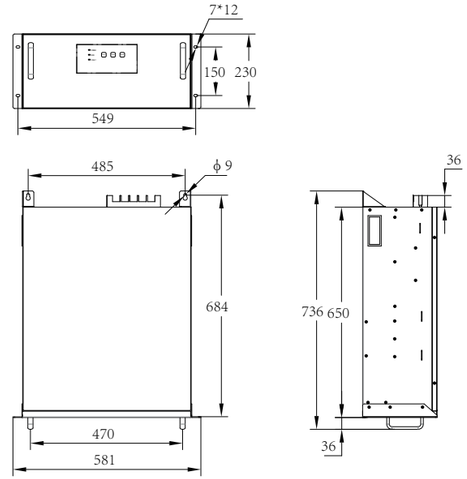
50A 75A Rack-mounted



100A 125A 150A Wall-mounted



100A 125A 150A Rack-mounted



Static Var Generator
SFR-SVG

Various application

Excellent filtering performance

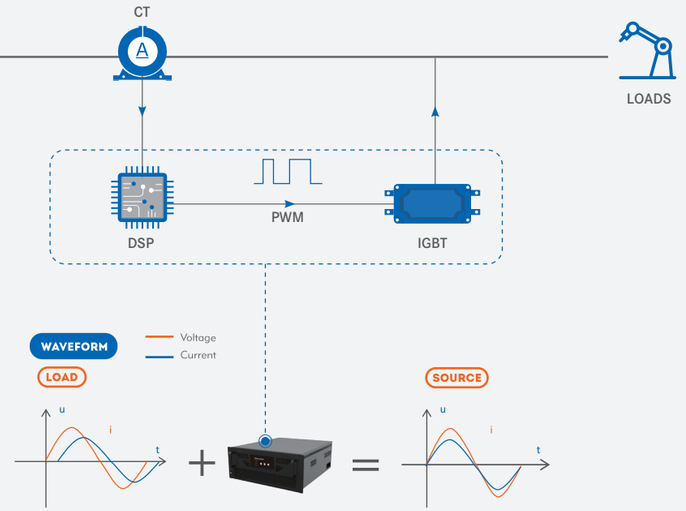
Excellent protection for equipment and system

User-friendly HMI

SFR-SVG is a new-generation product of Static Var Generator(SVG), it used the latest technology for the reactive power compensation. When the SFR-SVG parallel in the grid, it equalized as a dynamic reactive current source.The reactive current of the SVG could be flexibly controlled and compensate the reactive power automatically .

Overview

The SVG acquires the current signal of the load by the CT, the DSP tracks the command current in quick than calculate the reactive power rate of change by intelligent algorithm as to send the data to the IGBT by PWM signal. Finally the inductive or conductive power compensation current is generated on the inverter to achieve the real-time dynamic reactive power compensation.



Model Description

SFR-SVG ① 4 ② – 100 ③ / 0.4 ④ B ⑤

Annotation:

1. Model of the manufacturer
2. Wiring mode:
   3-Three-phase three-wire
   4-Three-phase four-wire
3. Compensation capacity(kvar):
   10/30/50/75/100kvar
4. Voltage level(kV)
5. Installation mode:
   M-Rack-mounted type, B-Wall-mounted type

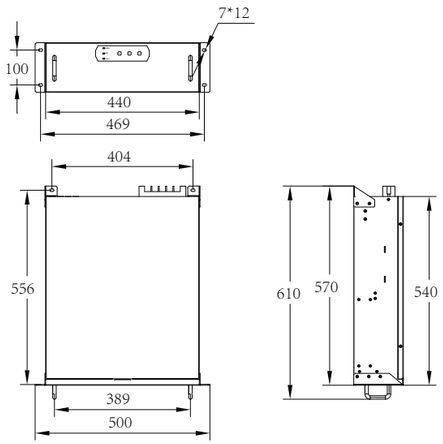
Technical Parameter

Item		Parameter		
SFR-SVG	Grid	208V, 400V 3P3W/3P4W*		690V 3P3W
	Mounting Type	Wall-mounted	Rack-mounted	Floor model
System	Rated Input	208V, 400V ±10%		690V ±10%
	Power Grid Frequency	50/60Hz ±5%		
	Parallel Operation	8 modules, customizable		
	Overall Efficiency	≥97%(laboratory data)		
	Circuit Topology	3-level		
Performance Indicators	Rated Capacity	10-100kvar		75kvar/ 100kvar
	Loss Of Active Power	<3% rated module power		
	Over-load Capability	120%		
	Mean Time Between Failures	≥100,000 hours		
	Reaction Time	<100μs		
	Response Time	10ms		
	Scope Of Reactive	Continuously adjustable from rated induced to rated capacitive		
	Adjustment	Compensation algorithm of screening vector of frequency domain possessing self-adaptation capability		
	Control Algorithm	FFT, Intelligent FFT and instantaneous reactive power		
	Switching Frequency	20kHz		
	Noise Level	Forced air cooling		
Communications & Display	Communications Port	≤65dB (A)		
	Communications Protocol	RS485		
	Module Display Interface	Modbus-RTU		
	Monitoring Alarm	4.3in LCD	LED indicator	LED indicator
	Monitoring	Available		
Ambient Standards	Altitude	Independent monitoring and centralized monitoring		
	Operating Temperature	1,000m, for every increased 100m, the power is reduced by 1%.		
	Relative Humidity	-20℃-45℃		
	Protection Class	5% to 95%,non-condensing		
Related Standards	Directive	IP20		
	Standards Compliance	2014/30/EU 2014/35/EU		
		EN 61000-6-2:2005+AC:2005 EN 61000-6-4:2007+A1:2011 EN 50178:1997 IEEE519		

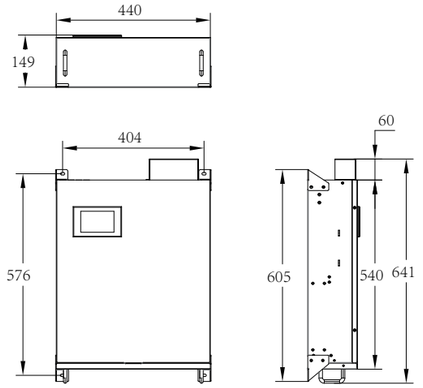
*: Please check other voltage levels, such as 480V, in the specifications of user manual.

Dimension

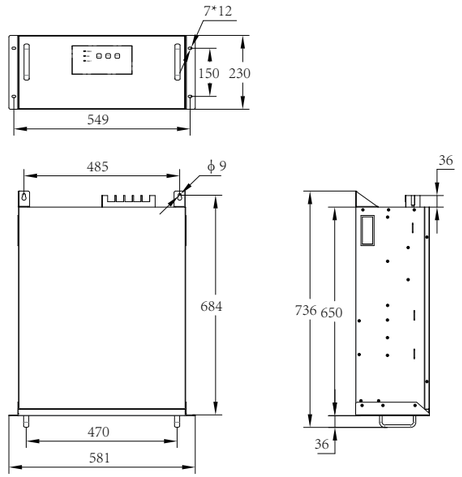
30kvar 50kvar Rack-mounted



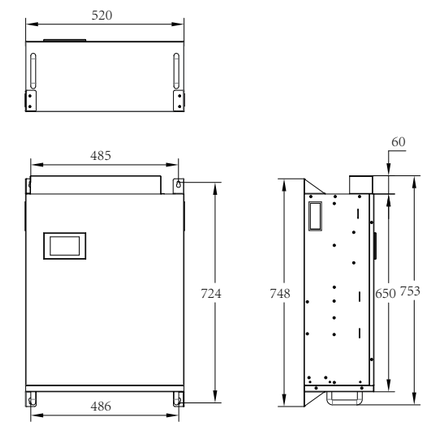
30kvar 50kvar Wall-mounted



75kvar 100kvar Rack-mounted



75kvar 100kvar Wall-mounted



Amplified Static Var Generator
SFR-ASVG

Smooth linear dynamic output

Dynamic filtering of odd harmonics of 13th and below

Friendly human-machine interface

Comprehensive protection function

Advanced control strategy and topology design

Based on the principle of voltage source inverter, the amplified static var generator (ASVG) uses insulated gate bipolar transistor (IGBT) to control the magnitude and phase of the inverter AC voltage, so as to achieve the purpose of reactive power compensation and harmonic control.

Overview

Model Description

SFR-ASVG ❶ 4 ❷ – 100 ❸ / 0.4 ❹ B ❺

Annotation:

❶ Model of the manufacturer

❷ Wiring mode:
3-Three-phase three-wire
4-Three-phase four-wire

❸ Compensation capacity(kvar):
30/50/75/100/125kvar

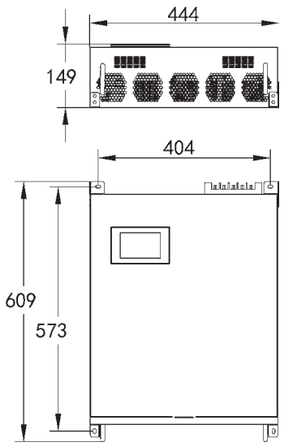
❹ Voltage level(kV)

❺ Installation mode:
M-Rack-mounted type, B-Wall-mounted type

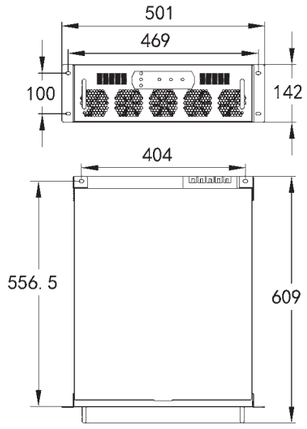
Product capacity	Equivalent capacity	
ASVG capacity (kvar)	Reactive compensation capacity (kvar)	Active harmonic filtering capacity (A)
30	25	25
50	40	40
75	60	60
100	80	80
125	100	100
Remarks	Output capacity can be adjusted proportionally according to user requirements.	

Dimension

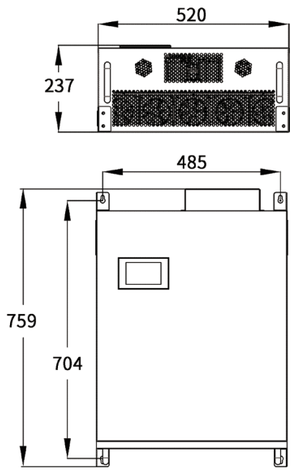
30kvar 50kvar Wall-mounted type



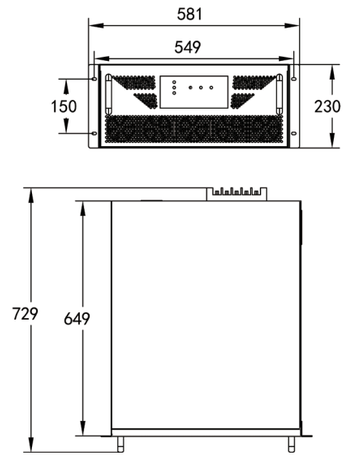
30kvar 50kvar Rack-mounted type



75kvar 125kvar Wall-mounted type



75kvar 125kvar Rack-mounted type



Technical Parameter

Item		Parameter
Rated Voltage		AC 400V ±10%
Working Frequency		50/60Hz ±5%
Compensation Range		-1~1
Number of Units in Parallel Connection		⩽8 units
Response Time		<10ms
Circuit Topology		Three-level
Electrical Wiring		3P3W/3P4W
Harmonic Filtering Range		3rd, 5th, 7th, 9th, 11th, 13th
MTBF		100,000 hours
Instantaneous Response Time		<200us
Compensation Mode		Harmonic compensation, reactive compensation and three-phase load unbalance compensation function
		Support setting one or more compensation methods
Control Connection		RJ45 connection, reliable and convenient
Compensation Effect	Reactive power	System power factor after compensation within the rated capacity＞0.98
	Active filter	Harmonic filtering rate within the rated capacity＞95%
	Three-phase unbalance	Unbalance of three-phase active current of the system after compensation within the rated capacity＜5%
Output Protection		The output current is automatically limited to 100% of the rated capacity
Ambient Standards		Ambient temperature -25°C~+55°C
		Relative humidity⩽95%, no condensation
		Installation altitude ⩽2000m, if installation altitude ＞2000m, please adopt reduced capacity design.

Smart Harmonic Mitigation Capacitor Bank
SFR-M

Intelligent

Zero-crossing

Harmonic mitigation

SFR-M series LV(low voltage) dynamic harmonic mitigation reactive power compensation module is designed for solve the problem of harmonic and power factor in the situation of slight harmonic pollution in 0.4kV low voltage power distribution network. It is used as an integrated reactive power compensation module with functions of power factor enhancement, effective harmonic suppression, reduction of line loss and improvement of power quality.

Overview

Model Description

SFR-M ❶ XD ❷ – 30 ❸ – P7 ❹ / 480 ❺

Annotation:

❶ Model of the manufacturer
Harmonic suppression module series

❷ Product design number

❸ Compensation capacity(kvar)

❹ Reactance rate

❺ Rated voltage, Unit V

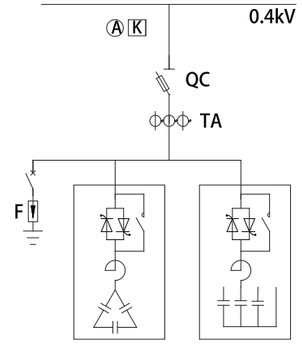
Model Selection

Compensation Mode	Capacity (kvar)	Model	Application Field
Three-phase Total Compensation	50	SFR-MXD-50-P7/480	It applies at the sites with much non-linear loads such as VFD, UPS, LED lights and switching power supply etc.
	25+25	SFR-MXD-2525-P7/480	
	40	SFR-MXD-40-P7/480	
	20+20	SFR-MXD-2020-P7/480	
	30	SFR-MXD-30-P7/480	
	20+10	SFR-MXD-2010-P7/480	
	20	SFR-MXD-20-P7/480	
	10+10	SFR-MXD-1010-P7/480	
	15	SFR-MXD-15-P7/480	
	10+5	SFR-MXD-1005-P7/480	
	10	SFR-MXD-10-P7/480	
Phase Separation Compensation	30	SFR-MXD-30-P7/280	
	20	SFR-MXD-20-P7/280	
	10	SFR-MXD-10-P7/280	

Technical Parameter

Function		Specification
Measurement Accuracy	Current	⩽1%
	Voltage	0.5% (80%～120%Un)
	Temperature	⩽±1°C
Switching Mode		Zero-crossing switch
Compensation Operation	Working voltage	AC 400V ±20%
	Consumption	⩽5VA
	Max.working current	1.35×In
	Switching inrush	⩽2√2×In
Host Protection	Over voltage	430V (Adjustable)
	Under voltage	300v (Adjustable)
	Harmonic exceeding	0%～100% (Adjustable)
Local Protection	Over current	0～100A (Adjustable)
	Over temperature	55°C (Adjustable)
	Unbalance	50%(Adjustable , only for total compensation)
Network Interface		Plug-in data line with RJ45 interface
Mechanical Installation	Outline dimension	W-280mm H-290mm, as the capacities of different specifications are slightly different, please consult us for specific product depth
	Installation dimension	W-295mm, as the capacities of different specifications are slightly different, please consult us for specific installation length
	Weight	⩽45kg
Ambient Temperature	Working temperature	-15°C～45°C
	Storage temperature	-25°C～55°C
Altitude		⩽2000m
Standard		IEC 831-1, 2(2000)

Typical Wiring

Content \ Solution	Combine compensation, zero-crossing switch,harmonic suppression
Primary Wiring Diagram	
Compensation Capacity (kvar)	Total capacity 240kvar (Total compensation 150kvar+Separate compensation 90kvar)

Configuration List

Name	Model	Quantity
Knife Fuse Switch	630A	1
Controller	WGK-31-203-F	1
Status Indicator	WGK-31-ZTA	1
Ammeter	PA194I-9X4	1
Current Transformer	SHI 500/5	3
Micro Circuit Breaker	160A	1
Surge Protection Device	SDX54/4P	1
Total Compensation Module	SFR-MXD-30-P7/480	5
Separate Compensation Module	SFR-MXD-30-P7/280	3
Cabinet (GCJ)	1000×1000×2200(mm)	1

The above sample used the dynamic harmonic suppression reactive power compensation module configured with WGK-31-203 controller, determines the compensation capacity and reactance coefficient according to the requirement, improves the power factor of the system, and suppresses the harmonic component. The controller can control 32 total compensation modules and separate compensation modules. When the compensation capacity should be added, please add the quantity of dynamic compensation modules and change the specification of knife fuse switch and fuse.

Power Factor Controller

Model Description

WGK-31 – 203 – G

1 2 3

Annotation:

1. Model of the manufacturer
2. Product design number
3. Compensation mode:
   G indicates three-phase total compensation
   F indicates combined compensation

Technical Parameter

Items			Parameters
Signal Input	Voltage	Range	Phase voltage 20～220V or line voltage 20～480V
		Overload	Continuous: 1.2 Un; instantaneous: 2Un
		Power Consumption	<1VA
	Current	Range	5A
		Overload	Continuous: 1.2 In; instantaneous: 2In
		Power Consumption	<1VA
	Frequency		45～65 Hz
Power Supply			AC/DC 80～270V
Communication			Data line connection, physical layer isolation connect up to 32 SFR series modules
Relay Output			2 programmable alarm relay outputs Capacity 3A/250VAC (3A/30VDC)
Measurement Accuracy			Current: 0.5(20%～120%),1.0 (5%～20%) Voltage: 0.5 (50%～120%)， 1.0 (5%～50%) Power : 1.0 Frequency:±0.1Hz Harmonic measurement: B
Display Mode			128*64 LCD,contrast can be set
Protection Degree			Panel IP65,case IP30
Ambient temperature			Working temperature: -15～55℃ Storage temperature: -20～75℃
Safety			Insulation between signal, power supply, output terminal and case resistor > 100MΩ Withstand voltage between signal input, power supply and output> AC 2kV
Outline			Outline dimension: 120×120×114mm Weight: 0.6kg

Smart Capacitor Bank

SFR-L

Intelligent

Zero-crossing

SFR-L series LV(low voltage) power capacitor module is designed for 0.4kV LV power distribution system. It is used as a new generation of compensation module with functions of energy saving, reduction of line loss, power factor enhancement and improvement of power quality. This module is mainly used in the occasions where the harmonic distortion is not serious. SFR-L series low voltage power capacitor modules take two type compensation capacitors or one Y type compensation capacitor as main body and are highly integrated with compound switch, microprocessor and other function modules.

Overview

Model Description

SFR-L ❶ XD ❷ – 20 ❸ 20 ❹ / 450 ❺

Annotation:

❶ Model of the manufacturer
Power capacitor series

❷ Product design number

❸ Value of first group capacitor, Unit kvar

❹ Value of second group capacitor, Unit kvar

❺ Rated voltage, Unit V

Total compensation and separate compensation combined type

Model Description

SFR-L ❶ XD ❷ – 20G ❸ 20F ❹

Annotation:

❶ Model of Company's Product
Power capacitor series

❷ Product design number

❸ Capacity of total compensation, Unit kvar

❹ Capacity of separate compensation, Unit kvar

Technical Parameter

Function		Specification
Measurement Accuracy	Current	⩽1.0% (5%～120%In)
	Voltage	⩽0.5%(80%～120%Un)
	Power	⩽2%
	Power Factor	⩽±0.01
Switching Mode		Zero cross switching
Compensation Operation	Working Voltage	AC 400V ±20%, distortion rate⩽5%
	Consumption	⩽5VA
	Max.working Current	1.35×In
	Switching Inrush Current	⩽2√2×In
Host Protection	Over Voltage	430V (Adjustable)
	Under Voltage	300V (Adjustable)
	Harmonic Exceeding	0%～100% (Adjustable)
Local Protection	Over Current	0～100A (Adjustable)
	Over Temperature	55℃ (Adjustable)
	Unbalance	50%(Adjustable)
Control Setting	Control Parameter	Plug-in data line with RJ45 interface
	Peripheral Unit Parameters	Current transformer ratio
Network Interface		Pluggable data line, internal network protocol
Mechanical Installation	Outline Dimension	As the capacities of different specifications are slightly different, please refer to the detailed table of outline dimensions.
	Installation Dimension	Installation and fixing hole distance: W-70mm * L-372mm or W-85mm * L-315mm,as the capacities of different specifications are slightly different, please consult us for specific installation and fixing hole distance.
	Weight	⩽6.5kg
Ambient Temperature	Working Temperature	-15℃~45℃
	Storage Temperature	-25℃~55℃
Altitude		⩽2000m
Standard		IEC 831-1,2(2000)

Model Selection

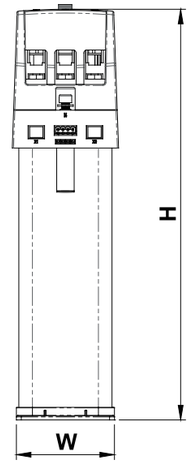
Compensation Mode	Capacity (kvar)	Model	Application Field
Three-phase Total Compensation	40+40	SFR-LXD-4040/450	It's used in the fileds where the power quality meets the national standard, the requirement for power quality is not very high and no harmonic sensitive equipment. Phase seperation compensation is used in the occation that three-phase load imabalance greater than 30%.
	40+20	SFR-LXD-4020/450	
	30+30	SFR-LXD-3030/450	
	20+20	SFR-LXD-2020/450	
	20+10	SFR-LXD-2010/450	
	10+10	SFR-LXD-1010/450	
	10+5	SFR-LXD-1005/450	
Phase Separation Compensation	30	SFR-LXD-30/250	
	20	SFR-LXD-20/250	
	10	SFR-LXD-10/250	
	5	SFR-LXD-05/250	
Total and Separation Combined Compensation	40+20	SFR-LXD-40G20F	
	40+15	SFR-LXD-40G15F	
	40+10	SFR-LXD-40G10F	
	30+20	SFR-LXD-30G20F	
	30+10	SFR-LXD-30G10F	
	20+20	SFR-LXD-20G20F	

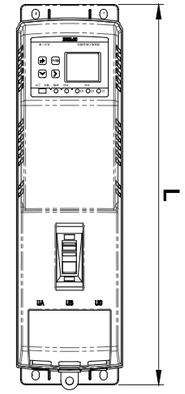
Configuration List

Name	Model	Quantity
Knife Fuse Switch	630A	1
Controller	WGK-31-201-G	1
Status Indicator	WGK-31-ZTA	1
Ammeter	PA194I-9X4	1
Current Transformer	SHI 500/5	3
Micro Circuit Breaker	160A	1
Surge Protection Device	SDX54/4P	1
Total Compensation Module	SFR-LXD-2020/450	6
Cabinet (GCJ)	800×800×2200(mm)	1

The above sample used low volage power capacitor module.The compensation capacity is determined according to the transformer and load capacity, and the general compensation capacity is about 30-40% of transformer.If you need separate compensation, please select separate compensation module.The low voltage power capacitor module can improve the power factor of the system,realize the zero crossing switching of the capacitor, and can communicate through RS485 interface via RJ45 data plugged line. When the compensation capacity should be added, please add the quantity of modules and change the specification of knife fuse switch.

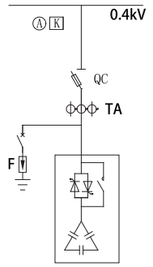
Dimension





Outline Dimension	Length (L)mm	Width (W)mm	Height (H)mm	Distance between fixing poles mm
Total and Separate Compensation Series				
SFR-LXD-40G20F/40G15F	392	110	423	70×372
SFR-LXD-30G20F/20G20F	392	110	383	
SFR-LXD-40G10F/30G10F	392	110	363	
SFR-LXD-20G15F/20G10F	392	110	363	
Total Compensation Series				
SFR-LXD-4040/450	392	110	423	70×372
SFR-LXD-4020/450	392	110	363	
SFR-LXD-3030/450	392	110	363	
SFR-LXD-2525/450	392	110	363	
SFR-LXD-2020/2010	370	71.5	332	85×315
SFR-LXD-1515/1510	370	71.5	332	
SFR-LXD-1010/1005	370	71.5	267	
SFR-LXD-0505	370	71.5	227	
SFR-LXD-05025	370	71.5	227	
Separate Compensation Series				
SFR-LXD-30/250	370	71.5	332	85×315
SFR-LXD-20/250	370	71.5	267	
SFR-LXD-15/250	370	71.5	267	
SFR-LXD-10/250	370	71.5	227	
SFR-LXD-05/250	370	71.5	227	
SFR-LXD-025/250	370	71.5	130	

Typical Wiring

Component \ Solution	Three-phase total compensation, zero-cross switching
Primary Wiring Diagram	
Compensation Capacity(kvar)	Total capacity 240kvar

Configuration List

Name	Model	Quantity
Knife Fuse Switch	630A	1
Controller	WGK-31-201-G	1
Status Indicator	WGK-31-ZTA	1
Ammeter	PA194I-9X4	1
Current Transformer	SHI 500/5	3
Micro Circuit Breaker	160A	1
Surge Protection Device	SDX54/4P	1
Total Compensation Module	SFR-LXD-2020/450	6
Cabinet (GCJ)	800×800×2200(mm)	1

The above example adopts low voltage power capacitor module.The compensation capacity is determined according to the transformer and load capacity, and the general compensation capacity is about 30-40% of transformer.If you need separate compensation, please select separate compensation module.The low voltage power capacitor module can improve the power factor of the system,realize the zero crossing switching of the capacitor, and can communicate through RS485 interface via RJ45 data plugged line. When the compensation capacity should be added, please add the quantity of modules and change the specification of knife fuse switch.

Power Factor Controller

Model Description

WGK-31 ① – 201 ② – G ③

Annotation:

① Model of the manufacturer ② Product model

③ Compensation mode:
G indicates three-phase total compensation
F indicates combined compensation

Items			Parameters
Signal Input	Voltage	Range	Phase voltage 20～220V or line voltage 20～480V
		Overload	Continuous: 1.2 Un; instantaneous: 2Un
		Power Consumption	<1VA
	Current	Range	5A
		Overload	Continuous: 1.2 In; instantaneous: 2In
		Power Consumption	<1VA
	Frequency		45～65 Hz
Power Supply			AC/DC 80～270V
Communication	Internal		RJ45 interface, connect up to 32 SFR series modules
	External		Support Modbus-RTU protocol
Relay Outputs			2 programmable alarm relay outputs Capacity 3A/250VAC (3A/30VDC)
Accuracy			Current: 0.5(20%～120%), 1.0 (5%～20%)
			Voltage: 0.5 (50%～120%), 1.0 (5%～50%)
			Power : 1.0
			Frequency: ±0.1Hz
			Harmonic measurement: B
Display Mode			128*64 LCD, contrast can be set
Protection Degree			Panel IP65, case IP30
Ambient Condition			Working temperature: -15～55℃
			Storage temperature: -20～75℃
Safety			Insulation between signal, power supply , output terminal and case resistor > 100MΩ
			Withstand voltage between signal input, power supply and output > AC 2kV
Outline Dimension			Outline dimension: 120×120×114mm
			Weight: 0.6kg

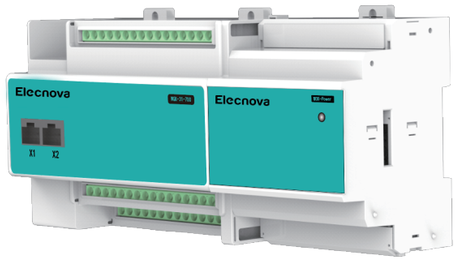
Reactive Power Compensation Controller
WGK-31-700

Real-time monitoring

Power factor correction

Harmonic analysis

Smooth network & communication



Reactive power compensation controller WGK-31-700 is a device special for correcting power factor and compensating reactive power, which has automatic detection and control functions. By utilized the advanced visual analysis tools, combined with power quality monitoring device to achieve the professional control and management of power quality.

Overview

Model Description

WGK-31 – 700 – □

① ② ③

Annotation:

① Model of the manufacturer

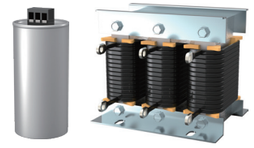
② Product design number

③ Smart capacitor bank 21-channel level control

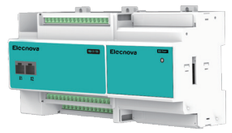
Application

LBFK Switch

LBT Switch



Capacitors & Reactors



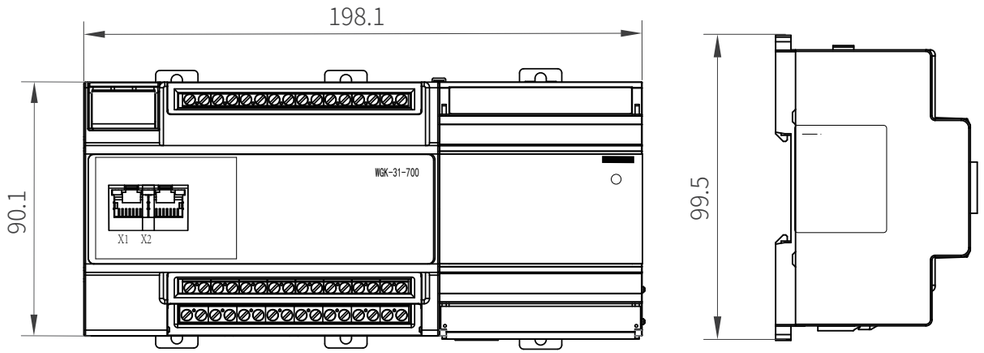
WGK-31-700

HMI

SFR-L Capacitor

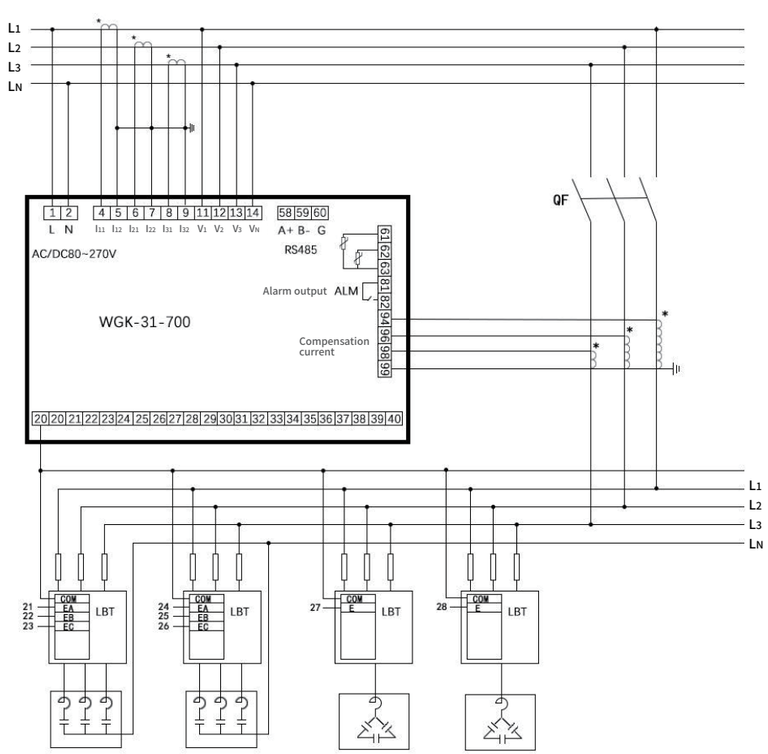
SFR-M Capacitor

Dimension



Typical Wiring

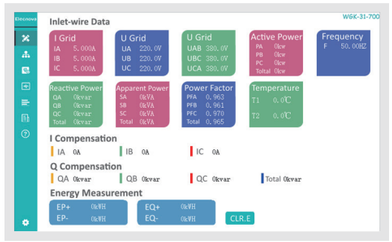
Diagram of combined compensation:



Technical Parameter

Function			Specification
Input	Wiring		3P3W, 3P4W
	Voltage	Value	20～400V LN
		Overload	Continuous: 1.2Vn Instantaneous: 2Vn
		Consumption	< 1VA
	Current	Value	5A
		Overload	Continuous: 1.2In Instantaneous: 2In
		Consumption	< 1VA
	Frequency		45～65 Hz
Power Supply			AC/DC 80～270V
Reactive Power Control		Level	21 steps Combined compensation
		Communication	RJ45 interface, connect up to 32 SFR-M modules
Alarm Output			1 Programmable alarm relay output Capacitor 5A/250VAC（5A/30VDC）
External Communication			Modbus-RTU protocol, 1200～19200bps（Level mode）
Event Records			100
Measurement Accuracy			Incoming U, I, P: Class 0.5 Incoming EP: Class 0.5S Incoming EQ: Class 1 Frequency: ±0.1Hz THD: 1～31st, Class B Compensation current: Class 1 (20%～120%) Temperature measuring: ±1℃
Display Mode			7inch TFT touch screen
Ambient Condition			Operation temperature：-15～55℃ Storage temperature：-20～75℃
Safety			Insulation: Signal, power supply, output terminal to shell resistance ＞100MΩ Withstand voltage: between signal input, power supply, and output >AC 2kV

Advantages



REAL-TIME MONITORING AND CONTROL

- Real-time monitoring and control of electrical equipment in power distribution network.
- Dynamic user interface combines real-time display and control functions to achieve more effective control and higher operation efficiency.
- Monitor the power factor fluctuation and compare the power factor before and after compensation.

ALARM ACTIVATION

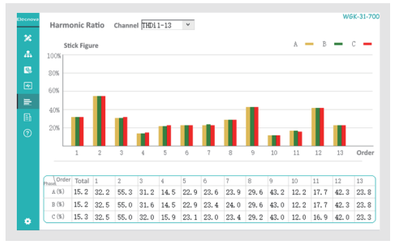
- If trigger an alarm under certain conditions, the independent screen will show the alarm and sequentially record events and all relevant data for diagnosis.

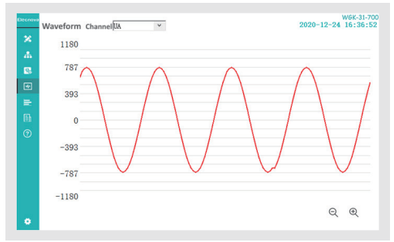
HARMONIC ANALYSIS

- 1-31st Harmonic analysis data with graphics and tables

EXTENSIBLE

- Measuring data could be integrated to any third party monitoring system by standard communication protocol





OPERATION AND MANAGEMENT

- Operation and management functions including capacitor module replacement reminder, residual capacity and cumulative operation time calculation, which can provide real-time data for on-site maintenance personnel to ensure the safe operation of reactive power compensation device.
- Clear software architecture, smooth network and communication, ensure data quality and support fault tolerance.

Reactive Power Compensation Controller
WGK-31-603

Real-time display

Power factor correction

Harmonic protection function

Manual /Auto switching

WGK-31-603 is a universal LC compensation system matched PFC.

Overview

Model Description

WGK-31 – 603 – 12 A

① ② ③ ④

Annotation:

① Model of the manufacturer

② Product design number

③ Compensation steps:
12 : 12 steps
21 : 21steps

④ Compensation method:
A: Static
B: Dynamic

Controller model	Switching mode		Compensation mode		RS485 communication	Max. compensation steps
	Contactor	Compound switch or silicon control	Total compensation	Combined compensation		
WGK-31-603-12A	●	–	●	●	●	12
WGK-31-603-12B	–	●	●	●	●	12
WGK-31-603-21B	–	●	●	●	●	21

"●" Yes "–" No

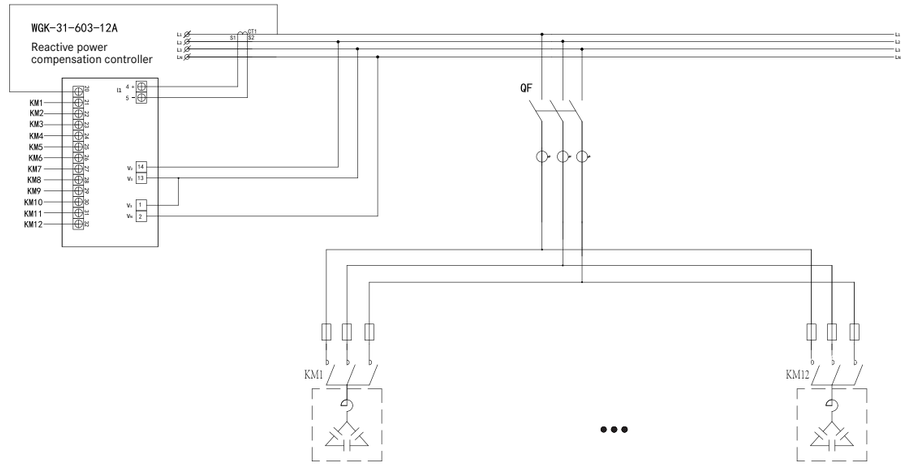
Technical Parameter

Items	Parameters
Display Mode	LCD
Cut-out Size	111*111mm
Sampling Voltage	400V or 230V
Working Voltage	AC 230V
Rated Compensation Steps	12/21 steps
Rated Input	5A
Working Mode	Auto/Manual
THD	THD measurement & protection function
Communication Interface	RS485, Modbus-RTU
Installation Mode	Panel mounted

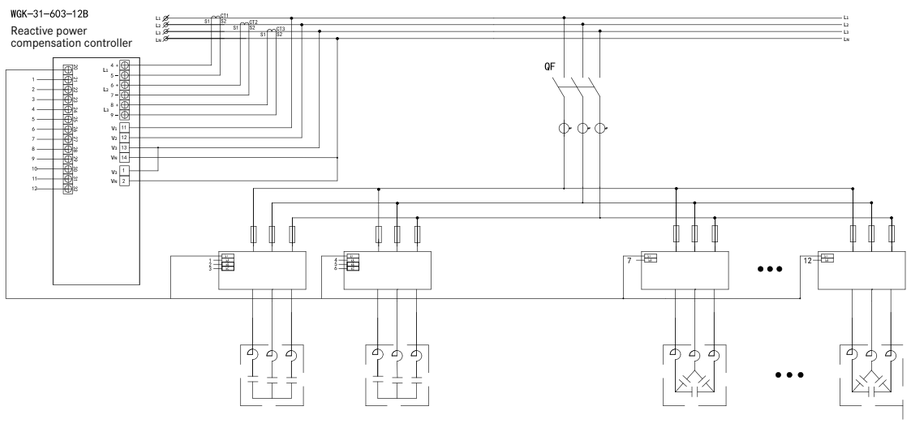
Terminal No.	Status	Description	Note
1 , 2	Input	Power supply	AC/DC 80 ～270V
4, 5, 6, 7, 8, 9	Input	Current signal	4, 6, 8 indicate the incoming terminals of three-phase current
11, 12, 13, 14	Input	Voltage signal	A, B and C indicate three-phase voltage inputs respectively
20 ～41	Output	Output control	12/21 steps output control, 20 indicates the common terminal
58, 59, 60		1 channel of RS485	Terminals A+, B- and G

Typical Wiring

The following is a dynamic wiring diagram of combined compensation:



The following is a static wiring diagram of total compensation:



Reactive Power Compensation Controller
WGK-31-605

TFT
touch screen

Power
factor correction

Harmonic
protection function

Manual
/Auto switching

WGK-31-605 is a universal LC compensation system matched PFC.

Overview

Model Description

WGK-31 – 605 – 16A – F – U
(1) (2) (3) (4) (5)

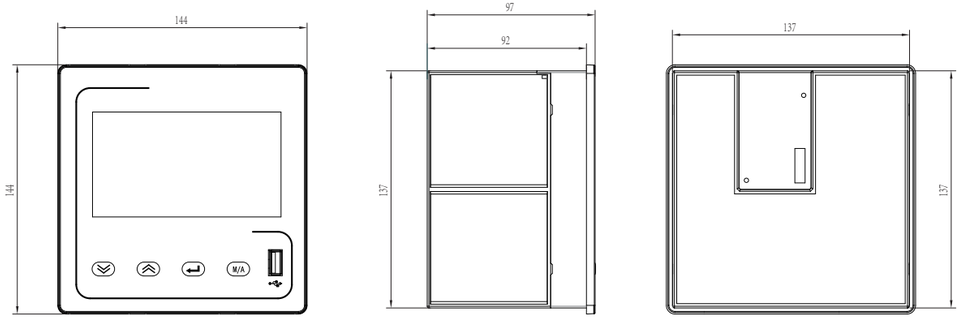
Annotation:

1. Model of the manufacturer
2. Product design number
3. Compensation steps:
   16A: static 16 steps
   24A: static 24 steps
   24B: dynamic 24 steps
4. Wiring method
   F: three-phase four wire
   G: single phase two wire
5. Optional function U:
   USB transfer function

Technical Parameter

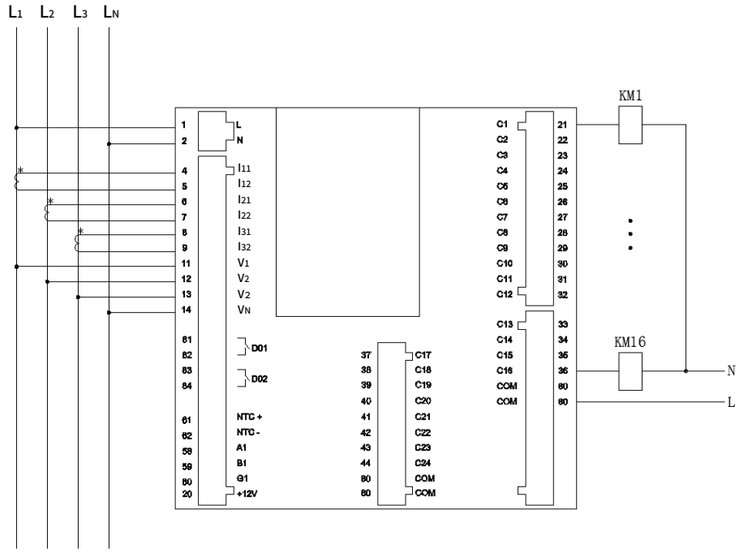
Specifications	16A-F	24A(B)-F	16A-G	24A(B)-G
Real-time	Three phase voltage, three line voltage		Single line voltage	
	Three-phase current		Single phase current	
	Three phase active power and total active power		Total active power	
	Three-phase reactive power and total reactive power		Total reactive power	
	Three phase apparent, total apparent		Total apparent	
	Three-phase power factor and total power factor		Total power factor	
	Frequency, temperature		Frequency, temperature	
Harmonic Measurement	2-31st			
Connection	Three-phase four-wire		Single phase two wire	
Number of Compensation Steps	16	24	16	24
Driving Method	A: Static B: Dynamic			
Compensation Method	Total and seperate compensation		Total compensation	
Control Strategy	Cyclic switching, steady-state cycling			
Event Recording	50 pieces			
Alarm Out	2-way programmable relay output, contact capacity AC 250V/3A DC 30V/3A			
Temperature Measurement	NTC temperature sensor, 3m length			
Communication	1-way RS485 Modbus-RTU protocol			
USB Drive Function	Optional USB flash drive for exporting measurement data function			
Display Method	5-inch color touch screen			
Outline Dimensions	144×144（mm）			
Cut-out Dimension	138×138（mm）			

Dimension

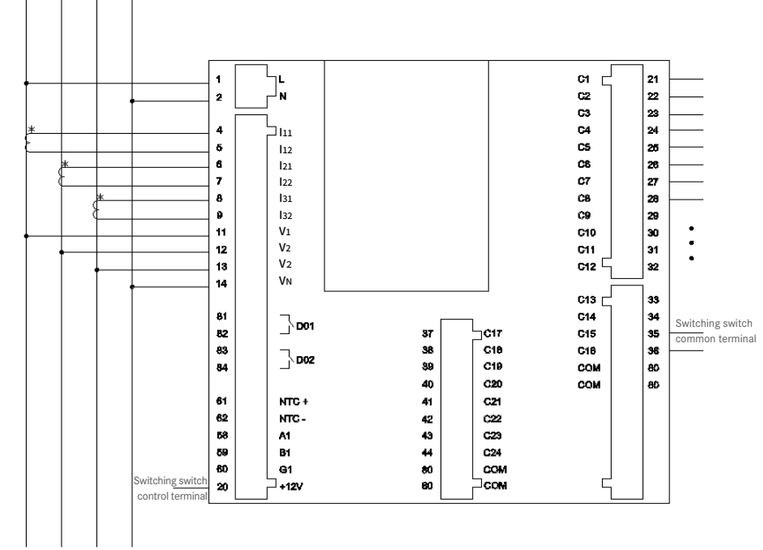


Typical Wiring

Static wiring diagram of total compensation (one phase, two wires)



Static wiring diagram of total and separate compensation (three-phase four wire)



Dynamic wiring diagram of total compensation (three-phase four wire)

Dynamic Switch Unit
LBFK

Overview

Model Description

LBFK 40 / G

1 2

Annotation:

1. Switching capacity(kvar)
2. Compensatin type:
   G: Total compensation
   F: Separate compensation

Dynamic response

Zero-crossing

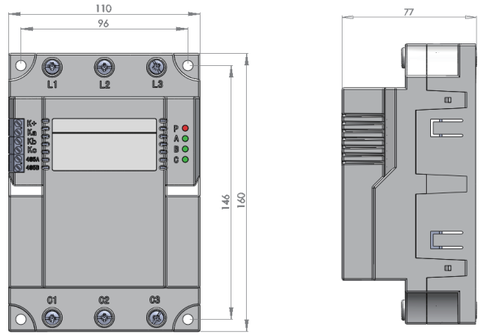
Million mechanical life cycles

LBFK series low-voltage compound switch refers to connecting SCR and magnetic latching relay in a parallel way, adopting internal single chip for controlling, making SCR undertakes zero-passing switching at the moment of switching, i.e. switching on when the voltage passes zero and switching off when the current passes zero; the conducting time of SCR is very short (doesn't generate heat), and then, the magnetic latching relay will be connected for running.Therefore, it has advantage of SCR switch that there is no inrush current in case of passing zero, and the advantage that there is no power loss when the AC contractor is running. In this case, defects including heating during the running of SCR and spark in case of contactor switching are avoided. It is a kind of relatively ideal switch. particularly there is no inrush current or spark when the magnetic latching relay is on or off, the use life of its electrical apparatus is longer than the design use life , and its mechanical use life reaches millions of times, which may guarantee long-term running.

Technical Parameter

Items	Parameters
Rated Voltage	AC wire voltage 400V±20%
Rated Frequency	50Hz
Harmonic Distortion	⩽5.0%
Control Voltage	5～40kvar
Power Consumption Of The Machine	DC 12V± 10%/ 10mA
Consumption	⩽4VA
Contact Resistance	⩽2mΩ
Ambient Temperature	-25～+55℃
Switching Times	1.20 million times
Altitude	⩽2000m

Dimension



External dimension:110×77×160 mm (width × depth x height)
IInstallation dimension:96×146 mm (width × height); the screw type M5*20.

Wiring Method

Items	Port	Description
Main Circuit	L1,L2,L3	Wire incoming end;
	C1,C2,C3	Connected to the capacitor (or series reactor) end
Modbus	485A	Communication interface A
	485B	Communication interface B
Control Circuit (G Type)	K+ end	The positive end of control voltage is connected with COM end of the controller.
	Ka+ end	The negative end of control voltage is connected with output end of each circuit of the controller.
	Kb+ end	Empty
	Kc+ end	Empty
Control Circuit (F Type)	K+end	Positive end of control voltage
	Ka+end	Phase-A control end
	Kb+end	Phase-B control end
	Kc+end	Phase-C control end

Note: The indicator P refers to power source lamp; when the main circuit is enable, the indicator will be on; otherwise, indicator will be off. When G type is switched on, indicators A, B and C refer to switching indication. In case of switching on, the indicators will be on, otherwise, the indicators will be off.
When F type is switched on, indicators A, B and C respectively refer to three-phase switching indication. In case of switching on, the indicators will be on; otherwise, the indicators will be off.

Dynamic Switch Unit

LBT

Dynamic response

Zero-crossing

Thyristor applications

LBT series dynamic switching unit refers to a kind of contactless rapid switch with high reliability, and it is used in dynamic power factor compensation equipment. Particularly apply to switching occasions requiring rapid and no-wearswitching. It is usually applied into occasions where reactive change is frequent,such as lifting equipment, elevator and electric welding machine.

Overview

Model Description

LBT 50 / G

1 2

Annotation:

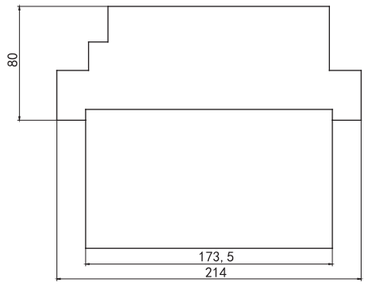
1. Switching capacity(kvar)

2. Compensatin type:
   G: Total compensation
   F: Separate compensation

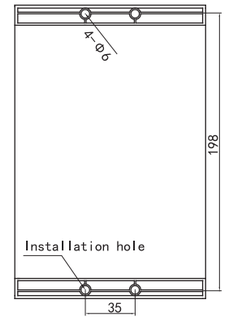
Technical Parameter

Items	Parameters
Working Power Source	AC 230V ±20%
Switching Capacity	15～50kvar
Control Voltage	5～15V DC
Switching Time	≤20ms
Contact Voltage Resistance	1600V
Cooling Mode	Active air cooling
Ambient Temperature	−25℃～+70℃
Ambient Humidity	≤85%
Allowable Maximum Altitude	≤2,000m (5,000m can be customized)
Service Life	10^6 times
External Dimension	External dimension: 116 (width)× 214(height)× 186 (depth)(unit: mm)
Nstallation Hole Dimension	Nstallation hole dimension: 35 (width)×198(height)

Vertical View



Back View



Model Selection

Common configuration and model selection of harmonic filtering type compensation cabinet (three-phase common compensation) un=400v, fn=50hz, and p=7% (reactance rates: p5.5,p12.5; see the following contents for reference)

Transformer Capacity (kVA)	Compensation Capacity (kvar)	Number of Compensation Ways	Reactive Compensatior Controller	Knife Switch (A)	SLG+LBT Model Selection		Recommended Cabinet Body Dimension W×D×H (mm)
630	200	6	WGK-31-603-12B	400	4×SLG25-P7/400 2×SLG50-P7/400	4×LBT25/G 2×LBT50/G	1000×800×2200
800	240	6		630	6×SLG40-P7/400	6×LBT40/G	1000 ×800 ×2200
1000	300	6		630	6×SLG50-P7/400	6×LBT50/G	1000×800×2200
1250	360	9		800	9×SLG40-P7/400	9×LBT40/G	1000×800×22001
1250	400	8		800	8×SLG50-P7/400	8×LBT50/G	200 ×1000 ×2200
1600	240×2	12	WGK-31-603-12B	630×2	12×SLG40-P7/400	12×LBT40/G	1000 ×800×2200(×2)
2000	300×2	12		630×2	12×SLG50-P7/400	12×LBT50/G	1000×800×2200(×2)
2500	360×2	18	WGK-31-603-12B	800×2	18×SLG40-P7/400	18×LBT40/G	1000×800×2200(×2)
2500	400×2	16		800×2	16×SLG50-P7/400	16×LBT50/G	1200×1000 ×2200(×2)

Welcome your inquiry for other specifications!

*It is suggested that main and auxiliary cabinets should be separated in case that the compensation capacity exceeds 300kvar.

Common configuration and model selection of harmonic filtering type compensation cabinet (three-phase common compensation + single-phase separate compensation)

un=400v (single-phase 230v),fn=50hz, and p=7% (reactance rates: p5.5,p12.5; see the following contents for reference)

Transformer Capacity (kVA)	Compensation Capacity (kvar)	Reactive Power Compensation Controller	Common Compensation Part		Separate Compensation Part		Recommended Cabinet Body Dimension W×D×H (mm)
			SLG	LBT	SLG	LBT	
315	100(30)	WGK-31-603-12B	2xSLG 15-P7/400 2xSLG20-P7/400	2xLBT 15/G 2xLBT20/G	3xSLG 10-P7/230	1xLBT30 /F	1000x800x2200
630	180(60)	WGK-31-603-12B	4xSLG 15-P7/400 2xSLG30-P7/400	4xLBT 15/G 2xLBT30/G	3xSLG20-P7/230	1xLBT60 /F	1000x800x2200
800	240(90)	WGK-31-603-12B	5xSLG30-P7/400	5xLBT30/G	3xSLG 10-P7/230 3xSLG20-P7/230	1xLBT30 /F 1xLBT60 /F	1000x800x2200
1250	360(120)	WGK-31-603-12B	6xSLG40-P7/400	6xLBT40/G	6xSLG20-P7/230	2xLBT60 /F	1200x1000x2200

Welcome your inquiry for other specifications!

Active Harmonic Filter

SFR-APF

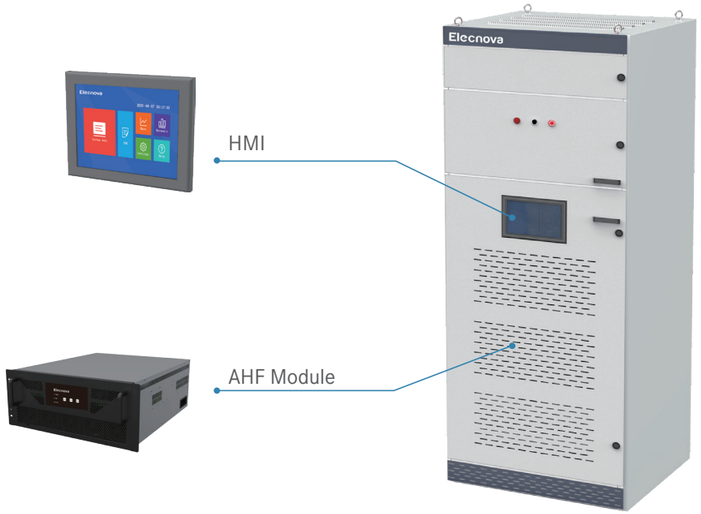
Modular design
easy to expand

LCD

7”/10” LCD
touch screen

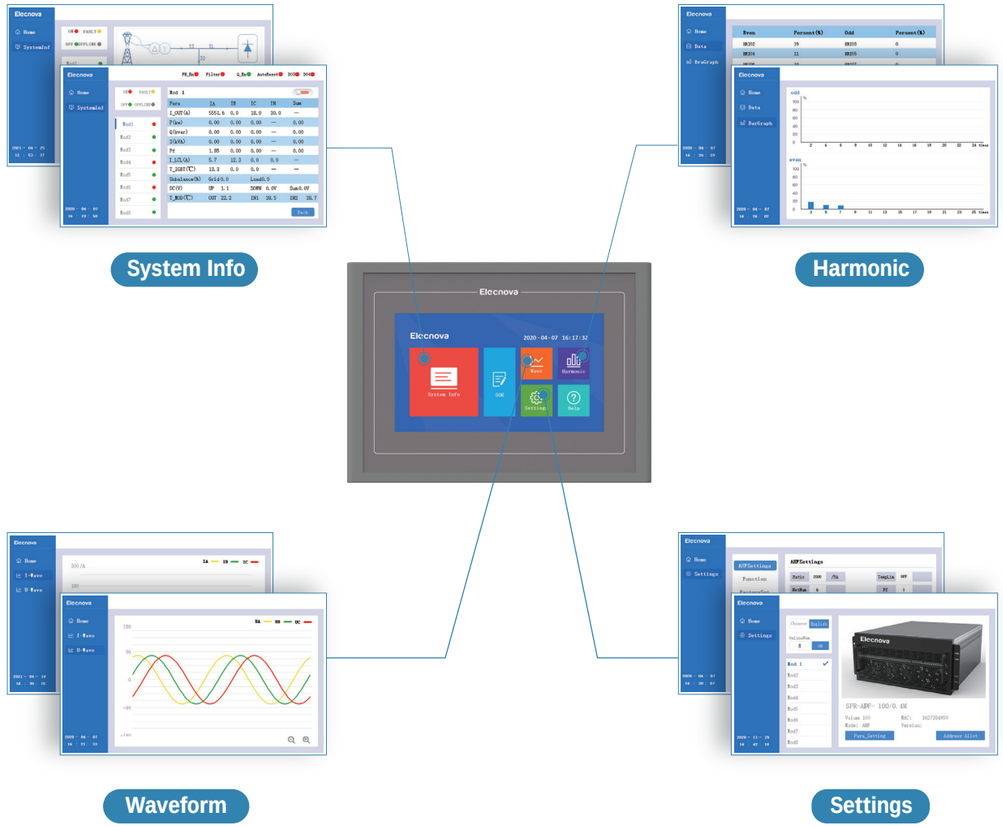
2-51st Harmonic filtering
THD＜3%

Supports parallel connection
of modules with different
capacities



SFR-APF active harmonic filter is a new type of power quality improvement production for dynamically filtering harmonics and compensating reactive power. It can filtering and compensate harmonic (variable in orders and frequency) and dynamic reactive power in real time. It is used to overcome the shortcomings of conventional harmonic suppression and reactive power compensation methods such as passive harmonic filters, and achieve the harmonic filtering function and reactive power compensation function of the system. SFR-APF is widely used in power, metallurgy, petroleum, port, chemical industry and mining enterprises.

HMI Display



- 7/10 inch full color LCD optional
- Real time display of signal detection, data processing and calculation in power system
- Visualization of power quality data and charts
- Monitoring and function setting of module working status
- Quick view of SOE events

Overview

Model Description

SFR-APF ① 4 ② – 300 ③ / 0.4 ④ G ⑤

Annotation:

① Model of the manufacturer

② Wiring mode:
3-Three-phase three-wire
4-Three-phase four-wire

③ Compensation capacity(A)

④ Voltage level(kV)

⑤ Installation mode: G-Cabinet type

Model Selection

Table Of Rapid Model Selection

Transformer Capacity（kVA）	Capacity and Quantity of Active Power Filter (Three-phase Four-wire)	Capacity and Quantity of Active Power Filter (Three-phase Three-wire)
200	SFR-APF4 -50/0.4	SFR-APF4 -50/0.4
250/315	SFR-APF4 -50/0.4	SFR-APF4 -50/0.4
400	SFR-APF4 -75/0.4	SFR-APF4 -75/0.4
500/630	SFR-APF4 -75/0.4	SFR-APF4 -75/0.4
800	SFR-APF4-100/0.4	SFR-APF4-100/0.4
1000	SFR-APF4-100/0.4	SFR-APF4-100/0.4
1250	SFR-APF4-150/0.4	SFR-APF4-150/0.4
1600	SFR-APF4-200/0.4	SFR-APF4-200/0.4
2000	SFR-APF4-200/0.4	SFR-APF4-200/0.4
2500	SFR-APF4-300/0.4	SFR-APF4-300/0.4
Scope of Application	Business center, office building, hotel, hospital, data center, theater and other occasions with relatively much single-phase load.	Chemical, metallurgy, communication, textile, papermaking, printing, tobacco, automobile,port and other occasions with relatively much three-phase load.

Note: Types M, B and G can be selected according to site situation.

Technical Parameter

Item		Parameter	
SFR-APF	Grid	400V 3P3W/3P4W	690V 3P3W
	Mounting Type	Cabinet	
System	Rated Input	400V LL ±15%	690V LL ±15%
	Power Grid Frequency	50/60Hz ±5%	
	Parallel Operation	8 modules, customizable	
	Overall Efficiency	≥97%(laboratory data)	
	Circuit Topology	3-level	
Performance Indicators	Rated Capacity	Up to 600A	Up to 500A
	Compensation Mode	Harmonic, reactive power, unbalance	
	Filtering Range	2 to 51 orders	
	Filtering Order	Selectable from 2 to 51	
	Filtering Degree	Adjustable from 2 to 51	
	Reaction Time	<100μs	
	Response Time	<5ms	
	Target Power Factor	Adjustable from -1 to +1	
	Control Algorithm	FFT, Intelligent FFT and instantaneous reactive power	
	Switching Frequency	20kHz	
	Cooling Mode	Forced air cooling	
	Noise Level	≤65dB	
Communications and Monitoring	Communications Port	RS485	
	Communications Protocol	Modbus-RTU	
	Module Display Interface	7in/10in LCD touch screen(optional)	
	Protection Function	Automatic current limit protection for power grid over-voltage and under-voltage,power gridoxer-frequency and under-frequency,inverted sequence of input voltage, over-current,over-heating and over-load, and busbar short-circuit.	
	Monitoring Alarm	Available	
	Monitoring	Independent monitoring and centralized monitoring	
Mechanical Properties	Net Weight	150kg-400kg	230kg-600kg
	Dimensions (W*D*H mm³)	800×800×2200 1000×800×2200 1000×1000×2200	800×800×2200 1000×800×2200 1500×800×2200
Ambient Condition Requirements	Altitude	1,000m, for every increased 100m, the power is reduced by 1%.	
	Operating Temperature	-20℃-45℃	
	Relative Humidity	5% to 95%,non-condensing	
	Protection Class	IP20(customizable)	
Related Standards	Directive	2014/30/EU 2014/35/EU	
	Standards Compliance	EN 61000-6-2:2005+AC:2005 EN 61000-6-4:2007+A1:2011 EN 50178:1997	

Static Var Generator
SFR-SVG

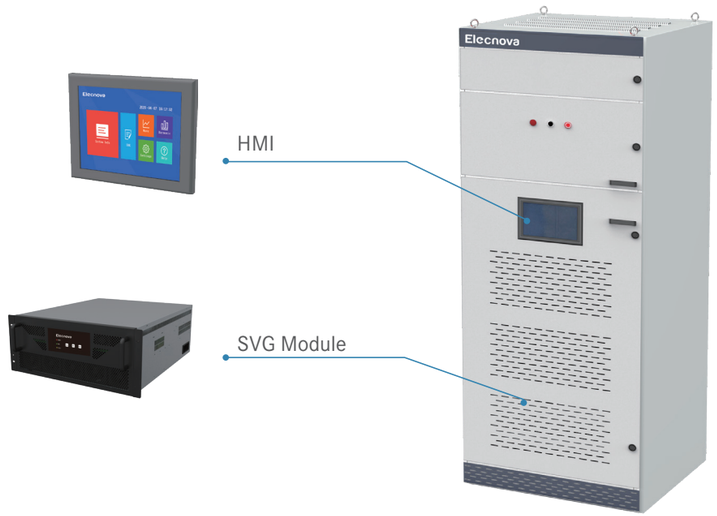
Modular design
easy to expand

LCD

7”/10” LCD
touch screen

Total response time ＜ 10ms
and faster control

Supports parallel
connection of modules
with different capacities



SFR-SVG is a new-generation product of Static Var Generator(SVG), it used the latest technology application for the reactive power compensation. When the SFR-SVG parallel in the grid, it equalized as a dynamic reactive current source.The reactive current of the SVG could be flexibly controlled and compensate the reactive power automatically.

Overview

Model Description

SFR-SVG ① 4 ② – 300 ③ / 0.4 ④ G ⑤

Annotation:

1. Model of the manufacturer
2. Wiring mode:
   3-Three-phase three-wire
   4-Three-phase four-wire
3. Compensation capacity(kvar)
4. Voltage level(kV)
5. Installation mode:
   G-Cabinet type

Model Selection

Table of Rapid Model Checking of SVG

Transformer Capacity（kVA）	Three-phase Four-wire	Three-phase Three-wire
200	SFR-SVG4-100/0.4×1	SFR-SVG3-100/0.4×1
250/315	SFR-SVG4-100/0.4×1	SFR-SVG3-100/0.4×1
400	SFR-SVG4-150/0.4×1	SFR-SVG3-200/0.4×1
500/630	SFR-SVG4-200/0.4×1	SFR-SVG3-300/0.4 ×1
800	SFR-SVG4-250/0.4×1	SFR-SVG3-400/0.4 ×1
1000	SFR-SVG4-300/0.4×1	SFR-SVG3-500/0.4×1
1250	SFR-SVG4-400/0.4×1	SFR-SVG3-300/0.4 ×2
1600	SFR-SVG4-250/0.4×2	SFR-SVG3-400/0.4 ×2
2000	SFR-SVG4-300/0.4×2	SFR-SVG3-500/0.4 ×2
2500	SFR-SVG4-400/0.4	SFR-SVG3-400/0.4 ×3
Scope of Application	Business center, office building, hotel, hospital, data center, theater and other occasions with relatively much single-phase load.	Chemical, metallurgy, communication, textile, papermaking, printing, tobacco, automobile,port and other occasions with relatively much three-phase load.

Note: Types M, B and G can be selected according to site situation.

Technical Parameter

Item		Parameter	
SFR-APF	Grid	400V 3P3W/3P4W	690V 3P3W
	Mounting Type	Cabinet	
System	Rated Input	400V LL ±15%	690V LL ±15%
	Power Grid Frequency	50/60Hz ±5%	
	Parallel Operation	8 modules, customizable	
	Overall Efficiency	≥97%(laboratory data)	
	Circuit Topology	3-level	
Performance Indicators	Rated Capacity	Up to 400kvar	Up to 500kvar
	Loss Of Active Power	<3% rated module power	
	Over-load Capability	120%	
	Mean Time Between Failures	≥100,000 hours	
	Reaction Time	<100μs	
	Response Time	10ms	
	Scope Of Reactive Adjustment	Continuously adjustable from rated induced to rated capacitive	
	Control Algorithm	Compensation algorithm of screening vector of frequency domain possessing self-adaptation capability	
	Switching Frequency	20kHz	
	Cooling Mode	Forced air cooling	
	Noise Level	<65dB (A)	
Communications and Monitoring	Communication Port	RS485	
	Communication Protocol	Modbus-RTU	
	Module Display Interface	7in/10in LCD touch screen (optional)	
	Monitoring Alarm	Available	
	Monitoring	Independent monitoring and centralized monitoring	
Mechanical Properties	Net Weight	150kg-400kg	230kg-600kg
	Dimensions (W*D*Hmm³)	800×800×2200 1000×800×2200 1000× 1000×2200	800×800×2200 1000×800×2200 1500×800×2200
Ambient Condition Requirements	Altitude	1,000m, for every increased 100m, the power is reduced by 1%.	
	Operating Temperature	-20℃-45℃	
	Relative Humidity	5% to 95%,non-condensing	
	Protection Class	IP20(customizable)	
Related Standards	Directive	2014/30/EU 2014/35/EU	
	Standards Compliance	EN 61000-6-2:2005+AC:2005 EN 61000-6-4:2007+A1:2011 EN 50178:1997	

Hybrid Compensation Device
SFR-SVGM

Intelligent operation

Intelligent and flexible

Flexible smoothing

Self-diagnosis

SFR-SVGM is the combination of a SFR-SVG static reactive power compensation module and SFR-M harmonic suppression compensation module in a cabinet for accurate continuous compensation.

Overview

Model Description

SFR-SVGM ① 4 ② – 200 ③ (50) ④ / 0.4 ⑤

Annotation:

① Model of the manufacturer

② Wiring mode:
3-Three-phase three-wire
4-Three-phase four-wire

③ Total compensation capacity

④ Compensation capacity(kvar)

⑤ Voltage level(kV)

Model Selection

Table of Rapid Model Checking of SVGM

Transformer capacity（kVA）	Capacity of SVGM	Quantity	Recommended cabinet size
200	SFR-SVGM4-100(50)/0.4	1	800 ×800× 2200
250/315	SFR-SVGM4-100(50)/0.4	1	800 ×800× 2200
400	SFR-SVGM4-150(50)/0.4	1	800×800 x 2200
500/630	SFR-SVGM4-200(50)/0.4	1	800 ×800× 2200
800	SFR-SVGM4-250(50)/0.4	1	1000×800× 2200
1000	SFR-SVGM4-300(50)/0.4	1	1000× 1000× 2200
1250	SFR-SVGM4-375(50)/0.4	1	1000×1000 × 2200
1600	SFR-SVGM4-250(50)/0.4	2	1000×800× 2200
2000	SFR-SVGM4-300(50)/0.4	2	1000× 1000×2200
2500	SFR-SVGM4-375(50)/0.4	2	1000× 1000×2200

Note: Types M,B and G can be selected according to site situation.

Technical Parameter

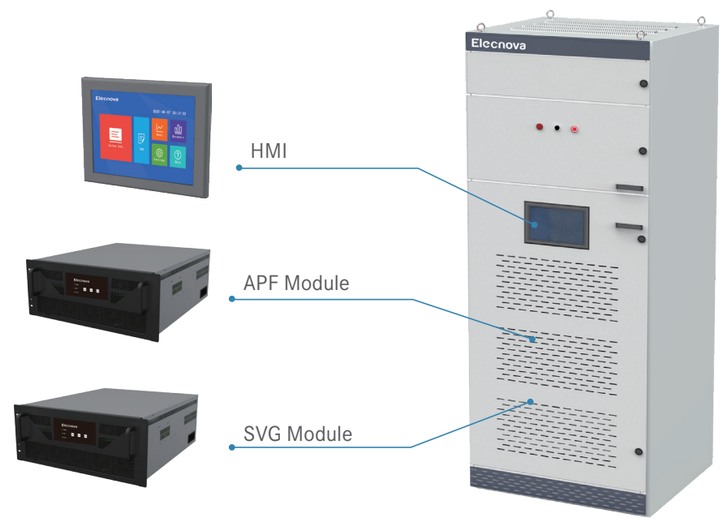
Item		Parameter
Single Cabinet Compensation Capacity		100～400kvar
AC Input	Rated Voltage	400V ±10%
	Rated Frequency	50Hz ±5%
	Wiring Method	Three phase four wire
Technical Indicators	Target Power Factor	0.99
	Split-phase Compensation Capacity	30～100%
	Harmonic Compensation Times	Specific times
	Response Time	≤10ms
	Overload Protection	Automatic adjustment
Working Mode		Automatic or manual
Communication Interface		RS485 / Ethernet optional
Protection Level		IP20
Display Interface		7 / 10 inch touch screen (optional)
Altitude Requirement		≤1000m，high altitude projects can be customized
Parallel Operation		Available
Cooling Method		Forced air cooling
Operating Temperature		-25℃～45℃
Storage/transport Temperature		-40℃～70℃
Operating/storage Relative Humidity		Relative humidity 20%～95%, no condensation/ relative humidity 10%～95%, no condensation
Single Cabinet Dimension		1000×1000×2200
Noise		<65dB(A)
Other		Non-standard sizes can be customized, special requirements can contact SFERE
SFR-M Module		Capacity：10～50kvar optional
		Reactance rate：7% and 14% optional

Hybrid Compensation Device
SFR-APF-SVG

Active filtering
& Reactive power compensation

Intelligent
operation

Flexible
smoothing



SFR-APF-SVG combines the SFR-APF module and the SFR-SVG module to compensate for the reactive power of the system while supplementing the harmonics of the system.

Overview

Model Description

SFR-APF-SVG ① 4 ② – 50 ③ – 200 ④ / 0.4 ⑤

Annotation:

1. Model of the manufacturer
2. Wiring mode:
   3-Three-phase three-wire
   4-Three-phase four-wire
3. Capacity of AHF(A)
4. Capacity of SVG(kvar)
5. Voltage level(kV)

Technical Parameter

Function	Specification
Rated Voltage	400V ±10%
Rated Frequency	50Hz ±5%
Wiring Method	3P3W/3P4W
Reactive Power Compensation Capacity	50~300kvar
Phase Separation Compensation Ability	100% with phase compensation
Active Filtering Capability	50A~300A
Harmonic Compensation Times	2~51st
Response Time	⩽5ms
Overload Protection	Can be set automatically
Active Power Loss	<3% rated power
Working Mode	Automatic or manual
Communication Interface	RS485, Modbus-RTU
Protection Level	IP20
Display Interface	7/10 Inch touch screen(optional)
Altitude	⩽1000m，High altitude projects can be customized
Parallel Operation	Can achieve
Cooling Method	Forced air cooling
Operating Temperature	-25℃~45℃
Storage/transport Temperature	-40℃~70℃
Operating/storage Relative Humidity	Relative humidity 20% ⩽ 95%, no condensation /Relative humidity 10% ⩽ 95%, no condensation
Single Cabinet Size	1000×1000×2200
Noise	<65dB(A)
Other	Non-standard dimensions can be customized, special requirements can contact ELECNOVA

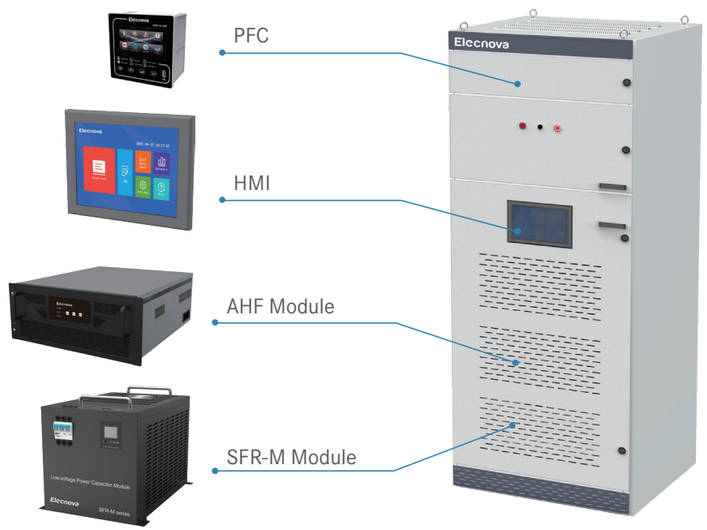
Hybrid Compensation Device
SFR-APFM

Hybrid compensation

Cost-effective

Flexible smoothing

Self-diagnosis



SFR-APFM is the combination of a SFR-APF active harmonic filter and SFR-M harmonic suppression compensation module in a cabinet for accurate continuous compensation.

Overview

Model Description

SFR-APFM ① 4 ② – 50 ③ – 200 ④ / 0.4 ⑤

Annotation:

① Model of the manufacturer

② Wiring mode:
3-Three-phase three-wire
4-Three-phase four-wire

③ Capacity of AHF(A)

④ Capacity of SFR-M(kvar)

⑤ Voltage level(kV)

Technical Parameter

Function		Specification
Single Cabinet Compensation Capacity		100~400kvar
AC Input	Rated voltage	400V ±10%
	Rated frequency	50Hz ±5%
	Wiring method	3P3W/3P4W
Technical Indicators	Target power factor	0.99
	Split-phase compensation capacity	30~100%
	Harmonic compensation times	2-51st
	Response time	⩽10ms
	Overload protection	Automatic adjustment
Working Mode		Automatic or manual
Communication Interface		RS485, Modbus-RTU
Protection Level		IP20
Display Interface		7/10 inch touch screen (optional)
Altitude Requirement		⩽1000m, high altitude projects can be customized
Parallel Operation		Available
Cooling Method		Forced air cooling
Operating Temperature		-10℃~45℃
Storage/transport Temperature		-25℃~70℃
Operating/storage Relative Humidity		Relative humidity 20%~95%, no condensation/ relative humidity 10%~95%, no condensation
Single Cabinet Dimension		1000×1000×2200 mm
Noise		<65dB(A)
Other		Non-standard sizes can be customized, special requirements can contact SFERE
SFR-M		Capacity: 10~50kvar optional
		Reactance rate: 7% and 14% optional

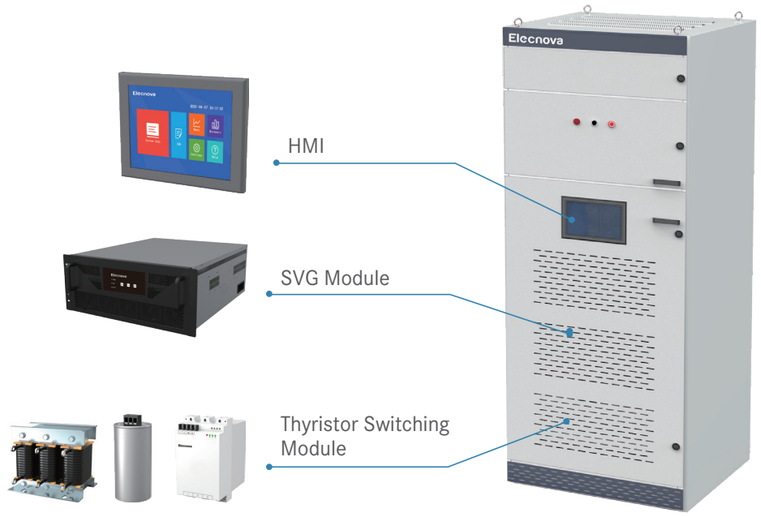
Hybrid Compensation Device
SFR-SVGC

Hybrid compensation

Cost-effective

Flexible smoothing

Self-diagnosis



SFR-SVGC is the combination of SFR-SVG static var generator and thyristor switching module in a cabinet for accurate continuous compensation.

Overview

Model Description

SFR-SVGC ① 4 ② – 200 ③ – (50) ④ / 0.4 ⑤

Annotation:

1. Model of the manufacturer
2. Wiring mode:
   3-Three-phase three-wire
   4-Three-phase four-wire
3. Total Capacity (kvar)
4. Capacity of SVG(kvar)
5. Voltage level(kV)

Technical Parameter

Function		Specification
Single Cabinet Compensation Capacity		100~400kvar
AC Input	Rated voltage	400V ±10%
	Rated frequency	50Hz ±5%
	Wiring method	3P4W
Technical Indicators	Target power factor	0.99
	Split-phase compensation capacity	30~100%
	Harmonic compensation times	Specific times
	Response time	⩽10ms
	Overload protection	Automatic adjustment
Working Mode		Automatic or manual
Communication Interface		RS485, Modbus-RTU
Protection Level		IP20
Display Interface		7/10 inch touch screen (optional)
Altitude Requirement		⩽1000m, high altitude projects can be customized
Parallel Operation		Available
Cooling Method		Forced air cooling
Operating Temperature		−10℃~45℃
Storage/transport Temperature		−25℃~70℃
Operating/storage Relative Humidity		Relative humidity 20%~95%, no condensation/ relative humidity 10%~95%, no condensation
Single Cabinet Dimension		1000×1000×2200 mm
Noise		<65dB(A)
Other		Non-standard sizes can be customized, special requirements can contact SFERE
Thyristor Compensation Module		Capacity: 10~60kvar optional
		Reactance rate: 7% and 14% optional

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